

UNITED STATES ARMY IN WORLD WAR II

The Technical Services

THE CORPS OF ENGINEERS: CONSTRUCTION IN THE UNITED STATES

by
Lenore Fine
and
Jesse A. Remington



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UNITED STATES ARMY IN WORLD WAR II

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. . . to Those Who Served

Foreword

In World War II the Corps of Engineers superintended the largest construction program in the nation's history, providing the home base for a United States Army that grew to more than eight million men and women. The Corps-related construction work included development of the facilities for making atomic bombs. In telling the story of these herculean efforts the authors set unprecedented standards: no detailed and scholarly history on the subject of construction has ever before been undertaken in this country.

Other aspects of the domestic contributions of the Army Engineers in the war have been covered in the first volume of this subseries to be published, *Troops and Equipment*, and a second told the story of the Engineer effort overseas in the war against Japan. A final volume still in preparation will relate the activities of Engineers in the Mediterranean area and Europe in the war against Italy and Germany.

While this volume presents the story of military construction during the war primarily from the point of view of the Corps of Engineers as revealed in its records and by its participants, it does justice also to the work of the Quartermaster Corps from which the Engineers inherited responsibility for military construction in the United States in 1940 and 1941. This book should be welcomed by both the thoughtful citizen and the military student for its readability as well as for its instructive value in describing with authority a variety of activities that collectively were a significant foundation of victory in America's most gigantic conflict.

Washington, D.C.
15 April 1971

JAMES L. COLLINS, JR.
Brigadier General, USA
Chief of Military History

The Authors

Lenore Fine, a member of the Engineer Historical Division since 1945, has an A.B. degree from Goucher College and an M.L.A. degree from The Johns Hopkins University. She has done additional graduate work in history at the latter institution.

Jesse A. Remington, who holds a Ph.D. degree from the University of Maryland, joined the Engineer Historical Division in 1947 and has been chief historian since 1958. During World War II, he served in the Historical Section, Headquarters, China Theater.

Preface

A vast homefront construction effort by the U.S. Army undergirded mobilization and combat in World War II. Started by the Quartermaster Corps and carried to completion by the Corps of Engineers, this building program embraced more than 27,000 projects, large and small, and cost $15.3 billion, roughly $59 billion in 1970 prices. (See Appendix.) Among its major features were camps and cantonments to house 5.3 million troops; plants to mass-produce explosives, ammunition, tanks, and planes; hospitals providing nearly half a million beds; a huge network of ports and depots; improvements to principal waterways and flood protection for vital industries; bomber bases which entailed a whole new technology; the mammoth Pentagon Building; and facilities for the epochal Manhattan Project. Our book is a history of this undertaking.

It is also a history of people: of military leaders and their staffs; of civilian engineers, contractors, suppliers, and equipment dealers; of dollar-a-year men and expert consultants; of industrialists and union organizers; of statesmen and politicians; of patriots and profiteers; and of the faceless multitude—workers, GI's, small businessmen, dispossessed property owners, and citizens of every stripe who participated in or felt the impact of the program. Throughout we have tried to show how individuals and groups influenced events.

Ostensibly a diffuse technical subject, an untempting prospect for historians, construction proved a rewarding field of inquiry. High-level planning, site selection, land acquisition, engineering design, contractual arrangements, procurement methods, labor relations, and day-to-day operations in the field—all were illuminating studies. Gradually a story emerged of public indifference and military myopia, of unprecedented challenges and initial unpreparedness, of cruel disappointments and serious mistakes, of remedial measures and sweeping reorganizations, and of prodigious efforts and crowning success. Because many World War II developments had their roots in World War I and the two decades that followed, the narrative begins in 1917 and, more or less following a chronological scheme, proceeds through eighteen chapters to August 1945. The final chapters discuss two extraordinary achievements—airfields for heavy bombers and the atomic bomb.

We are deeply grateful to all those persons who aided in the preparation of this volume. Special thanks are owing to our past and present colleagues in the Engineer Historical Division whose advice and assistance eased our task. Dr. O. J. Clinard, who launched us on the undertaking, was a source

of inspiration and encouragement. Dr. Karl C. Dod offered many valuable comments and suggestions. Miss Dorothe M. Grand gave us the benefit of her discriminating editorial judgment. Mr. Eugene V. McAndrews was a thoughtful critic. Miss Blanche D. Coll did research and drafted sections on labor relations; Miss G. Louise Marr, on real estate. A study of the Manhattan Engineer District by Dr. Ralph F. Weld provided the groundwork for Chapter XX. Many participants, nearly all of whom are named in the volume, gave generously of their time and knowledge, helping to illuminate the written record and correcting factual errors. We are particularly grateful to the officers who read and commented upon the entire manuscript: Lt. Gen. Leslie R. Groves; Maj. Gen. John R. Hardin; Lt. Gen. Eugene Reybold; Col. Lloyd C. Ritchie; Lt. Gen. Samuel D. Sturgis, Jr.; and Lt. Gen. Walter K. Wilson, Jr. To Generals Groves and Sturgis, who worked closely with us for many years, our debt is exceptionally heavy. Mr. Thomas B. Pringle and Mr. Harry B. Zackrison were invaluable advisers on technical subjects.

General acknowledgments are due to Mrs. Lois Aldridge, Mrs. Virginia M. Nester, Mrs. Mary K. Stuart, Mr. John E. Taylor, and Mrs. Mae E. Walker, whose archival assistance was indispensable; to Miss Agnes M. Dutkevich and Mrs. Ruth E. Steers, who typed the final draft of the manuscript and verified quotations and names; and to Mr. Robert L. Collins, Jr., who did artwork for maps and charts.

We are also obliged to members of the Office of the Chief of Military History, especially to Dr. Stetson Conn, Chief Historian, and Mr. Joseph R. Friedman, Editor in Chief, for their practical advice and constructive criticism. Mr. David Jaffé, Chief of the Editorial Branch, demonstrated rare skill and admirable diplomacy in the final editing. Mrs. Marion P. Grimes was the copy editor. Mrs. Muriel Southwick prepared the index.

Finally, we wish to express our warm appreciation to Mr. Robert W. Blakeley, Lt. Col. Frank E. Burk, Brig. Gen. Curtis W. Chapman, Jr., Mr. Logan O. Cowgill, Brig. Gen. Ira A. Hunt, Jr., Mr. August J. Karasek, Mrs. Bessie S. Rubin, and all the other members of the Engineer family who effectively supported our effort.

For the facts presented and the conclusions drawn in this volume, the authors alone are responsible.

Baltimore, Maryland
15 April 1971

LENORE FINE
JESSE A. REMINGTON

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THE CORPS OF ENGINEERS: CONSTRUCTION IN THE UNITED STATES

CHAPTER I

Legacy of World War I

Reviewing the lessons of World War II, Lt. Gen. Leslie R. Groves declared: "Mobilization was decisive and construction generally controlled mobilization."[1] In 1939, when hostilities began in Europe, the United States was ill prepared to counter threats to its security. To be sure, the Navy, the first line of defense, ranked with Britain's mighty fleet. But the Army was barely more than a token force, and the country had virtually no munitions industry. Before the nation could realize its huge military potential, it had first to build a vast complex of camps, plants, airfields, hospitals, and depots. As Presidential adviser Sidney Hillman pointed out in 1941:

> Construction is not only the biggest single part of defense, it is also the first step in defense. Before we can produce guns and planes and tanks, we must build defense plants or alter non-defense plants to new production . . . . Similarly, if we are to train our Army well, our soldiers must be provided with proper living conditions in camps and cantonments.[2]

Construction was the first major industry to attain large-scale defense and war production in World War II. A 15.6-billion-dollar Army construction effort set the pace for mobilization and laid the foundations for victory.

A Backward Glance

The nation's early wars told a different story. Before the 20th century, mobilization necessitated little construction. In the American Revolution, the War of 1812, the Mexican War, and the Civil War, armies were raised by mustering small units, which went almost immediately on active service in the field. There, bivouacked in tents or sheltered in crude huts of their own design, troops received such training as time permitted. In the Spanish-American War, regiments assembled at fairgrounds, race tracks, and armories and moved rapidly to tent cities at Chickamauga, Tampa, and other points in the Southeast, whence they embarked for Cuba as soon as ships were available. For weapons and ammunition, the Continental Army relied on imports and on the products of small foundries, smithies, and the like. During the 19th century, American forces were armed and supplied with explosives by federal and state arsenals and by private manufacturers, principally Remington, Winchester, Colt, and DuPont. Until the age of modern mass armies, construction presented no serious wartime challenge.

Throughout most of the country's history, responsibility for military con-

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[1] Comments of Lt Gen Leslie R. Groves on MS, Construction in the United States, 1955, I, 1. Cited hereinafter as Groves Comments.

[2] S Sp Comm Investigating the National Defense Program, 77th Cong, 1st sess, *Hearings*, Part 8, p. 2493. Cited hereinafter as Truman Comm, *Hearings*.

struction was shared by various branches of the Army. At the outbreak of the Revolutionary War, Congress, following British and Colonial practice, assigned to the Chief Engineer the work of building bridges, roads, and fortifications and to The Quartermaster General the task of quartering the Army. Thus it was established early that the Corps of Engineers would perform combat construction and the Quartermaster Corps would see to sheltering troops. The division of authority did not end there. The Ordnance Department erected arsenals; the Signal Corps, after its founding in 1863, built some of its own facilities; and most of the other branches, at one time or another, also engaged in building work. Nevertheless, the two agencies most closely associated with military construction were the Quartermaster Corps and the Corps of Engineers.

The Quartermaster Corps was a multifunctioned organization concerned with service and supply. Provision of transport, shelter, clothing, and equipage were its principal functions. In discharging his construction duties, The Quartermaster General over the years encountered little difficulty. A handful of small posts sufficed to house the Army in the early days of the Republic. As the westward movement gained momentum, hundreds of garrisons were built on the frontier by the occupying troops. Most of these outposts were tiny and most were of rude design. In time many of them outlived their usefulness and were abandoned, but scores were retained as part of the regular establishment. At permanent stations, buildings of brick and stone gradually replaced the log and frame structures of earlier days. Utilities became more elaborate; and maintenance work assumed greater importance. From time to time, a large project cropped up, for example, the Jeffersonville Depot in Indiana and the quarters for the Hawaiian Division at Schofield Barracks. But the volume of work was never large. Between 1865 and 1900 Congress seldom authorized more than 150 new buildings a year.[3]

Quartermasters General carried out construction with a minimum of organization. In the Office of The Quartermaster General in Washington an officer or two and a few civilians took care of budgetary and other administrative matters. Most officers on construction duty in the field were temporarily detailed from the line. Their work, in most instances, was supervised not by The Quartermaster General but by local and departmental commanders. In the early days, construction not performed by troops was usually accomplished under a system known variously as day labor, force account, or purchase and hire—an arrangement whereby the officer in charge drew whatever plans were needed, purchased materials, hired workmen, and oversaw the work. As time went on and structures became more elaborate, master builders entered the picture. By the 1850's the Quartermaster Corps had begun to utilize the services of contracting companies which were then springing up in cities. After 1861 contracts with such firms came under a law of that year which required advertising except when "public exigency" demanded immediate per-

[3] Annual Reports of The Quartermaster General to the Secretary of War.

formance. By 1900 the Quartermaster Corps had constructed 120 permanent posts and stations with capacity for 34,000 men. The largest of these installations, Fort Riley, Kansas, could accommodate 1,300 troops; the smallest, Fort Ontario, New York, could house 40.[4] With only a small amount of work to do, oriented toward supply rather than toward construction, composed largely of detailed officers, few of whom had any technical background, and forced to rely more and more on private builders, architects, and engineers, the Quartermaster Corps was unable to develop anything approaching the construction capability of the Corps of Engineers.

A combat branch and a public works construction agency, the Corps of Engineers was a unique organization. Historically, June 16th, 1775, the date of the Corps' founding, was barely more significant than March 16th, 1802. On that day President Jefferson signed a bill providing for a Corps of Engineers—seven officers and ten cadets—to be stationed at West Point, New York, and to "constitute a military academy." Jefferson's main object was a national college of engineering, and he designed the new academy not to train officers of the line but to educate engineers for public service. The first engineering school in the United States, West Point was the leading one until the Civil War. The Army Corps of Engineers, composed almost exclusively of top academy graduates, was the only sizable group of trained engineers in the country. As the demand for internal improvements rose and federal projects multiplied, the government turned to the Engineers. Rivers and harbors improvements, surveys and explorations, roads, canals, lighthouses, and public buildings—the Corps' responsibilities came to encompass all of these. By the time the civil engineering profession came of age in America, the Corps' role in civil works construction was firmly established.

Peacetime construction experience, plus first-rate technical education, fitted Engineer officers for wartime combat, logistical, and command assignments. West Point Engineers, who after graduation had gone on to build seacoast defenses, made a brilliant record in the War of 1812. Not one fortification designed by them fell to the enemy. Historian Henry Adams wrote of their performance: "Perhaps without exaggeration the West Point Academy might be said to have decided, next to the Navy, the result of the war." Adams credited West Point Engineers with doubling the Army's capacity for resistance during the campaign of 1814.[5] The Corps' experience in organizing sizable labor forces and in directing large construction enterprises was of great importance in later wars. Not only did Engineer officers perform the traditional duties of military engineers—impeding enemy advances and assisting movements of friendly troops—but they

[4] (1) *Ibid.* (2) Testimony of Maj Gen Edmund B. Gregory, TQMG, 30 Sep 41. In H Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on H R 5630, p. 82. (3) 12 *Stat.* 220. (4) Statement by OQMG, 13 Nov 1900, sub: Capacity of Posts. Doc 15827 OQMG Doc File, 1800–1914.

[5] Henry Adams, *A History of the United States of America*, 1930 ed. (New York: Albert and Charles Boni, 1930), IX, 236.

also occupied high staff and command positions. In the Civil War the Army's top logistician was an Engineer: Montgomery C. Meigs; Robert E. Lee epitomized the Engineer commander. The defenses around Washington, the crossings of the Rappahannock under fire, and the bridging of the James exemplified the Engineer support of the Union Army. By employing the Corps in time of peace, the government continued to assure that competent military engineers would be available in the event of war.

As time went on, as the westward movement accelerated and the country grew, the construction capability of the Corps of Engineers was enhanced. Although control of West Point passed to the Army-at-large in 1866, engineering and mathematics continued to form the core of its curriculum, and its top graduates consistently chose careers in the branch that offered superior opportunities for public service. To supplement the West Point education of Engineer officers, the Engineer School was founded at Willet's Point, New York, in 1885. Meanwhile, during the great expansion following Appomattox, Congress focused greater attention on internal improvements, and civil works programs bulked large. From 1866 through 1900, federal expenditures for rivers, harbors, and flood control totaled $333 million. During this period, a permanent, nationwide organization came into being. In 1888 the need for a formal field structure led the Chief of Engineers, Brig. Gen. Thomas L. Casey, to remake the Engineer Department by creating five divisions—one west and four east of the Rocky Mountains. Later more divisions were added and districts, or subdivisions, were established.[6] At the turn of the century, the Army Engineers had a construction organization that was by far the largest, best trained, and most experienced in the country.

By the early 1900's, sentiment was growing in favor of placing all military construction under the Engineers. At the time the General Staff was constituted, such a change was considered but was not effected.[7] The question came up again and again. In 1910 a high-ranking proponent of the Engineers explained his position:

> It may, I believe, be asserted without fear of challenge that construction work in the army under present conditions leaves much to be desired. . . . Construction requires technical knowledge of a high order. Such knowledge is possessed by only a small percentage of the officers of the Quartermaster's Department, while in the Corps of Engineers every officer receives special training along those lines.[8]

Maj. Gen. Leonard Wood, Chief of Staff from 1910–1914, took the same stand. During his term the issue was hotly debated but no decision was reached.[9] The Quartermaster construction organization continued along

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[6] (1) W. Stull Holt, *The Office of the Chief of Engineers of the Army: Its Non-military History, Activities, and Organization* (Baltimore: The Johns Hopkins Press, 1923), pp. 11–17. (2) H Doc 330, 80th Cong, 1st sess, *Historical Statistics of the United States, 1789–1945: A Supplement to the Statistical Abstract of the United States* (Washington, 1949), p. 169. Cited hereinafter as *Historical Statistics of the United States, 1789–1945*. (3) *Annual Report of the Chief of Engineers, U.S. Army, 1889* (Washington, 1889), Part 1, p. 16. (4) Paul W. Thompson, *What You Should Know About the Army Engineers* (New York: W. W. Norton and Company, Inc., 1942), pp. 194–198.

[7] S Doc 421, 57th Cong, 1st sess, 23 Jun 02.

[8] Rpt, TIG to SW. In WD Annual Rpts, FY Ending 30 Jun 10. OCE Doc 81599.

[9] (1) OQMG 1800–1914, Doc 494615. (2) OCE Docs 93454, 99428.

as before. Meanwhile, Engineers were building the Panama Canal.

Serious obstacles barred the way to a transfer. Maj. Gen. James B. Aleshire, the prestigious officer who was The Quartermaster General from 1907 to 1916, was unalterably opposed.[10] Many officers in other branches resented the proud bearing of the Engineer elite and the Corps' close relationship with Congress. Moreover, powerful opposition existed within industry. Since the 1870's, a movement had been under way among contractors and civil engineers to establish a Federal Department of Public Works and to assign to it the Engineers' civil functions.[11] Any step which would strengthen the Corps was certain to provoke determined resistance from backers of this proposal. The organization was left unchanged.

As the holocaust of World War I engulfed Europe, the old idea persisted in the United States—a million men would spring to arms overnight. This belief was outmoded. The days of taking the flintlock off the wall and going off to fight were beyond recall. A new day had dawned, a day of large-scale mobilization, systematic training, and technological warfare. Camps to house whole divisions; plants to mass-produce weapons and ammunition; warehouses, depots, and terminals to handle huge quantities of matériel; and myriad other facilities had become sinews of war. In a country which had no sizable standing army, no munitions industry to speak of, and few facilities to support a mighty military effort, construction had become the key to preparedness.

Mobilization: 1917

Like most of the War Department, the Construction and Repair Division, Office of The Quartermaster General (OQMG), was thrown into confusion by the declaration of war against Germany in April 1917. Following the neutral course set by President Woodrow Wilson, who continued to discourage military planning even after the diplomatic break with Berlin in February 1917, the Army had made few preparations to mobilize. One man who visited construction headquarters shortly after hostilities began described the scene as near bedlam: "There were a couple of Army officers and stenographers. . . . Every contractor in the country was here. All those men did was to stand in front of the desk and shake hands all day. . . . Paper was stacked high on the desk and there was confusion galore."[12] The uniformed handshakers were Col. Isaac W. Littell, the division chief, and his two assistants, Capt. William H. Oury and Capt. Richard C. Marshall, Jr. Littell, an 1883 West Point graduate, was an officer of the old school who preferred to do things by the book. Oury, his executive, was a Signal officer, nearing the end of a four-year detail with the Quartermaster Corps. The live wire of the organization was "Puck" Marshall, a Coast Artillery of-

[10] Memo, TQMG for TSW, 4 Mar 14. OQMG 1800–1914, Doc 494615.

[11] (1) S Commerce Comm, 50th Cong, 1st sess, *Hearings* on S 1448, Apr 1888, pp. 3–74. (2) S Report 1848, 50th Cong, 1st sess, 18 Jul 1888, pp. 64–69.

[12] Transcript of Conv, W. A. Starrett with G. B. Clarkson, 9 Aug 17. In H Subcomm of the Select Comm on Expenditures, 66th Cong, 1st sess, *Hearings*, II, 2525. Cited hereinafter as Conv, Starrett with Clarkson.

ficer, serving his second Quartermaster detail. Scion of a prominent Old Dominion family, an honor graduate of Virginia Military Institute and a former mathematics professor there, he displayed a rare blend of boyish charm and aggressive leadership. Word had gone out that a million men would be called to arms. A big construction effort seemed imminent, but Littell and his officers did not know what role they would have in it.

Their resources for handling a large emergency program were meager, and their claim to such responsibility was weak. In the spring of 1917, the Construction and Repair Division had three officers and fifty-three civilians in Washington and a handful of constructing quartermasters in the field.[13] Except for blueprints of barracks and mess halls prepared for use on the Mexican border by the Punitive Expedition of 1916, Littell had no plans for temporary structures. Nor did he have any plans for organizing and directing a huge, high-speed construction effort.[14] Providing temporary shelter had long been a duty of commanders in the field. When the United States entered the war against Germany, many assumed that the commanding generals of the six regional departments would build whatever camps were necessary. Some, among them General Leonard Wood, advocated that the work be done by the Corps of Engineers. But despite Littell's lack of preparation and despite the availability of the Engineer Department, the General Staff on 7 May ordered The Quartermaster General to complete thirty-two divisional cantonments by 1 September.[15]

Among the prominent industrialists who hastened to Washington to volunteer their services after war was declared were William A. Starrett, president of Starrett & Van Vleck, architects of New York City; Morton C. Tuttle, general manager of the Aberthaw Construction Company of Boston; and Clemens W. Lundoff, vice president of Crowell, Lundoff and Little of Cleveland. Late in April Secretary of War Newton D. Baker asked these men to form the Committee on Emergency Construction under the General Munitions Board. Starrett chaired the committee. Frederick Law Olmsted, the famous landscape architect, joined the group. Leonard Metcalf, one of the country's foremost designers of water and sewerage systems, and two leading consulting engineers, George W. Fuller and Asa E. Phillips, agreed to act as a subcommittee on engineering.[16] Taking the situation in hand, the Starrett committee charted the course war construction would follow.

To Starrett and his colleagues, the magnitude of Littell's task was appalling. Time was short, and the Quartermaster Corps was unfamiliar with high-speed building operations. A quick survey of the Construction and Repair Division convinced the committee that "the machine would collapse; that it would not accomplish anything." Urging swift

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[13] *Report of the Board of Review of Construction To The Assistant Secretary of War, August 31, 1919* (Washington, 1920), p. 99. Cited hereinafter as *Blossom Report.*

[14] (1) Ltr, TAG to TQMG, 21 Mar 17, and 1st Ind, same date. AG 2540178. (2) Ltr, TQMG to TAG, 9 Apr 17. AG 2570158.

[15] 1st Ind, TAG to TQMG, 7 May 17, on Memo, Chief, WCD GS for CofS, 4 May 17. AG 2593945.

[16] Min of the Gen Mun Bd, 27 Apr 17, p. 61; 10 May 17, p. 81; 22 May 17, p. 99. In Sp Comm Investigating the Mun Industry. S Comm Print 7, 74th Cong, 2d sess.

action, Starrett told Munitions Board Chairman Frank A. Scott to get Littell out of the War Department, "as it is no fit place for a man to try to do business," and to "get him space and some people around him." Scott agreed: "All right, we will get him out this afternoon." He put through a call to Secretary Baker, who promised to move Littell's office right away to the Munsey Building in downtown Washington.[17]

On 19 May Baker established the Cantonment Division with Littell as chief. Nominally a part of the Quartermaster Corps, the new organization was, for all practical purposes, separate. Littell would report directly to the Secretary of War. He would appoint and assign his own officers, issue travel orders on his own authority, and communicate with department and division commanders without reference to The Quartermaster General.[18] Littell had a single mission—to complete thirty-two cantonments estimated to cost $90 million by September 1917. Writing to him in May Starrett emphasized the "magnitude of the undertaking":

> In 16 weeks you are expected to have suitable quarters ready for the training of 1,100,000 men. . . .
>
> You must be building in 32 places at once. Most of the sites for the cantonments have not yet been chosen. When they have been fixed a group of engineering problems of first importance must be settled. The water supply for each camp must be carefully studied. Failure to supply abundance of pure water may jeopardize the whole undertaking. Proper sewerage must be provided if the danger of epidemic is to be forestalled. Heating, lighting, refrigerating, and laundry facilities must be furnished. The solution of these engineering problems will be different in every locality.
>
> The planning alone for construction work of each of the camps would normally take as many weeks as is given you for the completion of both the engineering and the building.
>
> . . . . . .
>
> The total cost of the building of the Panama Canal was approximately $375,000,000. This operation covered a period of 10 years, and the largest amount expended in any single year in the construction of the Canal was $49,000,000, but little over one-half of the sum that you are asked to expend in 16 weeks.[19]

Part of the staff of the Construction and Repair Division moved to the Munsey Building; part remained behind to take care of maintenance and repair work. Clearly, Littell would need reinforcements.

The Starrett committee assembled a high-powered staff for the Cantonment Division. Calls went to the country's leading construction firms: send us your best men. Frank M. Gunby, a partner of Charles T. Main, Inc., arrived from Boston to take charge of engineering. Dabney H. Maury, past president of the American Water Works Association, agreed to serve as Gunby's assistant. Milton J. Whitson, general superintendent of Grant Smith & Company of St. Paul, assumed direction of construction operations. Peter Junkersfield, president of the Association of Edison Companies, joined Whitson's staff. Robert E. Hamilton, general purchasing agent of the Stone & Webster Engineering Corporation, took on the job of buying materials. Wall Street lawyer

[17] (1) Min, Gen Mun Bd, 15 May 17, pp. 88–89. (2) Conv, Starrett with Clarkson, p. 2525. (3) Interv with Morton C. Tuttle, 15 Aug 56.

[18] Memo, TAG for Littell, 19 May 17. QM 020 (Constr) 1917.

[19] Memo, Starrett for Littell, 25 May 17. AG 2612346.

Evan Shelby appeared in Captain Marshall's office wearing striped trousers, frock coat, and spats to announce himself the division's legal adviser. Shelby promptly exchanged formal attire for Army khaki, as he and the others were quickly commissioned. Recruitment went forward rapidly. More civilian construction experts donned uniforms, the Civil Service Commission waived the requirement that employees be hired from its registers, and soon 250 persons were on the division's rolls.[20]

After about two or three days and nights of "solid conference," the members of the Starrett committee and the new officers of the Cantonment Division reached agreement as to how the building program should be handled. With the aid of Fuller, Metcalf, and Phillips, Major Gunby would prepare typical plans and layouts. Major Whitson, as construction manager, would direct the field forces, while six assistant managers, one for each Army department, would follow day-to-day operations at the job sites; six traveling supervisors would patrol the projects, watching for signs of trouble and giving on-the-spot help. Major Hamilton would procure all building materials, maintaining close contact with the various supply committees of the Munitions Board. Accountants, both in Washington and in the field, would check expenditures. In direct charge of each of the thirty-two cantonments would be a Constructing Quartermaster (CQM), who would have a staff of engineers, draftsmen, auditors, inspectors, and checkers to assist him. On 22 May the plan went to Littell. Two days later he approved it.[21]

Meanwhile, Starrett and his colleagues were seeking the answer to a crucial question—what method of contracting was best suited for emergency work. In peacetime the government used competitive agreements exclusively, for the old law of 1861 required advertising except "when immediate delivery or performance is required by the public exigency."[22] Advertised fixed-price contracts were awarded to the responsible contractor who submitted the lowest bid. The successful bidder agreed, within certain time limits, to furnish materials and complete construction in accordance with detailed plans and specifications. Where the agreement defined the scope of the project, the contractor received a lump-sum payment. Where the contract called for an indefinite quantity of certain specified items of work, such as square yards of paving, he received a unit price for each unit delivered. In normal circumstances, advertised fixed-price contracts offered several advantages on government work. Realistic competitive conditions tended to hold down bid prices. Advertisement obviated suspicion of favoritism and afforded every qualified and responsible bidder an opportunity to secure contracts for public work. Nevertheless, fixed-price contracts could be used only when complete plans and specifications were available. Even

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[20] (1) Ltr, Pres CSC to Baker, 8 Jun 17, in Brig Gen Richard C. Marshall, Jr., Hist of the Constr Div of the Army, 1919, Book II. Cited hereinafter as Hist of Constr Div. (2) Interv with Brig Gen Richard C. Marshall, 11 Apr 57. (3) Conv, Starrett with Clarkson, p. 2526.

[21] (1) Conv, Starrett with Clarkson, p. 2526. (2) Memo, Comm on Emergency Constr for Littell, 22 May 17. Hist of Constr Div, Book II. (3) Canton Div Office Orders, 24 May 17. QM 020 (Constr) 1917.

[22] 12 *Stat.* 220.

then, these agreements could not be used effectively unless materials and labor markets were relatively stable. Furthermore, advertisement was time consuming. The Starrett group saw that this method was far too slow and cumbersome for a situation where time was of the essence.[23]

On 12 April 1917 Secretary Baker invoked the emergency provision of the 1861 law. Advertisement generally gave way to negotiation throughout the War Department. Fixed-price contracts were superseded by cost-plus-a-percentage-of-cost, whereby the government agreed to foot nearly all the bills and to pay contractors a percentage of the cost of the work. The Starrett committee adopted a modified form of this agreement, the "cost-plus with sliding scale and fixed maximum fee." Under it the contractor's fee represented a percentage of cost, but the percentage decreased, from 10 to 6 percent, as the cost advanced and the maximum allowable fee was fixed at $250,000. This agreement avoided the worst features of percentage contracting and preserved the best: construction could begin at once, without detailed plans and specifications; and changes in the scope of a project could be made easily and at any time.[24]

As Starrett saw it, contractors were the key to success in the operation. On the big cantonment jobs, planning and design would have to be carried out at the same time as construction. Even "the best engineering organization in the world," the committee held, could not handle such a task "without blunders."[25] Construction would have to be placed at a rate of $500,000 per week.[26] From long experience in the "building game," members of the Starrett committee knew who the best contractors were. As a check on their own judgment, they sent a confidential questionnaire to nearly 2,000 architects and engineers requesting them to appraise the organization, efficiency, and integrity of contractors with whom they had done business. At the same time, the committee asked architect-engineers and constructors to submit performance records, together with data on their organizations, personnel, and financial status. As replies came in, the committee classified firms according to geographic areas and graded them on the basis of size and experience. By early June, Starrett was in a position to recommend a top-flight company for each cantonment project.[27]

After the enactment of selective service legislation on 18 May 1917, several highly placed officers showed signs of developing cold feet. Shortly after the President signed the bill, Captain Marshall received a message from Brig. Gen. Joseph E. Kuhn, chief of the War College Division of the General Staff, and Brig. Gen. Enoch H. Crowder, who would have charge of the draft. They doubted if the draft could be called in September. According to Marshall, they stated "that construction could not be completed in time" and that they "would

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[23] (1) Memo, Comm on Emergency Constr for Gen Mun Bd, 9 May 17. Hist of Constr Div, Book III. (2) Min, Gen Mun Bd, 12 May 17, p. 86.

[24] (1) WD Orders, 12 Apr 17. (2) *Blossom Report*, pp. 41–43.

[25] Memo, Starrett for Littell, 25 May 17. AG 2612346.

[26] Conv, Starrett with Clarkson, p. 2531.

[27] (1) Memo, Comm on Emergency Constr for Gen Mun Bd, 12 Jun 17. Hist of Constr Div, Book III. (2) Min, Gen Mun Bd, 6 Jun 17, p. 126.

like to be able to advance that as a reason." Marshall replied that the cantonments would be completed on schedule. Should the draft be postponed and construction blamed, he would give the whole story to the newspapers.[28] Marshall's superior, Colonel Littell, took a different position. Called to Kuhn's office late in May and asked if the cantonments could be completed by September, he said it would be "physically impossible." On 29 May Secretary Baker approved an order deferring construction of cantonments for sixteen National Guard divisions. Work on cantonments for sixteen National Army divisions would be started at the earliest possible date. For these projects, the September deadline held.[29]

Meanwhile, the Cantonment Division was assuming the character of a big engineering firm. In their own eyes, the newly commissioned officers of the division were heads of an enterprise that differed from ordinary civilian undertakings only in size and urgency. The division corresponded to the company home office. CQM's, handpicked by Major Whitson for their experience with large projects, would have roles equivalent to general superintendents. Almost to a man, the civilians in uniform were impatient with military discipline, channels of command, customs of the service, and the caution displayed by old-line officers. Soon after Shelby took charge of the Contracts Branch, someone handed him a thick volume containing the Army Regulations. He tossed it into the wastebasket. He and his associates adopted four rules: build a team; throw away peacetime yardsticks; substitute the day for the dollar; and get the job done.[30]

During June the tempo quickened. On the 8th Chairman Scott of the Munitions Board and Colonel Littell approved the final draft of the new emergency contract. A few days later, Secretary Baker informally OK'd it.[31] With the help of civilian engineers recruited by Olmsted, site selection boards appointed by department commanders made rapid progress. By the 14th Baker had approved locations for twelve of the sixteen cantonments.[32] As sites were selected the Starrett committee nominated leading construction firms, among them George A. Fuller, Thompson-Starrett, Stone & Webster, Bates & Rogers, and Mason & Hanger, to build the cantonments. The subcommittee chose top professional organizations, such as Black & Veatch, Frank A. Barbour, Samuel A. Greeley, and Alvord & Burdick, to serve as architect-engineers. Littell and Baker approved the selections.[33]

On the morning of 11 June Shelby delivered the first two contracts for Littell's signature: the total estimated cost was nearly $13 million. Returning a short time later to find the colonel poring over the fine print, the attorney

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[28] Ltr, Marshall to OCMH, 30 Mar 55. See also article from New York *World*, June 19, 1917, reprinted in 55 *Cong. Rec.* 5187.

[29] Memo, with Incls, Actg CofS for TAG, 29 May 17. QM 020 (Constr) 1917.

[30] (1) *Blossom Report*, pp. 18–19. (2) Interv with Evan Shelby, 17 Aug 56; Interv with Frank M. Gunby, 15 Aug 56.

[31] (1) Min, Gen Mun Bd, 8 Jun 17, p. 29. (2) Hist of Constr Div, Exhibits, Part 3.

[32] Memo, Littell for TQMG, 14 Jun 17. QM 600.1 (Gen).

[33] (1) Memo, Starrett for Gen Mun Bd, 12 Jun 17. Hist of Constr Div, Book I. (2) Conv, Starrett with Clarkson, pp. 2528–31. (3) *War Department, Annual Reports, Report of the Chief of the Construction Division, 1918* (Washington, 1919), p. 59.



CAMP CUSTER, MICHIGAN, UNDER CONSTRUCTION, *1917*

protested that the papers had to go out that afternoon. Littell sat back a moment and then explained that he always read every word before he signed his name. Forty years in the Army had taught him to be cautious. To elucidate he told a story. Some years before, while he was serving in the Philippines, a halter for which he was accountable slipped off a mule and fell into a well. When efforts to retrieve it failed, Littell was ordered to make good the loss, $1.40. He refused. The debt still stood and he would have to pay it before he could retire. Signing Shelby's contracts, he shook his head; the old army, he observed, did things differently.[34]

As soon as agreements were executed, sometimes even before, contractors hastened to the job sites. On 13 June an advance party from Fred T. Ley & Company arrived at Ayer, Massachusetts, to start building Camp Devens, a cantonment for 30,000 men. The following day, Stone & Webster commenced work on Camp Travis, near San Antonio, Texas, and Irwin & Leighton began staking out Camp Dix, near Wrightstown, New Jersey. By July construction was in full swing at all sixteen cantonments. Land was cleared, roads graded, and railway spurs brought in with record speed. Barracks, mess halls, latrines, hospitals, and storehouses went up fast. At Camp Upton, near Yaphank, New York, Thompson-Starrett erected sawmills and turned out prefabricated

[34] (1) *Blossom Report*, p. 142. (2) Shelby Interv, 17 Aug 56.

building sections. Several other contractors adopted the same method. Even the installation of utilities, usually slow-moving work, went forward rapidly. Speed was virtually the only criterion. Where there was a question of time or money, contractors spent.[35]

Shortages of materials slowed progress occasionally but not for long. The first war agency to enter the market for construction supplies, the Cantonment Division made the most of its advantage. As fast as Gunby could complete bills of materials, Hamilton wired concerns all over the country, placing orders for wallboard, roofing, window glass, furnaces, and nails. He purchased lumber through lumber manufacturers' associations, which set up offices in Washington. The plumbing industry also established headquarters in the capital to assist Hamilton in his work. The demand for nails, pipe, and lumber soon outran supplies. By bringing pressure to bear on producers, substituting wood stave pipe for cast iron, and accepting green lumber, Hamilton managed to fill requirements. Daily, 30,000 tons of supplies moved to the sixteen job sites. When a shortage of freight cars developed, Captain Marshall, trading dollars for days, sent toilet fixtures south from New Jersey by Pullman.[36]

By mid-July 1917 an army of 160,000 workers was laboring to build the cantonments. Each project had a hastily assembled force of 8,000 to 14,000 men. Although trained electricians and plumbers were needed, the big job, carpentering, was mainly one of nailing boards together, and for that handy men sufficed. Pay was good. Under an agreement between Secretary Baker and Samuel Gompers, president of the American Federation of Labor (AFL), union wage scales and working rules applied on cantonment projects. Men worked overtime, Sundays, and holidays at time and a half or double time rates. There were no serious strikes. Supervision was often weak and organization inadequate. Results were obtained through sheer force of numbers. When one contractor said he could increase production 25 percent by doubling his work force, his CQM told him to go ahead.[37]

In the midst of the drive to complete the cantonments, Littell got orders to provide sixteen camps for the National Guard. The directive came on Friday, 13 July. The first contingent of the Guard would arrive on 1 August. At a Saturday conference, Gunby, Whitson, and several others took stock of the situation. The Guardsmen had tents, so they would not need barracks. The Guardsmen had field kitchens, so they would not need cook shacks. The Guardsmen had tools with which to dig latrines. Water would have to be provided for them. That, said Gunby, meant pipe, lots of pipe. He knew just the man to turn to for help. An important pipe manufacturer from Youngstown, Ohio, was in town that day. Gunby located this man on a golf course, called him into the office, and persuaded him to telephone Youngs-

[35] (1) *Camp Devens, National Army Cantonment*, published by Fred T. Ley & Co, Inc., 1917. (2) *War Department, Annual Reports, Report of the Chief of Construction Division, 1918*, p. 59. (3) *Blossom Report*, pp. 116, 152.

[36] (1) *Blossom Report*, p. 133. (2) Benedict Crowell, *America's Munitions, 1917–1918* (Washington, 1919), pp. 536–37. (3) Marshall Interv, 11 Apr 57.

[37] (1) Memo, Littell for TQMG, 28 Nov 17. Hist of Constr Div, Book V. (2) QM 020 (Constr) 1917. (3) *Blossom Report*, p. 35.



TENTS AT CAMP WHEELER, GEORGIA, *1917*

town and start pipe moving south. By Monday CQM's were on their way to the job sites. On Tuesday and Wednesday Littell signed fifteen contracts. Before the week was out work was under way on ten of the camps; by the 25th all sixteen were building.[38]

At the thirty-two camp and cantonment jobs, contractors pushed furiously ahead, their eyes on the calendar. By mid-August accommodations were ready for 54,000 Guardsmen; by 1 September the camps could take 295,000. The "Guard business," said Gunby, was "the jewel of the whole thing."[39] Meanwhile, cantonment deadlines were being met. Housing for 287,300 draftees was ready on 4 September. Considerable work remained when the troops moved in, but no soldier went without a bed. From September on, construction ran ahead of schedule. More than a million men were housed by late 1917.[40]

The cost totaled $179,478,978,

[38] (1) Memo, Chief WCD GS for CofS, 9 Jul 17. AG 2619836. (2) Memo, Actg CofS for TAG, 13 Jul 17. Hist of Constr Div, Book I. (3) Gunby Interv, 15 Aug 56. (4) Min, Gen Mun Bd, 13, 16, 17, 24 Jul 17. (5) *Blossom Report*, pp. 111, 143.

[39] (1) Memo, Littell for TQMG, 26 Aug 17. Hist of Constr Div, Book III. (2) *Blossom Report*, p. 143. (3) Gunby Interv, 15 Aug 56.

[40] (1) Memo, Littell for Chief Admin Div OQMG, 23 Aug 17. (2) Rpt, Canton Div, n.d., sub: Tps Housed at NA Cantons on 4 Sep 17. Both in Hist of Constr Div, Book III. (3) *Report, Chief of the Construction Division, 1918*, p. 39.

TABLE 1—NATIONAL ARMY CANTONMENTS, 1917

Name of Camp	Location	Contractor	Capacity	Total Cost	Cost per Capita
Total National Army			654,786	$140,726,472	$214.92
Custer	Battle Creek, Mich.	Porter Bros.	34,045	8,700,000	255.54
Devens	Ayer, Mass.	Fred T. Ley & Co.	35,288	9,727,145	275.64
Dix	Wrightstown, N.J.	Irwin & Leighton Co.	41,309	9,623,067	232.95
Dodge	Des Moines, Iowa	Weitz & Son	40,526	6,815,519	168.17
Funston	Fort Riley, Kans.	George A. Fuller Co.	41,564	8,799,535	211.71
Gordon	Atlanta, Ga.	Arthur Tufts Co.	39,796	7,483,002	188.03
Grant	Rockford, Ill.	Bates & Rogers	41,309	8,517,233	206.18
Jackson	Columbia, S.C.	Hardaway Construction Co.	42,498	8,731,187	205.45
Lee	Petersburg, Va.	Reinhart & Dennis	45,512	11,300,000	248.28
Lewis	American Lake, Wash.	Hurley & Mason Co.	44,685	7,007,235	158.38
Meade	Annapolis Junction, Md.	Smith, Hauser & MacIsaac	41,309	10,500,000	254.16
Pike	Little Rock, Ark.	James Stewart & Co.	42,347	9,015,565	212.89
Sherman	Chillicothe, Ohio	A. Bentley Co.	38,393	9,620,075	250.57
Travis	Fort Sam Houston, Texas	Stone & Webster	41,353	6,717,176	162.43
Upton	Yaphank, L.I., N.Y.	Thompson-Starrett Construction Co.	40,913	11,128,341	272.00
Zachary Taylor	Louisville, Ky.	Mason & Hanger Co.	43,939	7,041,392	160.25

Source: Canton Div, Total Estimated Cost for Constr of National Army Cantons, 1917. EHD Files.

TABLE 2—NATIONAL GUARD CAMPS, 1917

Name of Camp	Location	Contractor	Capacity	Total Cost	Cost per Capita
Total National Guard			438,042	$38,752,506	$ 88.32
Beauregard	Alexandria, La.	Stewart-McGhee Construction Co.	27,152	2,648,982	97.56
Bowie	Fort Worth, Texas	J. W. Thompson	27,152	2,305,402	84.92
Cody	Deming, N. Mex.	J. W. Thompson	27,152	2,610,443	96.14
Doniphan	Fort Sill, Okla.	Seldon-Brack Construction Co.	27,152	2,331,802	85.88
Fremont	Palo Alto, Calif.	Lindgren & Co.	27,152	1,988,729	73.24
Greene	Charlotte, N.C.	Consolidated Engineering Co.	27,152	3,246,793	119.58
Hancock	Augusta, Ga.	T. P. Brown & Son	27,152	2,048,571	75.45
Kearney	Linda Vista, Calif.	W. E. Hampton & Co.	27,152	2,977,088	109.65
Logan	Houston, Texas	American Construction Co.	27,152	1,963,058	72.30
McClellan	Anniston, Ala.	J. O. Chisholm & Co.	27,152	3,258,278	120.00
MacArthur	Waco, Texas	Fred. A. Jones Construction Co.	27,152	1,974,375	72.72
Sevier	Greenville, S.C.	Gallivan Building Co.	27,152	1,871,440	68.92
Sheridan	Montgomery, Ala.	A. Blair	27,152	1,915,056	70.46
Shelby	Hattiesburg, Miss.	T. S. Moudy & Co.	30,762	3,289,825	106.94
Wadsworth	Spartansburg, S.C.	Fisk, Carter Construction Co.	27,152	2,187,327	80.56
Wheeler	Macon, Ga.	W. Z. Williams Co.	27,152	2,135,337	78.64

Source: Canton Div, Total Estimated Cost of Camp Constr, 1917. EHD Files.



BARRACKS AND LAVATORIES, CAMP DIX, NEW JERSEY

$140,726,472 for the National Army cantonments and $38,752,506 for the National Guard camps. The average per capita costs were $215 and $88, respectively. (*Tables 1 and 2*) To builders of the cantonments, the Army paid $4,000,000 in fees, or 2.84 percent of the total cost. Every one of these contractors received the maximum fee of $250,000, a sum less than would have been earned under straight cost-plus-a-percentage agreements. Proportionately the fees for camp construction were higher, amounting to $2,638,524, or 6.8 percent of the total cost. Because none of these contractors had attained the maximum fee, their earnings represented straight percentages of cost.

Huge quantities of materials and prodigious efforts had gone into construction. Close to 1 billion board feet of lumber, 80 million square feet of roofing paper, 34 million square feet of wall board, 1 million feet of wood stave pipe, 468,000 feet of cast iron pipe, 105,000 kegs of nails, and 314,000 barrels of cement had been purchased for the cantonments alone. A total of 105,358 freight cars had been used to haul materials to the 32 mobilization projects.[41] A total of 212,172 workmen had been employed—an average of 8,400 at each of the cantonments and of 2,750 at each of the camps. It was the largest force of construction labor ever assembled in the United States.

The training centers for the National Army and the National Guard were veritable cities, complete with roads, walks, power lines, and water systems. The largest of the cantonments, Camp

[41] Incl with Memo, Littell for TQMG, 28 Nov 17. Hist of Constr Div, Book V.

Lee, Virginia, accommodated 45,512 men; the smallest, Camp Custer, Michigan, 34,045. Each of the tent camps held a Guard division of 27,152, except Camp Shelby, which housed 30,762. Nearly all the comforts of large urban communities were provided for the troops—hospitals, infirmaries, bakeries, laundries, theaters, clubhouses, gymnasiums, and more. In the cantonments, troops lived in 250-man barracks, heated by steam or warmed by stoves, with modern lavatories nearby. Guardsmen were quartered in snug, floored tents, equipped with stoves or heaters. Their sanitary facilities, though crude, were adequate. Never before had American soldiers been so well housed in wartime.

Contemporaries marveled at the speed with which this vast undertaking was accomplished. Historians agreed that construction of the camps and cantonments in so short a time "constituted one of the great achievements of the mobilization effort" in 1917.[42] In the words of Frederic L. Paxson, "It was a triumph of skill and energy to have the camps as nearly ready as they were; a triumph for W. A. Starrett of the Emergency Construction Committee and Brigadier-General I. W. Littell of the Quartermaster Corps."[43]

Centralization

In the spring and summer of 1917, while Littell's division was building camps and cantonments, other military construction programs were starting under different auspices. Soon after the declaration of war, the Corps of Engineers began work on several depots and an office building; the Signal Corps began construction of a dozen schools for training pilots and technicians; and no fewer than five divisions of the Ordnance Department began erecting facilities for their own use. Competition for labor and materials caused trouble. Lack of uniformity in contracting methods encouraged builders to play one agency against another. The arrangement was illogical and uneconomical. As the camps and cantonments neared completion, and the work for which Littell's organization had been created was concluded, the Starrett committee proposed that all Army construction be placed under the men who had performed so well in meeting mobilization deadlines.

On 5 October 1917, upon the committee's advice, Secretary Baker ordered all military construction except fortifications, centralized in the Cantonment Division. On the 10th he transferred The Quartermaster General's organization for maintenance and repair, together with its chief, Maj. Charles O. Zollars, to the Cantonment Division.[44] Early in November Capt. Charles D. Hartman, a 1908 West Point graduate who had recently joined the Quartermaster Corps, became Zollars' assistant. Hartman's debut as a construction officer marked the beginning of an active career that would span nearly a quarter century. Under him and Zollars, main-

[42] Lt. Col. Marvin Kreidberg and 1st Lt. Merton G. Henry, *History of Mobilization in the United States Army, 1775–1945*, DA Pamphlet 20–212 (Washington, 1955), p. 311.

[43] Frederic L. Paxson, *America at War 1917–18* (Boston: Houghton, Mifflin Company, 1939), p. 107.

[44] (1) Ltr, TAG to TQMG, 5 Oct 17. QM 020 (Constr) 1917. (2) OQMG Office Order 106, 10 Oct 17.

tenance and repair meshed smoothly into the work of the Cantonment Division. But other construction activities remained where they were, in the Ordnance and Engineer Departments and in the Signal Corps.

Baker's centralization order met stiff resistance. The Chief Signal Officer asked for a blanket exemption. Writing to the Chief of Staff on 15 October, he argued that the Signal Corps construction program was closely tied in with production of planes and training of flyers. Howard E. Coffin, the Detroit industrialist who headed the Aircraft Production Board, opposed making a change. Swayed by these men, Baker gave ground. On the 20th he agreed to study the matter thoroughly and to poll the other bureau chiefs affected by his order. Until then, he advised Coffin, the Signal Corps would continue to build.[45]

Early in December representatives of the Cantonment Division, the Corps of Engineers, the Signal Corps, the Ordnance Department, and the Starrett committee met to try to reconcile their differences. Two plans were offered for discussion. Under the first, the various services would continue to build; the Starrett committee would co-ordinate their efforts. The second plan called for strict adherence to Secretary Baker's 5 October order. After two days of debate, the conferees were hopelessly deadlocked. The Engineers, the Signal Corps, and the Ordnance Department held out for the first plan; the Cantonment Division and the Starrett group, for the second. On 8 December Starrett informed the General Staff that efforts to reach an agreement had failed.[46]

Meanwhile, the tide was turning in favor of centralization. During October Starrett, Tuttle, and Marshall persuaded one of Baker's advisers that a centralized construction agency would be "in the public interest" and in conformance with "sound business principles."[47] In November Benedict Crowell, a former partner of Lundoff, became Assistant Secretary of War. Crowell joined the members of the Starrett committee in urging Baker to abide by his first decision. On 22 December the Secretary announced that his order of 5 October would stand.[48]

During the fall of 1917, Littell took steps to strengthen the Cantonment Division for larger tasks ahead. A number of changes appeared to be necessary. More men with experience in industrial construction would have to be recruited. To push the new program to completion, the division would need all of the powers and authorities given to it by the Secretary back in May, plus some new ones. On 9 October, the day he became a brigadier general, Littell asked Baker for authority to communicate directly with bureau chiefs, to commission civilians, to promote his principal assistants, and to make certain adjustments in his organization. The Secretary referred the matter to Maj. Gen. John

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[45] (1) Memo, Actg CSigO for CofS, 15 Oct 17. (2) Ltr, Coffin to WDGS, 20 Oct 17. Both in Hist of Constr Div, Book I.

[46] (1) Memo, Gunby for Starrett, 6 Dec 17. Hist of Constr Div, Book III. (2) Memo, Starrett for Col P. E. Pierce, WDGS, 8 Dec 17. CE Doc 115946. (3) Memo, Starrett for Maj W. W. Taylor, WDGS, 8 Dec 17. QM 020 (Constr) 1917.

[47] Memo, Stanley King for Baker, 26 Oct 17. Hist of Constr Div, Book I.

[48] Memo, OCofS for TAG, 22 Dec 17. OCS 6374-333.

Biddle, an Engineer officer who was Acting Chief of Staff.[49]

Littell's requests involved him in an acrimonious dispute with Biddle, for the two men held conflicting views about the Cantonment Division. Littell regarded his organization as a special outfit, responsible only to the Secretary. Biddle, on the other hand, looked upon the division as a subordinate element of the Quartermaster Corps; and he felt that Littell's proposals ought to be considered in the light of overall Quartermaster organization and policies. On one occasion, Biddle warned Littell that he could not continue to bypass his superior officer, The Quartermaster General. Early in January 1918, Biddle turned the problem over to the newly appointed Acting Quartermaster General, Maj. Gen. George W. Goethals, the Engineer officer acclaimed as the builder of the Panama Canal.[50]

To Goethals the solution was obvious—place all military construction under the Corps of Engineers. He gave no reason for his recommendation, perhaps feeling that none was necessary.[51] However, others believed some explanation was required. In a study of Goethal's proposal undertaken at Baker's request, Col. Daniel W. Ketcham of the War Department General Staff pointed out that efforts to transfer construction from the Quartermaster Corps to the Corps of Engineers had been made in the past, but that arguments advanced in favor of the change had "never been strong enough to prevail." A shift in responsibility, Ketcham argued, should be made only after conclusive evidence had been presented that gains in efficiency or economy would offset time lost in reorganization and readjustment. Goethals had offered no such evidence. In Ketcham's opinion, the Cantonment Division was doing a splendid job. To make "unnecessary changes in personnel, organization, and methods" in the midst of war, he concluded, "would be a grave mistake."[52]

The Cantonment Division was in serious trouble. Even if Goethals' maneuver failed, the division faced the prospect of working under an officer who favored its absorption by the Corps of Engineers. Recognizing that they had an impossible situation on their hands, Baker and Crowell acted to remove Littell from Goethals' jurisdiction. To a War Department order of 9 February 1918 dealing with the organization of the General Staff they added a paragraph charging the Operations Division with "the supervision and co-ordination of camp sites, cantonments, army posts, hospitals, sanitation, construction plans and projects as the same relate to all branches of the Army."[53]

Littell was unaware of this development. He received no copy of the War Department order and had no inkling of its content. Testifying on 11 February before the Senate Committee on Military Affairs, he said he expected the worst:

> Senator Chamberlain. Are you building for the Signal Corps in addition to the work of construction that is in hand?

[49] Memo, Littell for Baker, 9 Oct 17. QM 020 (Constr) 1917.

[50] OCS 10394.

[51] Memo, Goethals for Baker, 16 Jan 18. OCS 10394-6.

[52] Memo, Ketcham for CofS, 23 Jan 18. OCS 10394-6.

[53] WD GO 14, 9 Feb 18.

General Littell. We have taken over their work.

. . . . . .

Senator Chamberlain. When was that order issued?

General Littell. That was October 5.

. . . . . .

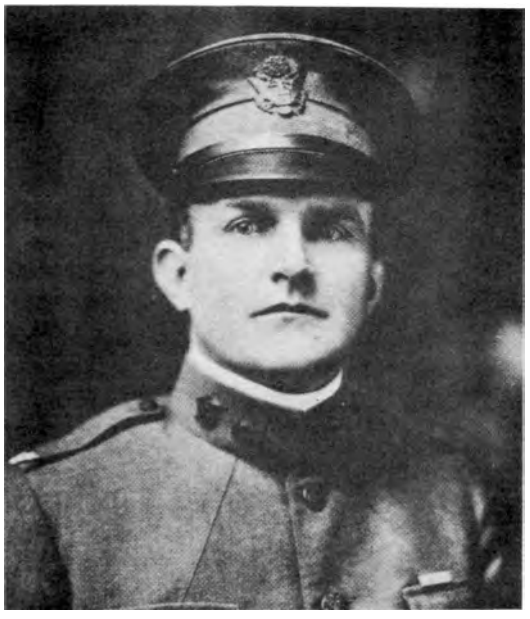
Senator Chamberlain. Is there not a more recent order that takes the construction work from you and turns it over to the Engineering Department?

General Littell. That is in contemplation, as we hear it.

Senator Chamberlain. You have not got an order?

General Littell. We have been told that the Cantonment Division would be transferred to the Engineer Corps.[54]

The next morning Littell was back on the Hill for another session with the committee, when his long military career ended abruptly. At Crowell's direction, orders were cut retiring Littell and naming Marshall his successor. The reasons for Littell's relief were obscure. Later, some pointed a finger at Goethals; others, at Starrett. Reportedly, Marshall once styled himself the "self-appointed" Chief of Construction.[55] To the members of the Cantonment Division, the dynamic and aggressive "Puck" Marshall presented a sharp contrast to the gentle-hearted Littell. The cousin of a former Chief of Engineers and a personal acquaintance of Secretary Baker, Marshall knew his way around the War Department.[56] The aging and kindly Littell had to step aside for the politically astute young officer.



GENERAL MARSHALL.
(*Photograph taken in 1918.*)

The effects of Colonel Marshall's leadership were soon apparent. A War Department order of 13 March 1918 changed the name of the organization to the Construction Division of the Army and allotted it 1,407 officers and 1,137 civilian employees.[57] On 19 April Marshall reorganized the division, created several new branches, and made changes in personnel. (*Chart 1*) With Crowell's backing, he took on additional duties. On 10 April the Construction Division became responsible for preparing plans, specifications, and estimates for all military construction projects. Encroaching on the jurisdiction

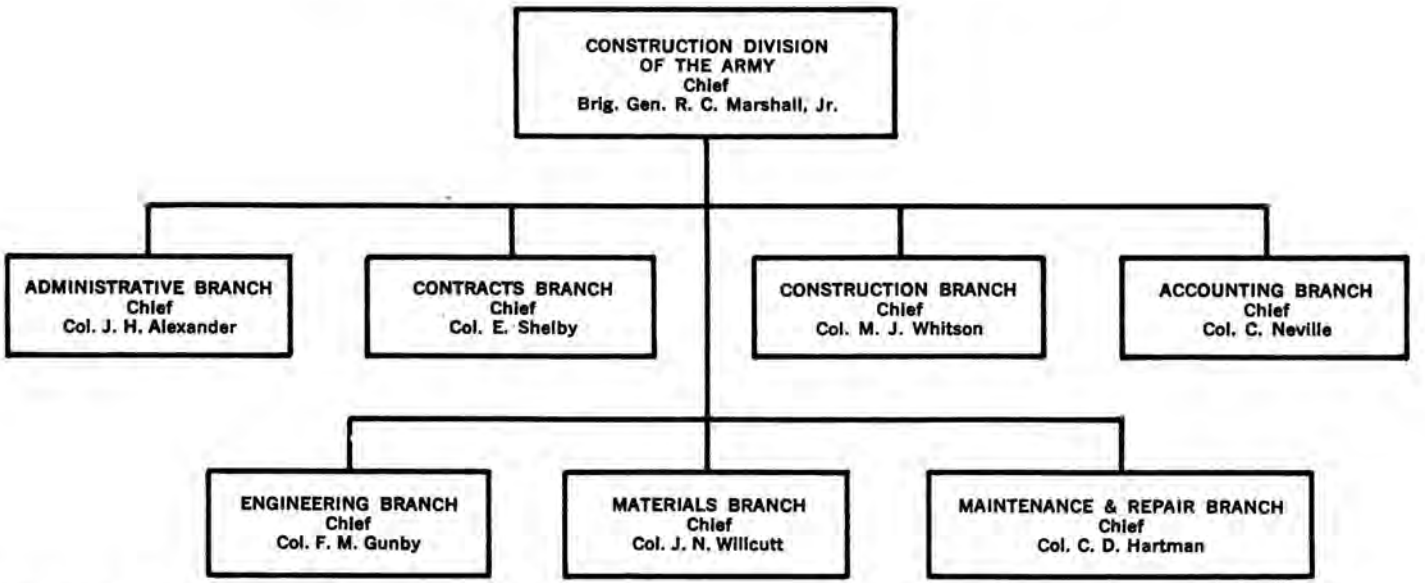
[54] S Comm on Mil Affs, 65th Cong, 2d sess, *Hearings, Investigation of the War Department*, Part 4, p. 2405.

[55] (1) Memo, Biddle for TAG, 12 Feb 18. OCS 10394-10. (2) Intervs with Col L. C. Ritchie, 26, 27 Apr 56; Shelby Interv, 17 Aug 56. (3) H Rpt 816, 66th Cong, 2d sess, 1 Apr 20. (4) Interv with Mrs. Mary B. Pagan, 8 Mar 57.

[56] Gunby Interv, 15 Aug 56; Marshall Interv, 11 Apr 57.

[57] Ltr, TAG to OIC Canton Div, 13 Mar 18. QM 020 (Constr) 1918.

CHART 1—ORGANIZATION OF CONSTRUCTION DIVISION OF THE ARMY
APRIL–NOVEMBER 1918



Source: Orgn Charts, Constr Div of the Army, 1918. EHD Files.

of the Corps of Engineers, Marshall undertook construction in the theater of operations—three meat storage and ice-making plants in France.[58]

Recognizing the defects in current contracting methods, Marshall adopted a new form of emergency agreement. Although contracts used during the first ten months of the war had in every case fixed a maximum allowable fee, there still existed an incentive for unscrupulous contractors to increase costs to the point that gave them the largest allowable profits. Since a contract under which contractors made the most money when costs were high was obviously not to the government's advantage, the use of percentage contracts was discontinued in February 1918, when Marshall switched to an arrangement very like the cost-plus-a-fixed-fee (CPFF) contract of World War II. Fees were henceforth based on original estimates rather than on actual costs. The new method had all the speed of percentage contracting but avoided offering rewards for inefficiency and extravagance.[59]

Beginning in the spring of 1918, Marshall had to devote more and more of his energies to fending off attacks on the division. About the first of May a disturbing rumor reached him: a paragraph calling for the transfer of the Construction Division to the Corps of Engineers had found its way into the Army appropriation bill then before the House Committee on Military Affairs. Marshall immediately conferred with Crowell and the new Chief of Staff, Maj. Gen. Peyton C. March.[60] When the news reached him, Secretary Baker tried to have the passage deleted. Appearing before the committee on 6 May, March declared that the Secretary was perfectly satisfied with the existing arrangement for construction. And so was he. "If there is any legislation in the appropriation bill relating to this subject in connection with the Engineer Corps," said March, "we want it stricken out."[61] The bill reported out by the committee contained no such provision.

Marshall lost no time in striking back. On 16 May, at his prompting, Senator Harry S. New of Indiana introduced a bill to create a permanent construction corps. The proposed corps would be headed by a major general and staffed by 570 officers, two-thirds of whom would be drawn from the officers of the present division. But the bill went further, for Marshall had included a provision to take rivers and harbors work away from the Engineers and assign it to the new Construction Corps.[62] The bill went to the Committee on Military Affairs, which forwarded the measure to the War Department.

The task of commenting on the bill fell to Brig. Gen. Lytle Brown, director of the War Plans Division of the General Staff and an Engineer officer. On 29 May, Brown wrote General March: "Consideration of this measure might lead to the belief that it is a scheme for making permanent provision for certain officers who have received temporary commissions in the Construction Corps and in this respect seems to be largely a plan for personal preferment." He found

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[58] (1) Ltr, TAG to OIC Constr Div, 10 Apr 18. Hist of Constr Div, Book I. (2) *Blossom Report*, p. 302.

[59] *Blossom Report*, pp. 192–93.

[60] Marshall Interv, 11 Apr 57.

[61] H Comm on Mil Affs, 66th Cong, 2d sess, *Hearings on Army Appropriation Bill, 1919*, vol. 2, pp. 27–28.

[62] 56 *Cong. Rec.* 6575.

the portions of the bill that dealt with the Engineers' civil functions particularly objectionable. "The War Plans Division," Brown protested, "is of the opinion that it is beyond the power of the human mind to solve in time of war, a question which pertains to a basis of peace." He drafted, and on 15 June Secretary Baker signed, a letter to the committee chairman opposing the bill.[63]

Senator New's measure posed a dire threat to the Corps of Engineers. For more than forty years a group within the construction industry had labored to consolidate all federal construction, including rivers and harbors work, into one government department. Men identified with this movement dominated the Starrett committee and the Construction Division of the Army. Leagued with them was Assistant Secretary of War Benedict Crowell. To Maj. Gen. William M. Black, the Chief of Engineers, the bill appeared to be part of a fine-spun plot which was beginning to unfold. The time for a showdown had come. The Engineers had either to crush the separate corps or to risk being crushed by it.

On 27 May, Black tried to persuade the Chief of Staff that the Construction Division should be turned over to the Corps of Engineers. He reminded March that the Corps had done construction of every type in discharging its military and civil duties. "Since the outbreak of war," he pointed out, "in the United States it has constructed the first complete system of embarkation points the Army now possesses . . . and is now in charge of all construction work of all character in France." Many Engineer Reservists were members of the Construction Division. "I now find that the continued separation of the Construction Department has resulted in embarrassment to this Department . . . . ," Black informed March. In conclusion, he declared:

> Difficulties would disappear were the Construction Department made a part of the Engineer Department and placed under the control of the Chief of Engineers. There would be need for but one purchasing department. Since there is a great variety in the work now assigned to the Construction Department as well as to the Engineer Department, the best experts for any particular class of work could be selected from either department were the Construction Department under the control of the Engineer Department, and the number of experts required reduced. Without a doubt, an increased efficiency and economy would result. The present organization is anomalous, and the Construction Department really now constitutes an independent bureau of the War Department. It is submitted that the existing conditions are not those compatible with good organization and greatest efficiency.[64]

March sent Black's proposal to the Construction Division the following day.

Replying on 6 June, Marshall attempted to refute Black's arguments. The Engineers had not built the embarkation depots, he declared; credit for that accomplishment belonged to Cantonment Division. Moreover, the Engineers had detailed only nine Reservists to him and Littell. Marshall dismissed Black's statement about competition by saying that there was none. He argued that a tradition-bound military organization could not be effective in a war situation. Engineer officers

[63] (1) Memo, Brown for March, 29 May 18. (2) Ltr, Baker to Chm S Comm on Mil Affs, 15 Jun 18. Both in OCS 10394-14.

[64] Memo, Black for March, 27 May 18. Hist of Constr Div, Book II.

"accustomed to the usually slow-progressing and permanent work of fortifications, military roads, and river and harbor improvements" were too inflexible to cope with emergency conditions. The Construction Division had what the Corps of Engineers lacked: top-notch men, unhampered by tradition and unfettered by red tape and military protocol. The division and the using services were working as a team. "To change or substitute for this teamwork spirit, the necessarily fixed ideas and strivings for perfection of an older department," Marshall warned, "would result in those conflicts of ideas and long drawn out discussions which have produced such adverse results in some of the other governmental activities."[65]

Marshall lined up powerful support. He went first to Crowell, who agreed to throw the weight of his influence behind the Construction Division. Marshall then took up Black's proposal with the Chief of Staff and the Secretary. March was against it, and so was Baker, who wanted no further changes in the wartime construction setup.[66] On 14 June The Adjutant General issued a terse order: "The Secretary of War disapproves the recommendation for the transfer of the Construction Division to the Engineer Department."[67] Two weeks later Baker raised Marshall to one-star rank. Henceforth the Chief of Construction was known to his comrades as "General Puck."

The struggle between Marshall and the Engineers was just beginning. In August 1918, General Goethals, who had been named director of the Purchase, Storage and Traffic Division (PS&T) of the General Staff, submitted a plan for reorganizing the Army's supply system, which put construction under PS&T. March approved the plan except the part dealing with construction. An attempt by Crowell and Marshall to make the Construction Division permanent by means of an Executive Order failed when Baker withheld approval.[68] Two months later, Marshall learned that Goethals had centralized many of the Army's procurement and fiscal activities. Indications were that the supply and finance functions of the Construction Division would soon go to PS&T. Marshall and his associates considered the idea preposterous. Building materials could not be divorced from building operations. Writing to the Chief of Staff on 2 November 1918, Marshall stated:

> Construction consists of the complete functions necessary for delivering at the site of a project materials and labor and [for] organizing, inspecting, accounting and paying for the same . . . . To omit any of these functions in a construction operation would produce a decided destructive effect upon a construction program. The loss of time and money would be too great to permit of using the word "organization" in connection with it.[69]

Nine days later the war ended.

Under Marshall's direction, the Construction Division had compiled an impressive record. At the time of the armistice, shelter for approximately 1,736,000 men had been provided at 32 camps

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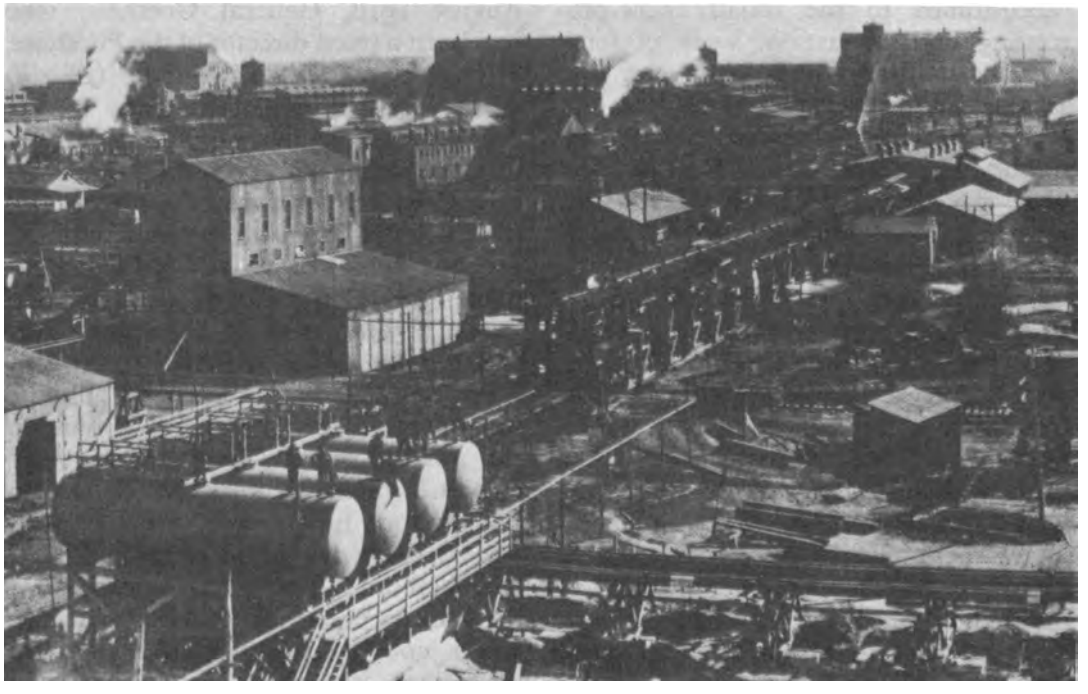
[65] Memo, Marshall for March, 6 Jun 18. Hist of Constr Div, Book II.

[66] Marshall Interv, 11 Apr 57.

[67] Ltr, TAG to OIC Constr Div, 14 Jun 18. QM 600.1 (1918–41).

[68] (1) Memo, March for Goethals, 26 Aug 18. (2) Memo, Marshall for Crowell, 2 Aug 18. Both in QM 600.1 (1918–41).

[69] Memo, Marshall for March, 2 Nov 18. QM 600.1 (1918–41).



OLD HICKORY POWDER PLANT, TENNESSEE, *nearing completion, 1918.*

and cantonments, 4 ports of embarkation, 22 special training centers, and numerous other posts and stations. In addition, work was completed, or nearly so, on 77 airfields, schools, and other facilities for the Division of Military Aeronautics; 49 base and 40 general hospitals for the Medical Corps; 30 supply bases and depots for the Quartermaster Corps; and 95 munitions plants and depots for the Ordnance Department and the Chemical Warfare Service. The program included 581 projects with a total cost of approximately $1 billion.[70]

To many in a position to observe its performance, the Construction Division was an effective organization, one worthy of praise and preservation. To others, it was an anomaly within the War Department, a reprobate outfit, and a proper subject for Congressional inquiry.

Congress Investigates

Senator Kenneth D. McKellar of Tennessee led the attack on what he called the "remarkable system" under which the camps and cantonments were built. Addressing the Senate on 17 July 1917, McKellar denounced extravagance and corruption in the construction program. An investigation of four cantonment projects had convinced him that cost-plus contracts were not in the public interest and that contractors were far more concerned with obtaining high fees

[70] (1) *War Department, Annual Reports, Report of the Chief of the Construction Division, 1919* (Washington, 1920), p. 64. (2) *Blossom Report*, p. 268.

than with saving tax dollars. Vast sums of money were being squandered. Construction costs were soaring out of sight. Moreover, McKellar charged, favoritism had entered into the selection of contractors. He identified Starrett with the George A. Fuller Company, contractors for Camp Funston, and with the Thompson-Starrett Company, contractors for Camp Upton. He stated that associates of other camp contractors were serving with the Committee on Emergency Construction and the Cantonment Division. Inveighing against big business, the Senator declared that the construction program was being run for the benefit of a few large corporations.[71]

Although other legislators soon joined McKellar in condemning the conduct of the building program, some months elapsed before Congress launched a formal inquiry. In December 1917 the Senate Military Affairs Committee, of which McKellar was a member, began an investigation of the mobilization effort. Speaking at a rally of the National Security League in New York City during January 1918, Chairman George E. Chamberlain revealed the committee's attitude: "The Military Establishment of America has fallen down. . . . It has almost stopped functioning . . . because of inefficiency in every bureau and in every department of the Government of the United States."[72] Two days later he introduced a bill to take direction of the war out of the President's hands and to vest it in a war cabinet. The committee endeavored to show why such a bill was necessary. Consuming fifteen weeks and producing 2,500 pages of testimony, its hearings told a story of failure and abuses.[73] In the rash of sensational headlines which emanated from the inquiry, construction had a prominent place.

Appearing before the committee in February 1918, the top men in the construction program were confronted by Senator McKellar in the role of principal interrogator. Hinting at conspiracy and collusion, McKellar subjected the witnesses to exhaustive questioning. Were all thirty-two camps and cantonments built under cost-plus contracts? Who was responsible for adopting the cost-plus system? Were not the fees enormous for three months' work? Who had selected the contractors? What were Starrett's connections with these firms? Was not his brother Paul head of George A. Fuller? Who were the stockholders in Thompson-Starrett? How many construction men had come into the government in order to feather their nests and those of friends and relatives? The examination continued for two full days—Littell, Starrett, Marshall, Gunby, Whitson, and Willcutt testified in turn—as McKellar sought to uncover a plot to mulct the government.[74]

Denying imputations of wrongdoing, the accused put up a vigorous defense. Starrett had severed connections with the Fuller Company of which his brother was president some years before; he had no interest in Thompson-Starrett or any other company which had received an emergency contract. Contractors had been chosen solely for their ability to

[71] 55 *Cong. Rec.* 5181ff.

[72] Quoted in Paxson, *America at War*, p. 216.

[73] *Ibid.*, 211–12, 216–23.

[74] S Comm on Mil Affs, 65th Cong, 2d sess, *Hearings, Investigation of the War Department*, Part 4, 11 and 12 Feb 18, *passim.*

construct a camp or cantonment within the time allotted. All selections had been approved by the responsible heads of the War Department and by the General Munitions Board. The emergency agreement had fully protected the public interest. Fees were lower than those usually paid for comparable work. Upholding the men from industry, Littell and Marshall emphasized the record of accomplishment. McKellar's allegations were not proved.[75] Nevertheless, the man in the street was inclined to believe that where there was such dense smoke, there must be some fire.

In response to criticism of the emergency construction contract, Acting Secretary Crowell asked that a study be made "to see if some better method of executing this work could be followed." At Marshall's invitation, a distinguished group of men formed a committee to advise the Construction Division "as to methods for future work." Members included John R. Alpine, representing the AFL; Frederick L. Cranford, president of the New York Association of Contractors; Charles T. Main, president of the American Society of Mechanical Engineers; John L. Mauran, president of the American Institute of Architects; Robert G. Rhett, president of the U.S. Chamber of Commerce; and Professor Arthur N. Talbot, president of the American Society of Civil Engineers.[76] Reporting to Marshall on 15 March 1918, this panel endorsed the agreement drawn up by the Starrett committee. In their opinion, no other form of contract could meet the conditions imposed by the emergency. They summed up their conclusions:

> This scheme appeals to the committee as possessing one qualification which must commend it to all thinking men—it permits starting actual work weeks and even months before the details are completely worked out and delineated and permits the Government to push the job at any speed it may elect, changing at will its plans and scope, but paying only what the work actually costs plus a fee which is so reasonable as to be above the reach of fairminded criticism.[77]

This stamp of approval, though widely publicized, failed to have the desired effect.

Through the remaining months of war, criticism of the program mounted. Rare indeed was the Senator or Representative who could not produce a sheaf of letters from constituents, telling about discrimination in the award of contracts, inordinate waste of materials, outrageous wages, idling on the jobs, and other scandalous conditions. "Camp Contracts Given Big Firms Only, Is Charge" was front-page news. Magazine articles appeared bearing such titles as "Evils of Cost-plus Contracts." Amid the general outcry, bills were introduced to outlaw percentage contracts and demands were heard for fresh investigations.[78] The halls of Congress rang with angry declamations. "Worse than scandal" was the pejorative comment of Senator Porter J. McCumber on "the building of all of our cantonments." Senator William H. King called upon his colleagues "to give the small contractors a chance to get into the game"

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[75] *Ibid.*

[76] Memo, Marshall for Comm to Review Emergency Contract, 14 Mar 18. Hist of the Constr Div, Part 3.

[77] Ltr, Comm to Marshall, 15 Mar 18. Hist of the Constr Div, Part 3.

[78] (1) New York *World*, August 20, 1918, p. 1. (2) P. Morse in *Forum*, August 7, 1918, pp. 60, 200. (3) 56 *Cong. Rec.* 5858ff., 7245, 7264, 7930, 4355.

and "to rescue the business of the country from a few enormous corporations and trusts." In the House, Representative Daniel R. Anthony, Jr., declared that "adoption of the cost-plus system" had "led to a veritable riot of waste and extravagance."[79] And Representative John C. McKenzie, an outspoken foe of construction "grafters," drew applause for the following remarks:

> When war comes, like snakes in the grass you can see their heads coming up everywhere looking for an opportunity to rob their Government. O God, grant that such may not be the opportunity they may have, and may God pity each and every one of them and damn each and every one of them forever.[80]

In July 1918, amid crescendoing complaints, Assistant Secretary Crowell called into being the Board of Review of Construction.[81] Appointed to review the work, record the facts, and apply the lessons of the wartime building effort were three respected figures in the industrial and financial world: Chairman Francis Blossom was a partner in Sanderson & Porter, one of the country's leading engineering firms; W. Sanders Davies was president of the American Institute of Accountants; Charles A. Morse headed the American Railway Engineering Association. Begun in September 1918, the board's investigation continued for almost a year. Scores of persons testified—officers of the Construction Division, members of the Starrett committee, heads of contracting firms, chiefs of using services, and many more. Records came in for careful scrutiny. In the course of their inquiry, Blossom and his colleagues visited some fifty projects, where they questioned constructing quartermasters, engineers, contractors, auditors, superintendents, foremen, and workmen. In August 1919, they submitted their report to Crowell.[82]

The Blossom board gave the program a clean bill of health. Adoption of the emergency contract was fully justified. No other form of agreement could have produced the required results. Fees paid contractors were "exceedingly low as compared with the fees paid on prewar private construction."[83] There was no evidence to support charges of favoritism in making awards. There had been no profiteering. The high cost of the work was due to abnormal conditions, not to inefficiency or mismanagement. True, economy had been sacrificed for speed. But, said the board, "If the completion of these cantonments and camps in time to receive the army in September 1917, and to house it during the extreme winter of 1917–18 shortened the war by only one week, their total cost was saved."[84]

Blossom and his colleagues directed their most trenchant criticism against decentralization—the system whereby each federal agency handled its own construction. This arrangement, they declared, was "at variance with business practice" and "wrong in principle." Even within bureaus responsibility was divided; at the beginning of the war, the Ordnance Department alone had had five groups dabbling in construction. Consolidation seemed the logical solu-

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[79] *Ibid.*, 5863, 5864, 7203.
[80] *Ibid.*, 7209.
[81] Ltr, Crowell to Blossom *et al.*, 24 Jul 18. Quoted in *Blossom Report*, p. 13.
[82] *Blossom Report*, pp. 11–16.
[83] *Ibid.*, p. 194.
[84] *Ibid.*, pp. 194, 286.

tion. The board strongly recommended that all government construction, both military and civil, be centralized in a new department of public works. Discussing the future of the Army Engineers, the members agreed: "It is unwise to ask the War Department to do any national construction and engineering work that civilians can do, because, in another war, its engineers will again be unable to handle such home work in addition to their military work." Asserting that the officers of the Corps were "outclassed by civilian engineers on most construction work," the Blossom committee went on to state: "Satisfactory results in the war emergency construction have been accomplished largely by, and in degree proportionate to, the freeing of experienced constructors from control by Army officers."[85] Published by the Government Printing Office, the 380-page *Report of the Board of Review of Construction* bore the War Department's imprimatur.

When the Republicans gained control of Congress in 1918, more rigorous investigations appeared certain. By the summer of 1919 a select committee of the House, headed by Representative William J. Graham of Illinois, was ready to begin a full-dress inquiry into war expenditures. A subcommittee of two Republicans—John C. McKenzie of Illinois and Roscoe C. McCulloch of Ohio—and one Democrat—Frank E. Doremus of Michigan—was assigned to investigate construction. Chosen to head the subcommittee, McKenzie announced his intention "to take up the question of the so-called emergency contract for the purpose of ascertaining why it was adopted to the exclusion of the usual form of construction contract, who was responsible for its preparation, and whether or not such form of contract safeguarded the interest of the Government; and if not, why not?"[86] For the next six months, the McKenzie group probed for answers to these questions.

Called before the subcommittee, high-ranking Engineer officers characterized the emergency construction contract as evil and unnecessary. Giving his views on cost-plus agreements, General Goethals stated: "I have always been opposed to them. It might have cost the Government a little more to do it by force [account], but there could never have been any criticism if they had had the proper men and put one in charge of each cantonment." General Black testified in much the same vein.[87] Col. Clarence O. Sherrill, recently returned from France where he had served as chief of staff of the 77th Division, said that the camps and cantonments could have been built faster and cheaper by purchase and hire. The thirty-five district offices of the Corps of Engineers could have started construction almost at a moment's notice. A telephone call from General Black would have put the machinery in motion. Neither contractors nor cost-plus contracts would have had any part in the program. The cost-plus arrangement, Sherrill insisted, "is a dangerous one for the Government to use, and opens the door to both inefficiency and fraud."[88]

Members of the Starrett committee and the Construction Division em-

[85] *Ibid.*, pp. 275, 276, 296–98.

[86] H Subcomm 2 (Camps) of the Select Comm on Expenditures in the WD, 66th Cong, 1st sess, *Hearings on War Expenditures*, I, 869.

[87] *Ibid.*, pp. 1015, 1166–70.

[88] *Ibid.*, pp. 2391–94.

phatically disagreed. Referring to the adoption of the emergency construction contract in the spring of 1917, Frederick Law Olmsted told the subcommittee: "I feel more confident now than I could possibly feel then of the fact that it was, on the whole, the wise thing to do in the case of the cantonment work with its extraordinary urgency."[89] Similar statements came from Olmsted's colleagues on the Emergency Construction Committee and from General Marshall and his officers. Secretary Baker and top war production officials also defended the use of cost-plus contracts. Many of the country's foremost architects, engineers, and builders testified that the emergency agreement was the only solution to the Army's war construction problems.

Late in October 1919 the subcommittee headed west to hold hearings at Columbus and Chillicothe, Ohio, and at Rockford, Illinois. More than seventy witnesses, carpenters, plumbers, auditors, timekeepers, teamsters, and laborers employed by A. Bentley & Sons at Camp Sherman and by Bates & Rogers at Camp Grant, took the stand. Their testimony told a sorry story of bartenders, schoolboys, mail clerks, and farmers hired as carpenters; of slow-down orders from contractors' foremen; of a perpetual crap game at Camp Sherman; of wasted lumber and buried kegs of nails. Despite denials by Constructing Quartermasters and contractors' representatives, McKenzie seemed satisfied that unpardonable waste and mismanagement had occurred. Returning to Washington on 17 November, he continued hearings until mid-January 1920.[90] During February and March, subcommittee members labored over their reports, studying more than 3,000 pages of testimony taken from nearly 200 witnesses.

The majority report sent to Chairman Graham on 1 April was a blistering indictment of the war construction effort. Conspiracy, usurpation, favoritism, profiteering, fraud, reckless spending, and unconscionable waste—virtually every accusation ever voiced against the directors of the program was contained in the eighty-eight conclusions set forth by McKenzie and McCulloch. Starrett was the villain of the piece. Knowingly and willfully, he and his associates had preempted the functions of responsible War Department officials. Their "first and most momentous" step had been the "unwarranted and illegal" suspension of competitive bidding. Adoption of the cost-plus contract was "without either excuse or legal justification." Vast amounts of public money had been wasted; at least $5 million could have been saved on each of the sixteen cantonments had the program been properly administered. Partiality had been shown in awarding contracts; Starrett had gone so far as to give a cantonment to his own brother's firm. "Reckless and unlimited expenditures" had gone together with "exorbitant and unreasonable" profits; the more construction was made to cost, the higher were contractors' fees. Secretary Baker drew severe criticism on two counts: first, for failing to assign emergency construction "to the very excellent Corps of Engineers that had a large and varied experience, and was in touch with the industry, through its branches, throughout the country, and had at its command the pick of the engineers of the United States"; and, second, for

[89] *Ibid.*, p. 1073.
[90] *Ibid.*, pp. 1201–2110.

giving Starrett a free hand. McKenzie and McCulloch recommended that cost-plus agreements be prohibited on government work, that the Secretary of War be required to advertise construction contracts even in emergencies, and that all military construction be transferred to the Corps of Engineers. They further recommended that the Constitution be amended so that war profiteers could be tried for treason. Finally, they recommended that the subcommittee's records and reports be turned over to the Department of Justice to be used as the basis for civil and criminal actions.[91]

The minority report, written by Doremus and signed by all the Democratic members of the Graham committee, was a point by point rebuttal of the majority statement. After defending the conduct of the program and exonerating Starrett and the others, the minority presented two conclusions. First, Secretary Baker had acted wisely in abandoning peacetime contracting methods in favor of the cost-plus system; adherence to normal procedures "was not only impossible, but involved an element of danger that the Secretary of War could not have been warranted in incurring." Second, had "the views of the majority . . . been adopted at the beginning of the war, the whole building program would have been in a state of chaos, many of our troops would have perished with cold or died of disease in the winter of 1917, and the German Army would have been in Paris before our soldiers could have entered the battle lines."[92] The Republican Congress made short work of Doremus' report.

On 13 April 1920 the House voted overwhelmingly to accept the majority report.[93] The files of the McKenzie subcommittee went to the Justice Department. Wilson's attorney general, A. Mitchell Palmer, was not about to leave off combatting the "Red Menace" and turn prosecutor for the Republicans. What use the next administration would make of these files remained to be seen.

The Compromise of 1920

Which agency should build for the Army? After the Armistice, when Congress considered plans for the postwar military establishment, four possibilities lay open: continue the Construction Division as an independent branch; assign the work to the Corps of Engineers; return the function to The Quartermaster General; or entrust military construction to a new department of public works. Each of these proposals had powerful advocates. In their fight to perpetuate the separate construction corps, General Marshall and his officers had the backing of Assistant Secretary Crowell. In its aspirations, the Corps of Engineers had the support of Secretary Baker and Chief of Staff March. Among those who favored turning construction back to the Quartermaster Corps was the victorious commander of the American Expeditionary Force (AEF), General John J. Pershing. Many of the country's leading civilian engineers were vigorous proponents of a public works department. As it prepared to legislate the size and organization of the peacetime Army, Congress came under extreme pressure from these contending factions.

Prospects for a department of public works had never seemed so bright as in

[91] H Rpt 816, 66th Cong, 2d sess, 1 Apr 20.
[92] Submitted with H Rpt 816.
[93] 59 *Cong. Rec.* 5620–21.

April 1919, when representatives of seventy-four engineering societies and contractors associations met in Chicago to form the National Public Works Department Association (NPWDA). Marshall O. Leighton, pioneer conservationist and member of the American Engineering Council, became president. Milton E. Ailes, vice president of the Riggs National Bank of Washington, took over the post of treasurer. Francis Blossom headed the finance committee. The goal of the association was to bring about a merger of the sixteen federal construction agencies, including the Rivers and Harbors Service of the Corps of Engineers and the Construction Division of the Army. A committee drafted legislation which was introduced in Congress in June 1919. The industry threw its full weight behind this measure, the Jones-Reavis bill. Herbert C. Hoover and other noted engineers urged its passage. Pledges of support came from distinguished educators and prominent politicians. Committees from every state tried to line up Congressional delegations behind the proposition. The newly organized Associated General Contractors (AGC), the first national association of its kind, joined the crusade. And although they advocated a separate Army construction corps as the best arrangement within the War Department framework, Marshall and his officers heartily endorsed the proposal for a national department of public works.[94]

[94] (1) *Engineering News-Record*, vol. 82 (January–June 1919), p. 855; vol. 83 (July–December 1919), pp. 149, 968. Cited hereinafter as *ENR*. (2) *The Bulletin of the AGC*, January 1920, p. 18; February 1920, p. 40; October 1919, p. 44. (3) John J. Lenney, *Caste System in the American Army: A Study of the Corps of Engineers and Their West Point System* (New York: Greenberg, 1949), pp. 63–66.

Three weeks before the introduction of the Jones-Reavis bill, another bill "to establish an Auxiliary Engineer Corps" was placed in the hopper. Offered by Senator Joseph E. Ransdell of Louisiana, president of the Rivers and Harbors Congress since 1905, this measure had originated with employees of the New Orleans Engineer District. In addition to river, harbor, and flood control work, the auxiliary corps would handle construction of highways, bridges, and other federal improvements. Condemning the Ransdell bill as "the first step in the attempt . . . to militarize the public works of the Federal government," NPWDA president Leighton wrote in the *Engineering News-Record:* "The long-expected response of the Corps of Engineers . . . to the activities of the engineers, architects and constructors of the country looking toward the establishment of a National Department of Public Works has been made." This statement drew from General Black a sharp denial that he had any connection with the measure.[95] Nevertheless, the incident served to highlight the bitter conflict between the Corps and sponsors of a public works department—a conflict that eventually forced a compromise on the military construction issue.

During the late summer of 1919, Congress took up the matter of the peacetime military organization. In August, upon the recommendation of Secretary Baker, identical bills were laid before the House and Senate, calling for an Army of 538,296, making permanent the wartime separation of transportation, motor transport, and finance from the

[95] (1) *ENR*, vol. 82 (January–June 1919), p. 1232. (2) *Ibid.*, vol. 83 (July–December 1919), p. 141.

Quartermaster Corps, and assigning construction to the Corps of Engineers. Maintenance and utilities were split off from construction and put back under The Quartermaster General. A month later Representative S. Hubert Dent of Alabama sponsored a measure setting the strength of the Army at 312,400 and reconstituting the Quartermaster Corps as it had been before the war. Hearings before the Military Affairs Committees began in the fall of 1919 and continued into the winter.

To General March fell the main task of explaining why the Corps of Engineers ought to do construction. Should Congress approve a 500,000-man force, the Army would have to renovate temporary barracks and quarters, and, ultimately, build permanent housing. The Quartermaster Corps lacked technically trained officers; the detail system ruled out specialization. An artilleryman could be detailed to the Quartermaster Corps and put to building barracks. "That is his job," said March, "but he knows nothing about that kind of work." It was different with the Engineers. Construction was their business. All military construction, the Chief of Staff declared, should be in their hands.[96] Supplementing March's testimony, Secretary Baker and high-ranking officers, including Maj. Gen. Frank W. Coe, Chief of the Coast Artillery Corps, and Maj. Gen. George W. Burr, director of PS&T, propounded the official view.[97]

Maj. Gen. Harry L. Rogers, The Quartermaster General, found himself in an awkward position. Military law forbade his publicly opposing Baker and March. Yet it was difficult for him to keep silent and acquiesce in a plan to emasculate his department. Rogers was particularly anxious to retain responsibility for transportation. When he came before the Senate committee on 3 September 1919, he at first declined to make "any replies that would be in the nature of expressions of opinions different from those of my superior officers"; but when Chairman James W. Wadsworth urged him to speak candidly, Rogers flatly said that transportation, finance, and construction "should be just as they were before the war."[98]

Unlike Rogers, General Marshall had no hesitancy in opposing the Secretary and the Chief of Staff. Before the Senate committee, he argued forcefully for a permanent construction corps. First, he contended, construction, a civilian undertaking, should not be assigned to the "strictly military" Corps of Engineers:

> To place the Construction Division under the Engineer Corps would delegate to the latter work for which it is not qualified either by experience or training. To do so would be unsound in theory and untried in fact. The Engineer Corps has never done the construction work for the Army.

Second, the Construction Division should not come under The Quartermaster General:

> To return the Construction Division to the Quartermaster Corps would place upon the Quartermaster Corps an added burden which it should not be called upon to carry. The Quartermaster Corps will be tremendous as it is, its volume of work at least three times what it was previous to the war. . . . No

[96] H Comm on Mil Affs, 66th Cong, 1st sess, *Hearings* on H R 8287, p. 95.

[97] (1) *Ibid.*, pp. 1788, 1037. (2) S Comm on Mil Affs, 66th Cong, 1st sess, *Hearings* on S 2715, Part 4, pp. 218–19.

[98] S Comm on Mil Affs, 66th Cong, 1st sess, *Hearings* on S 2715, Part 11, pp. 544, 546.

commercial concern in this country would jeopardize the efficiency and economy with which this . . . work is to be done by placing it as a subdivision of a subdivision. It is entitled to and must have direct access to final authority in the interest of efficiency and cutting of red tape.

Third, and last, the Construction Division should be continued as a separate staff corps:

In the interest of economy, in the interest of preserving to the Government the business methods of the Construction Division; to make available to the Government the experience gained by having carried forward to successful completion the greatest construction program in the world and the experience gained by the greatest utility organization known to this country; in order to organize this purely commercial function of the War Department in keeping with common-sense business practice of the commercial world, . . . there must be included a separate staff unit known as a Construction Corps . . . .

Marshall then offered an amendment to the Senate bill incorporating his views.[99] Appearing at his own request before the House committee, he enlarged on his testimony before the Senate and made one additional point: "If utilities and construction were to . . . be under any bureau of the War Department, it would be distinctly in the interest of the Government for it to be made a part of the Quartermaster Corps."[100]

Others raised their voices against the War Department proposal to give construction to the Engineers. Testifying before the Senate group, William W. Atterbury, operating vice president of the Pennsylvania Railroad and, during the war, a brigadier general in charge of rail transportation in France, had this to say:

From the standpoint of the Army it is a mistake to take "the cream off the jar of milk" and put them in the Engineer Corps. Then you send them to a school, after which the Engineers are put out on civil work. The result is that you have produced neither engineers nor soldiers. That is perhaps a little exaggerated, but I say they are not engineers because when out on general work, their work is done by civilians. The work ordinarily done by the Corps of Engineers . . ., buildings and river and harbor work, should be done by a civilian organization under a civilian department.

Although he conceded that military engineering—fortifications and the like—was best left to military engineers, Atterbury recommended that the Corps be excluded from all other types of construction.[101] Senator Chamberlain, opposed to dismembering that "great supply organization," the Quartermaster Corps, made the comment: "To transfer to the Engineer Corps the duties of construction and repair that from the earliest days of the Army have formed a natural and important part of the duties of the Quartermaster's Department . . . apparently is satisfactory only to the Engineer Corps."[102]

To help resolve the controversy, the committee invited Generals Wood and Pershing to testify. Now, as earlier, Wood wished to see construction in the Corps of Engineers. "You can," he told the Senate group, "I think, very wisely go

[99] S Subcomm of the Comm on Mil Affs, 66th Cong, 1st sess, *Hearings* on S 2715, Part 22, pp. 1414–16, 1389–1427, *passim*.

[100] H Comm on Mil Affs, 66th Cong, 1st sess, *Hearings* on H R 8287, I, 1710, 1697–1739, *passim*.

[101] S Comm on Mil Affs, 66th Cong, 1st sess, *Hearings* on S 2715, Part 8, p. 439.

[102] S Comm Print, 66th Cong, 1st sess, *Army Reorganization Bill*, 5 Sep 19, p. 20.

back to the Quartermaster Corps and charge that corps with transportation, clothing, food, and pay, and take construction away from it and put it under the Engineers . . . the only trained construction corps we have."[103] In an exchange with Chairman Julius Kahn of the House Military Affairs Committee, Pershing took a different stand:

Mr. Kahn. General, as I understand you, you recommend that the construction corps be continued as a part of the Quartermaster's Department.

General Pershing. Yes; it should have an organization similar to the one it has now, and I have no doubt that the Quartermaster General would simply embody it as it stands, as a part of his organization. That would be the logical and rational thing for him to do.

Mr. Kahn. It would not disrupt the Construction Corps if we were to transfer it?

General Pershing. I should think not at all.[104]

Among the last to testify was Benedict Crowell, who made a strong plea for an independent construction corps. Appearing before the House committee on 9 January 1920, he stated:

The main argument against the retention of the Construction Division seems to be one of expense. I have never been able to see, however, how the work could be done any cheaper by any other set of men. The plans of the Construction Division call for construction officers only to be located in the large posts . . . . The small repairs to the small posts could still be left to the quartermasters as they were in the old days.

When Congressman Anthony referred to reports by efficiency experts "giving figures, showing savings of a great many millions of dollars" to be brought about by consolidating functions, Crowell replied:

It is easy to say that by this consolidation we can save a lot of money. I have heard that many times.

You may have a few men out here digging a ditch and over in another place you may have a few men sawing wood. But by the consolidation of the men digging the ditch and the men sawing the wood you would not make any saving. Many of the consolidations proposed in the War Department are on a parallel with that.

One consolidation Crowell did favor was that of real estate with construction. Emphasizing the close relationship between the two, he said, "One can hardly be handled if separated from the other." Discussing proposals for an Under Secretary to have charge of the business side of the War Department, Crowell stressed the commercial character of both military construction and military real estate.[105]

When the hearings ended, Congressional opinion remained sharply divided on the issue of construction. A majority of the Senate committee proved to be receptive to the arguments advanced by Marshall and Crowell. On 27 January Chairman Wadsworth reported out a bill continuing the Construction Division as an independent branch. The measure also provided for a separate transportation corps and a separate finance corps. A minority report filed by Senator McKellar, who objected to the perpetuation of these separate branches, revealed the committee's lack of unanimity. After a heated debate, in which Engineer and separate corps partisans were beaten down, the House Military Affairs Committee voted in favor of the Quartermaster Corps. In

[103] *Ibid.*, Part 13, p. 637.

[104] H Comm on Mil Affs, 66th Cong, 1st sess, *Hearings* on H R 8287, I, 1542.

[105] *Ibid.*, II, 1824, 1819–20, 1825.

late February Chairman Kahn reported out a bill returning to The Quartermaster General all of his prewar functions, except finance, which would be a separate department.[106] Both committees had rejected Baker's proposal to put construction under the Engineers. As the bills reached the floor, the scene appeared to be set for a battle royal.

Although the committees had turned down his recommendation on construction, Secretary Baker was not ready to accept defeat. Toward the end of February he asked his staff to prepare an order transferring construction to the Corps of Engineers. He then left Washington on a short trip. While he was away, a draft of the order went to Acting Secretary Crowell, who pigeonholed it. Upon Baker's return, Crowell informed him that many of General Marshall's officers would resign if the order took effect. Since the Construction Division still had a sizable program under way, the threat was a real one. Regretfully, Baker suspended the order and left the decision to Congress.[107]

As their hopes of absorbing the Construction Division dimmed, the Engineers found themselves on the defensive. Since the fall of 1919, the campaign for a public works department had gained momentum. Recognizing the Corps as their great adversary, leaders of the NPWDA adopted a dual strategy: first, to save the Construction Division of the Army; and, second, to demolish the arguments in favor of having rivers and harbors under the Engineers. Speeches, bulletins, pamphlets, press releases, articles—Leighton and his staff pumped out a steady stream of propaganda. To transfer the Construction Division to the Engineers would be absurd; "civilian work totaling a hundred million dollars a year [would fall] into the hands of men with no training and experience along these lines."[108] To continue "militaristic control" over civil works was unsound.[109] The Engineers' civil projects were "much too costly, their procedure inefficient, and their training too narrow and inbred." The logic that they must have civil work in time of peace as training for their wartime mission was no longer valid. In France Engineer Regulars had performed non-Engineer duties. Line officers had laid out the trenches, the principal field works of the war. A civilian-manned construction corps had carried out a vast building program behind the lines. The Engineers in the AEF had been superfluous. Militarily, the Corps was defunct[110]—or so its opponents maintained.

By early 1920, the offensive seemed to be gaining ground. In January ninety-five delegates, representing societies with a membership of 90,000, met in Washington for a second NPWDA conference. A roll call indicated strong support in Congress; two states reported their entire delegations pledged to support the Jones-Reavis bill. Senators and Representatives threw open their doors. The

[106] (1) S Rpt 400, 66th Cong, 2d sess. (2) 59 *Cong. Rec.* 4205. (3) H Rpt 680, 66th Cong, 2d sess.

[107] Ltr, Baker to McKenzie, 10 Mar 20. Reprinted in 59 *Cong. Rec.* 4226.

[108] NPWDA *Bulletin*, November 26, 1919. Quoted in Lenney, *Caste System in the American Army*, p. 48.

[109] Testimony of Professor G. F. Swain, Harvard University, 11 Feb 20. In S Comm on Public Lands, 66th Cong, 2d sess, *Hearings* on S 2236, p. 14.

[110] National Public Works Department Association, *This Tells Why the Government Should Have a Department of Public Works* (Washington: NWPDA, 1919), pp. 23–26.

conference heard addresses by Governor Frank O. Lowden of Illinois, whose state was one of several with a public works department; by Representative Reavis, the author of the bill; by Mr. Leighton, who referred to "our effort, our idea, our legislative bill" as "the cornerstone of a structure embodying efficiency in all departments of Government"; and by General Marshall, who urged creation of the new department as "the most constructive step in the history of Government work." The gathering broke up on an optimistic note.[111] On 11 February the Senate Committee on Public Lands opened hearings on the Jones-Reavis bill.[112] On the 17th, speaking before the Mining and Metallurgical Engineers in New York City, Herbert Hoover reiterated his support of the measure.[113] At an AGC conference a few days later, members reported that sentiment in favor of the bill was growing rapidly.[114]

On 8 March 1920, when the House took up the Army reorganization bill, General Marshall's officers packed the galleries. Noting their presence, one representative observed: "I have never in all the history of Congress seen such a lobby as there has been in an effort to make this a separate corps."[115] In a surprise move, Representative Thomas W. Harrison of Virginia read into the record a recent letter from Secretary Baker to Chairman Kahn, endorsing the plan for an independent construction corps. The climax came on 11 March, when Representative Rollin B. Sanford of New York offered an amendment making permanent the Construction Division of the Army. Speaking in support of this rider, Congressman Reavis argued that military engineering was obsolete. "The great monuments of the Army engineers of the past withered before the march of the Germans in the first Battle of the Marne," he said. "The fortifications and forts of Belgium and France were of no service." Continuing, he observed:

> Among the very great Army Engineers that we had in the Army when that sort of situation came up was General Harts, a very great engineer. He was made provost marshal in Paris. General Sibert, to whom the world will always be indebted for his services in the Panama Canal construction, was put in charge of chemical warfare in Washington. General Biddle was put in charge of our troops in England, and in their places we put on the work at the front and behind the front civilian engineers, who knew road building, who knew railroads, who knew the building of bridges, who knew water supply, and sanitation; we put them in a construction corps, and their work in France is among the marvelous things that America did in that country during this war.[116]

Although the House applauded the mention of General Sibert's name, it proceeded to adopt the Sanford amendment by a vote of 133 to 74. Both houses now had before them bills favoring the separate corps. To many it appeared that Marshall's battle was won.

But Maj. Gen. Lansing H. Beach, who had succeeded Black as Chief of Engineers in January, was determined to fight to the finish. Upon learning of the

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[111] (1) *The Bulletin of the AGC*, January 1920, p. 18; February 1920, p. 40. (2) *ENR*, vol. 84 (January–June 1920), pp. 169–70, 292. (3) Lenney, *Caste System in the American Army*, p. 67.

[112] S Comm on Public Lands, 66.h Cong, 2d sess, *Hearings* on S 2236, 11 Feb 20.

[113] *ENR*, vol. 84 (January–June 1920), p. 418.

[114] *The Bulletin of the AGC*, March 1920, pp. 43–44.

[115] 59 *Cong. Rec.* 4205.

[116] 59 *Cong. Rec.* 4226. The officers to whom Reavis referred were Brig. Gen. William W. Harts; Brig. Gen. William Sibert; and Maj. Gen. John Biddle.

House action, he went at once to Secretary Baker. On 12 March, the same day the amendment carried, the Secretary repudiated the letter read by Mr. Harrison. In a letter to Chairman Kahn, Baker stated: "Through inadvertence the full purport . . . escaped my notice and I desire at once to correct any erroneous impression it may have conveyed as to my attitude." He strongly urged that construction go to the Corps of Engineers.[117] On the 13th Beach called attention to serious errors of fact in Mr. Reavis' remarks. There was no Construction Corps in the AEF. Virtually all construction in France was done by the Engineers. Generals Harts, Sibert, and Biddle were promoted out of the Corps for "meritorious service."[118] On the 17th Beach reached an agreement with General Rogers: the Engineers would back the Quartermaster effort to obtain transportation, finance, and maintenance and utilities; The Quartermaster General would support the Engineers' contention that construction belonged in their Corps.[119] The following day General Pershing made a strong statement on the Engineers' behalf. Holding that the Engineers should not be "deprived of the credit justly due them for the energy and skill" they had displayed as the sole construction arm of the AEF, Pershing wrote:

> If Congress is indisposed to return the work to the Quartermaster Corps, it might with equal advantage be confided to the Corps of Engineers, which I know to have proved itself competent to perform the task promptly, economically, and to the satisfaction of the Army and the country. The long and honorable record of able, honest, and faithful service of the Corps of Engineers is one of which the entire Army, and the United States itself, may well be proud, and I feel sure that no mistake will be made if all military construction is, in the United States as it was in France, given to that Corps.[120]

On the 18th the House, reversing its stand, voted to strike out the Sanford amendment and passed the committee bill returning construction to the Quartermaster Corps.

Having blocked the separate corps in the House, Beach hoped to go on to win the Senate vote. Initially, he tried to gain the support of Senator Wadsworth. Two of the top-ranking Engineers in the AEF, Maj. Gen. William C. Langfitt and Maj. Gen. Mason M. Patrick, went in person to ask that Wadsworth sponsor an amendment favoring the Corps. Making the same request in writing, General Beach inclosed a draft of the proposed rider and copies of his correspondence with General Rogers. Secretary Baker also urged the Senator to back the Engineers.[121] When Wadsworth rejected these advances, another champion was found. On 13 April Senator Irvine L. Lenroot of Wisconsin moved to strike out the provision in the committee bill which called for a separate corps and announced that if his motion carried he would propose that construction be placed where it belonged—in the Corps of Engineers. The highlight of the debate was a speech by Senator Wadsworth, flaying Generals Beach and Rogers. Behind the scenes,

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[117] Ltr, Baker to Kahn, 12 Mar 20. Martin Papers in EHD.

[118] Ltr, Beach to Kahn, 13 Mar 20. Martin Papers.

[119] (1) Ltr, Beach to Rogers, 17 Mar 20. (2) Ltr, Rogers to Beach, even date. Both in Martin Papers.

[120] Ltr, Pershing to Kahn, 18 Mar 20. Martin Papers.

[121] (1) Ltr, Beach to Wadsworth, 19 Mar 20. Martin Papers. (2) Ltr, Baker to Wadsworth, 29 Mar 20. AG 011–012.2.

Wadsworth charged, a fierce struggle for power had raged between the two. But when both realized they were losing, they had joined forces to squelch the separate corps. Wadsworth advised his colleagues to turn down the Lenroot amendment.[122] The decision came on 14 April; Lenroot was defeated. Six days later the Senate passed the committee bill providing for an independent construction corps.

With the Engineers out of the running, the choice was between the Construction Division of the Army and the Quartermaster Corps. There could be no question as to which General Beach preferred. When the House and Senate conferees made their report late in May, he could take heart from their decision. Along with transportation, construction and real estate were assigned to General Rogers' department. Both houses accepted the conferees' version of the bill, and on 4 June President Wilson signed it into law. In his order transferring construction, Secretary Baker directed that the Construction Service be "organized and operated as a separate service of the Quartermaster Corps."[123] Implicit in this directive was the idea that construction might be lifted out again in another emergency. The new arrangement was a compromise; how long it would endure only time could tell. To the Engineer way of thinking, the Quartermaster Corps was a supply organization. What was needed was a branch whose sole duty would be construction. That branch ought to be the Corps of Engineers. From this premise, no Chief of Engineers ever wavered.

When the Construction Division of the Army went down in defeat, the drive for a national department of public works was temporarily blunted. As the civilians who had joined up in 1917 returned to their firms, pressure on Congress relaxed. According to Leighton's recollection, two or three "old fellows, fierce folk who would speak out," continued the battle. But Marshall's officers, on whose backing Leighton had counted heavily, left him in the lurch. When Congress adjourned early in June, on the eve of the Republican national convention, the Jones-Reavis bill died in committee. But the "dream," as Leighton called it, was far from ended.[124] Proponents of a public works department would be heard from again.

The Construction Division was disbanding. One by one the officers were saying farewell. General Marshall was resigning from the Army to become managing director of the Associated General Contractors. Colonel Hartman, the one remaining regular, was attempting to sign up temporary officers for permanent service in the Quartermaster Corps. The spirit of the wartime organization was preserved in a song to be sung to the tune of "Hinkey Dinkey Parlez-Vous." Evoking memories of their warm comradery:

> "We fought the war with General Puck's Construction Crew,
> The only French we ever learned was 'Entre Nous'"

and glorying in their accomplishment:

> "We made a dollar look like a dime,

[122] 59 *Cong. Rec.* 5600–5612, 5650, 5894.
[123] WD GO 42, 14 Jul 20.
[124] Interv with Marshall O. Leighton, 2 Apr 57. See also *The Bulletin of the AGC*, August 1920, p. 33.

But all the camps were done
on time,
By General Puck's Construc-
tion Crew"

the singers ended with a promise:

"And if we have another war,
They'll only have to signal for
General Puck's Construction
Crew."[125]

[125] Reprinted in *The Homecomer*, December 3, 1937, p. 4.

On that note the Construction Division of the Army passed into history.

American experience in the First World War had demonstrated conclusively the vital role of construction in modern-day mobilization and the decisive importance to national security of a strong construction force in being. Unfortunately, lessons taught are not always lessons learned. A second, graver emergency would have to arise before these truths were grasped and translated into action.

CHAPTER II

Lean Years

The years following World War I were famine years for the War Department, as the American people reverted to their traditional postwar custom of reducing a fighting army to a skeleton force. The war to end war had been fought and won. Disarmament, neutrality, and isolationism were widely accepted as desirable and attainable goals. The twenties, with their return to normalcy and balanced budgets, brought sharp retrenchment in military spending. The great depression of the thirties directed attention away from problems of national security to problems of national recovery. As the Army dwindled to virtual insignificance, the military plant decayed and military vision clouded. Efficiency was sacrificed to economy. Planning tended to become increasingly unrealistic. The Construction Service of the Quartermaster Corps, like most of the Army, suffered from the effects of governmental parsimony and public indifference.

The Construction Service labored under even crueler handicaps. As a subdivision of a multipurpose supply organization, it was at a serious disadvantage. Its chief, one of three brigadier generals in the Quartermaster Corps, was selected on the basis of seniority; no engineering background was required. "It was sometimes difficult," one construction officer recalled, "to get technical matters across to our superiors."[1] Maintaining a staff of technically competent officers was also difficult. Such men were often reluctant to serve in a corps which might assign them to wagon companies, remount depots, or graves registration duty; and the General Staff showed little inclination to place good officers in Quartermaster vacancies. Moreover, the status of the service was at times affected by the onus of criticism which attached to its wartime predecessor, and its future seemed filled with uncertainties. As the public works controversy waxed hotter, as powerful forces battled for high stakes, rumors periodically swept through the Construction Service: "The Engineers are going to grab us."[2]

That many problems could have been avoided by placing military construction under the Engineers is beyond doubt. A specialist corps, with a large continuing program of rivers, harbors, and flood control projects, and the chosen branch of most top West Point graduates, the Corps of Engineers was in a far more advantageous position than the Construction Service. But despite strong arguments in favor of a transfer, the compromise of 1920 endured for two decades, as circumstances combined to preserve the *status quo*.

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[1] Comments of Brig Gen Wilmot A. Danielson on MS, Constr in the United States, 1959, p. 55. Cited hereinafter as Danielson Comments.

[2] Interv with Miss Winnie W. Cox, 10 Sep 56.

The Construction Service, 1920–1938

When, on 15 July 1920, the Construction Division of the Army became the Construction Service of the Quartermaster Corps, the future appeared bright. For the first time in the Army's history, all military construction, except fortifications work, was centralized in one permanent organization. Also for the first time, on-the-job construction was centrally controlled, as Constructing Quartermasters reported directly to The Quartermaster General rather than to commanders in the field. Never before had the Quartermaster Corps been so rich in construction talent. Ninety officers of the wartime division accepted permanent commissions, and their ranks were swelled by the transfer of technically trained officers from other branches and the assignment of a number of fine Quartermaster Regulars to the Construction Service. A staff of highly competent civilians was an important legacy from General Marshall's organization. A 42.6-million-dollar program, comprising 139 projects, was on the books in mid-1920, and prospects for a large continuing program seemed good.[3] Authorized under the Defense Act of 1920 was a force of 280,000 men, over two and one-half times the size of the prewar Army.

Designed as a separate element of the Quartermaster Corps, the Construction Service was self-contained and distinctive. In the Washington office, three major divisions, Construction, Maintenance and Utilities, and Real Estate, were supported by Administrative, Fiscal, Legal, and Planning Branches. Recently established district headquarters at Washington, San Antonio, San Francisco, Honolulu, and Manila were independent of other Quartermaster field offices.[4] From mid-1920 through 1938, eleven Chiefs of Construction,[5] known unofficially as Constructing Quartermasters General, ruled over "a kingdom in itself." A companionable, close-knit group, the members of the service formed "a sort of club." The separation of construction from other Quartermaster activities was reinforced by a corps-wide policy announced in 1921. Recognizing "that the highest efficiency can only be attained by the training and development of specialists and the intelligent use of such specialists," the Acting Quartermaster General wrote: "Every effort should be made . . . to utilize to best advantage the services of specialists and in the lines in which they have specialized."[6]

The fortunes of the service suffered an early decline. The inauguration of President Harding ushered in an era of strictest economy in military spending. The enlisted strength of the Regular Army fell to 132,106 by July 1922 and to 118,348 a year later. Not until the mid-1930's would the strength exceed 130,000.[7] On 1 August 1921 Secretary of

[3] *Report of the Chief of the Construction Division, 1920* (Washington, 1920), p. 7.

[4] (1) OQMG Circ 11, 28 Jul 20. (2) OQMG Office Memo 119, 30 Aug 21. (3) Constr Div Office Order 312, 21 Jun 20.

[5] They were: Brig. Gen. John M. Carson, Col. Edward S. Walton (Acting), Brig. Gen. John T. Knight, Brig. Gen. Albert C. Dalton, Brig. Gen. M. Gray Zalinski, Brig. Gen. Arthur W. Yates, Brig. Gen. William S. Horton, Brig. Gen. Winthrop S. Wood, Brig. Gen. Louis H. Bash, Brig. Gen. Patrick W. Guiney, and Brig. Gen. A. Owen Seaman.

[6] OQMG Circ 20, 31 Oct 21.

[7] Mark Skinner Watson, *Chief of Staff: Prewar Plans and Preparations*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1950), p. 16.

War John W. Weeks imposed a ceiling of $500 on expenditures which could be made on "any building or military post or grounds" without his approval.[8] Later that month he laid down the policy which would govern construction for the next six years: "No permanent construction will be undertaken where permanent construction can be postponed and only such repairs and temporary construction necessary will be considered."[9] From 1921 through 1926 funds voted for construction at military posts totaled $4,535,357, an average of but $755,893 per year. Most of this money went for a few big projects: Camp Benning, Georgia, and Camp Lewis, Washington; Edgewood Arsenal in Maryland; the disciplinary barracks at Fort Leavenworth, Kansas; a reservoir and a refrigeration plant for the Hawaiian garrison; and a large warehouse at Gatun, Canal Zone. During this same period, $4,725,760 was appropriated for construction and repair of hospitals. The total provided for maintenance and utilities in these years, $29,452,217, though comparatively large, was woefully inadequate for the tasks at hand.[10]

Meantime, Weeks was moving to divest the Army of surplus war properties. He placed nine camps and cantonments built in 1917 and 1918 in caretaking status to be used as training grounds for the nine corps areas;[11] he selected five special cantonments constructed late in the war as permanent "homes" for various branches;[12] and he retained Aberdeen Proving Ground, Edgewood Arsenal, eight airfields, two general hospitals, and several dozen other installations.[13] The rest of the huge wartime military plant was slated to go. Factories would be auctioned off; cantonments, salvaged; and land, leased or sold. During fiscal year 1923, Maj. Napoleon W. Riley, chief of the Real Estate Division, Construction Service, cleared $3.5 million through sales and negotiated leases which would bring in rentals totaling nearly $1 million a year. Riley co-ordinated his work with the Office of the Director of Sales, which Major Hartman headed from 1922 to 1924.[14] Maj. Merrill D. Wheeler, who succeeded Riley in 1924, was to conduct more extensive "mopping up" operations involving larger blocks of real estate.

Maintenance, rather than new construction, constituted the principal work of the service in the early 1920's. As the Army fell back on its permanent installations, the Quartermaster Corps faced an immense task of upkeep and repair. Heading the maintenance organization during the Harding administration, Capt. William Cassidy and Maj. Wilmot A. Danielson faced what was described as

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[8] WD GO 36, 1 Aug 21.

[9] Ltr, TAG to Chiefs of Brs, 26 Aug 21. 600.1 Part 1.

[10] Summary of Appns, Constr Div OQMG, 1920–40, 13 Sep 41. EHD Files. Cited hereinafter as Summary of Appns, 1920–40.

[11] These corps area training centers were: Devens, Mass. (First); Dix, N.J. (Second); Meade, Md. (Third); McClellan, Ala. (Fourth); Knox, Ky. (Fifth); Custer, Mich. (Sixth); Funston, Kans. (Seventh); Travis, Tex. (Eighth); and Lewis, Wash. (Ninth).

[12] These were: Humphreys, Va., renamed Belvoir (Engineers); Vail, N.J., renamed Monmouth (Signal Corps); Eustis, Va. (Railway Artillery); Bragg, N.C. (Field Artillery); and Benning, Ga. (Infantry).

[13] The airfields were: Brooks and Kelly, Tex.; Chanute and Scott, Ill.; Langley, Va.; March, Calif.; Mitchel, N.Y.; and Selfridge, Mich. The hospitals were: Fitzsimmons General Hospital at Denver, Colo., and Beaumont General Hospital at El Paso, Tex.

[14] Incl with Memo, Riley for Chief Constr Serv, 15 Oct 23. QM020 (Constr) 1921–39.

"the worst headache in the Army."[15] Under their care were more than 150 reservations, many dating from the earliest days of the nation's history and most encumbered with temporary wartime structures. Standard building and engineering practice indicated a yearly sum for maintenance equivalent to 3 percent of the appraised value of permanent structures and to 8 percent of temporary. Yet in 1922 appropriations amounted to only 1.5 percent and in 1923 to but 0.82. Post quartermasters did their best to stretch meager budgets by using salvaged materials and employing troops as repairmen and custodians. But with insufficient funds, they fought a losing battle. The backlog of deferred maintenance averaged approximately $10 million a year.[16]

It was in these years that a start was made toward modernizing the military plant. Developing a plan for updating life on Army posts, Cassidy and Danielson pushed determinedly ahead. Automation was ushered in with the introduction of pressure switch controls for pumping plants and thermostats for heating systems. Installation of an electric ice box in the Chief of Staff's quarters at Fort Myer marked the beginning of home refrigeration in the Army. Electric ranges began to replace old-time coal cookstoves. When funds were lacking, the Quartermaster officers resorted to stratagems.[17] Recalling the method by which natural gas was brought to several reservations, Danielson wrote:

> One of my first duties on reporting in Washington . . . in the fall of 1921 was to negotiate a gas contract for Kelly Field and Normoyle at San Antonio. To use natural gas required, of course, a distribution system. No funds for this were available. To overcome this we estimated the cost of the distribution system and added 10 cents a thousand to the contract price of 30 cents for the gas, making 40 cents total until the distribution system had been paid out. . . . This plan was used in getting natural gas to Fort Sill and Fort Riley.

A somewhat different plan was used at Fort Leavenworth, where a right-of-way concession served as the *quid pro quo* for "a contract at a reasonable rate." Thus, the wartime pattern was reversed, as the Construction Service struggled to make a dime look like a dollar.[18]

Retrenchment forced major readjustments in the construction setup. As the volume of new work diminished, district offices were abandoned, and the staff in Washington was reduced. By late 1923 the Construction Service had only twenty-four officers, thirteen of whom were CQM's.[19] In 1924 The Quartermaster General reported only one project "of any magnitude," a hospital wing and a cluster of officers quarters at Fort Benning, Georgia.[20] Surplus construction officers received other Quartermaster duties. Men trained as architects and engineers found themselves commanding wagon companies, administering depots, and serving as post QM's. Specialization went out the window, as emphasis shifted to the development of "all-around quartermasters."[21]

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[15] Cox Interv, 10 Sep 56.

[16] (1) WD Ltr AG 600.15 (1-9-23) Misc M-D, 12 Jan 23. QM 600.3 (Misc) 1922-31. (2) Annual Rpt of TQMG, 1923, pp. 4-5. QM 319.1. (3) Memo, G-4 for CofS, 20 Jul 25. AG 319.12 (8-21-25).

[17] Elizabeth C. Ryder, History of the Evolution of Repairs and Utilities (MS), 1958, Secs 2, 6, 7. EHD Files.

[18] Danielson Comments, pp. 4-6.

[19] (1) OQMG Circ 21, 30 Nov 21. (2) Memo, OQMG for ASW, 16 Nov 23. QM 210.321 1923.

[20] Ltr, TQMG to TAG, 4 Sep 24. QM 319.1.

[21] Memo, OQMG (Maj M. R. Wainer) for TQMG, 13 Oct 22. QM 210.321 1922.

The organization inherited from General Marshall deteriorated sadly. Morale dipped. Some gave up in disgust. A dedicated few fought to prevent further losses. When Major Danielson talked of transferring to the Corps of Engineers, his brother officers persuaded him to stay. Conditions, they told him, were bound to improve.[22]

A turning point came in the mid-1920's, when living conditions at Army posts became a topic of wide concern. As early as May 1923, commenting on housing at Fort Belvoir, Virginia, the Chief of Engineers, General Beach, advised The Quartermaster General:

> Present temporary buildings are rapidly approaching the end of their usefulness as habitable shelter. Maintenance cost by constant repair is prohibitive. Considering the delapidated condition of these buildings, money spent for repairs, while an immediate necessity, is beyond a doubt uneconomical and each year of delayed replacement by permanent construction adds to what is considered a waste of Government funds.[23]

A few months later The Inspector General pointed out that temporary wartime structures were "becoming unfit and unsafe for occupancy."[24] Early in 1924, when an officer publicly stated that posts in the Second Corps Area were "rotting away" and told how soldiers at Governors Island fished for driftwood to repair flooring, the story made the front page of the New York *Times*.[25] In his annual report for 1924 Secretary Weeks disclosed that 40,000 men were living under "unsuitable" conditions.[26] Leading periodicals took up the theme, featuring articles with such titles as "Our Homeless Army" and "Army Housing: A National Disgrace."[27]

By the fall of 1924 Weeks was prepared to offer a long-range building program to Congress. Two plans had been submitted by Constructing Quartermaster General Knight. Both were based on an Army of 150,000 men, and both were relatively modest. The first made use of virtually all existing posts; the second concentrated troops at a few large reservations and provided for the abandonment of surplus installations. Although the General Staff preferred the second plan, practical considerations compelled it to choose the first. As G–4 advised the Chief of Staff: "Difficulty has always been experienced in securing the necessary authority to dispose of old Army posts due to the fact that adjoining communities through their Congressmen have raised such strong objections to having the garrison taken away." There was another important consideration: the first plan would cost $10 million less than the second.[28]

The program presented to Congress contemplated the expenditure of $110 million over a 10-year period. To alleviate miserable living conditions was the main objective. Permanent barracks, quarters, and hospitals would replace ramshackle wartime structures. Water and sewage systems would be modern-

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[22] Danielson Comments, p. 55.

[23] Ltr, CofEngrs to TQMG, 28 May 23. 600.1 Part 1.

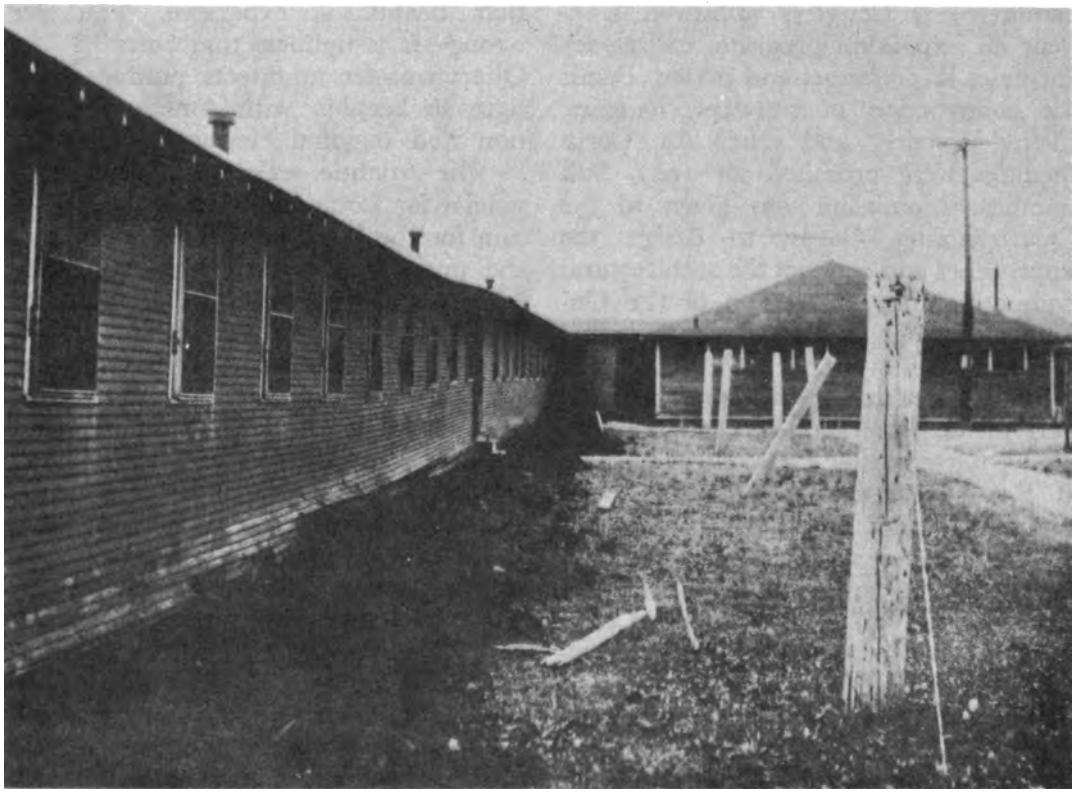
[24] Ltr, TIG to SW, 10 Sep 23. AG 319.12 (9–31–23).

[25] New York *Times*, February 26, 1924, pp. 1, 10. © 1924 by The New York Times Company. Reprinted by permission.

[26] *Report of the Secretary of War, 1924* (Washington, 1924), p. 16ff.

[27] (1) *Outlook*, vol. 142, no. 5 (February 3, 1926), pp. 178–80. (2) *The Literary Digest*, November 5, 1927, pp. 10–11.

[28] Memo, G–4 for CofS, 18 Oct 24. G–4/14958.



CHANUTE FIELD, ILLINOIS, *1923, showing dilapidated condition of World War I temporary structures.*

ized, and up-to-date heating and cold storage plants would be provided. Later on, if funds permitted, hangars, vehicle storage, and warehousing would be constructed. The Quartermaster General came up with a scheme for financing the program. Since the end of the war, he had transferred to other departments or sold over $90 million worth of surplus military real estate. The War Department had received nothing whatever from these transactions. The Quartermaster General asked that proceeds from future sales go into a fund to be used for permanent construction.[29]

[29] G–4/14958.

In 1926 Congress loosened the purse strings slightly. The Quartermaster General received his permanent construction fund, together with authority to spend $7 million during the coming year. The total made available for new construction in 1926 topped the $8 million mark for the first time since the war. Appropriations for maintenance, repairs, and utilities, the so-called barracks and quarters funds, amounted to nearly $14 million, almost $10 million more than the figure for the previous year. The sum for construction and repair of hospitals remained as before, between $400,000 and $500,000. Recognizing another urgent

requirement, Congress approved a 5-year air expansion program, calling for increases in personnel and planes. Funds for construction of runways, hangars, fueling systems, and other Air Corps facilities were promised for 1927. Still another commission was given to the Quartermaster Corps: to design the approaches and conduct the architectural competition for the Tomb of the Unknown Soldier in Arlington National Cemetery.[30]

With a sizable sum of money in hand and the expectation of more to come, The Quartermaster General, Maj. Gen. B. Frank Cheatham, launched a comprehensive plan for post development. At the time, few reservations were places of beauty. As one architect observed, barracks and quarters were often "arranged in monotonous rows close together, with little privacy, with no outlook or setting, utterly unattractive."[31] Cheatham's architectural staff was second to none in Washington. Headed by Lt. Col. Francis B. Wheaton, formerly with McKim, Meade & White, it included Luther M. Leisenring, a graduate of the University of Pennsylvania and a former associate of Cass Gilbert; 1st Lt. Howard B. Nurse, a graduate of Mechanics Institute who had practiced in Rochester, New York; and a number of other fine professionals. Although cost would be an important factor in the drafting of new plans, the attitude of Wheaton's group was expressed by Nurse, who quoted a passage from Ruskin: "You may have thought that beauty is expensive. You are wrong—it is ugliness that costs."[32] The Quartermaster architects produced designs in keeping with American tradition and regional character: Georgian for the Atlantic seaboard, French Provincial for Louisiana, and Spanish Mission for the Southwest. To help lay out the projects, they called in nationally known city planners as consultants. Their goal, as Cheatham defined it, was "a deviation from the set type of military post."[33]

In carrying out the 10-year program, the Construction Service was handicapped by a shortage of officers. To be sure, there were more than enough qualified men within the Quartermaster Corps to handle the load. But relatively few were available for construction duty. Most were performing other Quartermaster tasks, serving on staffs, or attending school. The so-called Manchu Law, under which no officer below the rank of general could remain in Washington longer than four years, made a bad situation worse. When Lt. Col. Henry R. Casey, the key man in the Washington office was due to leave, Constructing Quartermaster General Dalton managed to keep him on by means of a "field" assignment to the Washington QM Depot. When Capt. Phillips H. Mallory, chief of the maintenance division, was "Manchued" out, Dalton summoned Danielson from Boston, where he was completing work toward a master's degree at MIT. Only with difficulty could Constructing

[30] (1) 44 *Stat.* 302, 264, 783, 914. (2) Summary of Appns, 1920–40. (3) *Report of the Secretary of War, 1926* (Washington, 1926), pp. 33–36.

[31] George B. Ford, "New Army Posts for Old," *The Quartermaster Review*, November–December 1929, p. 19.

[32] 1st Lt. Howard B. Nurse, "The Planning of Army Posts," *The Quartermaster Review*, September–October 1928, p. 15.

[33] Annual Rpt of TQMG, 1927, pp. 67–69. AG 319.12.



POST CHAPEL, RANDOLPH FIELD, TEXAS

Quartermasters be found for the growing number of projects. Fortunately, some good officers were available, among them Capts. George E. Lamb and Elmer G. Thomas, both veterans of the wartime division; Maj. John D. Kilpatrick, holder of two engineering degrees from Princeton University; and Capt. George F. Hobson, a graduate of MIT. But the ranks were too thin. General Cheatham had to recommend that commanding officers act as CQM's at Aberdeen Proving Ground and two Ordnance depots.[34]

[34] QM 210.321.

As the program expanded, pleasing vistas opened before the "homeless Army." Handsome masonry buildings began to replace the unsightly tempos of World War I. Telephones, oil burners, automatic stokers, storm doors, screens, and lighted streets enhanced the amenities of life on reservations. The new Air Corps stations were to be showplace installations. New medical facilities would be the last word in hospital design. These innovations and improvements sparked a sprucing-up campaign. Station commanders started nurseries and promoted the planting of trees and shrubs. Garden



OFFICERS' CLUB, FORT BELVOIR, VIRGINIA

clubs sprang up at almost every post. A ladies' committee, headed by Mrs. Cheatham, assisted with the decor of family quarters. The large, well-planned, permanent posts, with their fine buildings and attractive landscapes, were a source of pride to the Army. Fort Belvoir, Virginia, with its colonnaded structures spread out along ridges overlooking the Potomac, and Randolph Field, Texas, with its gleaming Mission architecture and imposing grounds, were particularly striking. The program aroused considerable enthusiasm and won the strong support of Secretary of War Dwight F. Davis. The attitude of Congress was favorable; from 1926 through 1930 it voted approximately $126 million for the Construction Service.[35]

Large-scale construction at permanent posts, major airfield projects, modern hospital wards and clinics, the Wright Brothers Memorial at Kitty Hawk, North Carolina, restoration of the Lee Mansion at Arlington, Virginia, a group of massive buildings at the U.S. Military Acad-

[35] (1) Annual Rpts of TQMG, 1927–30. QM 319.1. (2) Ltr, Chief Constr Serv OQMG to TAG, 5 Nov 28. QM 618.34 (Gen). (3) Summary of Appns, 1920–40.

emy—each new assignment added to the strain. The officers of the Construction Service were aging, and few young men were being trained to fill their shoes. Since the war, second lieutenants had shown little interest in Quartermaster careers. In the spring of 1928 General Cheatham had only five on his rolls, although he was authorized forty-two. A hard core of "old guard" construction officers—men like Danielson, Hartman, Nurse, and Thomas—endeavored to hold the line. CQM and Vicinity offices, each having jurisdiction over a wide area, were established in major cities. Civilians filled key posts in the Washington office. When Colonel Wheaton retired in the late 1920's, Leisenring took over as supervising architect. Another mainstay of the organization was Joseph A. Bayer, who administered fiscal activities for nearly twenty years. Increasingly, Cheatham felt the need for an "automatic supply of second lieutenants." Determined to meet this need, he set out to get what the Quartermaster Corps had never had before, men from West Point graduating classes.[36]

Arguing before the General Staff for a "fair share of the intelligent and well educated young officers who enter the Army," Cheatham won his case. Each year a few vacancies in the Quartermaster Corps would be open to Academy graduates.[37] But recruitment proved difficult. The attitude of the faculty was discouraging; one instructor asked a cadet if he wished to spend his life buying groceries and issuing shoes. On several visits to West Point, General Cheatham spoke to the first classmen, stressing the advantages of a Quartermaster career. In response to his appeals, three members of the class of 1929—Everett C. Hayden, Elmer E. Kirkpatrick, and Clarence Renshaw—joined the Construction Service. Assigned to West Point in the summer of 1929 as CQM for the new million-dollar project there, Hartman assumed the role of talent scout. During his 5-year stay at the Academy, he helped guide a score of graduates into military construction.[38] Cheatham and his successor, Maj. Gen. John L. DeWitt, arranged for ten of these "boys" to take degrees at leading engineering schools. Hopes for the future depended heavily on these young careerists.

With Brig. Gen. Louis H. Bash, the unusually able and forceful officer who was Chief of Construction from 1929 to 1933, DeWitt took further steps to strengthen the organization. He revived specialization, classifying construction officers as such and restricting them to their specialty. Years later he explained, "I always operated on the theory that a Jack-of-all-trades is master of none." More new blood was infused into the Construction Service. DeWitt personally combed the files in The Adjutant General's office, looking for likely candidates, men with superior ratings and technical qualifications, who might be detailed to the Quartermaster Corps.[39] About a dozen officers, including five with engineering degrees, came into the Service in this way. Meanwhile, Bash and his

[36] Ltr, Cheatham to TAG, 10 Mar 28. QM 210.321 (Asgmts) 1928.

[37] *Ibid.*

[38] (1) Intervs with M. Scott Dickson, 10 Jul 61; Brig Gen Clarence Renshaw, 13 Feb 59; Brig Gen Christian F. Dreyer, 27 Feb 59. (2) Ltr, Hartman to DeWitt, 16 Jun 31. QM 210.321.

[39] (1) Interv with Gen John L. DeWitt, 10 Apr 57. See also WD Ltr AG 201.6 (1-12-33) Misc M, 17 Jan 33.

assistants were also on the lookout for good men. Among the outstanding officers they recruited were 1st Lt. Kester L. Hastings and Maj. Hugo E. Pitz. A 1918 West Point graduate, Hastings was destined to become The Quartermaster General. Pitz, a 1904 graduate of Rensselaer Poly, was to be a key figure in construction during the 1930's—"a human dynamo who kept the train on the track," one associate described him.[40] A noteworthy change made by DeWitt and Bash in 1930 was the revival of the name Construction Division—a change which served to remind construction officers of the wartime accomplishment.

As the economic crisis deepened, as the volume of construction in the United States fell from $13.9 billion in 1929 to $5.7 billion in 1932, Congress voted modest increases in Army building funds. In the last three years of the Hoover administration, approximately $100 million, roughly half of it for new construction, became available to Bash's organization. The landmark legislation approved on 21 July 1932, the Emergency Relief and Construction Act, set aside more than $15 million for housing at Army posts. A program comprising some sixty projects, including million-dollar jobs at Barksdale, Langley, and Maxwell Fields, went forward during the early years of the depression.[41] Revitalized and strengthened by DeWitt and Bash, the Construction Division took this work in stride. Recalling the organization as it was in February 1933, when Bash succeeded him as The Quartermaster General, DeWitt stated: "There were no weaknesses that I know of. We did a good job."[42]

With the advent of the New Deal, the situation changed radically. Assuring the "host of unemployed citizens" that first things would come first, and calling for "action now," President Roosevelt declared in his inaugural address: "Our greatest primary task is to put people to work." At the same time he pledged his administration to reducing the cost of government and to "making income balance outgo."[43] The military appropriation act approved on 4 March 1933, the same day Roosevelt took office, provided $12 million for routine maintenance but no new money for Army housing. Before the month was out, directives reached the War Department severely restricting expenditures and impounding construction money appropriated under Hoover. The first "Hundred Days" of the new administration produced the Civilian Conservation Corps (CCC) and the Public Works Administration (PWA), both designed to created useful employment for the jobless. The Army came into the picture when Roosevelt ordered it to have 250,000 young men in the forests by early summer and when the Chief of Staff, General Douglas MacArthur, requested a large sum of PWA construction money.[44]

For the first time since the war, the Construction Division faced an emergency. Fourteen hundred CCC camps

[40] Dreyer Interv, 27 Feb 59.

[41] (1) Summary of Appns, 1920–40. (2) 47 *Stat.* 716. (3) Annual Rpt of TQMG, 1933, pp. 52–55. QM 319.1.

[42] DeWitt Interv, 10 Apr 57.

[43] H Doc 218, 87th Cong, 1st sess, *Inaugural Addresses of the Presidents of the United States*, pp. 236–37.

[44] (1) Annual Rpt of TQMG, 1933, pp. 62, 59. (2) Annual Rpt of the CofS, 1933. In *Report of the Secretary of War to the President, 1933* (Washington, 1933), pp. 15–16, 19.

to be ready by July, plus plans for spending $135 million in PWA funds asked for by the Chief of Staff—such was the task confronting the Constructing Quartermaster General, Brig. Gen. Patrick W. Guiney, and his principal assistant, Colonel Pitz, in the spring of 1933. With more than 13,000,000 people out of work, speed was "paramount" and time was "the dominant consideration." "Everything had to be done before it was started," Danielson recalled.[45] Part of the load was lifted from Guiney's shoulders, when CCC construction was decentralized to the corps area commanders, who surmounted the crisis by calling up Reserve officers and housing the enrollees, temporarily, in tents. The burden was lightened still further, when the Army allotment under the 3.3-billion-dollar PWA program was pared to $61.4 million, less than half the sum MacArthur had requested. Even so, the undertaking was several times larger and far more urgent than anything attempted since 1918.[46]

The situation demanded extraordinary measures. Responding to the President's call for action, Guiney and Pitz hastened to enlarge their organization, freeze designs, and place construction under way. They hired more civilian engineers. They rounded up every available officer with construction experience, including Danielson and Hartman, who came to Washington to help direct the effort. They issued standard blueprints, instructed CQM's to brook no interference by corps area and post commanders, and persuaded the Secretary of War to notify the field: "Time is not available for any extensive effort toward creating designs, drawing new plans, or effecting variations in plans already proven to be satisfactory."[47] They made a good record. Within a 40-week span, they awarded contracts totaling $47.5 million, launched purchase and hire jobs with a total estimated cost of $10.8 million, and put more than 11,000 persons to work. Projects undertaken with PWA funds included extensive construction at Aberdeen Proving Ground, a photolithographic plant at Fort Belvoir, a riding hall at Fort Myer, a chapel at Fort Meade, and needed improvements at several dozen other posts.[48]

An experiment designed to tide the needy over the winter of 1933–34 pointed work relief in another direction. Less businesslike than Interior Secretary Harold L. Ickes' PWA, but a good deal faster, was the Civil Works Administration (CWA), set up under Harry L. Hopkins in the fall of 1933. With a billion dollars transferred by the President from PWA, Hopkins created jobs for 4,000,000 people in thirty days. Participating in this program, the Construction Division had its first experience with "make work" projects. In a few months, the division spent $24.3 million at 265 posts, cemeteries, and Guard camps to employ 55,000 men. The bulk of the money went for wages and virtually all the work was of a pick and shovel variety: improving drainage, grading roads, and the like.[49] Although CWA

[45] (1) WD Ltr AG 600.12 IR (5-19-33) Misc M-D, 9 Jun 33. (2) Danielson Comments, p. 26.

[46] Annual Rpt of TQMG, 1934, pp. 20, 25. QM 319.1.

[47] WD Ltr AG 600.12 IR (5-19-33) Misc M-D, 9 Jun 33.

[48] (1) QM 210.321. (2) Annual Rpt of TQMG, 1934, p. 20. (3) 1st Ind, 9 May 34, on Memo, G-4 for TQMG, 4 May 34. QM 600.1 (Public Works).

[49] Annual Rpt of TQMG, 1934, pp. 20–21.

TABLE 3—APPROPRIATIONS FOR MAINTENANCE AND REPAIRS

Year	Appropriated	Percent of Appraised Valuation	Estimated Requirement
1934	$2,444,003	0.65	$13,290,448
1935	1,670,364	0.39	12,715,152
1936	2,465,185	0.61	19,604,580

Source: Incl with Memo, G-4 for TQMG, 8 May 36. QM 600.3 (Misc) 1941.

passed from the scene in early 1934, more and more money flowed into this type of activity, as first the Federal Works Administration (FWA) and later the Works Progress Administration (WPA) organized so-called "leaf-raking" projects in virtually every community. Meantime, the flow of PWA funds slowed to a trickle and appropriations for military construction all but ceased.

The Army housing and Air Corps programs, begun so hopefully in the late 1920's, came to a halt and maintenance funds dwindled almost to the vanishing point. From 1934 through 1936 only $14 million was appropriated for military construction, and nearly $10 million of this sum was for buildings at West Point and for Hickam Field, Hawaii. The Wilcox Act, passed in 1935, authorized construction of five strategic air bases in the United States and Alaska and two major air depots, one in the southeast and one in the Rocky Mountain area, but no funds were voted for this work until 1937, when Congress made available $8.8 million. Appropriations for maintenance and repairs hit bottom during this period.[50] (*Table 3*) FWA and WPA funds—$5 million in 1934, $19 million in 1935, and $28 million in 1936—were the chief reliance; but, because most of the money had to be spent for wages and much of the labor was unskilled, the Construction Division received a low return for its relief dollars. An increase in the enlisted strength of the Army to 153,212 in 1936 led to serious overcrowding. Men were housed in stables, attics, and gymnasiums; and at Carlisle Barracks prisoners were confined in a Hessian guardhouse dating from the Revolution. Without proper maintenance, the military plant became more and more dilapidated.[51] Recalling living conditions at run-down Army posts, one high-ranking officer declared: "We reached a situation where, at times, an umbrella inside the house was as useful as one outside."[52]

Appeals for an end to made work and a resumption of constructive effort were bootless. Year after year The Quartermaster General drew up realistic estimates based on the Army's needs. Year after year the Bureau of the Budget turned thumbs down, with a repetition of the set phrase, "not in accord with the program of the President." Mean-

[50] Incl with Memo, G-4 for TQMG, 8 May 36. QM 600.3 (Misc) 1941.

[51] (1) Summary of PWA and Work Relief Funds Available to OQMG, FY's 1934-40. Opns Br Files, S.3 (WPA). (2) G-4/30552.

[52] Testimony of Gen G. C. Marshall, 5 Aug 40. In S Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings* on H R 10263, p. 6.

while, the construction industry pushed a campaign of militant opposition to WPA. In a speech to the annual convention of the AGC early in 1936, President William A. Klinger presented the industry's "viewpoint of recovery economics":[53]

> The basic principle of priming the pump is to put the water into the pump. This can't be done by taking a bucket of water and spilling it over the pump, letting the great bulk of the water waste itself in holes in the ground . . . . A pump cannot be primed by men that know nothing about the pump that is to be primed. It cannot be primed by a Social Welfare worker . . . . It must be done by somebody who knows something about the industry to be used as the primer.[54]

But the industry's thrusts had little effect. When Danielson's assistant, Lt. M. Scott Dickson, a personal friend of Hopkins', called on the WPA administrator for help in accomplishing new construction projects, Hopkins told him: "I don't give a damn about your projects. I just want to put men to work. I don't give a damn if they dig a hole one day and fill it up the next. I want them working."[55]

As international tensions mounted after 1936, as the Army was augmented to 165,000 in 1937 and to 170,000 in 1938, continued efforts were made to resume the military construction program suspended in 1933. Colonel Pitz developed a plan for spending $162 million over a period of years. Colonel Hartman, as chief of the Construction Branch, G–4, led the movement to put the plan across. When the Bureau of the Budget withheld approval, the Chairmen of the Military Affairs Committees, Senator Morris Sheppard and Representative Lister Hill, took a hand. The result was an act approved on 26 August 1937, authorizing the appropriation of $25.5 million to be spent at forty-six posts and stations. This authorization helped pave the way for a twelve-million-dollar appropriation on 11 June 1938. The first big break came ten days later, when President Roosevelt agreed to give the Construction Division $65 million—$50 million in PWA funds and $15 million in WPA money—on condition that contracts be let and work started by 15 August.[56]

At this point a new obstacle arose in the person of the Constructing Quartermaster General, Brig. Gen. A. Owen Seaman, who declined to accept the money on the President's terms. An officer with thirty-eight years' service and good political connections, Seaman had succeeded General Guiney upon the latter's death in December 1936. The appointment had been made over the opposition of construction officers who favored Danielson for the post. Peppery and unpredictable, Seaman had antagonized the General Staff, and his refusal to take the proferred funds exasperated the Chief of Staff, General Malin Craig. Sending for The Quartermaster General, Maj. Gen. Henry Gibbins, Craig arranged to "sidetrack" Seaman. On 21 June, the day the

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[53] (1) Ltr, BOB to SW, 25 Jan 36. G–4/30552 Sec II. (2) WD Ltr AG 600.12 (5–1–37) Misc M–D, 4 May 37. (3) Memo, G–4 for CofS, 20 Jan 38. G–4/30552 Sec IV. (4) *The Constructor*, March 1936, p. 11.

[54] *The Constructor*, April 1936, pp. 5–6.

[55] Dickson Interv, 10 Jul 1961.

[56] (1) G–4/30552 Sec III. (2) 50 *Stat.* 857. (3) 52 *Stat.* 651. (4) Ltr, Roosevelt to Ickes, 21 Jun 38. AG 600.12 IR (3–11–33) Sec ID. (5) Memo, G–4 for TQMG, 11 Aug 38. QM 600.1 (Public Works) 1938.

money became available, Colonel Hartman became executive officer of the Construction Division with full authority to see that the President's wishes were carried out.[57] Of this assignment Hartman later wrote:

> I was ordered by the Chief of Staff to report to The Quartermaster General with instructions to assume full charge of the Construction Division to carry out the program. General Seaman remained in the office without authority and acted on all papers subject to my approval. This was a most embarrassing situation since I was then a colonel and his junior by some ten years.[58]

Despite his awkward situation, Hartman had the program under way by 15 August.[59] His subsequent success was but one of many achieved by the Construction Division.

With but half a billion dollars to spend over a 19-year span, the division did a remarkable job, providing permanent housing for 75,000 officers and men, erecting more than a dozen modern Air Corps stations, enlarging older general hospitals and building several new ones, constructing schools, laboratories, depots, and memorials, and updating the military plant. High quality at low cost was the Quartermaster hallmark. An annual prize awarded by the Association of Federal Architects went to the Construction Division three years out of six. Overhead generally ran well below 7 percent. Looking back over the lean years of the 1920's and 1930's, one long-time Quartermaster officer reflected:

> I feel confident that that loyal group of hard-working, experienced, competent, and efficient men and women inwardly glow with a fierce pride and take great pleasure in the accomplishments of the Construction Division of which they were a part. They can point with justifiable pride to the beautiful monumental buildings at the United States Military Academy at West Point and to the unobtrusive grandeur and beauty of the Memorial Amphitheater and Unknown Soldier's Tomb at Arlington. Who can deny being impressed with such tremendous plants as the posts of Fort Benning, Fort Sill, Fort Bragg, and Fort Knox that were built within the span of a single generation?[60]

The list of accomplishments was long. But whether the Construction Division would be equal to a major emergency was open to question.

Preparedness and Public Works

A construction force capable of meeting almost any emergency existed in the civil works organization of the Corps of Engineers. A nationwide network of field offices, a host of professional civilian employees, and a select group of officers imparted strength to the Engineer Department. A $2.5-billion program of navigation, flood control, and fortifications projects, undertaken in the years of peace, contributed to the department's stability.[61] Vast engineering enterprises tested its capacity to perform ex-

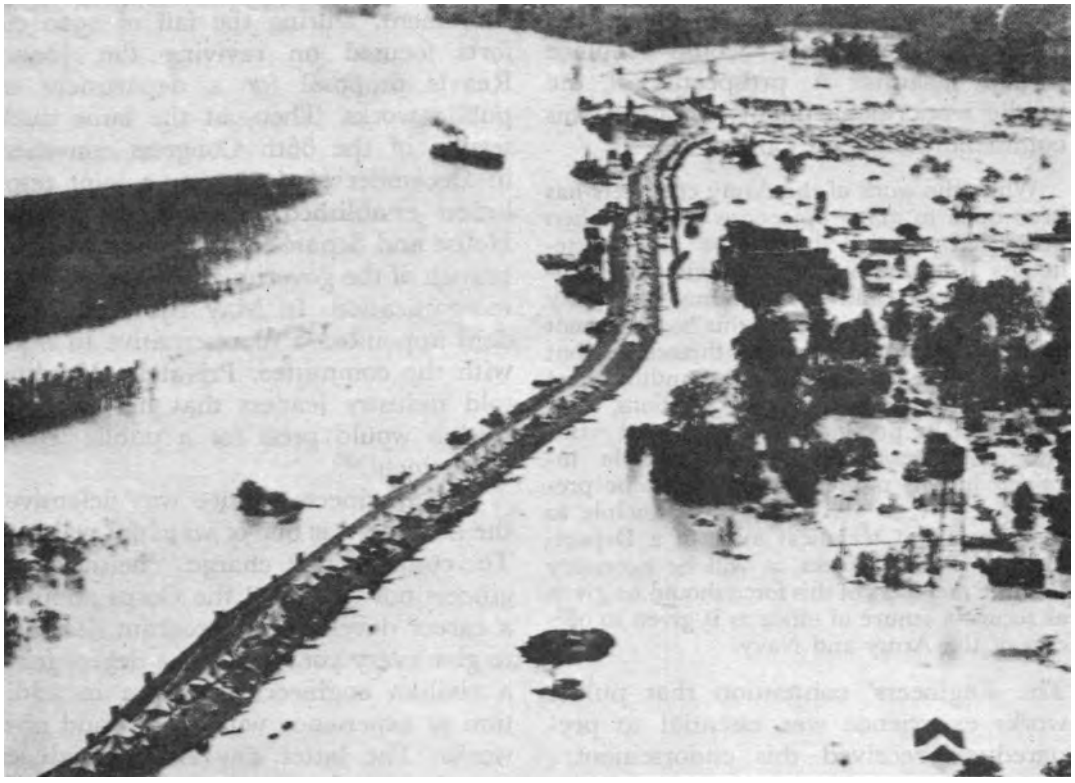
[57] (1) Statement of Gen Hartman (prepared in response to questionnaire from the authors), 5 Jul 55, pp. 3–4. (2) Danielson Comments, pp. 18–19. (3) Memo, M. H. McIntyre for the President, 19 Dec 36. (4) Ltr, Dickson to McIntyre, 20 Dec 36. Last two in Roosevelt Papers, OF25–X, WD QMC, 1933–34. (5) Intervs with Mr. Dickson, 10 Jul 61; Brig Gen George P. Tyner, 28 Sep 55; Maj Gen James H. Burns, 24 May 56. (6) Memo, Gibbins for Rcd, 21 Jun 38. QM 625 1935–41. (7) Memo, G–4 for SGS, 23 Jun 38. G–4/22853–27.

[58] Statement of Gen Hartman, 5 Jul 55, p. 4.

[59] Ltr, Craig to Ickes, 15 Aug 38. G–4/29778.

[60] Answers to Questionnaire, Violante to authors, 25 Sep 57.

[61] Table, prepared by OUSW, Sep 41, title: Constr Opns, FY's 1920–39. USW Files, Misc and Sub—Constr Transfer, QM–CE.



CAMP ON LEVEE, ARKANSAS CITY, ARKANSAS, DURING 1927 FLOOD

tensive construction in time of war or in preparation for war. Depicting operations at the $86-million Fort Peck Dam, one officer declared: "This is not theoretical training and experience; it is the real thing!"[62] Battling floods could be likened to hard-fought military battles. "In physical and mental strain," wrote one veteran of the 1927 Mississippi River disaster, "a prolonged high-water fight on threatened levees can only be compared with real war."[63] Experience gained in civil works could pay huge dividends in a defense emergency. But throughout the twenties and thirties, the system which produced this experience was in danger of being scrapped.

Resuming their campaign against the Engineers in the fall of 1920, proponents of a public works department tried a fresh approach. Admittedly, the tussle over military construction had been a mistake. "My idea," chief tactician Leighton afterward confessed. "I wish I hadn't thought of it."[64] The new line was to leave the function in the War Department, at least temporarily. Criticism of the En-

[62] Capt. C. H. Chorpening, "Experience for War," *The Military Engineer*, XXIX, no. 166 (July–August 1937), p. 250.

[63] Maj. John C. H. Lee, "A Flood Year on the Mid-Mississippi," *The Military Engineer*, XX, no. 112 (July–August 1928), p. 307.

[64] Leighton Interv, 2 Apr 57.

gineers was to be more temperate. Flanking movements would replace frontal assaults. A prospectus of the public works department contained this commendation of the Corps:

> While the work of the Army engineers has been open to many objections and has often been accompanied by delays and wastefulness, it has been conducted with the minimum of graft and the minimum of petty political partisanship. And this has been not so much because of the men themselves, but because they were given a high standing, were suitably protected in their positions, and could not be peremptorily discharged without real cause. It is the principle involved in this matter which should be preserved. . . . To apply this principle to the permanent technical force of a Department of Public Works, it will be necessary that the members of this force should be given as secure a tenure of office as is given to officers of the Army and Navy.

The Engineers' contention that public works experience was essential to preparedness received this endorsement:

> It is realized [the prospectus stated] that modern war demands the services of nearly the entire engineering profession, and provision should therefore be made for the fullest use desired by the Army of the officers of this new department. They should be and can be as eligible for immediate detail with the Army in time of war or other emergency as are the present officers of Army engineers who are engaged on civil work.

How the plan would work was hazy.[65]

A determined offensive soon got rolling. The Federated American Engineering Societies, led by Herbert Hoover, spearheaded the drive for legislative action. The Associated General Contractors assumed a major role in the struggle, and its aggressive managing director, General Marshall, became the firebrand of the movement. During the fall of 1920 efforts focused on reviving the Jones-Reavis proposal for a department of public works. Then, at the lame duck session of the 66th Congress convened in December of that year, a joint resolution established a committee of the House and Senate to study the executive branch of the government with a view to reorganization. In May 1921 the President appointed a representative to work with the committee. Privately, Harding told industry leaders that his administration would press for a public works department.[66]

The Engineer posture was defensive; the attitude was one of watchful waiting. To combat the charge "neither engineers nor soldiers," the Corps adopted a career development program designed to give every young officer a degree from a civilian engineering college in addition to experience with troops and civil works. The latter day Army Engineer was likely to be an alumnus of Cornell, California, or MIT, as well as a top graduate of West Point. Master's degrees were plentiful, and here and there was a Ph.D.[67] To build support within the Army, the Engineers engaged in missionary work. A lecture by General Patrick at the General Staff College embodied their message. Emphasizing the "vital importance" of civil works in developing Engineer officers, Patrick stated:

> This is a matter which is not thoroughly understood by the army at large, . . . and it is known that in many quarters there

[65] *The Constructor*, January 1922, pp. 65, 86.

[66] (1) *The Bulletin of the AGC*, January 1921, p. 33. (2) 41 *Stat.* 1083. (3) 42 *Stat.* 3. (4) A. C. Oliphant, "The Need for a Bureau of Public Works," *The Constructor*, November 1925, p. 23.

[67] (1) 025 Part 2. (2) Incl with OCE Memo, 13 Jun 28. 316 (Office Methods and Opns). (3) Data prepared in EHD, Education of CE Officers, 1920–39.

is a decided prejudice against the Corps of Engineers being charged with the conduct of such civil works. To us it seems clearly evident that this is due to a misunderstanding and misconception of the relation which this duty bears to the work of the Corps of Engineers in war. . . . We must have in the permanent Army a sufficient number of trained military engineers to guide and direct our reserve officers until such time as they shall have become thoroughly conversant with military conditions. . . . We know of no other way in which this training can be secured except by the employment of engineer officers on public works.[68]

While attempting to shore up their position, the Engineers tried to steer clear of controversy. Much as they wanted the military construction function, they were content to bide their time.[69] If, as the saying went, the first step in any war was to reorganize the Quartermaster Corps, their opportunity would come.

Aiding the cause of the Engineers were proceedings instituted by the Justice Department late in 1922. Around Thanksgiving Day, Attorney General Harry M. Daugherty filed lawsuits totaling $55 million against eleven of the sixteen World War cantonment contractors. A month later, after examining the evidence of the Graham committee and hearing a number of witnesses, among them, reportedly, the wartime Chief of Engineers, a special grand jury indicted former Assistant Secretary of War Benedict Crowell for conspiracy to defraud the government. Charged as co-conspirators were Starrett, Lundoff, Tuttle, and three other members of the Committee on Emergency Construction.[70] Reaction to these developments was mixed. "A monstrous wrong," said President Arthur S. Bent of the AGC. "To indict a great industry, to accuse its outstanding leaders of treason to this Government of the most despicable character, is to attack the morale of the entire country and feed the dangerous fires of distrust and lawlessness."[71] By contrast, Col. Clarence O. Sherrill, the Engineer officer who served as principal military aide to Presidents Harding and Coolidge, expressed the view: "Take the graft and absolute loss of funds through graft to the Government . . . . I feel no hesitation in saying that if that work had been under the Corps of Engineers . . . that would never have happened."[72]

The government lost every case. Imputing political motives to the Republican administration, Crowell and his fellow defendants retained as counsel Henry L. Stimson, Secretary of War in the Taft administration, and Frank J. Hogan, a prominent Washington lawyer. The defense attorneys promptly filed demurrers. Appearing before the Supreme Court of the District of Columbia in the fall of 1923, they assailed the indictment as "an attempt to turn a difference of political opinion into a charge of crime."[73] On 30 January 1924 Judge Adolph A. Hoehling sustained the de-

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[68] Lecture by Gen Patrick, 10 Feb 20. 025 Part 2.

[69] (1) Ltr, CofEngrs to Col S. M. Felton, 24 May 26. 400.12 Part 33. (2) Memo, CofEngrs for Rcd, 13 Jun 28. 020 (Engrs, Office, Chief of) Jan 21–Sep 40.

[70] New York *Times*, November 25, 1922, p. 15; December 5, 1922, p. 10; December 31, 1922, p. 1.

[71] Address before Annual Mtg of AGC at Los Angeles, 30 Jan 23. Reprinted in *The Constructor*, February 1923, p. 22.

[72] H and S Joint Comm on Reorgn of the Admin Br of the Govt, 68th Cong, 1st sess, *Hearings* on S Jt Res 282, p. 744.

[73] *The Constructor*, November 1923, p. 27. See also New York *Times*, October 4, 1923, p. 25; October 5, 1923, p. 21.

murrers, thus dismissing the indictments. The civil actions also failed. One by one, suits against the contractors were thrown out of court. In the only case which went to trial, the jury took just three minutes to bring in a verdict for the defendants. As General Marshall put it, the prosecutions "begun with a shout" had "ended with a whisper."[74] Nevertheless, suspicion of wrongdoing lingered in the public mind. The "colossal cantonment steals" of World War I—the phrase is H. L. Mencken's—became an American myth, and echoes of scandal reverberated down through the years.

Early in 1924, while the construction world awaited Judge Hoehling's decision, a joint committee of Congress began hearings on proposals to reorganize the government. An imposing array of witnesses appeared in support of a public works department—officials, professors, and industry spokesmen. Propounding the classic argument for consolidation, Secretary of Commerce Hoover testified: "At the present moment we have a great many departments doing construction work. Congress today has no knowledge of the totals of our construction activities."[75] Speaking for the American Society of Civil Engineers, Leonard Metcalf elaborated on this theme:

> The Engineer Corps stands rather as an executor of works than as a planner . . . . The question of a desirable project is, of course, a relative question. There are thousands of projects which are perfectly feasible. The relative economic desirability may be different, however. And my point was that . . . it was not the function of the Engineer Corps, nor was it so regarded, I take it, by the Corps itself, to point out to Congress or to the Senator who might have been responsible for this measure that it was less desirable economically than a number of other projects which were before them.[76]

Other witnesses contended that the new department would strengthen national defense. Looking at the matter from the standpoint of preparedness, Professor William F. Willoughby of the Institute for Government Research averred: "Should war break out, the Government would have its engineering ability practically mobilized in one department, available for use . . . . Of course," he added, "it would then work under military direction."[77] A plan emerged for detailing Engineer officers to the public works department. Extolling the advantages of this plan to the Engineers, General Marshall stated: "I think it would be a distinct addition to their training . . . they would go back to the service and to the Army with a better development and a greater asset than can now be had . . . where their line of construction is limited."[78]

Opposition came from expected quarters, the Secretary of War and the Corps of Engineers. Called before the joint committee, Secretary Weeks presented a judicious argument for keeping things as they were. After weighing the pros and cons of transferring rivers and harbors work from the War Department, he concluded:

> It is apparent that the principal points upon which decision might rest are in dis-

[74] General R. C. Marshall, Jr., "Cantonment Suits Now in Discard," *The Constructor*, November 1927, p. 19.

[75] H and S Joint Comm on Reorgn of the Admin Br of the Govt, 68th Cong, 1st sess, *Hearings* on S Jt Res 282, p. 344

[76] *Ibid.*, pp. 253–55.

[77] *Ibid.*, p. 72.

[78] *Ibid.*, p. 583.

pute; moreover, that they are not of a character to admit of practical proof one way or the other. . . . In this connection, it should be remembered that the present arrangement has a record of many years of successful operation to its credit, whereas the proposed arrangement has little more than a theory with which to support its claim.

I want to say at this point, Mr. Chairman, that I think one of the finest exhibitions in our Government has been the conduct of the rivers and harbors improvements under the Engineer Corps of the Army. . . . That the work could have been more economically done under civilian administration, I do not believe.[79]

Last minute witnesses, appearing at their own request, were General Beach and Colonel Sherrill. Disposing of insinuations about "little creeks and streams" (the Board of Engineers for Rivers and Harbors, created in 1902, was an effective safeguard against pork-barrel projects), Beach warned the committee against flying to ills they knew not of. Civilians, he emphasized, would be far more responsive to political pressure than military men. Questioned about the wisdom of detailing Engineers to the proposed department, he ridiculed the idea that officers could be effectively trained outside the Army. Taking a bolder line than the Chief, Colonel Sherrill made a strong bid for more construction functions. High on his list was the work of the Constructing Quartermaster General. Both Beach and Sherrill identified proponents of a public works department with the "vicious" cost-plus system. In fact, they suggested, the real purpose of these men was to fasten that system on the government. Alluding to cost-plus profiteering in the recent war, General Beach observed: "It was a good deal like the traditional tiger getting his taste of human blood."[80]

The testimony of Beach and Sherrill produced a sharp reaction within construction circles. In a resolution of censure, the executive board of the American Society of Civil Engineers branded the statements of these officers as "manifestly unfair and grossly inaccurate" and deplored their "wholesale charges of graft and incompetency." The resolution went on to urge that, "in the best interest of the people of the United States," all river and harbor work be placed "under civilian and not under military engineering direction."[81] A press release issued by the society raised the following questions: did the Corps of Engineers honestly believe that members of the profession outside its own ranks were untrustworthy; did the Engineers deny that the building of the wartime cantonments was a creditable achievement; did the Chief of Engineers endorse charges which no court had upheld?[82] Joining in the condemnation of Beach and Sherrill, Frederick L. Cranford, president of the AGC, labeled their attacks on brother engineers as "despicable and damnable." He contended that the Corps had "fixed upon a policy of destroying the established method of conducting construction work in this country" and would use any means to accomplish its purpose. Unless the Engineers were stopped, virtually all federal construction would sooner or later come under their control. Only by the creation of a public

[79] *Ibid.*, pp. 116–17.

[80] *Ibid.*, pp. 695–715, 743–746.

[81] Resolution, ASCE, Board of Direction, Apr 8, 1924. Reprinted in *The Constructor*, May 1924, p. 34.

[82] Rpt, ASCE Comm on Public Relations. Reprinted in *The Constructor*, May 1924, pp. 34, 51–52.

works department could this blow be averted.[83]

If civil engineers and general contractors believed a change was necessary, the joint committee of Congress did not. In its report, released in June 1924, the committee rejected the idea of a public works department. On the subject of the Engineers' civil responsibilities, its findings were as follows: "The assignment of Army Engineers to river and harbor work is at the present time the principal means whereby these officers can acquire the engineering experience necessary to fit them to meet the demands put upon them in time of war; and, on the other hand, there is a measure of economy in using personnel of the Corps of Engineers on necessary public works of a nonmilitary character." The committee recommended against a transfer of functions from the Corps.[84] Terming this verdict "illogical" and complaining of "political pressure strongly brought to bear in this way and that," General Marshall sounded the call for a new offensive. Leaving the campaign for legislative action largely to the Federated Engineering Societies, he launched attacks along another front.[85]

In speeches and articles, in testimony before Congressional committees, in every forum open to him, Marshall denounced the Engineers as socialistic. Increasingly, river and harbor improvements were being accomplished under the system known as day labor or purchase and hire. The building of the Panama Canal had furnished a striking demonstration of the system's effectiveness; and an Act of July 27, 1916, provided that no navigation or flood control project would be done by contract if bids exceeded by 25 percent the estimated cost of the job.[86] By 1924 the Engineers were doing 75 percent of their work by day labor as against 12 percent in 1900; and capital investment in government-owned equipment was about $50 million as compared with $2.5 million a quarter of a century earlier.[87] Condemning the Corps' use of day labor, Marshall told a House committee:

> The Bolshevistic regime of Russia favors the taking of industry by the Government, the nationalization of industry, and its operation by individuals on the Government payroll. The Corps of Engineers of the Army favors the application of the same principle to the Government work which falls under its control. . . . It actually operates whatever industry it controls as the soviet Government in Russia would operate it.

He went on to argue, in this case justly, that Engineer estimates were too low, since they made no allowance for hidden costs, such as interest and insurance. Extending over four years, Marshall's crusade failed.[88] Regularly, bills were introduced to compel the Corps to do more work by contract; with equal regularity, Congress declined to enact such legislation.

One of several proposals for a public works department discarded by Congress during the Coolidge administration, the Wyant bill of 1927 called forth a thoughtful statement by Secretary of War Davis. Taking up the "specious arguments, speculations, and postulates" advanced by the opposition, he disposed of them,

[83] *The Constructor*, November 1924, p. 38.
[84] H Doc 356, 68th Cong, 1st sess, 3 Jun 24, p. 21.
[85] *The Constructor*, June 1924, pp. 28, 50.
[86] 39 *Stat.* 411.
[87] H Subcomm of the Comm on the Judiciary, 69th Cong, 1st sess, *Hearings* on H R 8902, pp. 1–12.
[88] (1) *Ibid.*, p. 34. (2) The campaign can be followed in the pages of *The Constructor*, 1924–28.

one by one. To consolidate all engineering in one department would be as senseless as to consolidate all chemistry. Engineering was a means to an end, not an end in itself. Each operating unit ought to have its own technical force. There was no advantage in bigness as such; quite the contrary. Competition made for efficiency. Turning to questions of the Engineers' competence, the Secretary pointed out that there were no complaints from users of the waterways and people of the river valleys. The service of the Corps had been exceptional. After mentioning the Panama Canal, the work on the Mississippi, the deepening of the Great Lakes harbors and channels, and the improvements along the coasts, Davis went on to state: "The Corps of Engineers of the Army has built up a degree of respect and a capacity for teamwork which I do not believe are equaled, and certainly not surpassed in either private or Government organizations. . . . No other bureau can hope to achieve this coherence without the fraternal background of war sacrifice which is its inspiration." Predicting that in future wars engineering would be "even more important and far more complicated" than in the past, Davis held that "a competent and versatile" Corps of Engineers was essential for adequate defense. The civil works responsibility was a guarantee that such a corps would be available.[89]

As the turbulent twenties drew to a close, the Engineers moved to heal the breach with industry. A younger generation of officers moved into key positions in the Corps. Old policies gave way to new, and moderate views prevailed. A cost accounting system, the first in the federal government, produced more accurate estimates and enabled contractors to bid successfully for river and harbor jobs. A 300-million-dollar program of flood control, adopted in the wake of the 1927 disaster, was designed to make maximum use of contracting firms. Work was "packaged" in such a way that small concerns could bid as well as large; specifications were revised to throw less risk on contractors; and the Corps' cost and experience records were opened to prospective bidders. In a message to the AGC convention at Chicago in February 1929, Brig. Gen. Thomas H. Jackson of the Mississippi River Commission explained that a certain amount of day labor was "vital" to the Corps' existence, but, he said: "We want this; we want no more."[90] On becoming Chief of Engineers in the fall of 1929, Maj. Gen. Lytle Brown announced that all river and harbor work would be done by contract except where it was "manifestly impracticable or a waste of government funds."[91] Industry spokesmen applauded the "new spirit of sincerity and cooperation."[92] Unquestionably, a change in the management of the AGC did much to promote this spirit. General Marshall's resignation in May 1928 helped usher in an era of good feeling between contractors and the Corps of Engineers.

Hoover's elevation to the Presidency gave fresh impetus to the movement

[89] Ltr, Davis to Rep William Williamson, 25 Jan 28. In H Comm on Expenditures in the Executive Depts, 70th Cong, 1st sess, *Hearings* on H R 8127, pp. 3–6.

[90] Brig. Gen. Thomas H. Jackson, "A New Policy on Flood Control Work," *The Constructor*, April 1929, pp. 26–29.

[91] Ltr, Brown to Editor. In *The Constructor*, November 1929, p. 51.

[92] *Ibid.*, October 1930, p. 24.

for a department of public works. During his term as Chief Executive, at least a dozen messages went from the White House to Capitol Hill requesting authority to reorganize the government, and several bills to create a works agency received the Presidential blessing. Hearings on these bills took a curious turn as witness after witness was called upon to explain why all federal construction should not come under the Army Engineers. Hoover's endeavor reached its high point in June 1932, with the enactment of legislation empowering him to make governmental reorganizations, subject to Congressional approval. Hoover could come no closer to his goal. In January 1933 Congress disapproved an executive order, transferring the civil functions of the Corps of Engineers to the Interior Department. The next move would be up to the incoming administration.[93]

During the early years of the New Deal, the proposal for a works department was revived. Secretary of the Interior Ickes, a proponent of the plan, waged a campaign against the Engineers which was no less determined than the one General Marshall had conducted in the twenties. But despite Ickes' almost fanatical zeal, the effort failed. Years of study by Executive commissions and prolonged debate in Congress culminated in the Reorganization Act of 1939, which granted the President extraordinary powers but specifically exempted the Corps of Engineers.[94] When questioned about the "conflict" between the Engineers and the Interior Department's Bureau of Reclamation, Roosevelt expressed the feeling that "these two construction agencies ought to be maintained . . . in such a way that neither one of them would overwhelm the other." Emphasizing that "both are extremely good," he continued:

> In case of war the Army Engineers are intended, the great bulk of them, for service at the front with the Army and, therefore, we felt it would be a mistake to make them so big that they would do all the construction work.
>
> So we laid down what might be called a rule of thumb; and that was that they would continue to do all the harbor work, all the Mississippi work and all the river work where flood control was the primary function—flood control and navigation, the two being tied together; and to allocate the rest of the work . . . in such a way that the Bureau of Reclamation would be kept going with equal importance to the Army Engineers—to keep both organizations functioning. Each one would be merely a check on the other. The result is that we have now a very excellent system . . . .[95]

At session after session, for nearly two decades, Congress considered arguments for and against a transfer of river and harbor construction from the Corps of Engineers. The question was examined from every angle—efficiency, economy, and national defense. Proposals for a

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[93] (1) H Comm on Expenditures in the Executive Depts, 72d Cong, 1st sess, *Hearings* on H R 6665 and H R 6670, pp. 40–41, 65, 93–94, 111, 159, 179. (2) 47 *Stat.* 413. (3) H Doc 493, 72d Cong, 2d sess, 9 Dec 32. (4) 76 *Cong. Rec.* 2109.

[94] (1) *The Secret Diary of Harold L. Ickes*, II, *The Inside Struggle, 1936–1939* (New York: Simon and Schuster, 1954), 151–152, 318, 337–338. (2) *The Public Papers and Addresses of Franklin D. Roosevelt, 1938*, compiled by Samuel I. Rosenman (New York: The Macmillan Company, 1941), pp. 183–192. (3) 53 *Stat.* 561.

[95] *Public Papers and Addresses of Franklin D. Roosevelt, 1939* (New York: The Macmillan Company, 1941), p. 419.

change were invariably rejected. Weighing heavily in the decisions of Congress was the conviction that the Corps' civil functions were essential to preparedness.

Mobilization Plans

With events of 1917 fresh in mind, Congress had adopted safeguards against future unpreparedness. Aimed at preventing a repetition of the near chaos that reigned in the early months of the war were provisions of the 1920 Defense Act which defined responsibility for emergency planning. Under this law, the Assistant Secretary, as business head of the War Department, would develop plans for industrial mobilization and would oversee procurement; the Chief of Staff, as military head, would prepare plans for national defense and for mobilizing the nation's manhood. Hailing the act as "the beginning of a new era in the service of this department to the country," Secretary Weeks said in 1921: "It provides for an effective development of our strength in the protection of our ideals. The American people can now, in time of need, be guided in their mobilization through a system prepared . . . in accordance with the best of military doctrines."[96] Unhappily, results fell short of expectations. The climate of American opinion during the peace decades was inhospitable to realistic planning for war.

Machinery to implement the act went into operation in the early 1920's. Secretary Davis took a first step toward industrial preparedness in 1921, when he created the Planning Branch, Office of the Assistant Secretary of War (OASW), and assigned to it these duties: determine the productive capacity of American industry, allocate facilities, and assure the supply of critical and strategic material. Secretary of War Weeks and Secretary of the Navy Edwin Denby took a second step in 1922, when they established the Joint Army and Navy Munitions Board (ANMB). An outgrowth of competition between the two services during the war, ANMB was to co-ordinate procurement of munitions and supplies required by the Army and Navy for war purposes. Finally, through the efforts of a few farsighted officers, the Army Industrial College was founded in 1924 to promote the science of industrial preparedness. From this institution and its leading spirits—among them Majors James H. Burns and Charles T. Harris, Jr., of Ordnance and Col. Harley B. Ferguson of the Engineers—flowed much of the zeal that attended industrial planning. On the other side of the house, in the War Department General Staff, logistical considerations received far less weight. Drawn largely from the line of the Army, the officers of the General Staff were, on the whole, better equipped to cope with problems of strategy and organization than with problems of shelter and supply.

Soon after its establishment, the Planning Branch, OASW, began to study the nation's industry against the background of past mistakes and prospective needs. In 1917 there had been no industrial inventory to guide procurement officials, and, as a result, unnecessary plants were built. Some factories were swamped with orders, while others operated far below

[96] *Report of the Secretary of War, 1921* (Washington, 1921), p. 8.

capacity. Lack of information as to sources of power and raw materials, availability of labor, means of transportation, and the like, led to confusion, delay, and needless expense. By June 1923 plant surveys were well under way. Year after year Army representatives made the rounds, collecting production data and studying problems of conversion or expansion. Although the planners recognized that many plants would have to be enlarged and some new ones built, they looked to industry to do the job.[97] The planners respected what one of them termed "perhaps our greatest weapon . . . the potential capacity of American industries to produce munitions."[98]

That a war construction program would be necessary was generally assumed by experts in logistics, but plans for such a program were a long time maturing. Not until 1929, when Assistant Secretary Patrick J. Hurley asserted his authority over military construction, was there a policy covering this phase of mobilization: OASW would authorize projects and review plans; The Quartermaster General would supervise the work. So great was the magnitude of the Assistant Secretary's mobilization task—marshaling the entire economic resources of the country—that a comprehensive blueprint was long delayed. Admittedly tentative and fragmentary, the first Industrial Mobilization Plan (IMP), completed in 1930, dealt with broader issues than construction.[99] Early in 1932, the head of the Planning Branch, OASW, averred:

> Of all the phases of industrial mobilization, it may be admitted that the problem of construction of new facilities and conversion and expansion of existing ones has lagged perhaps more than any other feature in reaching a solution. No definite directive has ever been furnished the supply arms and services on this subject and no clear cut methods of attacking the problem have ever been developed.[100]

The Planning Branch was not alone in neglecting this important aspect of preparedness. Rejecting lessons of the recent conflict, the General Staff evolved a scheme reminiscent of the war with Spain. The Mobilization Plan of 1924, prepared while General Pershing was Chief of Staff, incorporated the old principle of local mobilization. An army of 4 million men would be mustered in company, battalion, and regimental units, and, after a brief period of training, shipped overseas. Little, if any, new construction would be necessary. Although the 1924 plan mentioned The Quartermaster General as the Army's construction agent, the 1928 plan was more consistent. Under this second plan, developed during the term of General Charles P. Summerall as Chief of Staff, decentralization was virtually complete. In matters of supply, the corps area commanders were practically supreme.

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[97] (1) WD Bull 14, 17 Aug 23, sub: Industrial Mobilization, p. 4. (2) Constance M. Green, Harry C. Thomson, and Peter C. Roots, *The Ordnance Department: Planning Munitions for War*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1955), pp. 54–55.

[98] Testimony of Col Harry K. Rutherford, 6 May 40. In S Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings* on H R 9209, p. 137.

[99] (1) WD Ltr AG 381 (4–20–29) (Misc) C, 13 May 29. (2) Notes of Conf in OASW, by Capt W. R. White, OQMG, 30 Jul 29. Opns Br Files, Mobl Plng. (3) For a discussion of the IMP, 1930, see Harold W. Thatcher, Planning for Industrial Mobilization, 1920–1940, QM Historical Study 4, 1943, pp. 84–96.

[100] Memo, Dir Plng Br OASW for Dir AIC, 8 Jan 32. ASW Plng Br Files, Constr 337.

The commanders, not The Quartermaster General, would be responsible for shelter.[101] Discussing the philosophy behind this plan, a history of mobilization stated: "As the memory of World War I began to fade, the importance of supply began to fade also. . . . The planners . . . became obsessed with the preeminent importance of manpower, and, as the obsession grew, the other factors of mobilization ebbed in importance."[102]

Lecturing at the Army War College in 1928, Col. James K. Parsons, chief of the Mobilization Branch, G–3, explained the staff's thinking on emergency construction. Recognizing that "an enormous amount" of shelter would be needed for mobilization, planners had given a great deal of thought to ways and means of providing it. Billeting had seemed the easiest solution, but because Congress probably would be unwilling to go along, no provision was made for quartering troops in private homes. Divisional camps and cantonments had also been ruled out. Construction would consume too much time and effort and place too great a burden on transportation systems. And, besides, where were the great cantonments of World War I? Most of them were gone. In another emergency, the Army would follow a different course:

> In lieu of camps and cantonments [Parsons related] the policy is to charge each corps area commander with the responsibility of procuring shelter for the troops mobilized by him. It is understood that he will undertake no construction unless he finds that after full use is made of available public buildings, supplemented by available tentage and suitable privately-owned buildings, additional shelter is still required.[103]

Again, as in the Spanish-American War, troops would occupy fairgrounds, race tracks, and the like. In 1898 the Maryland National Guard had gone to Pimlico. Parsons suggested that the 29th Division be quartered in Baltimore's huge Montgomery Ward building and drilled in nearby Carroll Park.[104] Asked later what he thought of this idea, the 29th's commander shook his head and said: "Preposterous."[105]

The philosophy of the General Staff was slow to change. The phrase "minimum construction" ran like a thread through all its plans. General MacArthur, who succeeded Summerall as Chief of Staff in 1930, continued to support the no-cantonment thesis. Testifying before the War Policies Commission in May 1931, MacArthur stated: "A mobilization plan must depend on certain basic assumptions of fact. Upon the correctness of these assumptions depends the successful application of the plan." Plans formulated during his regime were based on three assumptions; and one was:

> That great cantonments, such as we had in the World War, will not be constructed. Full utilization of Federal, State, county, and municipal buildings will be made as troop shelter. Where necessary, arrangements will be made to use privately owned buildings.[106]

That MacArthur, an Engineer and one of the most brilliant soldiers of his time,

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[101] (1) WD Gen Mobilization Plan, 1924. AG 381 (5–1–24) (Misc C). (2) WD Gen Mobilization Plan, 1928. AG 381 (8–1–28) (Misc C).

[102] Kreidberg and Henry, *History of Military Mobilization*, p. 415.

[103] Lecture by Col Parsons, 13 Sep 28. AG 381 (GMP 28).

[104] Truman Comm *Hearings*, Part 2, p. 478.

[105] Interv with Maj Gen Milton A. Reckord, 25 Nov 58.

[106] H Doc 163, 72d Cong, 1st sess, pp. 357–58.

could make this assumption indicated the extent to which pacifism and penury had undermined military judgment.

As these plans of the General Staff took shape, the M-day capability of the Construction Service declined. In the early 1920's the Service was blessed with a wealth of war experience and a strong Reserve. On file in the central office were structural drawings, organizational blueprints, layouts, specifications, and a history of the wartime division—all turned over by General Marshall. Many members of his "construction crew" were Quartermaster Reservists, and a Construction Division Association formed an active link between past and present. A Planning Branch in the Washington headquarters was the guiding force. Heading it were able and experienced officers—Captain Hobson, Capt. Edward M. George, and Col. Milosh R. Hilgard. Their principal civilian aide, William F. Kinney—"our wheelhorse," they called him—was a dedicated man. In each of the nine corps areas, a construction district, manned by Reservists, made plans for construction. During 1925 almost 500 Reserve officers participated in this planning. With the publication of the 1928 Mobilization Plan, virtually all activity ceased. The construction Reserve now came under the corps area commanders, the districts disappeared, and the Planning Branch merged with the War Planning and Training Branch, OQMG. Interest in the Construction Division Association waned. Wartime records went into storage. The loss was nearly total.[107]

In the eyes of the General Staff, the Constructing Quartermaster General had but one M-day duty—to provide structural plans for such additional shelter as might be necessary. The type of structure to be used was a debated question. In 1923, on General Pershing's orders, the Construction Service prepared tracings for prefabricated wooden structures. To be manufactured in sections at the mills, these small one-story portables were designed for quick and easy erection by troops or unskilled workmen.[108] Asked for an opinion as to the military potential of prefabs, William A. Starrett wrote: "As a practical matter the thing would be a disappointment, if not a disaster." He pointed out that prefabs would necessitate longer roads and utility lines than the larger two-story cantonment types. Productive capacity was small, and a prefab order for 50,000 troops would "swamp the mills of the country." Furthermore, Starrett warned, transporting the bulky sections would be no easy matter.[109] From the construction standpoint, these arguments were valid. But five years were to pass before permission to update the World War cantonment drawings came through. By early 1929, a few rough sketches—the first in the new 700 series—were ready for inspection. Although G–4 approved these plans, the General Staff continued to have a predilection for prefabs.[110]

As the illusion of permanent world peace began to dissolve in the mid-1930's, a small but vocal group of men raised

[107] Jesse A. Remington, Planning for Mobilization (MS), 1963, pp. 5, 13–16, 23.

[108] QM 634 (1922–34).

[109] Ltr, Starrett to ExecO Constr Serv, 22 May 23. QM 634 (1922–34).

[110] (1) Memo, Cheatham for Horton, 2 Jul 28. (2) Ltr, Cheatham to TAG, 30 Jan 29. Both in Opns Br Files, Mobl Plng. (3) Memo, G–4 for TAG, 15 Feb 29. G–4/20052–19.

the cry for realistic planning. Chief among them were Col. Charles T. Harris, director of the Planning Branch, OASW, and Lt. Col. James L. Frink, who headed The Quartermaster General's planning organization. Also prominent in this movement were Maj. Douglas C. Cordiner, the Quartermaster officer who was Harris' adviser on construction; Maj. Theodore P. Heap, Frink's deputy; and the hard-working Kinney. Expressing the attitude of this small band was Colonel Harris' homily:

> Even though we all deprecate war and feel that it is an unhappy undertaking, it must be remembered that every generation in the United States born prior to 1918 has seen a war. Until human nature can be changed it is only logical to expect that the future will bring more wars. If wars are bound to come, it is our duty so to plan as to minimize the harmful effects of war and to insure that this nation be victorious.[111]

In the spring of 1934, Harris and his colleagues were joined by Colonel Hartman, or, as he came to be known, "Mr. Construction himself."

Returning to Washington in 1934 after an 8-year absence, Hartman checked on the status of plans for emergency construction. The facts were chilling. The Planning Branch of the Construction Division, recently revived by General Bash, was starved for funds and woefully undermanned. The only known requirements were for remount depots, distribution centers for horses and mules; and the only detailed layouts were for these Quartermaster facilities. The 700 series drawings were in a sad state: a few tracings for barracks, mess halls,



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storehouses, and sheds—that was all. Many details were missing; there were numerous structural flaws; and the lumber sizes called for were no longer produced commercially. Equally distressing, not a single copy of General Marshall's history was around. Hartman did his best to repair the damage. He threw himself into the struggle for realistic M-day plans and called for a thoroughgoing revision of the 700 series.[112] No such effort could succeed completely. "We had no money," Hartman explained. Planning was "a side line rather than a fixed job."[113]

Research undertaken by the Army Industrial College disclosed an enormous gap between accomplishments and needs in the field of construction planning.

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[111] Col. C. T. Harris, Jr., "Industry and National Defense," *Army Ordnance*, vol. XVI, no. 96 (May–June 1936), p. 331.

[112] (1) Statement of Gen Hartman, 5 Jul 55, pp. 1–2. (2) Memo, Kinney for Frink, 7 Feb 34. Opns Br Files, Mobl Plng.

[113] Testimony of Gen Hartman, 12 Aug 41. In Truman Comm *Hearings*, Part 7, p. 2040.

After reviewing the wartime experience and evaluating current plans in the light of this experience, a committee headed by Maj. Raymond G. Moses of the Corps of Engineers submitted a 96-page study of the problem. Gravely critical of existing plans, the committee urged prompt corrective action. The fact had to be faced: mobilization would require a major construction effort. Plans had to be made accordingly. The committee underscored the need for firm construction requirements, for a survey of the building industry, for uniform types of emergency contracts, for standard plans and specifications, and for a strong organization in the field. Most important, Moses and his colleagues held: "There should be centralized control of all construction activities in the Army."[114] Armed with the findings of the Moses group, Colonel Harris called together representatives of G–4 and the Arms and Services in September 1934. After describing the "mammoth size" of the emergency construction task and receiving a lukewarm response, Harris told the others bluntly:

> It is absolutely necessary to get this construction control actively oriented and begin to get some plans for its accomplishment. It will be the first load placed on industrial America when war is declared. We must get requirements from the Corps Area Commanders for their needs. We must get requirements for industrial needs . . . . We have got to analyze the priorities and get that coordinated. If the Corps Area Commander should not be charged with construction, we must get it changed . . . . The thing we have to plan is what we are going to do and how.[115]

Failing to rally much support, Harris tried to start the ball rolling with the help of Frink and Hartman.

Battling the high tide of pacifism and isolationism, the planners made uncertain progress. Reflecting the mood of the American people were the Nye committee investigation of the international arms traffic and the branding of munitions manufacturers as "merchants of death"; the passage of neutrality acts in 1935 and 1937; and the embargo on exports of war materials to belligerents in the Spanish Civil War. As late as October 1937 the President's appeal for a quarantine against aggressors evoked no popular response. So pervasive was this mood that it infected even top levels of the War Department. In this situation, planning funds were hard to come by, and planning continuity was difficult to maintain. Much that needed doing remained undone. Nevertheless, the planners scored some gains.

Assistant Secretary Harry H. Woodring scored one gain on 14 June 1935, when he approved drafts of two emergency construction contracts. Developed in co-operation with the AGC, these forms would supersede the controversial agreement used in World War I. The first, designed "for relatively small projects where the scope of the work is known, and there is small probability of material changes and where time will permit competitive bidding," was a fixed-price contract with an "escalator" clause. This clause provided for increases in the contract price when wages or prices rose. The second form was a negotiated "evaluated fee" contract. Based on the cost-plus-a-percentage principle, this agreement introduced a novel method of computing fees. In 1917–18 contractors had received a percentage of the

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[114] AIC Rpt on Problem 17, Conversion and Construction of Facilities, 21 Feb 34. QM 020 (Constr) 1921–39.

[115] Min of Mtg in Plng Br OASW, 11 Sep 34. G–4/20052–55.

cost of the work regardless of the quality of their performance or the efficiency of their operations. The new form provided a bonus for good work and a penalty for bad. Although it perpetuated the basic defect of all percentage contracts by using actual costs to measure the value of contractors' services, it nevertheless gave the War Department a larger measure of control.[116]

Another significant advance was in the field of engineering. According to one informed estimate, it would take a technical force of 25 to 50 men 5 years to complete preparations—drawings, specifications, bills of materials, and layouts—for a major war construction effort.[117] "Of course," as Frink recalled, "the main trouble was always money." In the summer of 1935, with the help of Colonel Hartman, who had recently become chief of the Construction Branch, G–4, General Guiney was able to secure $55,000 in relief money. "A godsend," Frink called it. Work on the 700-series plans began anew in the fall. In the spring of 1937 revised drawings went to the General Staff, and Hartman had the satisfaction of approving them for the War Department. Although much had been accomplished, the plans were still far from complete.[118]

Meanwhile, an attempt to dilute the already weak authority of the Constructing Quartermaster came to nothing. Who would build for Ordnance and Chemical Warfare? On this issue opinions differed. The view of the using services was expressed by a Chemical Warfare officer in September 1934: "Control of construction facilities through a centralized point in time of war would break down of its own weight. All our plans are built around decentralized operations."[119] Six months later Ordnance made a bid to handle its own construction: Colonel Harris proposed that the using service appoint the officers who would direct the work.[120] Quartermaster officers opposed this change as a violation of the National Defense Act. Writing to the Assistant Secretary, Colonel Frink explained:

> This law . . . was brought about by the chaotic conditions existing in the early stages of the World War where . . . valuable time was lost, much confusion created, and greatly increased costs were directly attributable to the systems of control and supervision advocated in the proposed changes.[121]

There the matter rested.

The trend appeared to be in the right direction. On becoming Chief of Staff in October 1935, General Malin Craig reviewed the M-day plans and ordered a complete revision. By early 1936 a three-man committee, headed by Colonel Hartman, was at work restudying the problem of emergency shelter. Extremely critical of decentralization, the Hartman committee received strong support from corps area commanders, who held that the War Department's "makeshift" policy of using racetracks, fairgrounds,

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[116] Ltr, Harris to Bash, 16 Aug 35. QM 160 II. The contract forms are in QM 160 (Constr Contract) and QM 160 (Evaluated Fee Constr Contract).

[117] Memo, H. L. Burt for TQMG, 16 Jan 26. QM 381 (Policies, Precedents, etc.) 1925–40.

[118] (1) Answers to Questionnaire, Frink to authors, 22 Apr 64. (2) Memo, G–4 for CofS, 8 Jul 35. G–4/20052–55. (3) Ltr, TQMG to TAG, 24 Apr 37, and 1st Ind, 5 May 37. QM 600.1 (Mobl) 1936.

[119] Min of Mtg in Plng Br OASW, 11 Sep 34. G–4/20052–55.

[120] Draft of Amendment 1 to Plng Br Circ 3, 22 Mar 35. QM 600.1 (1918–41).

[121] Memo, Frink for ASW, 23 Apr 35. QM 600.1 (1918–41).

and public buildings was not feasible.[122] The committee's stand for centralization would be reflected, though faintly, in later mobilization plans. Louis A. Johnson, who succeeded Woodring as Assistant Secretary of War in June 1937, gave new impetus to industrial planning. In collaboration with his executive, Col. James H. Burns—"the finest officer in the U.S. Army," in Johnson's words[123]—the new Assistant Secretary tried to get rearmament rolling. During his first year in office, he traveled 50,000 miles, preaching the gospel of preparedness.[124]

Under Johnson's leadership, progress on the industrial front was good. With the co-operation of DuPont and other armaments manufacturers, the Chiefs of Ordnance and Chemical Warfare selected sites and developed typical plans for plants to be built in an emergency. The setting up of a Wilmington office in 1937 enabled the Ordnance Department to maintain close liaison with DuPont engineers.[125] Guidelines for future plant construction appeared in the War Construction Plan of 1937, which was based on the most recent edition of IMP, published in 1936. Under the construction plan, the number of new plants would be held to the minimum and such building as was necessary would be done by industry under the supervision of the using services.[126] The plan thus reaffirmed the Army's faith in the war potential of private enterprise. Johnson's greatest contributions were not to construction planning but to production. It was largely because of his efforts that the War Department was able to encourage industrial preparations for war, through a program of production studies and educational orders in the late 1930's.[127]

The result of General Craig's 1936 directive, the Protective Mobilization Plan (PMP) of 1938 envisioned a moderate-sized, balanced force for the defense of U.S. territory.[128] Emphasizing the purely defensive purpose of the plan, Secretary Woodring observed:

> In general, the protective mobilization plan visualizes in the event of a major war immediate employment of an initial protective force of approximately 400,000 men. This force will comprise existing units of the Regular Army and National Guard . . . . Under the protection of this initial defensive force there will be progressively mobilized, trained, and equipped such larger national armies as the defense of the United States demands.[129]

To be ready eight months after M-day was a force of a million men. Plans for full-scale mobilization of a 4-million-man army remained somewhat nebulous. PMP contemplated virtually no construction. Regular Army divisions would assemble at home stations; National Guard divisions at state summer camps. The men would live in existing barracks

[122] (1) Kreidberg and Henry, *History of Military Mobilization*, p. 475. (2) WDGS SO 5, 7 Jan 36. (3) Remarks of Col Hartman at G–1 Conf, 4–16 May 36. AG 381 (7CA GMP–Gen). (4) AG 381 (7–7–33).

[123] Interv with Louis A. Johnson, 9 May 56.

[124] Annual Rpt of ASW, 1938, p. 19.

[125] Harry C. Thomson and Lida Mayo, *The Ordnance Department: Procurement and Supply*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1960), pp. 11–12.

[126] Planning Br OASW, War Construction Plan, 1937, pp. 15–16. EHD Files.

[127] (1) Thomson and Mayo, *Procurement and Supply*, pp. 19–21. (2) R. Elberton Smith, *The Army and Economic Mobilization*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1959), pp. 61–65. (3) Col. H. K. Rutherford, "Educational Orders," *Army Ordnance*, November–December 1939, 162ff.

[128] For a detailed discussion of PMP see Kreidberg and Henry, *History of Military Mobilization*, ch. XIV.

[129] *Report of the Secretary of War, 1938*, p. 2.

and in tents. Corps area commanders would provide tent floors, kitchens, and utilities. Moving overseas one month after M–day, the initial protective force would vacate shelter which would then be occupied by successive groups of men.[130] Whether a large-scale construction effort would be undertaken in later stages of mobilization was left up in the air. The plan read:

> The acquisition of additional land and the construction of cantonments, or provision of housing facilities, for troops and installations not included in the Protection Mobilization Plan but which may be required at a later period is a function of The Quartermaster General and will be provided as directed by the War Department. He will maintain standard plans for buildings, and groups of buildings, and will so draw his plans that he will be able to undertake construction by 30 M if so ordered.[131]

After the sidetracking of General Seaman in the summer of 1938, Hartman fell to work on the plans for war construction. Securing $63,000 from WPA, he hired a staff to complete the 700 series drawings. Using some $200,000 in PWA money, he let contracts for a new building at Fort Myer, Virginia; ostensibly a warehouse, this structure was designed to hold a large emergency force of engineers and draftsmen. With the help of the Air Corps, he obtained aerial mosaics to supplement the division's collection of post maps, some of which were hopelessly out of date.[132] Meantime, he charted the M–day organization and considered ways to streamline contracting methods. In pushing these preparations, Hartman faced several obstacles. One was Seaman, who scornfully referred to the mobilization structures as "cigar boxes,"[133] and who failed to foresee another war.[134] A second was the lack of requirements. With no idea how many units of what type and size might someday have to be housed, Hartman framed his typical layouts around the battalion. He later explained:

> In the plans that I formulated I conceived of block units each complete with water, sewage, housing, etc. These block units would care for roughly a battalion of men and could be modified for varying type units and multiplied for larger units. In addition, there were plans for special type installations. I believed, in general, that it was much easier to modify an existing detail plan than it was to begin from scratch on a new one.[135]

During Hartman's stay in the division, the plans progressed steadily. But whether they would ever be put to use no one knew.

A vast program of military construction to be undertaken on or before M-day—the War Department's plans did not foresee this eventuality. Prophets who foretold such a program and who warned that construction would be the controlling factor in mobilization were little honored. Nevertheless, their vision was clear. In Biblical imagery, the stone which the builders rejected would become the headstone of the corner.

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[130] Testimony of Gen Tyner, 7 Aug 41. In Truman Comm *Hearings*, Part 7, pp. 1994–97.

[131] The Protective Mobilization Plan, 1939, sec. V, p. 11. AG 381 (10–31–38) (Misc) C–M.

[132] (1) QM 600.1 (Funds—Work Projects) II. (2) Memo, Maj Arthur R. Wilson for Budget and Legis Plng Br WDGS, 4 Oct 38. G–4/29778. (3) Interv with Mr. Leisenring, 5 Jun 57. (4) QM 600.92 1941.

[133] Interv with Gen A. Owen Seaman, 2 Oct 57.

[134] Testimony of Gen Seaman, 7 Aug 41. In Truman Comm *Hearings*, Part 7, p. 2021.

[135] Statement of Gen Hartman, 5 Jul 55, p. 1.

CHAPTER III

Coming of the Emergency

By 1939 the nation was beginning to rearm. An increasingly ominous world situation impelled the Army to assume a "position in readiness." Not knowing when, where, or under what circumstances the United States might be called upon to fight, military leaders sought to prepare for any foreseeable eventuality. Efforts were made to enlarge the air and ground forces and to equip them with the latest weapons, to ready industry for war production, to stockpile matériel for the Initial Protective Force, and to strengthen the network of strategic bases.[1] The Expansion Program, as these measures, collectively, came to be known, made necessary the first major military construction effort since the Armistice. Between January 1939 and March 1940, approximately $175 million became available for building purposes. This money enabled the War Department to strengthen seacoast defenses, modernize arsenals, enlarge dozens of stations, and establish ten new installations—airdromes, depots, and garrison posts. Minuscule in comparison with the mobilization and war efforts that were to follow, the Expansion Program was nevertheless "a real start . . . toward placing the Army on a basis of preparedness."[2] It was, moreover, the first real test of the construction system established by the Defense Act of 1920.

The Expansion Program

The program had its origins in the Munich Crisis. News that Britain and France had yielded to Hitler's demands came as something of a shock to people in the United States. The signing of the appeasement pact on 30 September 1938 marked the beginning of a shift in American public opinion. Although isolationism was still prevalent, there was growing sentiment in favor of a strong home defense. Reports from Europe indicated that Prime Minister Chamberlain and Premier Daladier, apprehensive over Germany's resurgent military power, viewed the *Luftwaffe* with particular alarm.[3] On 14 October, having sat up late the night before "hearing the European side of things" from his ambassador to France, President Roosevelt announced that the defense picture was due for a "complete restudy." Questioned by reporters, he refused to outline a specific program, revealing only that

[1] Annual Rpt of the CofS, 1939. In *Report of the Secretary of War to the President, 1939* (Washington, 1939).

[2] Rpt of the ASW for F.Y. 1940. In *Report of Secretary of War to the President, 1940* (Washington, 1940), p. 1.

[3] (1) William L. Langer and S. Everett Gleason, *The Challenge to Isolation, 1937–1940* (New York: Harper & Brothers, 1952), pp. 35–38. (2) Watson, *Chief of Staff*, pp. 130–32.

he was considering, among other matters, mass production of airplanes.[4] Within a week of the President's announcement the War Department was humming with planning activity.

Reporting to Assistant Secretary Johnson's office on 31 October, Lt. Col. Russell L. Maxwell, an expert in air ordnance called to Washington a few days before, was struck by the vastness of Johnson's projects and the broad scope of his authority. The first person Maxwell encountered was Johnson's executive, Colonel Burns, who spoke of a White House meeting on 25 October at which the President had stated that war was on the way. Burns revealed that because Secretary Woodring and Chief of Staff Craig did not share this view, Roosevelt was leaving them out of his councils, relying on Johnson instead. Among those the President was consulting were Maj. Gen. Henry H. Arnold, Chief of the Air Corps, Brig. Gen. George C. Marshall, Craig's new deputy, and representatives of the Navy and the WPA. Roosevelt, it seemed, was concerned almost entirely with planes and plane production.[5] General Arnold believed the Chief Executive was "thinking largely of how American industrial power might help to supply the air needs of those obvious friends abroad who were now being squeezed to the point of desperation by Germany."[6] On the afternoon of his arrival, Maxwell attended a planning session. "The conference," he said, "was discussing such large numbers of airplanes, . . . airplane factories, airplane pilots and mechanics that, fresh as I was from our very conservative headquarters of the GHQ, Air Force, I found it a bit difficult to take it all in." During the next two weeks, conference followed conference as Johnson and his associates endeavored to block out an air expansion program.[7]

General Craig viewed rearmament in a different light. His goal was the balanced military force envisioned in the Defense Act and in the mobilization plans—a well-organized, all-purpose force, capable of quick expansion. To rebuild the Army along these lines would take a great deal more than planes. Men, guns, camps, and munitions plants would also be necessary.[8] The Chief of Staff emphasized the decisive role of land armies. In 1939, on the eve of his retirement, he reaffirmed his position:

> No navy, no air force, can operate except from protected bases. It is only necessary to allow hostile ground troops to advance over their bases and their manufacturing facilities and they cease to exist . . . . New devices for war are of critical importance. To be without them invites failure. But we must never lose sight of the fact that we must guarantee their continued production and use. . . . Considered and concentrated attention upon the adequacy and efficiency of ground forces can never be neglected. There lies final success or failure.[9]

Along with Secretary Woodring, Craig stressed the fact that the Army's mission was defensive. Both men saw the need for increased military preparedness as

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[4] *Public Papers and Addresses of Franklin D. Roosevelt, 1938*, pp. 546–48.

[5] (1) Interv with Maj Gen Russell L. Maxwell, 15 Feb 57; Burns Interv, 24 May 56. (2) Ltr, ASW, ASN, and Dep Admin WPA, to the President, 28 Oct 38. AG 580 (10–19–38) Bulky, Increase of the AC. (3) Watson, *Chief of Staff*, pp. 132–33, 136.

[6] Henry H. Arnold, *Global Mission* (New York: Harper & Brothers, 1949), p. 173.

[7] Speech by Col Maxwell to a group of Ord officers (Jan 39). Maxwell's Papers.

[8] Watson, *Chief of Staff*, pp. 127–28, 130–31, 134–35.

[9] *Report of the Secretary of War, 1939*, pp. 24–25.

stemming not so much from the international crisis as from recent technological advances which had "so shortened the elements of distance and time" that "our national security was no longer assured by the broad expanses of the Atlantic and the Pacific Oceans."[10]

While the early November conferences in the Assistant Secretary's office dealt principally with ways and means of increasing aircraft production, the planners agreed that the objective should be broader. Johnson and Burns, tireless workers in the cause of industrial preparedness, sought means of expanding the country's capacity for making munitions. A great believer in war reserves, General Marshall wished to see that Ordnance was well provided for. Although gratified by the President's interest in air power, General Arnold pointed out that planes alone would not make an air force. Construction figured importantly in the thinking of these men. Plants, warehousing, barracks, schools, airfields, and air depots—all these and more were on the list of needed facilities, a list which continued to grow. Owing largely to Burns' efforts, planning was gradually directed back into regular channels. As framed by the Chief of Staff, the War Department's program included substantial increases not only for the Air Corps but for the other arms and services as well. How much of this plan the President and Congress would adopt was a subject of conjecture.[11]

On 14 November the first of two momentous meetings took place at the White House. Johnson, Craig, Arnold, Marshall, and Burns were there for the War Department. The President spoke at length—of German leadership in aircraft production, of America's weak defenses, and of threats to the Western Hemisphere and the need for countering them. The first requirement was for planes, he said. A fleet of 20,000 and a capacity for manufacturing 24,000 annually would be desirable. But because Congress might refuse so large a request, he intended to ask for 10,000 planes and capacity for building 10,000 a year. When the Army's representatives interposed a plea for balance, Roosevelt replied that runways, barracks, and schools would not impress Hitler at all. He asked that the War Department prepare a program based on his expressed desires. The next day Johnson, apparently on his own authority—he was Acting Secretary at the time—directed General Craig to draw up three cost estimates: one for 10,000 planes and seven aircraft factories plus the matériel, services, and installations to support an expanded Air Corps; one for war reserves for the 1,000,000-man Army contemplated under the Protective Mobilization Plan; and one for industrial preparedness. Arnold, whose job it was to determine the cost of expanding the Air Corps, prepared most of the estimates for construction. He did not consult Quartermaster General Gibbins, although Marshall had instructed that this be done. Soon plans were taking shape for spending, over a 2-year period, $1.3 billion for a balanced air force, $427 million for war reserves, and $122 million for industrial preparedness.[12]

[10] *Ibid.*, p. 2. See also pp. 4, 25–26.

[11] (1) Maxwell Speech (Jan 39). (2) Watson, *Chief of Staff*, pp. 141f. (3) Johnson Interv, 9 May 56; Burns Interv, 24 May 56; Maxwell Interv, 15 Feb 57.

[12] (1) Rpt (n.d.) by Arnold on Conf at White House, 14 Nov 38. CofS Misc Confs, 1938–42. (2) Watson, *Chief of Staff*, pp. 136–43. (3) Arnold, *Global Mission*, pp. 177–80. (4) Langer and Gleason, *Challenge to Isolation*, p. 38. (5) Maxwell Speech (Jan 39). (6) WPD 3708–28A.

When Roosevelt learned what was happening, he summoned his advisers to a second meeting. He wanted planes, he told them, and they were trying to give him everything but planes. Besides, he said, he was not inclined to ask Congress for more than $500 million. Before the discussion ended, the President had nevertheless agreed to accept roughly one-quarter of the Army's program. He would call for a total of half a billion dollars: $200 million for nonair items, $180 million for planes, and $120 million for other air requirements. Of this last amount $62 million would be earmarked for construction.[13]

The War Department was planning more construction than could possibly be had for such a sum. Panama, Alaska, Puerto Rico, the southeastern United States, and New England were each to have a big, new air base. Some forty existing Air Corps stations were slated for expansion. There was talk of four more bombing and gunnery ranges and at least two more air depots. Considerable work would be done on seacoast and antiaircraft defenses, and three new posts would be built in the Canal Zone to house an increase in the Coast Artillery garrison there. The list of proposed industrial projects included the seven aircraft factories and important additions to the Frankford and Springfield Arsenals, Aberdeen Proving Ground, the Signal Corps laboratory at Fort Monmouth, New Jersey, and the aeronautical laboratory at Wright Field, Ohio. How to build so much with so little money was a difficult problem indeed. General Arnold predicted that the Air Corps alone would require $194 million in construction funds before 30 June 1940. And this estimate did not include the aircraft plants, which would cost in the neighborhood of $40 million. The planners did their best to economize, proposing to build as little and as cheaply as possible. When the aircraft industry promised greatly to increase its capacity, they dropped the seven factories. Still, enough money was not in sight. Unless the President would ask for more, much work that the planners believed essential would have to be postponed.[14]

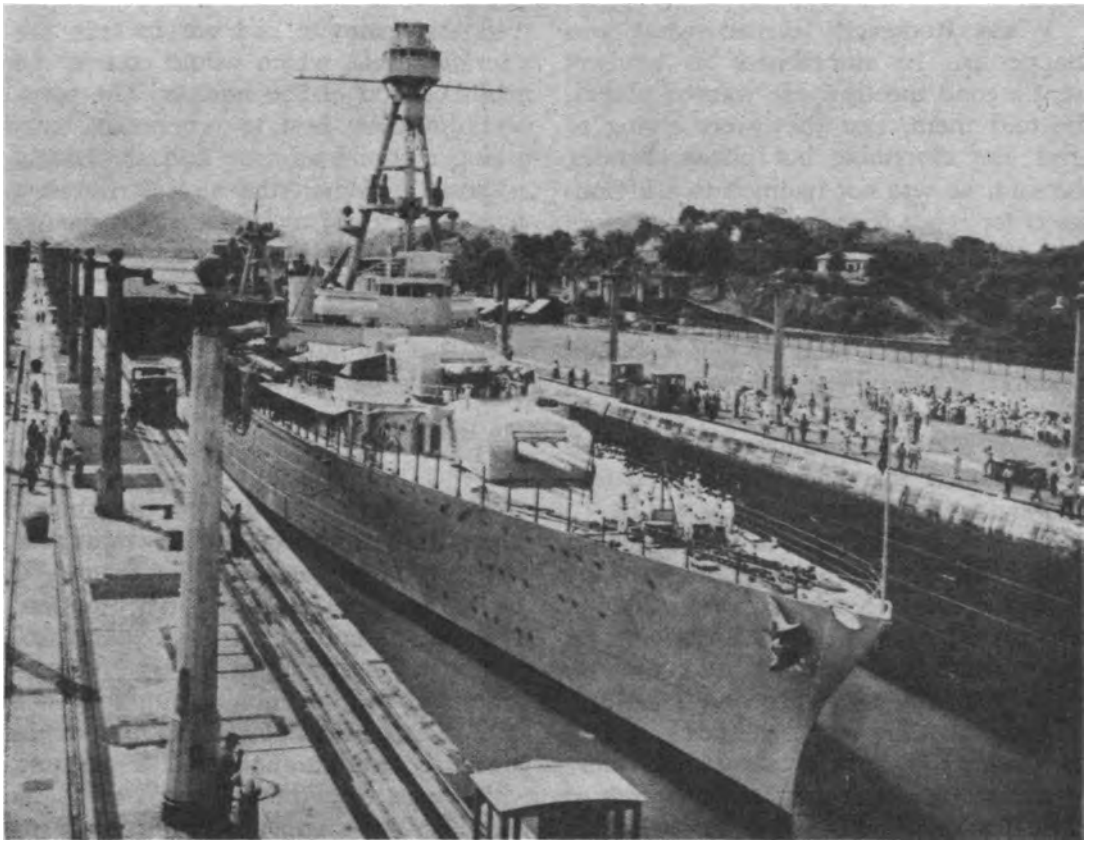
The Quest for Funds

When Congress convened in January 1939, Roosevelt proposed "a minimum program for the necessities of defense."[15] The price was appropriately modest. The regular budget for fiscal year 1940, submitted to Congress on 5 January, contained $470 million in funds for the War Department plus $20.7 million in contract authorizations. This request, which was not much larger than the previous year's appropriations, provided almost nothing for expansion. Only $28.5 million was to go for construction, land, and maintenance. A week later, in a special message to Congress, the President asked for $525 million for defense—$450 million for the Army, $65 million for the Navy, and $10 million for private schools which would train civilian pilots. The Army's share would be apportioned as follows: $300 million for the Air Corps; $110 million for critical items of equipment for the 400,000 men of the Initial Protective Force; $32 million for educational orders; and $8 million for sea-

[13] *Ibid.*

[14] (1) Memo, Arnold for Craig, 28 Nov 38. WPD 3807-28A. (2) Memo, Johnson for the President, 28 Dec 38. (3) Memo, G-4 for TQMG, 20 Feb 39. Last two in G-4/31265 Sec 1.

[15] *Public Papers and Addresses of Franklin D. Roosevelt, 1939*, p. 73.



USS HOUSTON SOUTHBOUND THROUGH MIRAFLORES LOCKS, PANAMA CANAL

coast defenses in the United States, the Canal Zone, and Hawaii, and for a transisthmian highway in Panama. In addition to his big request, the President made another smaller one for $27 million to strengthen the Panama garrison. He recommended that $5 million of this amount be granted at once so that construction of housing could begin.[16] Although he stressed the need for an adequate defense, the sums he asked for were, from the War Department's standpoint, far from sufficient.

Congress lost little time in taking up the President's proposals. On 17 January the Military Affairs Committees of both houses began hearings on his rearmament plans. Appearing that same day before both these groups, Secretary Woodring set forth the views of the War Department. Regardless of world conditions, he declared, the defenses of the United States must be modernized and strengthened. Of first importance were plans for the Panama Canal, "the keypoint of our whole protective system."

[16] (1) *Ibid.*, pp. 36ff., 70–74. (2) H Subcomm of the Comm on Appns, 76th Cong, 1st sess, *Hearings on Military Establishment Appropriation Bill for 1940*, pp. 4, 226, 257–70, 497.

The Canal Zone must have more airfields, more planes, and better seacoast and antiaircraft defenses. To protect the eastern approaches, an air base must be built in Puerto Rico. Although Alaska was of less strategic value, it was essential that an airdrome be constructed there. "We must be ready," Woodring explained, "to guard northwestern America against the establishment of hostile air bases." After commenting on the need for educational orders and war reserves, he took up the proposal for an expanded air force. The amount asked by the President would provide 3,000 additional planes and make possible the organization of new squadrons for the United States and outlying possessions. It would also provide "personnel, materiel, a portion of the bombs, and some of the bases and shelter construction necessary for the operation of an increased Air Corps." Regarding the program as a whole, Woodring said, "I consider . . . [it] exceedingly modest, and I feel that its soundness can be sustained under the most searching examination. That program has the wholehearted support of the Army's staff, which has intensively studied the matter and has worked out the detailed plans involved." Pointedly, he added, "I do not mean that the officers concerned find included in the program all that they think necessary."[17]

Following Woodring to the stand, General Craig told the House committee, "Our most difficult problem has been to arrive at a satisfactory decision with reference to the construction program." Of the $62 million requested for Air Corps construction, he explained, nearly $23 million was set aside for projects in the Canal Zone. Another $4 million was for the Alaskan air base. The remainder would have to cover the jobs in the United States, Puerto Rico, and Hawaii. When his turn came to testify, General Arnold outlined a scheme for making the money go around. He meant to hold to a minimum the number of shops, hangars, and warehouses, dispense with concrete runways except in Alaska and the tropics, and provide officers quarters only where no accommodations could be had in nearby towns. He expected to save on housing for enlisted men. In the extreme climates of Panama and Alaska, barracks had to be sturdy, but elsewhere he planned to erect cheap prefabricated structures. "In any event," Arnold assured the congressmen, "we feel that construction will not present a very difficult problem." The Quartermaster General appeared less sanguine. Asked what troubles he foresaw in carrying out his part of the program, General Gibbins replied, "I do not think we would have any difficulty with any of those problems, the problems of procurement, except for construction."[18]

As the bill to authorize the President's program moved toward passage, the War Department endeavored to secure additional building funds. Looking about for any available cash that might help get construction started, Colonel Maxwell uncovered $4.5 million in unused work relief money, which he was able to obtain for expanding the Wright Field Laboratory and purchasing land. At the Congressional hearings several

[17] H Comm on Mil Affs, 76th Cong, 1st sess, *Hearings, An Adequate National Defense as Outlined by the Message of the President of the United States*, pp. 1–3.

[18] H Comm on Mil Affs, 76th Cong, 1st sess, *Hearings, An Adequate National Defense . . .* , pp. 5–6, 12–13, 23, 78.

witnesses testified that an adequate defense would cost much more than Roosevelt had seen fit to ask. But these indirect appeals to Congress for bigger appropriations were unsuccessful. General Craig approached the Bureau of the Budget. On 16 March he put in a supplemental estimate for $122.5 million for construction. The Budget turned him down. The authorization act, approved on 3 April, sanctioned the program recommended by the President but stipulated that the appropriations, which had yet to be made, not exceed the sums asked in January.[19] Chances of getting more money from Congress seemed practically nil. Maxwell's lucky find was not likely to be duplicated. There remained one last resort—the funds of the WPA.

WPA had entered the picture early. At the time of the Munich Crisis, the President had sent Harry Hopkins to survey the West Coast aviation industry and explore the possibilities of expanding it. Hopkins returned with a plan for employing WPA to build more aircraft factories.[20] Meanwhile, Maj. Arthur R. Wilson, the War Department's liaison officer with WPA, had informed the General Staff that Hopkins believed "the Army and Navy are sitting pretty to get a lot of money in the next relief bill for the national defense *if* they can sell the idea to the President."[21] During October Hopkins and his assistants persuaded Johnson, Arnold, and Marshall that WPA could be of help in the rearmament program. The idea appealed to the President. At the White House conference of 14 November, he announced his intention of turning over to Hopkins the aircraft plant projects, the only construction he then contemplated. As the construction program grew, WPA funds assumed larger importance in the plans of Johnson and his group. While Hopkins was eager to participate, he naturally wished to do so on his own terms. He had long disliked the arrangement whereby WPA transferred money to other federal agencies, preferring to have relief work directed by his own organization.[22] Late in November word reached The Quartermaster General that WPA was preparing to superintend a part of the Army's construction program.

The men responsible for military construction took a dim view of this development. General Gibbins pointed out that the Quartermaster Corps had "an experienced and thoroughly competent organization." While offering to cooperate "with whatever agency may be directed to conduct this work," he questioned the wisdom of entrusting high-speed projects to WPA. The Assistant Chief of Staff, G–4, Brig. Gen. George P. Tyner, was more outspoken. Stating that he was "unable to comprehend . . . how the WPA could

[19] (1) Memo, Johnson for the President, 14 Feb 39. AG 600.12 IR (5–13–39). (2) Maxwell Interv, 15 Feb 57. (3) H Comm on Mil Affs, 76th Cong, 1st sess, *Hearings, An Adequate National Defense* . . . , pp. 4–8, 46, 73. (4) S Comm on Mil Affs, 76th Cong, 1st sess, *Hearings* on H R 3791, pp. 34, 295–98. (5) Ltr, BOB to SW, 12 Apr 39. G–4/30552–21. (6) 53 *Stat.* 555.

[20] (1) Robert E. Sherwood, *Roosevelt and Hopkins, An Intimate History* (New York: Harper & Brothers, 1948), pp. 99–101. (2) Arnold, *Global Mission*, pp. 171–72, 177–78.

[21] Ltr, Wilson to WD. Quoted in Sherwood, *Roosevelt and Hopkins*, p. 100.

[22] (1) Watson, *Chief of Staff*, pp. 137–38. (2) Arthur W. MacMahon *et al.*, *The Administration of Federal Work Relief* (Chicago: Social Science Research Council on Public Administration, 1941), pp. 134, 329–30.

handle this job," he reminded General Marshall: "It is an accepted fact that the WPA is inefficient and uneconomical on construction projects." Since much of the work would be in thinly settled areas, Tyner failed to see how WPA could even man the jobs, much less complete them on time.[23]

Despite the conspicuous lack of enthusiasm on the part of Tyner and Gibbins, pressure for using relief funds continued to grow. Disappointed in the President's request to Congress, Johnson and Arnold looked increasingly to WPA for a way out of their budgetary difficulties. On 18 January Arnold informed Craig that if adequate storage and maintenance facilities were to be ready when planes began rolling off the assembly lines, $20 million was necessary at once for enlarging two air depots and building two new ones. As no appropriation had been asked for depots, Arnold urged that negotiations be started with WPA immediately. A few days later he added a third new depot, bringing to $28 million the sum required from the relief agency. Johnson was meanwhile seeking $3,750,000 in WPA money for Ordnance and Signal Corps projects. By late January the estimated cost of the War Department's building program, exclusive of fortifications and posts for the Panama garrison, had risen to $93,750,000. Johnson now revealed his intention of allotting only $32 million of the big Air Corps appropriation to construction and of using this money as the sponsor's contribution toward work to be done by WPA. The bulk of defense construction would thus go to the relief agency. General Tyner was taken aback. Col. Francis C. Harrington, an Engineer officer of 30 years' service, had recently succeeded Hopkins as WPA Administrator. Tyner could not believe that Harrington approved of Johnson's scheme. He therefore proposed that the War Department and WPA get together and work out a more practicable plan.[24]

The powwow took place on 25 January. Among those present were Maj. Bartley M. Harloe, Harrington's principal assistant, Lt. Col. Paul W. Baade, chief of the Construction Section, G–4, and Colonel Maxwell. Speaking for General Tyner, Baade attempted to show that Johnson's plan was unworkable. Construction in Panama, Alaska, and Puerto Rico would cost at least $34.3 million, and there was no WPA in those territories. Some $7 million would be necessary to equip depots and other installations in the United States and Hawaii; yet WPA could buy no equipment with its funds. Moreover, the relief agency could spend only piddling sums for materials—a mere $7 per man per month for common labor and even less for skilled. Colonel Maxwell interrupted Baade to disclose that the President had, in confidential reserve, $25 million that could be used for purchasing. Maxwell suggested that this fund, together with the sponsor's contribution and $25 million from WPA, would see the program through. Baade disagreed. Alluding to the high cost and slow progress of most WPA construc-

[23] (1) Memo, Gibbins for Marshall, 1 Dec 38. G–4/31265 Sec 1. (2) Memo, Tyner for Marshall, 16 Jan 39. G–4/30552–4.

[24] (1) Ltrs, Arnold to Craig, 18 Jan, 23 Jan 39. G–4/31265 Sec 1. (2) Memo, Tyner for Craig, 26 Jan 39. OCS 20808–159. (3) Memo, Harrington for Hopkins, 30 Nov 38. (4) Memo, ExecO G–4 for P & E Br G–4, 20 Jan 39. Last two in AG 580 (10–19–38) Bulky, Increase of the AC.

tion, he questioned whether the work could be completed with the funds and in the time available. Furthermore, he argued, Panama, Alaska, and Puerto Rico had still to be provided for. Turning over military funds to WPA was, in his opinion, highly unwise if not illegal. Baade's objections were brushed aside. Maxwell and Harloe agreed to work out a plan which Harrington could lay before the President.[25]

The plan submitted to Harrington early in February 1939 was ill-contrived and tentative. Unable to find a way of handling the jobs in Panama, Puerto Rico, and Alaska through WPA, Maxwell and Harloe made no provision for them; nor did they refer to a sponsor's contribution. In substance their proposal was that WPA do the construction in the continental United States and Hawaii, using $25 million of its own money and the President's confidential reserve. But whether Roosevelt would release his funds they did not know. Two months went by and nothing happened. Meanwhile, WPA had run short of money and the President had spent his reserve funds for unemployment relief. By late March little time remained. The House and Senate conferees had reached agreement on the authorization act, and the way would soon be open for introducing an appropriation bill. On 25 March Harrington proposed a solution. Leaving the Canal Zone, Puerto Rico, and Alaska to the Army, he recommended that WPA and the War Department each contribute $25 million toward the projects in the States and Hawaii, which local WPA administrators would build. Johnson promptly sent this proposal to the White House.[26]

There was some question whether WPA would be in a position to undertake any of the Army's jobs, for the relief agency was in trouble with Congress. During the recent election, charges of improper political activity had been made against it. Conservatives of both parties, never friendly toward WPA, had been further antagonized. The intended victims of the President's attempted congressional purge were particularly hostile. Roosevelt's request on 5 January 1939 for $875 million to see WPA through to the end of the fiscal year had aroused determined opposition. The House slashed $150 million from the President's estimate and the Senate refused to restore the cut. The supplemental appropriation, approved on 4 February, carried a provision which, for the first time, prohibited WPA from competing with private manufacturers. On 27 March the House passed a resolution to investigate WPA's activities.[27] The Associated General Contractors had meanwhile renewed their pledge to "fight for the preservation of private industry in construction, the enlightenment of the public, and the retarding and ultimate dissolution of the Works

[25] Memo, Baade for Rcd, 25 Jan 39, and related correspondence in G–4/31265 Sec 1.

[26] (1) Draft of Memo for the President, prepared by Maxwell and Harloe, 28 Feb 39, and Incl. SW Secret Files, 591–701. (2) Memo, Harloe for Maxwell, 27 Jan 39. (3) Ltr, Harrington to SW, 25 Mar 39. Last two in G–4/31265 Sec 1. (4) Memo, Johnson for the President, 29 Mar 39. SW Files, Constr Work 1–250.

[27] (1) MacMahon, *Federal Work Relief*, pp. 282ff. (2) Sherwood, *Roosevelt and Hopkins*, pp. 98, 104. (3) Donald S. Howard, *The WPA and Federal Relief Policy* (New York: Russell Sage Foundation, 1943), pp. 116–17, 133, 576. (4) H Res 130, 76th Cong, 1st sess, 27 Mar 39.

Progress Administration."[28] Neither Congress nor the contractors seemed likely to accept a plan for putting large-scale military construction projects under WPA.

Assistant Secretary Johnson faced a tough decision. At most, only $87 million was in prospect for emergency construction, and $25 million of that was WPA money, worth no more than fifty cents on the dollar in terms of finished work. If the program were designed to fit these funds, few plant or depot projects could be included. On the other hand, if all the jobs were started, chances were that the money would run out before many of them reached completion. Johnson chose the bolder course. On 29 March he advised the President that, while $87 million would "initiate the main features of the program on a minimum basis, additional funds may be required."[29] In Woodring's absence, Johnson, as Acting Secretary, ordered affairs in the War Department to suit his purpose. For some days G–4 had been developing a construction program that could be accomplished for $62 million. Each project had received a priority. Installations in Panama were first on the list, followed, in order, by bases in Puerto Rico and Alaska and the more urgent jobs in the United States and Hawaii. Should funds be forthcoming from WPA, G–4 planned to use them for General Arnold's depots and additional buildings at the Wright Field laboratory. No provision had been made for new Ordnance and Signal installations. On orders from Johnson, G–4 wiped out the priorities and revised the list to include all the projects. Still hoping that WPA would come through with more funds than Harrington had so far offered, Johnson insisted that Congress be asked to vote the $62 million as a lump sum which could be used for any or all projects on the revised list. How this appropriation would be spent would be decided later, after WPA received its money for the new fiscal year.[30]

Johnson's decision stirred up protests. General Arnold stated his unalterable opposition to including items that had nothing to do with the Air Corps in the Air Expansion Program. General Tyner contended that industrial projects, though urgently required, "should not be constructed at the expense of much needed Air Corps items."[31] Several officers pointed out that The Quartermaster General would not be able to make detailed plans "primarily for the reason that the money provided was insufficient for the construction involved."[32] Learning that the War Department was proceeding "on the assumption" that it would be able to employ large amounts of relief money for emergency construction, several congressmen suggested that the assumption might turn out to be mistaken.[33] But it was futile to argue.

[28] Ltr, E. J. Harding, Managing Dir AGC, to Sen James F. Byrnes, 11 Mar 39. In S Sp Comm to Investigate Unemployment and Relief, 76th Cong, 1st sess, *Hearings* on S 1265, p. 307.

[29] Memo, Johnson for the President, 29 Mar 39. SW Files Constr Work, 1–250.

[30] (1) Memo, Tyner for Craig, 27 Mar 39. (2) Memo, Johnson for Craig, 29 Mar 39. Both in G–4/31265 Sec 1. (3) Memo, OCAC for Rcd, 5 Apr 39. AAF Central Files, 600.1–600.12H to 30 Jan '39.

[31] Memo, Tyner for Craig, 27 Mar 39.

[32] Notes of Conf in G–4, 4 Apr 39. G–4/31265 Sec 1.

[33] H Subcomm of the Comm on Appns, 76th Cong, 1st sess, *Hearings on Supplemental Military Appropriation Bill for 1940*, pp. 24, 43–44.

Johnson had his way. The supplemental estimate submitted to Congress late in April requested a lump sum of $62 million for construction.

Some construction money was becoming available, though not much. On 26 April the President signed the regular military appropriation bill, which carried $25.5 million for construction, maintenance, and land at permanent posts and $2.7 million for Engineer work on fortifications. A week later he approved a deficiency appropriation giving the Construction Division $800,000, most of it to repair damage done by the New England hurricane of 1938, and providing $2 million for the erection of seacoast defenses. Hearings on the big emergency appropriation bill did not begin until 16 May.[34] Uncertainty as to what emergency projects would be built and how they would be financed promised to continue for some time.

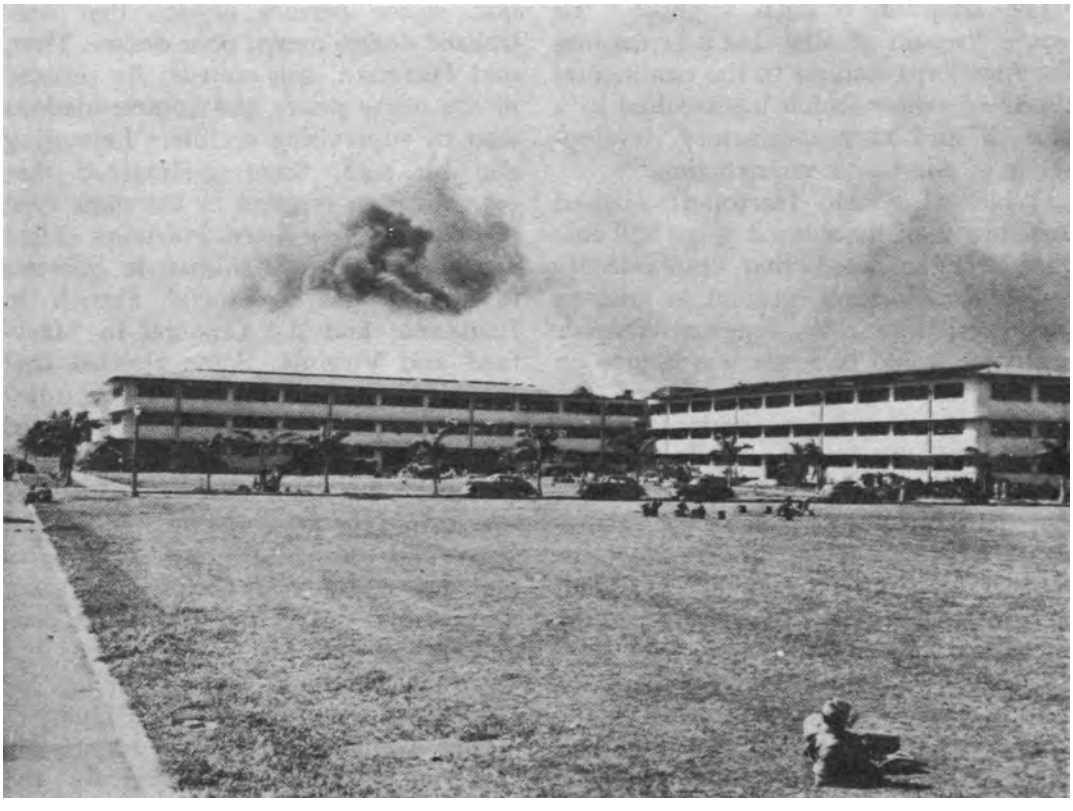
Questions of Responsibility

Where responsibility for emergency construction would lie was an open question. So long as the volume of new construction remained small, the compromise of 1920 endured. There was dissatisfaction, to be sure. There were complaints that Quartermaster methods were too slow and Quartermaster organization was too centralized. But there was no concerted effort to bring about a change. No sooner had expansion begun than moves were afoot to wrest responsibility from The Quartermaster General. Local commanders, intent on strengthening defenses as fast as possible, sought to do construction work themselves without reference to Washington. The Air Corps, displaying strong separatist tendencies, entered a bid for more authority in construction matters. Proponents of transferring construction to the Corps of Engineers felt the time had come to act. For the Construction Division, these threats were far graver than the one posed by WPA. Turning over part of the expansion program to the relief agency would be no more than a temporary expedient designed to stretch appropriations, but any shift of responsibility within the Army was likely to be permanent.

Among the first to challenge the existing order were the commanding generals of the Panama Canal and Hawaiian Departments. Normally, commanders of the overseas departments had little to do with the Construction Division. A 1929 War Department order permitted them to choose locations, prepare layouts, and draw plans and specifications for most new structures within their commands. Construction was carried out by department quartermasters under the commanding generals rather than by Constructing Quartermasters responsible to The Quartermaster General. Nevertheless, department commanders came under the regulations which stated that all projects involving new construction or major alterations must have prior approval of the Secretary of War and that The Quartermaster General would award construction contracts unless otherwise directed. The Secretary sometimes asked the Construction Division to plan large or unusual overseas projects.[35] During the

[34] (1) 53 *Stat.* 592. (2) 53 *Stat.* 626. (3) H Subcomm of the Comm on Appns, 76th Cong, 1st sess, *Hearings on Supplemental Military Appropriation Bill for 1940.*

[35] (1) WD Ltr AG 620 (12-9-29) Misc Div (D) to CG's Panama Canal and Hawaiian Depts, 11 Dec 29. WPD 1379-18 to 45. (2) Memo, Tyner for Marshall, 16 Jan 39. G-4/30552. (3) AR 30-1435, 28 Nov 33. (4) Bruner, Outline of Authorizations—Constr Contracts, p. 1. EHD Files.



3,200-MAN BARRACKS BURNING AFTER JAPANESE ATTACK, *Hickam Field, Hawaii, 7 December 1941.*

latter half of 1938 Maj. Gen. David L. Stone, the commander in Panama, clashed with the division over designs for runways at Albrook Field, and Maj. Gen. Charles D. Herron, who commanded in Hawaii, arguing in favor of a dispersed layout, opposed the division's plans for a 3,200-man barracks at Hickam Field. Protracted disagreements delayed the start of construction on these projects, both of which the Air Corps considered urgent.[35]

In order to restrain the commanders, General Arnold attempted to tighten his control over Air Corps construction in Panama and Hawaii. At the first sign of trouble with the Albrook job, he urged that the overseas departments turn design responsibility back to the War Department. A few months later, when General Herron tried to prevent the building of the 3,200-man barracks, Arnold broadened his demands. This time he recommended that all questions concerning both the construction and design of Air Corps stations overseas be decided jointly by him and Gibbins and that any disagreements between them be referred to the General Staff.

[35] (1) QM 600.1 (Hickam Fld) II. (2) QM 600.92 (Hickam Fld) 1935–40. (3) QM 611 (Albrook Fld) 1938–40. (4) G–4/29980–6.

"The adoption of such a policy," he wrote, "would parallel that now existing for Air Corps stations in the continental limits—a policy which has resulted in a smooth and very satisfactory development of Air Corps construction."[37]

While Colonel Hartman favored Arnold's plan, he wished to go still further. He proposed that responsibility for all construction, ground as well as air, be centered in Washington. Whether a change would be made was largely up to General Tyner, who viewed the existing arrangement with concern. Arnold and Hartman had little difficulty in persuading him to go along with them. On 18 February 1939 Tyner recommended recision of the 1929 order. General Craig agreed. A new directive went to the department commanders on 25 February. Henceforth, the War Department would pick sites and make layouts for all military projects in the Canal Zone and Hawaii, and although plans and specifications might still be prepared locally, they could not be used until Washington approved them.[38] The advocates of centralized control appeared to have won a signal victory.

So sharp a reversal of policy did not go unchallenged. Hartman soon had to defend the principle of centralized control. In a 12-page memorandum prepared for Tyner's signature, he dealt with the objections against centralization. Some persons argued that centralized design meant poor design. That, said Hartman, was untrue; he pointed to the many prizes and commendations won by supervising architect Leisenring and his staff. Some maintained that centralization resulted in the same type of housing everywhere. Hartman called attention to the Spanish-style quarters in Texas, the Provincial French in Louisiana, and the Colonial in Maryland and Virginia. Some asserted that the Air Corps built for itself better quarters than the Quartermaster provided for the rest of the Army. Emphasizing that the air stations were comparatively new, while the great majority of ground posts had been built by local commanders many years before, Hartman commented: "The fact that the construction of the Air Corps stations has been satisfactory is very gratifying, inasmuch as the Office of The Quartermaster General is entirely responsible for that condition." Repeatedly the question had arisen why Constructing Quartermasters took their orders from Washington rather than from post and corps area commanders. The day was long past, Hartman said, when nonprofessionals could do construction. Nowadays a corps of specialists was required. Commanders could not themselves direct CQM's with any degree of competence, nor could they justify the expense of maintaining separate technical staffs. Hartman warned that if authority were decentralized, construction would be back where it was in the spring of 1917. Having disposed of these objections, he took the following stand:

> In light of the lessons of the past and the recognized civilian practice, . . . the need of a strong centralized organization is

[37] (1) Ltr, Arnold to TAG, 11 Aug 38. AAF Central Files, 611 A to Jul 40. (2) 1st Ind, Arnold to TAG, on TWX, Herron to Arnold, 14 Nov 38. QM 600.1 (Hickam Fld) II.

[38] (1) Draft of Ltr, TAG to CG's, Panama Canal and Hawaiian Depts, 2 Dec 38. G–4/31288. (2) Memo, Tyner for Marshall, 16 Jan 39. G–4/30552. (3) Memo, Tyner for Craig, 18 Feb 39. G–4/31288. (4) WD Ltr (2–18–39) Misc D to CG's, Panama Canal and Hawaiian Depts, 25 Feb 39. AG 600.12 (2–18–39).

important, first, because a central organization can be more efficiently and economically managed and controlled, and second, [because] responsibility can more readily and directly be placed . . . . The present plan of operation provides for much needed centralization of advisory and directing functions, a decentralization of necessary supervisory and executive duties, and the ability to expand to meet construction requirements of almost any character. Such a plan, past experience indicates, is essential to meet war time demands.

He recommended continuation of the current policy. On 24 March General Tyner signed the memorandum and forwarded it to G–3 and the War Plans Division (WPD) for concurrence. But those divisions did not concur.[39] They now had before them a proposal of another kind, one to give the airfield projects to the Corps of Engineers.

Behind the scenes, a powerful triumvirate was seeking to effect a transfer. The Assistant Secretary sparked the movement to take construction from The Quartermaster General. In Johnson's eyes, the Quartermaster Corps was a clumsy, slow-moving outfit that seldom finished anything on time, while the Engineers were experienced technicians who did the work assigned them expeditiously and well. General Marshall, now a leading candidate to succeed Craig as Chief of Staff, also believed the Engineers would do a better job. He held, moreover, that additional experience with peacetime construction would strengthen the Corps for its wartime mission of building in theaters of operations. "All along," he wrote, "I favored the Engineer Corps to handle construction."[40] The President, too, was for making the change, though he gave Johnson to understand that there must be no fight in Congress. It was with this backing that Colonel Maxwell on 28 March proposed that the Chief of Engineers be charged with building for the Air Corps.[41]

The National Defense Act offered a convenient loophole. As mentioned earlier, Congress had excepted fortifications when it assigned military construction to the Quartermaster Corps in 1920. The same day that Maxwell made his proposal, General Tyner began investigating whether airfields could be considered fortifications and as such turned over to the Engineers. The Judge Advocate General held that runways, hangars, and other technical structures, as distinct from housing, could be so considered. But because he doubted the legality of diverting funds appropriated for one branch to another, he advised Tyner to wait until Congress voted construction money directly to the Engineers. Taking issue with the Judge Advocate, the Budget Officer for the War Department saw no objection to shifting funds about.[42] Meanwhile, General Marshall had talked the matter over with the Chief of Engineers, Maj. Gen. Julian L. Schley, who recalled: "I remember . . . Marshall as the strong advocate of having the Corps build the airfields. He discussed the

[39] Memo, Tyner for Craig, 24 Mar 39. AG 211.99 CQM (4–1–36).

[40] Replies to Questionnaire, Marshall to authors, received 23 Apr 56.

[41] (1) Johnson Interv, 9 May 56. (2) Memo, Maxwell for Marshall, 28 Feb 39. (3) Memo, Maxwell for ACofS WPD, 28 Mar 39. Last two in Maxwell's Papers.

[42] (1) Memo, Tyner for JAG, 30 Mar 39. (2) Memos, JAG for Tyner, 3 Apr 39, and BOWD for Tyner, 10 Apr 39. All in G–4/31324.



GENERAL SCHLEY

subject with me several times and I expressed my interest in the successful transfer of this work." Aware of the political dangers involved, Marshall told the Engineers to stay in the background. The Corps, he said, must take no active part but must leave negotiations entirely in his hands.[43]

As much as he desired to see construction transferred, General Schley wished to avoid spreading his Corps too thin. He was concerned primarily with developing able military engineers who could serve, along with Infantry and Artillery, as members of the combat team and carry out major construction in theaters of war. In early 1939 there were approximately 775 active Engineer officers. Three-quarters of them were on duty with the Corps, engaged in mapping, supply, research and development, troop training, and construction of river, harbor, and fortification works. The remainder were detailed to other organizations. Already, the Engineers had a number of jobs to fill that had little relation to military engineering, and Schley was wary of taking on more.[44] While he welcomed the opportunity of doing the Army's construction, he feared that his "officer personnel . . . would be wasted if burdened also with the troublesome job of maintenance."[45]

Schley viewed the problem from still another angle. The Engineers, he felt, must not stress building work so much that they lost sight of combat. A civil works program costing in excess of $275 million was in prospect for fiscal year 1940.[46] On 10 April Schley indicated to Tyner his willingness to undertake a small part of the Air Corps program. He understood, he said, that the task proposed for the Engineers was to build the technical features of five new air bases. In agreeing to accept this job, he was making certain assumptions: maintenance would be left to the Quartermaster Corps; the airfield projects would be assigned to the districts and divisions of the Engineer Department, which handled civil works and fortifications; and the Engineers would be free to carry out construction "in such manner as may be most expeditious and economical and to the best interests of the Government." Schley reminded Tyner that use of WPA funds would be inefficient

[43] Incl with Ltr, Schley to EHD, 5 Sep 53.

[44] (1) *Ibid.* (2) Annual Report Covering Military Activities of the Corps of Engineers for the Fiscal Year Ending June 30, 1939, pp. 1–3.

[45] Ltr, Schley to EHD, 19 Feb 57.

[46] (1) Interv with Maj Gen Julian L. Schley, 26 Oct 55. (2) Incl, Appns for Mil and Civil Functions CE, with Memo, Chief Budget and Programs Div OCE for Chief EHD, 6 Jan 55.

and might delay completion. As for "the larger question of the future responsibility of the Corps of Engineers for construction and maintenance of Air Corps technical features," Schley asked that this be settled later.[47]

Tyner decided to let well enough alone. On 15 April, he told Craig why he believed the proposed change should not be made. There were, he knew, sound arguments in favor of a transfer. The Quartermaster General had too many duties, and the Engineers would undoubtedly turn in a fine performance. Tyner for many years had felt that construction belonged with the Engineers. But to detach a part of the program—either the runways and hangars at five fields, as discussed by Schley, or all Air Corps technical structures, as actually proposed—seemed to him unwise. Every post affected by the move would have two construction offices buying land, making layouts, and competing with one another for labor and supplies. The job of administering building funds would be much more difficult. And what of the Construction Division, which would still be charged with the bulk of the work? Surely, its morale would suffer. For the present, Tyner held, things ought to stay the way they were. Perhaps later the Defense Act could be amended to transfer all construction to the Engineers. He concluded with the following reminder:

> A contributing factor in raising the basic question at this time is the fact that considerable apprehension exists within the War Department General Staff as to the qualifications and capabilities of the head of the Construction Division [General Seaman] . . ., to carry to successful completion the huge construction program now underway and in immediate prospect. In this apprehension I frankly share. It is desired, however, to point out that this is a personnel problem which should be solved on its own merits . . . . Certainly, the War Department should not . . . endeavor to correct a faulty personnel situation by making a hasty change in basic organization.[48]

Under its system of concurrences, the General Staff made no changes in policy until all interested branches had approved. Hence, Tyner's opposition stopped the move to classify airfields as fortifications.

By this time a way was open to transfer all construction to the Engineers without amending the Defense Act. On 3 April Congress had passed the Reorganization Act of 1939, authorizing the President to overhaul the administrative machinery of the government by regrouping agencies and transferring functions. Soon afterward, Roosevelt asked Woodring what changes ought to be made within the War Department. By mid-April the General Staff was considering whether to recommend that Quartermaster construction work go to the Engineers.[49] General Tyner favored such action. He argued that construction was a branch of engineering and should be handled by engineers rather than by specialists in supply. Schley had the right men for the job, the cream of the crop from West Point and many graduates of the finest civilian engineering schools. The transfer would be beneficial all the way around. The Engineers

[47] Memo, Schley for Tyner, 10 Apr 39. G–4/31324.

[48] Memo, Tyner for Craig, 15 Apr 39. G–4/31324. See also Tyner Interv, 28 Sep 55.

[49] (1) 53 *Stat.* 561. (2) Ltr, BOB to SW, 14 Apr 39. (3) Memo, SGS for Tyner, 17 Apr 39. Last two in G–4/31343.

would gain additional experience. The Quartermaster General would be shed of an onerous responsibility unrelated to supply. The War Department would have a single construction agency, one capable of attaining "a standard of efficiency not possible under the present set-up." Having concluded that maintenance and the group that oversaw it would have to remain with the Quartermaster Corps—a combat arm must not be burdened with "unnecessary and undesirable housekeeping duties," he said—Tyner proposed to move the other branches of the Construction Division to the Office of the Chief of Engineers. No abrupt change would be made in operating methods and personnel. Only gradually would the former Quartermaster organization be fitted into the Engineer scheme of things.[50]

Although generally well received, Tyner's plan foundered. The Assistant Chiefs of Staff, G–1 and WPD, endorsed the plan, Craig seemed willing to go along, and Schley raised no objections.[51] But the G–3, Maj. Gen. Robert M. Beck, would have none of it. On 22 April, in a memorandum of nonconcurrence, he explained his position:

> Primarily it is believed that the present is a very inopportune time to make any such radical change in organization as is indicated. It should also be borne in mind that although the Corps of Engineers is charged with construction duties in the theater of operations, the character of this construction is of an entirely different nature than is the permanent construction carried on at our various posts and stations during peacetime. It is doubted that the training obtained by the Corps of Engineers . . . would be of particular value during a period of national emergency.

As a matter of fact, Beck feared that giving the Engineers additional construction might impair their readiness for combat. Furthermore, he opposed splitting maintenance and construction.[52] Since the General Staff would not act without G–3's approval, Tyner's plan was shelved. Perturbed by what he regarded as the Staff's inertia, Johnson forwarded papers to the White House, recommending the transfer. Learning of this, Secretary Woodring recalled the papers for reconsideration and pigeonholed them. Roosevelt's first reorganization plan, presented to Congress on 25 April, made no mention of military construction.[53]

The Air Corps was the next to challenge the Construction Division. Late in April Arnold's office ordered commanding officers at air stations to draw layouts for the new housing proposed under the Expansion Program. Colonel Hartman soon learned of this development, for Constructing Quartermasters promptly sent him copies of the order, and local air commanders, faced with an unfamiliar task, appealed to him for help. Hartman lost no time in reminding Arnold that responsibility for layouts rested with The Quartermaster Gen-

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[50] Memo, Tyner for Craig, 21 Apr 39. G–4/31343. See also Tyner Interv, 28 Sep 55.

[51] (1) Memo, Tyner for Craig, 21 Apr 39, and concurrences thereon. (2) Note, Marshall to Craig (n.d.), and Craig's penciled comments thereon. G–4/31324.

[52] Memo, Beck for Tyner, 22 Apr 39. AG 020 (4–21–39).

[53] (1) Johnson Interv, 9 May 56. (2) Statement of Gen Hartman, 5 Jul 55, p. 14. (3) *Public Papers and Addresses of Franklin D. Roosevelt, 1939*, pp. 245ff.

eral.[54] Arnold was conciliatory. Knowing commanders would shortly want to comment on layouts prepared by the Quartermaster Corps, he had sought to familiarize them with the problem beforehand. "The Chief of the Air Corps is greatly concerned over the construction phase of the program, since its completion on time is vital . . .," he wrote to Hartman on 6 May, "and this was one of his efforts to make sure that no Air Corps officer or agency causes or is responsible for any delay whatever."[55] Arnold failed to mention another step he had taken to expedite construction. Sometime around the first of May, he and Marshall had visited the Pacific coast, where they had discussed construction matters with Col. John C. H. Lee, the highly regarded division engineer at Portland. At Arnold's request, Lee had agreed to investigate the airfield program and report "what action, if any, seemed necessary to assure completion in two years."[56]

Even before he took off on 9 May for a flying tour of airfield projects, Lee thought he knew what ailed the building program. According to his diagnosis, construction suffered from "excessive centralization . . . in The Quartermaster General's office, where it was a secondary matter."[57] As Lee sped from place to place, inspecting ten jobs in thirteen days, he found much to confirm his view. Almost every project furnished him with an example of unsatisfactory progress or faulty design which might be laid to centralized control. He was shocked to learn that The Quartermaster General had let contractors set their own completion dates. Although a few Constructing Quartermasters impressed him favorably, he rated most of them as mediocre or worse. All of them appeared to be handicapped by the necessity of referring so many decisions to Washington. Reporting to Arnold on 23 May, Lee recommended immediate decentralization. On the 25th he discussed his findings with Gibbins, Seaman, and Hartman, who advised him that they considered "the present centralized system of design and control to be not only satisfactory but the best method . . . for the Army."[58] That same day Arnold wrote to Craig, enclosing Lee's report and urging that Gibbins be ordered to decentralize.[59]

On reading Arnold's memorandum, General Tyner was much put out. Not one of the projects Lee had seen was in any way connected with the Expansion Program. All had been started in 1938 with WPA funds. That, said Tyner, explained why they were slow. Since none of the work was urgent and construction budgets were small, contractors had been permitted to fix the deadlines themselves. An Engineer, the G–4 intimated, ought to know that speed costs

[54] (1) Ltr, Hq 3d Wing GHQ Air Force to CO Barksdale Fld, La., 21 Apr 39. (2) Ltr, CQM Barksdale Fld to TQMG, 22 Apr 39. Both in QM 600.1 (Barksdale Fld) 1939. (3) TWX, CO Mitchel Fld, N.Y., to TQMG, 27 Apr 39. QM 600.1 (Mitchel Fld) (AC Program) 1939–40. (4) Ltr, Hartman to Arnold, 28 Apr 39. Last two in QM 600.1 (Mitchel Fld).

[55] 1st Ind, 6 May 39, on Ltr, Hartman to Arnold, 28 Apr 39.

[56] Memo, Lee for ACofS WPD, 8 Jun 39. WPD 3809–24.

[57] Interv with Lt Gen John C. H. Lee, 25 Apr 57.

[58] Memo, Lee for Strong, 8 Jun 39. WPD 3809–24.

[59] Memo, Arnold for Craig, 25 May 39. G–4/32165 Sec 1.

money. Dismissing Lee's report as unfair and irrelevant, he undertook to set Arnold straight. Decentralization was bound to create trouble. If Gibbins gave authority to the field, Constructing Quartermasters would have to bow to the wishes of higher ranking Air Corps and corps area officers. All sorts of innovations would be tried. Engineering standards would go out the window. There would be confusion and delay. After repeating the argument that most big civilian construction firms used the same system as the Quartermaster Corps, Tyner referred to his predecessor, Brig. Gen. George R. Spalding. An Engineer officer, Spalding had come into G–4 an advocate of decentralization and had left believing firmly "that the organization of the War Department for construction was fundamentally sound and should not be changed." Arnold had indicated that he would refuse to delegate his responsibility for Air Corps construction unless his demands were met. This attitude nettled Tyner, who declared: "The Chief of the Air Corps at the present time has no responsibility so far as construction is concerned other than making known his requirements and the necessity therefor."[60]

Meanwhile, on 26 May, Arnold and Lee had left for the Caribbean with Brig. Gen. George V. Strong, Assistant Chief of Staff, WPD. In Panama they conferred with General Stone, who expressed dissatisfaction with the Quartermaster setup. He asked that he be given entire responsibility for construction in the Canal Zone and that the department engineer superintend the work. Moving on to the West Indies, Arnold and his companions found the commander of the new Puerto Rican Department thinking along the same lines as Stone. Everywhere they went the three officers heard complaints against the Quartermaster system. At one point during the trip, General Strong asked Lee what steps were necessary to meet present and future construction requirements. By the time they returned to Washington early in June, Lee was ready with an answer.

On 8 June, in a lengthy memorandum, he suggested drastic changes in the Army's construction organization. To insure timely completion of the Air Expansion Program, Gibbins should decentralize at once. Colonel Hartman should give way to "a carefully selected military engineer, accustomed to decentralized control and to getting work properly completed on time." The field should take over planning and design. "Competent military engineers," who would co-operate fully with corps area and department commanders, should replace unsatisfactory Constructing Quartermasters. If Gibbins did not have enough qualified officers, district and department engineers should take over part of the program. Lee looked forward to the time when his own Corps would do all military construction. "For the eventual assurance of Army construction efficiency with probable ability to meet any future emergency," he wrote, "all such work should, in my opinion, be transferred after a reasonable transition period and be placed under the supervision of [the] Chief of Engineers."[61]

[60] Incl, 29 May 39, with Memo, Tyner for SGS, 1 Jun 39. G–4/31265 Sec 1.

[61] Memo, Lee for Strong, 8 Jun 39. WPD 3809–24.

The question remained open, as Lee's memo gathered dust. For the present, Hartman had his way. With Tyner's help, he even succeeded in tightening control over operations in the field. General Craig took responsibility for drawing plans and specifications away from the department commanders and gave it to The Quartermaster General. He also sent Constructing Quartermasters to Puerto Rico and Alaska with instructions to report directly to Gibbins.[62] But, although centralization was stronger than before, the Construction Division's future remained in doubt. Toward the end of June, in his final report to the Secretary of War, General Craig observed: "The Quartermaster Corps, now charged with construction, has a task of first magnitude to perform in the supply and maintenance of troops . . . . I believe the Corps of Engineers should be utilized to relieve that Corps of the additional responsibility for new construction."[63] When General Marshall succeeded Craig in September 1939, some read the handwriting on the wall. Col. Edmund B. Gregory, soon to become The Quartermaster General, believed a transfer was now inevitable. Years later he disclosed: "I knew it was foreordained . . . , the thing was all settled when General Marshall became Chief of Staff."[64]



GENERAL GREGORY

Quartermaster Plans and Preparations

In an atmosphere of uncertainty, the Construction Division prepared to build. Lights burned late in the Munitions Building as Colonel Hartman pressed to get the program started. He had no time to lose. Under a recent amendment to the Manchu Law, no officer below the rank of general could remain in Washington longer than 5 years at a stretch. In August Hartman's tour would end. How would the work go then? Having almost completed the $80

[62] (1) Memo, Tyner for Craig, 24 Jun 39. G–4/31288. (2) WD Ltr AG 600.12 (6–24–39) (Misc) D to CG's, Panama Canal and Hawaiian Depts, 30 Jun 39. QM 600.1 (Panama) (AC Expansion) I. (3) Ltr, Seaman to Lt Col R. W. Riefkohl, 27 May 39. QM 600.1 (Borinquen Fld) 1939–40. (4) Ltr, Seaman to CQM Ogden OD, Ogden, Utah, 27 May 39. QM 600.1 (Ladd Fld) II.

[63] *Report of the Secretary of War to the President, 1939*, p. 32.

[64] Verbatim Rpt of Mtg, Maj Gen Edmund B. Gregory, Maj Gen Kester L. Hastings, the authors, *et al.*, 29 Jun 55, p. 31. EHD Files. Cited hereinafter as Verbatim Rpt, Meeting with Gregory and Hastings.

million PWA–WPA program begun in 1938, the Construction Division seemed ready for larger, more difficult tasks. The branch chiefs were experienced men. Colonel Pitz headed New Construction and Major Nurse, Planning. Lt. Col. Rigby D. Valliant, a 1902 West Point graduate, was in his second term as chief of Real Estate. In charge of Repairs and Utilities was Maj. Will R. White, a civil engineer who had joined the Cantonment Division in 1917. With 12 officers and some 1,300 civilians in the central office and 108 officers in the field, the organization appeared to be adequate. Since returning to the Construction Division in the summer of 1938, Hartman had pushed preparations for emergency work with every means at his command, and, despite Seaman's reluctance to co-operate, progress had been good. But there was, Hartman realized, another side to the coin. The arrangement whereby he ran the division while Seaman continued as titular head had made for divided loyalties. Opinions differed sharply on such basic matters as mobilization planning, structural designs, and contracting methods. Under the circumstances, Hartman wanted plans completed, policies agreed to, and at least some projects under way before he left town.[65]

In the absence of a well-defined construction program, planning went slowly. Johnson's decision to wait for WPA money placed the Quartermaster Corps in a tight spot. Hartman knew in general what would be built in Panama, Puerto Rico, and Alaska and roughly how much money would be spent there, but that was all. Parts of the program submitted to Congress were so vague that one representative asked, "Why, in the name of heaven, should we hold hearings on a thing like that?"[66] Tyner tried repeatedly to force a decision as to which projects would be built with the $62 million requested from Congress.[67] But Johnson insisted on waiting. Meanwhile, he demanded that plans be developed for all the proposed projects with a view to using a maximum of WPA money and a minimum of military funds. "Until this is done," he held, "it is premature to determine that any of the items cannot be undertaken."[68] What Johnson asked appeared to be impossible. Major Nurse had no way of knowing what limitations Congress would place on the future expenditure of WPA funds or how many relief workers would be available in various localities some months hence. Moreover, even with $25 million in WPA money—possibly even with $50 million—funds would still be insufficient for all the projects Johnson wanted. The situation did not improve until early June, when Tyner issued an unofficial directive, telling the Quartermaster to push ahead with plans for the overseas projects, the three air depots, and additions to a number of Air Corps stations.[69]

Until sites were chosen, planning could not begin. For many years boards of officers appointed, in some cases, by

[65] Statement of Gen Hartman, 5 Jul 55, pp. 2, 5.

[66] H Subcomm of the Comm on Appns, 76th Cong, 1st sess, *Hearings on Supplemental Military Appropriation Bill for 1940*, p. 42.

[67] (1) Memo, Tyner for G–1, 17 May 39. G–4/31265–2. (2) Memos, Tyner for Craig, 13, 24 May 39. G–4/31265 Sec 1.

[68] Memo, Johnson for Craig, 15 May 39. G–4/31265 Sec 1.

[69] (1) Memo, with Incl, Tyner for SGS, 29 May 39. G–4/31265 Sec 1. (2) WD Ltr AG 600.12 (5–25–39) Misc D to TQMG, 3 Jun 39. QM 600.1 (Misc 1939).

the War Department and, in others, by corps area or department commanders, had selected locations for new installations. The General Staff and, when appropriate, the using service, reviewed the boards' recommendations. Final decision rested with the Secretary of War. For some months, site boards had been out seeking locations for the bases and depots the Air Corps wished to build. These boards, most of whose members Arnold named, were composed chiefly of airmen with a sprinkling of General Staff and Engineer officers. Often there was no Quartermaster representative. Despite an early start, progress was poor. Survey teams visited many sites, but because none was ideal, the Air Corps had difficulty choosing among them.[70] Asked what progress the boards were making, General Arnold said on 17 May, "Never in the history of the Air Corps has the War Department gone to such lengths in the consideration of all requirements before deciding upon . . . locations."[71] Quartermaster officers were inclined to question this statement, for several of the sites favored by the Air Corps left much to be desired from a builder's point of view.[72]

While the site boards deliberated, Quartermaster planners centered their attention on existing posts. Construction estimated to cost some $34 million was in prospect at Air Corps establishments in the continental United States, Panama, and Hawaii. Among the items to be provided were barracks and quarters, shops and warehouses, storage for gasoline and oil, runways, aprons, hardstands, hangars, laboratories, offices, hospitals, and schools. Late in April Colonel Hartman began submitting layouts for various stations to Arnold for approval. Among the structures shown on these layouts was a two-story mobilization-type barracks with inside plumbing and hot air heat. Several weeks went by and not one of the layouts had received approval. The reason was soon apparent—Arnold would accept no plan calling for mobilization-type barracks.[73]

Since January he had been telling congressional committees that temporary shelter could be provided cheaply. Before the House Appropriations Committee on 17 May, he testified:

> Mr. Engel. What will the temporary quarters cost?
>
> General Arnold. One hundred and fifty dollars per man.
>
> Mr. Engel. Those will have to be replaced ultimately.
>
> General Arnold. The ones we are living in now in the Air Corps at certain stations have been there since the World War, for 21 years.
>
> Mr. Engel. You have gotten your money's worth out of them.

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[70] (1) Wesley F. Craven and James L. Cate, eds., *The Army Air Forces in World War II*, vol. VI, *Men and Planes* (Chicago: University of Chicago Press, 1955), pp. 127–28. (2) WPD 3809–24 (Landing Flds). (3) Memo, Tyner for TAG, 25 May 39. G–4/31265 Sec 1. (4) Memo, Seaman for Tyner, 18 May 39. QM 600.1 (Misc) (1939).

[71] H Subcomm of the Comm on Appns, 76th Cong, 1st sess, *Hearings on Supplemental Military Appropriation Bill for 1940*, p. 45.

[72] (1) Intervs with Gen Seaman, 21 Jul 55, 2 Oct 57. (2) Verbatim Rpt, Meeting with Gregory and Hastings. (3) Incl with Ltr, Col Elmer G. Thomas to EHD, 31 May 56.

[73] (1) H Subcomm of the Comm on Appns, 76th Cong, 1st sess, *Hearings on Supplemental Military Appropriation Bill for 1940*, pp. 114–49. (2) Ltr, Seaman to Arnold, 25 Apr 39. QM 600.1 (Mitchel Fld) (AC Program) 1939–40. (3) Ltr, Hartman to Arnold, 29 Apr 39. QM 600.1 (Barksdale Fld) VI. (4) Ltr, Hartman to Arnold, 9 May 39 with 1st Ind, 11 May 39, and 2d Ind, 18 May 39. QM 600.1 (AC) 1937–39. (5) Memo, Tyner for G–1, 17 May 39. G–4/31265–2.

General Arnold. We have had our money's worth out of them; yes sir.[74]

The reference to World War housing was misleading, for housing of that type could not be had at Arnold's price. The average cost of the old cantonments had been $215 per man. It was true, of course, that most of them had been built on virgin tracts. But it was also true that hourly wages in the building trades had more than doubled in the intervening years.[75] Moreover, the structures Arnold had in mind bore little resemblance to World War barracks.

The Air Corps' answer to the housing problem was the portable building or prefab. At CCC camps throughout the country, portables had been erected at a cost of $160 per man. Much of the work had been done by the men themselves. Confronted, on the one hand, with an increase of 26,000 men in the Air Corps and, on the other, with a slim construction budget, Arnold had decided to have barracks prefabricated and to let troops put them up. The plan was visionary, to say the least. Shelter provided at CCC camps did not meet the Army's heating and space requirements. The building trades unions, stronger now than in the early years of the New Deal, were certain to protest. Moreover, prices of materials were on the rise.[76] Told that he would have to provide prefabricated housing at $150 per man, Colonel Hartman exclaimed, "It is an impossible task. . . . You will spend more than that on utilities outside the building." The Air Corps had an answer to that: use utilities that were already there; in other words, put prefabs in among permanent buildings. Hartman refused to consider the idea. He told a member of Arnold's staff, "If the plan of the Chief of the Air Corps is carried out, . . . a fire hazard will be created that will endanger millions of dollars worth of construction."[77] Despite Hartman's contention that mobilization-type buildings offered superior accommodations at a lower price, Arnold continued to hold out for prefabs. General Tyner made Hartman's position more difficult by siding with the Air Corps on this issue.[78]

Asked repeatedly by Johnson and Arnold when certain projects would be completed, General Seaman declared, "The *immediate* and *pressing* question is *when* they can be *started*."[79] Once site choices were firm and full topographic and subsurface data were available, it might take a month or more to make layouts for the new bases. Then would come the task of drawing detailed plans and specifications. How fast this work would go was a question. Major Nurse's staff of engineers and draftsmen was too small to cope with any considerable number of crash projects; yet the long-awaited formal directive was now cer-

[74] H Subcomm of the Comm on Appns, 76th Cong, 1st sess, *Hearings on Supplemental Military Appropriation Bill for 1940*, p. 46.

[75] (1) Incl with Ltr, R. C. Marshall to OCMH, 30 Mar 55. EHD Files. (2) U.S. Departments of Commerce and Labor, *Construction Volume and Costs, 1915–1954, A Statistical Supplement to Volume I of Construction Review* (Washington, 1955), Table 9, p. 27.

[76] (1) Ltr, Arnold to TQMG, 21 Jun 39. QM 600.1 (AC) 1937–39. (2) Memo, Seaman for Tyner, 23 Jun 39. G–4/31265 Sec 1. (3) Memo, Pitz for G–4 Rcd, 28 Jun 39. G–4/31265 Bulky.

[77] Notes of Conf, Baade, Hartman, Spaatz, *et al.*, 20 Jun 39. G–4/31265 Bulky.

[78] (1) Memo, Seaman for Tyner, 25 Jun 39. QM 600.1 (Misc) 1939. (2) Notes of Conf, Arnold, Tyner, Pitz, *et al.*, 28 Jun 39. G–4/31265 Bulky.

[79] Memo, Seaman for Tyner, 18 May 39. QM 600.1 (Misc) 1939.

tain to come as a rush order. Moreover, a single change might upset a good deal of careful planning, and, according to Hartman, "No branch of the War Department was so changeable as the Air Corps."[80] After Nurse had finished, more time would go into advertising for bids and awarding lump-sum contracts.

Drawing on his wartime experience Colonel Hartman devised a plan for getting around some of these obstacles. In May 1939 he moved to revive the wartime contract. "I started early," he wrote, "to get the necessary legislation to handle construction on a cost-plus-a-fixed-fee basis."[81] As one who had served with the Construction Division of the Army, he knew firsthand the advantages of the fixed-fee agreement; and he was also familiar with the criticisms raised against it. Obtaining authority to use the contract might not be easy. The competitive system of awarding government contracts was by now very nearly sacrosanct. Many in the War Department disliked cost-plus contracting in any form. Others feared it. Still others preferred the evaluated-fee agreement for emergency use. In his efforts to overcome this opposition, Hartman had help from General Tyner and Rear Adm. Ben Moreell of the Navy's Bureau of Yards and Docks. On 25 April Moreell got authority from Congress to negotiate fixed-fee contracts for construction outside the United States and to employ architectural and engineering firms without reference to the law requiring competition. With Moreell's encouragement, Hartman and Tyner incorporated the pertinent provisions of the Navy's bill into one of their own. They next enlisted the support of the Chief of Staff and the Secretary of War. On 18 May Woodring sent the measure, with his endorsement, to Chairman Sheppard of the Senate Military Affairs Committee and to Speaker William B. Bankhead, who shortly introduced it in both houses.[82] The bill was introduced in the House on 23 May and in the Senate on 6 June.

The construction industry was delighted with the bill. The quickening of military preparations was causing some concern in contracting circles. Costs were rising and risks increasing. Bidders were thinking in terms of larger contingency items. Construction men were fearful lest a sharp jump in contract prices slow the industry's progress toward recovery.[83] AGC officials believed the situation called for a change in contracting methods. Reporting to the association's members in the fall of 1939, Managing Director Edward J. Harding declared:

> A solution . . . will become clearer when owners understand that the general contractor performs two functions. He not only constructs the project, but he insures its completion for an agreed upon price. When insurance alone is purchased, the purchaser expects to pay an increased premium to cover increased hazards. So it should be in construction; the purchaser should either expect to pay [the] appropriate cost of the insurance for completion of the project, or

[80] Statement of Gen Hartman, 5 Jul 55, p. 4.
[81] *Ibid.*, p. 11.

[82] (1) Tyner Interv, 28 Sep 55; Pagan Interv, 8 Mar 57. (2) 53 *Stat.* 591. (3) Memo, Tyner for Craig, 16 May 39. (4) Ltrs, Woodring to Sheppard and Bankhead, 18 May 39. (5) Memo, OCofS Budget and Legis Plng Br for Craig, 24 May 39. Last three entries in G–4/31364.

[83] (1) Telg, Harding to Johnson, 8 Aug 39. QM 600.1 (Ladd Fld) (AC Program) I. (2) *The Constructor*, October 1939, p. 14.

he should be his own insurer, and relieve the contractor of that burden.[84]

Here, then, was an argument for the fixed-fee contract, under which the purchaser was self-insured and the contractor assumed very little risk. Fixed-fee contracts imposed no penalty for delay and required no performance or payment bonds. Less hazardous than fixed-price agreements, they were also more easily financed, since reimbursements to the contractor did not need to lag much behind expenditures. Authorization of fixed-fee agreements for overseas projects might help point the way toward more liberal terms for domestic contracts also.

In certain quarters of the War Department, the measure got a cold reception. While his advice had not been asked, General Seaman was dead set against the fixed-fee contract.[85] He summed up his attitude in a statement to a congressional committee in 1941: "We never would have had any cost-plus jobs if I had my way about it. I don't believe in it. Too expensive."[86] A more formidable opponent was Louis Johnson, whom the authors of the bill had not consulted either. On learning that such a measure had been introduced in Congress, he protested to General Craig. Johnson maintained that the Defense Act gave him, as business head of the War Department, the same responsibility for construction as for other procurement activities. The General Staff opposed this view. Thus began a "paper war" which lasted well into 1940, each side bombarding the other with memorandums detailing their respective responsibilities for construction. The issue was finally settled in the Assistant Secretary's favor. Meanwhile, Johnson threw the weight of his influence against what he apparently considered a premature switch to the fixed-fee method.[87]

On 23 June 1939 the Senate Military Affairs Committee held a hearing on the bill. Tyner and Hartman were the only witnesses. The G–4 explained why the proposed legislation was necessary. It was imperative, he said, that the overseas bases be completed at an early date. If competitive contracts were used, it might take two and one-half years to finish the work—two months for readying plans and specifications, two more for advertising, two more for getting the jobs under way, and because fixed-price contractors would insist on plenty of time, two years for construction. Tyner warned that the competitive method would also be very expensive. Because bidders would have to take into account "unusual hazards, the uncertainty of weather, the distance from material and labor markets, and the cost of overcoming unforeseen construction difficulties," contingency items would be huge. The fixed-fee contract offered a ready solution to these problems. In the absence of plans and specifications, construction could begin and go forward along with design and engineering work. Changes in the character and scope of a project could be made at any time and without much trouble. Moreover, since the government would assume nearly all the risk, it would probably pay less for fixed-fee construction. Coming to the matter of architect-engineer con-

[84] *The Constructor*, October 1939, p. 21.
[85] Seaman Intervs, 14, 21 Jul 55, 2 Oct 57.
[86] Truman Comm *Hearings*, Part 7, p. 2019.
[87] (1) G–4/31381. (2) G–4/31364. (3) Incl, 23 Mar 56, with Ltr, Brig Gen John W. N. Schulz to EHD, 24 Mar 56.

tracts, Tyner revealed that the War Department could not quickly enlarge its professional staff. Federal pay scales were too low and Civil Service procedures too cumbersome. Even office space was lacking. "The obvious alternative," he told the committee, "is to engage the services of private engineering and architectural firms or individuals to supplement the work of the War Department." With these professionals, negotiation was obligatory, for their national associations had declared competition in regard to fees unethical. Furthermore, Colonel Hartman added, "It is as illogical to advertise for the services of an engineering or architectural specialist as it would be to advertise for the services of a medical specialist."[88]

In response to the Senators' questions, Hartman described the fixed-fee contract and how it worked. The agreement was, as he phrased it, "essentially a contract for service." Under its terms, the contractor would furnish labor, materials, and equipment and do everything necessary to complete the job in the shortest possible time. The government would reimburse him for all his expenses except home office overhead, executive salaries, and interest on borrowed money. Hartman emphasized that this was not a percentage agreement. In payment for his services, the contractor would receive a fee, determined at the time of negotiation and based on the original estimate of cost. No change in the amount of the fee would be made unless the scope of the project was materially altered. The contractor's fee was like a salary. "We are hiring his brains and his organization to do the job for us," Hartman said. After pointing out that noninsurance of government property was a well-established principle, he went on to explain that the fixed-fee contract had long been used by such big corporations as General Motors and DuPont, which were in a position to spread risks widely. When several Senators asked whether contractors might not defraud the government by falsifying accounts, Hartman assured them that the War Department would have "absolute check and control" over all expenditures. While he maintained that including the terms of the contract in the bill would make the law too inflexible, some of the members suggested that the legislation should be specific on that point. "As I understand it," said one, "you have stated what the intentions of the War Department are . . . but there is nothing in the law to guarantee that what you say . . . will be carried out, is there?" "No, sir," Hartman answered, "except that we are all officers of the Government and bound to look after the interests of the Government and that is our intention."[89] Apparently satisfied, the committee reported the bill favorably. Some time would elapse before the proposal came to a vote.

During June 1939 Congress was occupied with other urgent legislation. The War Department followed with particular interest the progress of two important bills. The first, the supplemental military appropriation bill for 1940, carried the funds for air expansion and for new posts

[88] S Comm on Mil Affs, 76th Cong, 1st sess, *Hearings* on S 2562, *A Bill to Facilitate Certain Construction Work for the Army, and for Other Purposes*, pp. 3–6, 14.

[89] *Ibid.*, pp. 7–15.

in Panama. It also increased the enlisted strength of the Army from 174,000 to 210,000. Approved on 1 July 1939, the measure provided $64,862,500 for construction plus a contract authorization of $21,337,500 and made available additional sums totaling $4,208,459 for maintenance, repairs, and real estate. The second bill contained the appropriation for work relief. Owing largely to the efforts of the Associated General Contractors, the bill was amended to prohibit WPA from participating in the construction of any federal building which cost more than $50,000. With approval of the relief act on 30 June, hopes of using large sums of WPA money on military projects collapsed.[90] Referring to the $50,000 limitation, Colonel Baade said, "That throws out most of our buildings—everything in the United States and Hawaii."[91]

With passage of the appropriation bills, the program took shape rapidly. At a series of meetings, funds were earmarked and differences of opinion were reconciled. On 28 June Arnold, Tyner, Pitz, and members of their staffs held an all-day conference to decide how far the military appropriation—the "gold money" they called it—would stretch. Arnold and Tyner had agreed beforehand what priority each job would have. As Colonel Baade read down the list, the others determined how much relief money could be used for each job and how much "gold" would have to be allotted. Late that afternoon Tyner telephoned Marshall to report that the "gold money" had run out. By including $4 million in WPA funds, a large part of it for grading, the conferees provided for troop housing in Panama and most of the Air Corps jobs. But the air depots and the Ordnance and Signal projects had had to be left out. At an informal get-together on the 30th, the Chief of Ordnance persuaded Tyner and Brig. Gen. Lorenzo D. Gasser, whom Marshall had recently chosen as his deputy, to divert $400,000 from the Alaska air base to two laboratory projects. For a time Johnson persisted in trying to use larger sums of WPA money, but at length he agreed to ask for a deficiency appropriation to cover the remaining industrial and depot projects. At Tyner's insistence, Seaman and Arnold ironed out their differences over design; Arnold accepted the Quartermaster layouts and withdrew his objections to mobilization-type barracks, and Seaman promised to give the prefab industry an opportunity to compete for housing contracts. Affairs were soon in order. On 13 July, after months of waiting, Gibbins was formally directed to begin construction.[92]

Construction Gets Under Way

When the directive reached General Seaman's desk, the Construction Division was set to go. New mobilization drawings were complete and detailed plans and layouts for many Air Corps projects were ready. By mid-July 1939 the di-

[90] (1) 53 *Stat.* 992. (2) 53 *Stat.* 932. (3) Memo, G–4 for DCofS, 29 Jul 39. G–4/29778.

[91] Notes of Confs, Arnold, Tyner, Pitz *et al.*, 28 Jun 39. G–4/31265 (Bulky).

[92] (1) *Ibid.* (2) Memo, G–4 for Marshall, 28 Jun 39. AG 600.12 (1–23–36) sec. 1–c. (3) Memo, with Incls, Tyner for CofS, 30 Jun 39. G–4/31265. (4) Memo, CofOrd for Gasser, 30 Jun 39. AG 600.12 (1–23–36) Sec 1–c. (5) Memo, Tyner for CofS, 14 Jul 39. G–4/31265. (6) WD Ltr AG 580 (7–7–39) (Misc) (D) to TQMG, 11 Jul 39. (7) WD Ltr AG 580 (7–11–39) (Misc) (D) to TQMG, 13 Jul 39. Last two in QM 600.1 (AC) 1937–39.

vision was forwarding specifications to the field along with instructions to advertise immediately. In line with the agreement between Arnold and Seaman, Constructing Quartermasters were to call for alternate bids on mobilization structures and prefabs. Bids were to be opened not later than 10 August and shelter was to be available for the first increment of troops by 30 September. Meanwhile, at twenty-eight projects where WPA would participate, construction officers were working out arrangements with local relief authorities. At a cabinet meeting late in July Woodring reported that progress at existing posts was good and that prospects for the remainder of the program seemed bright. When he succeeded Hartman as executive officer early in August, Colonel Pitz had reason to believe that construction would go smoothly.[93]

This hopeful outlook was due in no small part to the efforts of Colonel Valliant. The chief of the Real Estate Branch lost no time in getting land acquisition under way. Hardly had Woodring approved the location for a new installation when the veteran Quartermaster was on the scene. On 6 July Gibbins learned that Point Borinquen would be the site for the Puerto Rican air base. Three days later Valliant flew to the island to start condemnation proceedings. Shortly after the selection on 14 July of a site near Tampa for the southeast air base, the future MacDill Field, Valliant went to Florida to oversee the donation by Hillsborough County of 5,800 acres of land to the government. With the approval in August of a 5,000-acre tract near Chicopee, Massachusetts, for the New England air base—to be known as Westover Field—the Real Estate Branch acted promptly to take options, secure rights of entry, arrange for the relocation of power lines, and negotiate for a railroad right-of-way. Pressure for speed was great. Each site presented its particular challenge. Yet the work was, for the most part, swiftly and skillfully done.[94]

Another encouraging development was passage of a deficiency appropriation bill. On 20 July the President sent to Congress a supplemental request for $16,931,300. This sum covered construction at nine projects. The bulk of the money, $14,730,900, was for two new air depots and additional facilities at two existing ones; $400,000 was to pay back the account of the Alaska air base; and the remainder was for three Ordnance installations and the Signal Corps laboratory. Congress hastened to comply, and an act of August 9, 1939 gave the President all he had asked. Although eased considerably, the shortage of construction funds was by no means ended. General Arnold had tried unsuccessfully to insert an item for bombing ranges into the bill. Five important Ordnance projects had not been provided for. The

[93] (1) Memo, ExecO G–4 for Constr Br G–4, 18 Jul 39. G–4/31265 Sec 1. (2) Ltr, Constr Div to CQM, Barksdale Fld, La., 21 Jul 39. QM 621 (Barksdale Fld) 1939. (3) Ltr, Pitz to CQM's, 31 Jul 39. QM 600.1 (Barksdale Fld) 1938–39 II. (4) Memo, ExecO G–4 for Constr Br G–4, 26 Jul 39. (5) Memo, with Incl, Seaman for Tyner, 26 Jul 39. Last two in QM 600.1 (Augmentation Program) 1939.

[94] (1) Memo, Tyner for Gibbins, 6 Jul 39. (2) Telg, Gibbins to CG Puerto Rican Dept, 8 Jul 39. Both in QM 600.1 (Borinquen Fld) 1939. (3) Interv with Col Rigby D. Valliant, 11 Jun 56. (4) QM 601.1 (MacDill Fld) 1939. (5) G–4/31411. (6) OQMG Constr Div, Real Estate Branch Progress Report, 21 Feb 41, pp. 2–5. Copy in EHD Files.

funds available for buying land would probably be inadequate. Even so, the deficiency money gave the program a welcome boost.[95]

During August gains were substantial. The Construction Division turned out a sizable number of plans and layouts. Woodring picked a site near Mobile, Alabama, for one of the new air depots and approved locations for most of the Panama projects. A board of officers headed by Colonel Lee completed a survey of airfield sites in Alaska, and Maj. Edward M. George, who was to direct construction there, left with a staff for the territory. Many new projects were starting up. Constructing Quartermasters were assembling work crews, renting equipment, buying materials, and beginning what jobs they could by purchase and hire. Bids were being opened and contracts awarded. Here and there a runway was being poured and a building was going up. On 7 August the President signed the fixed-fee bill, authorizing negotiated contracts for architectural and engineering services and for construction in Panama and Alaska.[96]

While the program as a whole seemed to be going well, trouble spots were appearing. Several jobs fell behind because WPA could not furnish workmen. Changes in Air Corps requirements forced the abandonment of one project and slowed construction at several others. The Quartermaster system of centralized control was encountering stubborn resistance from local commanders. General Arnold was becoming more and more critical of the Construction Division's methods. His agreement with Seaman regarding structural designs was not working out as the Air Corps had anticipated; contractors who based their offers on mobilization drawings were consistently underbidding prefab firms. Meanwhile, Johnson had renewed his efforts to transfer construction to the Engineers. Although initially unsuccessful, he had reason to be optimistic, for General Marshall assured him that a transfer was only a question of time.[97]

Word that the Army planned to construct the Alaska air base by day labor created a stir in contracting circles. On 8 August the Lee board recommended building the base by purchase and hire. That afternoon the Assistant Secretary received a telegram of protest from the Associated General Contractors, urging that the job be done by the fixed-fee method.[98] In a reply framed by the Construction Division, Johnson stated that, since purchase and hire would take no longer and cost much less, Seaman was adopting the board's suggestion. Johnson went on to explain: "Execution of construction on the basis of cost-

[95] (1) Ltr, the President to the Speaker, H R, 20 Jul 39. (2) Ltr, Dir BOB to the President, 20 Jul 39. Both in G–4/31265 Sec 1. (3) 53 *Stat.* 1301. (4) Memo, Tyner for Marshall, 24 Jul 39. G–4/30337–10. (5) Memo, G–4 for Marshall, 31 Jul 39. G–4/31190–1.

[96] (1) QM 600.1 (Panama) (AC Expansion) I. (2) QM 600.1 (Misc 1939). (3) QM 600.1 (Ladd Fld) (AC Program) II. (4) Incl with Memo, SGS for Marshall, 17 Aug 39. G–4/31265 Sec 2. (5) 53 *Stat.* 1239.

[97] (1) G–4/31265 Sec. 1. (2) QM 600.1 (Barksdale Fld) II. (3) Memo, Tyner for Gibbins, 25 Aug 39. G–4/31265 Sec II. (4) Memo, Marshall for Woodring, 1 Sep 39. G–4/31411. (5) 2d Ind, G–4 to TQMG, 1 Aug 39, on Ltr, TAG to TQMG, 3 Jun 39. QM 600.1 (Misc 1939). (6) R&R Sheet, Exec OCAC to Sup Div OCAC, 22 Aug 39. AAF Central Files, 600.1–600.12 I. (7) Ltr, Arnold to TAG, 9 Aug 39. G–4/31190–1. (8) AG 580 (3–31–26) (1) Sec 3A.

[98] (1) Ltr, Lee *et al.* to TAG, 8 Aug 39. WPD 3512–38. (2) Telg, Harding to Johnson, 8 Aug 39. QM 600.1 (Ladd Fld) (AC Program) I.

plus-fixed-fee is, in the final analysis, practically identical with procedure by purchase and hire with the exception that in the former case the government would pay to the contractor a considerable fee for the Alaska project."[99] The contractors expressed concern. "It is our hope," wrote AGC director Harding, "that this does not indicate a fundamental belief by the Quartermaster Corps that the use of contractors is superfluous, without advantage, on construction under difficult conditions."[100] While he refused to overrule Seaman, Johnson was reassuring. "The Quartermaster Corps, as you know," he reminded Harding, "is constantly utilizing the knowledge and skill of many contractors on numerous construction projects and expects to continue to do so."[101]

The outbreak of war in Europe on 1 September 1939 altered the construction picture. The President moved swiftly to tighten defenses and to step up the pace of military preparations. On 5 September he issued a proclamation of neutrality and transferred control of the Panama Canal from the Governor to General Stone. Three days later he proclaimed a limited national emergency and, by Executive Order, provided for expansion of the Regular Army from 210,000 to 227,000 men and of the National Guard from 200,000 to 235,000. Meanwhile, the War Department took steps to meet the situation. It drew up plans for a defense program to cost between $850 million and $1 billion, though the President made no request to Congress at this time. Reinforcements went to Puerto Rico and Panama. Additional demands rained in on the Construction Division: set up temporary tent camps for recruits; provide makeshift shelter in the Caribbean area; rush a runway to completion in Puerto Rico; expedite all work at outlying bases; and, above all, push the Panama jobs.[102]

Autumn of 1939 was a busy time for the Construction Division. Hard pressed to meet the demands of the Expansion Program, Seaman and his organization faced a new series of rush orders growing out of the recent increase in the Army. There was more building to do but no supplemental appropriation to do it with. Funds for the additional work had somehow to be scraped together. Colonel Harrington was co-operative, giving priority in assignment of relief workers to construction for the recruits. But restrictions on spending WPA funds for materials limited the help that he could give. A total of $3,640,000 came from Woodring's reserve and Gibbin's maintenance, fuel, and furniture funds. Sums also came from the accounts set up for Expansion projects, and, in some instances, troops did construction. Seaman tried by various methods to expedite the work. To relieve his overburdened design section, he took advantage of the Act of August 7 to employ private architects and engineers for seven large projects, including MacDill, Westover, and Borin-

[99] Ltr, Johnson to Harding, 17 Aug 39. G-4/31364. See also original draft of this letter by Seaman. QM 600.1 (Ladd Fld) (AC Program) II.

[100] Ltr, Harding to Johnson, 21 Aug 39. QM 600.1 (Ladd Fld) (AC Program) I.

[101] Ltr, Johnson to Harding, 30 Aug 39. QM 600.1 (Ladd Fld) (AC Program) I.

[102] (1) Watson, *Chief of Staff*, pp. 156ff. (2) Memo, Tyner for TAG, 1 Sep 39. WPD 4191-3. (3) WD Ltr 320.2 (9-11-39) M-D to CG Puerto Rican Dept, 20 Sep 39. WPD 4191-4. (4) Memo, Gasser for Tyner, 14 Sep 39. CofS, Emergency Measures, 1939-40 (Misc File). (5) DS, Tyner to Gibbins, 20 Nov 39. G-4/30552-28.

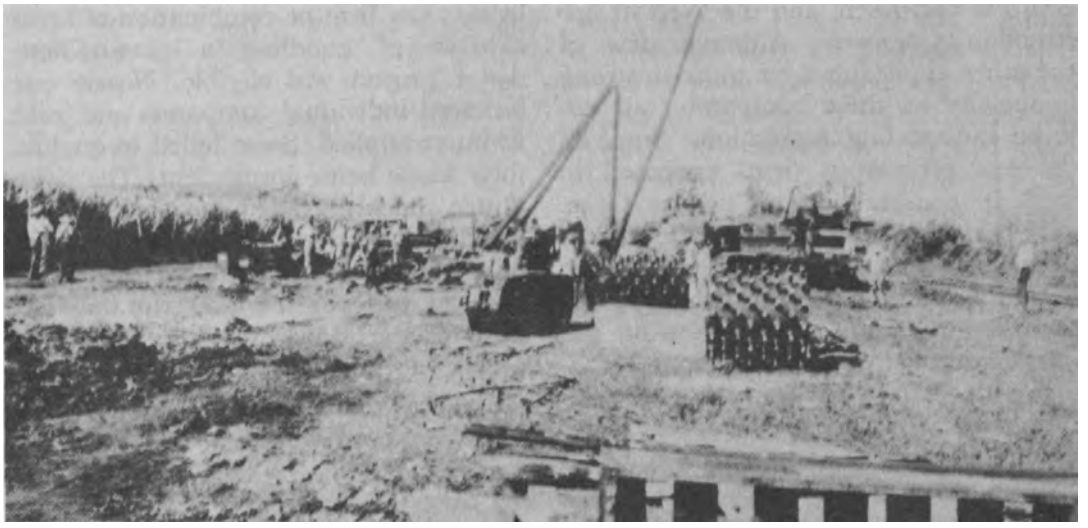
quen Fields and the Alaska air base. He and members of his staff made frequent trips to the field. He encouraged Constructing Quartermasters to keep in touch with Washington by telephone and report any bottlenecks at once. Lastly, he urged Woodring, Arnold, and local commanders to make decisions on construction matters quickly.[103]

By the end of the year, Seaman had accomplished quite a bit. He had most of the land required for a dozen major projects. He had permanent construction at existing stations in this country under way. He had designs and blueprints for the Ogden Depot, Westover, and MacDill. He had completed practically all the temporary shelter. In Hawaii, Puerto Rico, and Alaska, work was proceeding according to plan. Contractors at Hickam Field were on or ahead of schedule. Under 1st Lt. Morton E. Townes, one of the young West Pointers who had chosen a construction career, work at Borinquen was going smoothly: the runway was in; the layout for the entire base had won praise from the department commander; and clearing, grading, and drainage operations were well along. Major George reported that the Alaska project was off to a promising start: planning was far advanced; a site at Fairbanks was under development; and preparations were moving ahead for the main construction effort in the spring. But while the program as a whole was progressing satisfactorily, several key projects were lagging. One was the Mobile Depot, still delayed by lack of funds for land. Another was McChord Field, Washington, where boggy ground hampered runway construction. Of gravest concern was the work in Panama.[104]

From the first the Panama jobs were beset by troubles. Early in 1939 disagreements had arisen over the choice of sites. After locations were firm, Hartman had difficulty getting layouts approved as first General Arnold and then General Stone challenged his plans. Maj. George F. Hobson, who took over the new post of Constructing Quartermaster in July, soon discovered that his was a tough assignment. He got a cold reception from Stone, who had had another man in mind for the position. In carrying out the emergency program, Hobson faced formidable obstacles. Except for brick and tile, virtually no construction materials were produced locally. Machinery was scarce. Skilled labor was at a premium and semiskilled workmen were hard to find. Hobson and his two assistants had to start from scratch to build an organization. When Seaman suggested that the Panama work be done by purchase and hire, Hobson opposed the idea. The two men were soon at odds. In September the outlook brightened. On the 5th Major Nurse flew to Panama, where he persuaded General Stone to approve the Quartermaster layouts. On the 8th a group of architects and engineers ar-

[103] (1) Memo, Wilson for Tyner, 23 Sep 39. QM 600.1 (Works Projects) V. (2) Ltr, Marshall for Harrington, 29 Sep 39. G–4/29778. (3) WD Ltr AG 600.12 Ft Sam Houston (9–28–39) to TQMG, 5 Oct 39. G–4/30002–70. (4) WD Ltr AG 600.12 (2–14–40) M–D to TQMG, 16 Feb 40. 652 I. (5) Seaman Interv, 2 Oct 57. (6) G–4/31265–2 to 10. (7) QM 600.1 (Ladd Field) (AC Program) I and II.

[104] (1) Memo, G–4 for Rcd, 6 Jan 40. G–4/30552–29. (2) Ltr, Hq Puerto Rican Dept to TAG, 21 Dec 39. QM 611 (Borinquen Fld) 1940. (3) Rad, CG Puerto Rican Dept to TQMG, 1 Dec 39. QM 600.1 (Borinquen Fld) (AC Program) 1939–40. (4) Ltr, Gibbins to CG San Francisco POE, 16 Dec 39. QM 600.1 (Ladd Fld) (AC Program) II. (5) Memo, Hartman for G–4, 4 Mar 40. QM 600.1 (Misc) 1940.



EQUIPMENT ARRIVING AT BORINQUEN FIELD, PUERTO RICO, *November 1939.*

rived from the United States. The next day Colonel Danielson replaced Major Hobson.[105]

Late in September Woodring decided to do the Panama jobs by the fixed-fee method. By using emergency agreements he hoped not only to speed the work but also to cut costs by 35 percent. There would be three contracts, one for the Atlantic side and two for the Pacific. Leading construction firms would be invited to apply. A committee of three officers would rate the applicants on experience, organization, and financial responsibility and submit a list of those that seemed best qualified to the Secretary. A board headed by Woodring would then make final selections and conduct negotiations. Two of the officers named to the committee were Engineers—Col. John R. D. Matheson of Tyner's staff, and Capt. David A. D. Ogden of the Chief's office. The third member was Maj. Elmer G. Thomas, one of the few active Quartermaster officers who had directed a cost-plus project during World War I. As chief of the newly organized Fixed Fee Section of Seaman's office, Thomas would have charge of all work done under emergency agreements. Matheson, Ogden, and Thomas had no time to lose, for Woodring wanted the list as soon as possible.[106]

At Gibbin's invitation, fifty of the nation's top constructors submitted applications. Among those who thus expressed their interest in a fixed-fee contract were such giant concerns as George A. Fuller, Mason & Hanger, Starrett

[105] (1) Memo, Lee for Strong, 8 Jun 39. WPD 3809–24. (2) Ltr, Hartman to Arnold, 5 Jun 39, with 1st Ind, 9 Jun 39. QM 600.1 (Albrook Fld) (AC Program). (3) QM 600.1 (Panama) (AC Expansion) I. (4) Memo, Seaman for Gibbins, 25 Jul 39. QM 600.1 (Panama) 1930–41.

[106] (1) Memo, Gasser for Gibbins, 30 Sep 39. G–4/31364. (2) Interv with Col Elmer G. Thomas, 27 Dec 55. (3) OQMG Office Order 34, 16 Oct 39. QM 020 (Constr) 1921–39.

Brothers and Eken, and the Walsh Construction Company. Although few of the other applicants were quite so strong financially as these companies, all enjoyed outstanding reputations. Some of the less prosperous firms proposed to work in combinations of two or three. With so many fine candidates to choose from, the committee could not fail to find a number eminently qualified for the Panama jobs. After reviewing the information sent in by contractors, checking with Dun & Bradstreet, and consulting the Bureau of Contract Information of the AGC, Thomas and his colleagues rated the applicants. They also drafted a contract and established a tentative fee schedule. Meanwhile, the Fixed Fee Section arranged to transport men, equipment, and materials to the Canal Zone. By the third week in October, all was in readiness. Woodring had only to name the contractors and negotiate the contracts.[107]

It was not to be that simple. The procedure adopted by the Secretary sparked accusations that the War Department was favoring big business. The AGC and the building trades unions demanded that all contractors have equal opportunities. On learning that a majority of the applicants were from the East, several congressmen from other sections raised objections. Other congressmen entered pleas on behalf of constituents. Late in October Woodring agreed to circularize the industry. Interested parties had until 8 November to file experience briefs. Any firm or combination of firms capable of handling a nine-million-dollar project was eligible. Nearly one hundred individual companies and joint ventures applied. Some failed to qualify, their assets being insufficient. The committee quickly graded the rest and, on 17 November, sent a list of seventeen "first choice" contractors to the Secretary. At this point, a powerful sponsor, dean of the House Adolph J. Sabath, urged selection of a contractor who, as Thomas put it, had his office in his hat and who, moreover, had recently drawn a heavy penalty for not completing a job on time. Unable to withstand this pressure and unwilling to give in to it, Woodring in early December ordered Seaman to advertise the Panama projects for fixed-price letting. Under the slow competitive system, bids could not be opened before February.[108] The attempt to expedite construction in Panama by using fixed-fee contracts had ended in failure.

The scapegoat for the Panama fiasco was the Quartermaster Corps. In vain did General Gibbins protest that the delay in letting contracts was owing "to causes beyond the control of this office."[109] From Panama General Stone wired the War Department: "Dry season

[107] (1) Ltr, Pitz to George A. Fuller Co., 28 Sep 39. QM 095 (Fuller, George A.) 1936–41. (2) Memo, Ogden for Schley, 21 Oct 39. (3) Ltr, Pitz to Danielson, 20 Oct 39. Last two in Thomas Papers. (4) Answers to Questionnaire, Thomas to EHD, 31 May 56. (5) Memo, Matheson, Thomas, and Ogden for the Board of Selection, 25 Oct 39. Thomas Papers.

[108] (1) QM 600.1 (Panama) 1920–39. (2) Ltr, Pitz to All Contractors, circa 31 Oct 39. (3) Telg, Gibbins to The Austin Co., Phila., Pa., 31 Oct 39. Last two in Thomas Papers. (4) *The Constructor*, November 1939, p. 16. (5) Ltr, with Incl, Matheson *et al.* to the Board of Selection, 17 Nov 39. Thomas Papers. (6) Thomas Interv, 27 Dec 55. (7) Answers to Questionnaire, Thomas to EHD, 31 May 56. (8) Memo, Gasser for Gibbins, 13 Nov 39. QM 600.1 (Panama) 1930–41. (9) Ltrs, Woodring to Rep Adolph J. Sabath, 14 Nov, 7 Dec 39. SW Files, Constr Work, 251–650. (10) Telg, TAG to Stone, 12 Dec 39. QM 600.1 (Panama) (AC Expansion) I.

[109] 2d Ind, Gibbins to TAG, 7 Dec 39, basic missing. QM 600.1 (Panama) (AC Expansion) I.

has come and weather is fine . . . . Am more convinced than ever of necessity of putting all construction work here under the direction of the Department Commander. With the push and initiative he can give, the work will be carried on to early completion."[110] General Arnold, still the Quartermaster's most persistent critic, expressed particular dissatisfaction with the handling of the Panama air base. Until this time General Seaman had managed to hold his own. With Tyner's help he had checkmated a move by the Air Corps to take over airfield design; and he had withstood continuing pressure from the AGC for a fixed-fee contract in Alaska. There were some who praised his efforts, among them Brig. Gen. George H. Brett of Arnold's staff.[111] But Brett's voice and the voices of like-minded men were drowned out by the rising chorus of complaints.

Removing construction from the Quartermaster Corps came up again. In October 1939 two members of the House Appropriations Committee, Representatives Albert J. Engel and Joe Starnes, informed the General Staff that they intended to sponsor legislation giving the function to the Corps of Engineers. The news was not particularly welcome. A premature attempt to bring about the change might ruin the Engineers' chances for years to come. Although the congressmen seemed in no hurry, General Marshall had to be ready to take a stand should a bill be introduced. Somewhat reluctantly, he reopened the question. The Staff reviewed earlier studies and kept an eye on Quartermaster progress.[112] Vetoing a proposal by a former member of the wartime Construction Division to reestablish the separate corps, General Tyner conceded that a change was desirable but maintained that construction should go to the Engineers eventually. "The enormous . . . program now underway is too far developed," he added, "to change horses at this moment."[113] Then, on 18 January 1940, the President called once more for recommendations as to what changes should be made under the Reorganization Act. The next day General Gasser asked Tyner what to do with maintenance if construction went to the Engineers.[114] Learning from Matheson what was afoot, General Schley hastened to offer his views. Maintenance, he insisted, should be left where it was. As for transferring construction, he felt the time was inopportune. The change should not take place while the Quartermaster Corps was in the midst of a big emergency program. "Any transfer," Schley wrote, "no matter to what organization, will cause delay. Such a delay might be

[110] Telg, Stone to TAG, 4 Dec 39. QM 600.1 (Panama) (AC Expansion) I.

[111] (1) DS, G–4 to TQMG, 7 Dec 39. G–4/30552–20. (2) Memo, Arnold for Tyner, n.d., sub: Delay in AC Constr Program. QM 600.1 (Air Corps) (Emergency Program) 1940. (3) R&R Sheet, B&G Sec OCAC to Arnold, 22 Aug 39, with handwritten note thereon. AAF Central Files, 600.121 from Jul 39–Aug 40. (4) Ltr, CQM to CO Barksdale Fld, 28 Dec 39, and Inds. QM 600.1 (Barksdale Fld) 1940. (5) G–4/31364. (6) R&R Sheet, Brett to Arnold, 7 Nov 39. AAF Central Files, 600.121 from Jul 39–Aug 40.

[112] (1) Memo, OCofS (Maj James D. McIntyre) for Marshall, 26 Oct 39. AG 020 (4–21–39). (2) Memo, Tyner for Strong, 13 Nov 39. G–4/30552–25. (3) Tel Conv, Col Chamberlain, G–4, and Seaman, 29 Dec 39. QM 600.1 (Misc) 1940.

[113] Memo, Tyner for Marshall, 26 Dec 39. G–3/31597.

[114] (1) Ltr, BOB to Woodring, 18 Jan 40. (2) Memo, Gasser for Tyner, 19 Jan 40. Both in AGO 020 (4–21–39).



GENERAL MOORE

serious at this time."[115] This argument made a deep impression on the new G–4, Brig. Gen. Richard C. Moore, who had succeeded Tyner on 21 January. When Moore, who was an Engineer officer, suggested that the transfer be postponed for at least a year, Marshall and Woodring decided to wait.[116]

This decision was followed shortly by the retirement of General Seaman. Recalled from the West Coast late in February, Colonel Hartman became head of the Construction Division on 1 March 1940. The new chief was generally regarded as the logical man for the job. Within the Construction Service he had long enjoyed an outstanding reputation. Capable and conscientious, he had won the respect of the General Staff. General Spalding had commended him highly. General Tyner, asked later if he had considered Hartman competent, replied laconically, "God, yes." And although General Moore would have preferred to see the position filled by an Engineer, he agreed that the new man seemed particularly well qualified.[117] General Gregory, who succeeded Gibbins on 1 April 1940, raised no objections. Afterward he said, "At the time I was made Quartermaster General, my three assistants had already been chosen, which included General Hartman, but I probably would have appointed him anyway because he had been in the Construction Division during World War I and had made a very good record then."[118] In the months to come, Hartman was to need all of his knowledge and experience, for on his shoulders soon would fall the mantle of Littell.

The Period of the Phony War

In the offing was a far larger and better balanced program than the one begun in 1939. Throughout the months of the "phony war," military leaders, anticipating a major emergency, pressed for further rearmament. Among their immediate goals were a Regular Army of 280,000, a National Guard of 450,000, critical and essential items of equipment for the Protective Mobilization Force, and a stronger network of defenses. Beyond this they sought to prepare the way for an eventual wartime force of

[115] Memo, Schley for Matheson, 2 Feb 40. 600.1 Secret File No. 1 of 2 Secret Files.

[116] (1) Memo, Moore for Marshall, 10 Feb 40. (2) Memo, Moore for Marshall, 24 Feb 40. (3) Ltr, Woodring to BOB, 8 Feb 40. All in G–4/31343.

[117] (1) Pagan Interv, 8 Mar 57; Tyner Interv, 28 Sep 55. (2) Memo, Moore for Marshall, 30 Mar 40. AG 020 (4–21–39).

[118] Verbatim Rpt, Meeting with Gregory and Hastings, p. 8.

4,000,000 men. By peacetime standards the cost of construction alone would be staggering. The sums required for expanding existing arsenals, depots, and proving grounds and for building new manufacturing plants came to more than $400 million. About $100 million would go for troop construction at established posts in the United States. The Air Corps' deferred projects would cost another $100 million. To complete the installations in the overseas possessions would take at least $55 million more. These sums did not cover the proposed improvement of seacoast defenses. Nor did they include contemplated projects for which no estimates had yet been made. An early beginning was imperative, particularly for the industrial projects.[119] In December 1939 the Chief of Ordnance, Maj. Gen. Charles M. Wesson, warned the Assistant Secretary that time was wasting. "To adequately prepare this nation for a major war," he said, "would require, under present conditions, two years from the time money is available."[120]

The Army had neither the funds nor the authority to launch its bold new program. The outbreak of war in Europe had raised hopes of immediate large appropriations and vigorous action, but these hopes were dashed as the President, trimming his sails to the political winds, decided to go slowly. In October 1939 the Bureau of the Budget notified the War Department that requests should be for minimum requirements only. Before long Roosevelt revealed his intention of starting a drive for governmental economy. In November he asked Congress for a modest sum to defray the costs of the limited emergency. The Construction Division would receive a mere $10,661,600, two-thirds of which was to pay back money borrowed from authorized projects. The War Department's budget for fiscal year 1941, presented to Congress in January 1940, contained but $30,061,748 for construction, $18,857,458 for maintenance, and $866,000 for land. And when the President made drastic cuts in the rivers and harbors estimate, the House retaliated by slashing the estimate for military construction in half. Meanwhile, the Budget Bureau's insistence that future askings be small hampered the Army's effort to draft a new construction authorization bill.[121] As long as the "phony war" continued, a big preparedness effort seemed unlikely.

The Construction Division needed time to get ready. After two decades of mobilization planning the War Department

[119] (1) Watson, *Chief of Staff*, pp. 157ff. (2) Memo, Marshall for Woodring, 7 Sep 39. CofS, Misc Confs, 1938–42. (3) WD Ltr AG 320.2 (10–27–39) E–C to WDGS, 30 Oct 39. G–4/31453. (4) Memo, Tyner for Strong, 8 Jan 40. G–4/31349–1. (5) Incl with Ltr, Woodring to A. J. May, Chm H Mil Affs Comm, 13 Jan 40. SW Files, Nat Def 151–400. (6) Memo, Seaman for TAG, 9 Jan 40. QM 600.1 (Funds) VIII.

[120] Memo, Wesson for Johnson, 2 Dec 39. SW Files—782–850.

[121] (1) Ltr, BOWD to Chiefs of Estimating Agencies, 30 Oct 39. G–4/31190–7. (2) New York *Times*, November 27, 1939, p. 1; December 6, 1939, p. 3; December 27, 1939, p. 1; January 1, 1940, p. 1. (3) H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Emergency Supplemental Appropriation Bill for 1940*, Nov 39, pp. 1ff., 68–80. (4) Brief, OCofS (W.M.R.) 12 Feb 40. QM 652 1922–40. (5) H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Military Establishment Appropriation Bill for 1941*, Feb–Mar 40, pp. 23–26, 388. (6) H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on War Department Civil Functions Bill for 1941*, Jan–Feb 40, pp. 101ff. (7) S Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Military Establishment Appropriation Bill for 1941*, Apr–May 40, pp. 5–6. (8) G–4/30552 and G–4/30552–27.

still had no effective blueprint for carrying out a large emergency building program. Addressing the annual convention of the AGC at Memphis on 8 February 1940, Assistant Secretary Johnson said, "Let me frankly confess, we are not ready to face an M-day on the construction front . . . . We have been so busy on the munitions front of guns, planes, tanks and fighting equipment that we have neglected the construction phases of industrial mobilization which are equally important toward the ultimate success of battle."[122] The plans for command construction were in far worse shape than those for industrial projects. The latest Protective Mobilization Plan echoed earlier versions in calling for little building. Johnson tried belatedly to remedy the situation. In February 1940 he organized a Construction Section in ANMB and instructed it to study not only industrial but command requirements as well. Other responsible officials continued to neglect the problem. Aside from forcing the Quartermaster Corps to make exhaustive studies of prefabs, General Tyner did little to advance construction preparations. General Seaman did even less. In October 1939 he abolished the Planning Branch and henceforth made no apparent effort to ready the division for a full-scale emergency.[123] When Hartman returned in early 1940, time was fast running out.

With the coming of spring, the "phony war" in Europe ended. As the Germans launched their swift offensives and won their crushing victories, the United States began to mobilize.

[122] *The Constructor*, February 1940, p. 20.

[123] (1) WD, MR 4–1, 5 Jan 40, sub: Supply, Constr, Transport, Sec V. (2) Memo, Secy ANMB for Gibbins, 8 Feb 40. ANMB Files—334 Comm Members and Min of Mtgs (Constr Sec). (3) G–4/31409–1. (4) QM 600.1 (Prefab Bldgs). (5) OQMG Office Order 34, 16 Oct 39. QM 020 (Constr) 1921–39.

CHAPTER IV

First Steps Toward Mobilization

The lightning German attacks on Denmark and Norway in April 1940, followed by the invasion of Belgium and the Netherlands in May and the fall of France in June, brought into operation the War Department's M-day plans. As the Allies' situation became increasingly critical, the President outlined a vast program for defense. He proposed to call to arms the largest peacetime force in the nation's history, to equip it fully with up-to-date weapons, and to gear the economy for rapid production of implements of war. Spurred by Hitler's victories, Congress voted huge appropriations and granted necessary powers. The course of events in Europe underscored the urgency of American rearmament. But, before the United States could mobilize, before it could create a large, modern army and realize its industrial potential for war, it first had to build facilities for housing and training troops and for manufacturing and storing munitions. As in 1917, construction emerged as the controlling factor in preparedness.

The Defense Program

In mid-May, while German armies were overrunning the Low Countries, the President asked Congress to add $732 million to the military appropriation bill for 1941, then before the Senate. The bulk of this money was to cover costs of increasing the Regular Army to 255,000 men and procuring equipment for the Protective Mobilization Force, which might soon be called out. The President's request included $26 million for building service schools, tactical stations, storage, shelter, and seacoast defenses. It also contained a substantial sum for breaking bottlenecks in the production of critical items—$44,275,000 to enlarge the old-line arsenals and erect four new government-owned munitions plants: two for making smokeless powder, one for loading ammunition, and one for manufacturing Garand M1 rifles. Appearing before the Senate Appropriations Committee on 17 May, General Marshall recommended a further step—expansion of the Army to 280,000, the peacetime limit set by the National Defense Act of 1920. Congress quickly acceded to these requests. The augmented bill, approved on 13 June, gave the War Department $1,756,552,958 in funds and contract authorities. A total of $133,880,887 was earmarked for construction.[1]

On 31 May, as the German tide swept toward Dunkerque, President Roosevelt sent a second urgent request to Congress, this one for "over a billion dollars." Directing attention to the "almost incredible

[1] (1) *Public Papers and Addresses of Franklin D. Roosevelt, 1940*, pp. 198–205. (2) S Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings* on H R 9209, pp. 400–401, 404, 406, 409. (3) 54 *Stat.* 350. (4) For a detailed account of the events treated in this section, see Watson, *Chief of Staff*, pp. 166–92.

events of the past two weeks," he urged "the speedy enlargement of the program for equipping and training in the light of our defense needs." Roosevelt emphasized the need for munitions plants. He declared: "These facilities require a long time to create and to reach quantity production. The increased gravity of the situation indicates that action should be taken without delay." But while he put industrial requirements first, the Commander in Chief did not neglect the need for a larger army. He coupled his appeal for funds with a request for authority to bring the National Guard into federal service.[2] The German successes in western Europe and the threatened disaster to Great Britain, which possibly might involve the surrender of the British fleet, had changed the whole rearmament picture. A new urgency gripped the nation's military planners and Congress. No longer would modest increases in the armed forces suffice. What came to be called the defense program was, after late May, a broad build-up at the fastest possible rate, not only for the immediate goal, defense of the Western Hemisphere, but also for wider demands that might lie in the future.

Two days before his second message to Congress, on 29 May, Roosevelt took the first organizational step toward expediting the defense effort. On that date he revived the Advisory Commission to the Council of National Defense (NDAC), a World War I agency which had never been formally abolished.[3] In a fireside chat a few evenings earlier, he had cleared the way for this move, announcing that he would call in men from industry to help direct rearmament. "It is our purpose," the President told his listeners, "not only to speed up production but to increase the total facilities of the nation in such a way that they can be further enlarged to meet emergencies of the future." But, he added, "We must make sure, in all that we do, that there be no breakdown or cancellation of the great social gains we have made in these past years." He saw nothing in the situation to warrant longer hours, lower standards of pay, or poorer working conditions. Rather he envisioned the New Deal and preparedness going forward together, the one furthering the other.[4] An order of 24 June named the commission's members, three to serve full time and four part time. The full-time advisers were to be William S. Knudsen, president of General Motors; Edward R. Stettinius, Jr., chairman of the board of U.S. Steel; and Sidney Hillman, head of the CIO's Amalgamated Clothing Workers.[5]

As a matter of fact, the commission had already started to function. The first meeting took place at the White House on the morning of 30 May. Since NDAC was to be his co-ordinating agency, Roosevelt on 6 June ordered the Army and Navy to submit for its approval contracts for "all important purchases"—later defined as those amounting to $500,000 or more. Agreements for construction as well as for

[2] *Public Papers and Addresses of Franklin D. Roosevelt, 1940*, pp. 250–52.

[3] Council of Nat Def, Rules and Regulations (5 *F.R.* 2213), 29 May 40. Authority for the appointment of the Advisory Commission was in the Act of August 29, 1916 (39 *Stat.* 649).

[4] *Public Papers and Addresses of Franklin D. Roosevelt, 1940*, pp. 236–38.

[5] (1) Council of Nat Def, *Nominations to Advisory Commission* (5 *F.R.* 2583), 24 Jun 40. (2) Civilian Production Administration, *Industrial Mobilization for War, I, Program and Administration* (Washington, 1947), p. 19.

supplies would be subject to this review. The commission began almost at once to chart a course consistent with the President's aims. By late June the members were in substantial agreement that ways would have to be found to obtain earliest deliveries at lowest prices and that work would have to be spread in such a way as to reduce unemployment and utilize idle productive capacity. They recognized that these ends were attainable only if contracting methods were both flexible and streamlined.[6]

While the Advisory Commission was thus engaged, the War Department, too, was bestirring itself. At the instance of Assistant Secretary Johnson and his executive, Colonel Burns, supplemental estimates were in preparation and long-range plans were under consideration for an Army of 4,000,000 men. On 11 June, the day after Italy entered the war, Johnson appointed a 7-man committee "to submit a balanced program based on military needs . . . for the creation of additional productive capacity."[7] The formation of this committee was but part of an intensive effort to define the Army's objectives which began on the 11th. Knudsen had that day demanded to know how much productive capacity the country would need and when. For the next three weeks, Johnson and Marshall endeavored to find an answer.[8]

In June, while the scope of the defense program was becoming clear, the War Department received its first large increase in emergency funds. On the 26th the President signed the First Supplemental National Defense Appropriation Act for 1941, providing for the expenditure of slightly more than a billion dollars. Roughly one-quarter of the money was for construction. Since it came so early, this measure did not allow for a substantially larger military force than had the regular appropriation of 13 June. The enlisted strength of the Army was raised to 375,000, but there was as yet no action on the President's proposal to call the National Guard. A total of $84,079,584 was made available for reception centers, troop housing, airfields, and seacoast defenses. More significant was the provision of $200 million for expediting production.[9] This sum was almost five times as much as the act of 13 June had furnished for the same purpose—an indication of what General Marshall in mid-June termed "the rapidly developing threat . . . of the world situation."[10]

By the end of the month the War Department had outlined the basic plan that would guide the first phase of its rearmament effort. Known as the 30 June Munitions Program, the plan was designed primarily to create the facilities needed to equip and maintain an army of 2,000,000 men. The President approved the program on 2 July and submitted it to Congress with a price tag of $3.9 billion on the 10th, together with

[6] (1) CPA, *Industrial Mobilization for War*, pp. 19–25. (2) Memo, Roosevelt for Woodring, 6 Jun 40. WPB 411.33 Constr Project, Mil, Jun 40–41. (3) CPA, *Minutes of the Advisory Commission to the Council of National Defense, June 1, 1940 to October 22, 1941* (Washington, 1946), pp. 2–3, 15–17. Cited hereinafter as *Minutes of the NDAC.*

[7] Memo, Johnson for . . . , 11 Jun 40. ASF 134 A, Constr Program—Site Comm.

[8] (1) Memo, Burns for Johnson, 13 Jun 40, sub: National Policy on Mun Production Capacity. 470 Part 1. (2) Burns Interv, 24 May 56.

[9] (1) 54 *Stat.* 599. (2) H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on Military Establishment Appropriation Bill for 1942*, pp. 6, 156–57.

[10] S Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings* on H R 10055, p. 4.

a request for 15,000 planes.[11] He described the objectives, aside from aircraft procurement, as follows:

> To complete the total equipment for a land force of approximately 1,200,000 men, though of course this total of men, would not be in the Army in time of peace.
>
> To procure reserve stocks of tanks, guns, artillery, ammunition, etc., for another 800,000 men or a total of 2,000,000 men if a mobilization of such a force should become necessary.
>
> To provide for manufacturing facilities, public and private, necessary to produce critical items of equipment for a land force of 2,000,000 men, and to produce the ordnance items required for the aircraft program of the Army and Navy—guns, bombs, armor, bombsights and ammunition.[12]

The last of these objectives alone meant that the War Department would build its own munitions industry. Because critical items were by definition noncommercial articles normally not produced by private industry, most of the new manufacturing plants would be government built and owned. A vast military construction effort would be necessary to achieve the program's goal, which was, in the President's words, the filling of "the material requirements without which the manpower of the nation, if called into service, cannot effectively operate, either in the production of arms and goods, or their utilization in repelling attack."[13]

Until now the administration had not sought to muster a citizen army. It being an election year, the President was wary of anything so controversial as a peacetime draft. Pressure for compulsory military service had, therefore, to come from other sources. It was through the efforts of the Military Training Camps Association, a group of prominent New Yorkers who had served as officers in World War I, that the Burke-Wadsworth Selective Service Bill was introduced in Congress on 20 June. That same day the President named Henry L. Stimson, one of the association's members, Secretary of War. Roosevelt publicly endorsed the selective service measure on 10 July. Two days later General Marshall appeared before the Senate Military Affairs Committee to urge speedy passage of the Burke-Wadsworth bill and prompt action to federalize the National Guard.[14] For the first time in history, Congress had before it proposals to mobilize the nation's manpower in time of peace.

The War Department confronted a situation it had not foreseen. For twenty years top military planners had assumed that a huge emergency construction effort would not again be necessary. But the crisis of 1940 compelled the Army to undertake an even larger building program than had U.S. entry into World War I. In 1917 the Allies had held a stable front in France, their fleets had controlled the seas, and their factories had furnished munitions to American forces as well as to their own. Now German armies stood on the shores of the Atlantic, Britain was in jeopardy, and friendly nations were seeking armaments here. Moreover, mobilization occurred before this country's formal entry

[11] (1) Memo, Marshall for Johnson, 2 Jul 40. (2) Memo, Burns for Rcd, 3 Jul 40. (3) Memo, Johnson for Secy NDAC, 16 Jul 40. All in G-4/31773.

[12] *Public Papers and Addresses of Franklin D. Roosevelt, 1940*, p. 290.

[13] *Ibid.*

[14] (1) Watson, *Chief of Staff*, pp. 188–92. (2) Sherwood, *Roosevelt and Hopkins*, pp. 155–57. (3) *Public Papers and Addresses of Franklin D. Roosevelt, 1940*, p. 290.

into World War II. This time the United States, largely on its own, had to outstrip Germany's arms production. This time, too, it had to maintain a sizable army for an indefinite period on American soil.[15]

Early Preparations

Even before the invasion of Denmark and Norway, preparations were under way for a large-scale building program. Early in March, a week or ten days after Hartman's return to Washington, the Chief of Staff sent for him. General Marshall wanted to know how long it would take to house 2,000,000 men. The record of the old Cantonment Division came readily to Hartman's mind. In 1917 there were virtually no plans to start with. Yet shelter for a million men was complete five months after work commenced. Hartman thought of the plans he had developed during the past six years—the organization charts, the studies and reports, the ideal layouts, and the mobilization drawings. Then he gave his answer. If he could know at once what units were to be housed and where, if he could get the money in May or June and begin work in July, the new Army could be sheltered before 1 December. Marshall was merely seeking information he might need if and when mobilization did take place. But to Hartman this interview was the signal to get moving.[16]

His first step was to check the plans. Calling for the mobilization drawings, he made a startling discovery—during his stay in California, someone had altered the drawings. The size of the barracks had been reduced, roof designs had been cheapened, and studs had been more widely spaced. Plywood had been substituted for drop siding. The new structures would be cramped and weak. Some of the materials specified were scarce. In short, the drawings would not serve. The men who had helped with the original blueprints started immediately to make another set. Colonel Hartman soon received an even ruder jolt. The remainder of his plans had disappeared. Though copies had once been on file with the Construction Division, The Quartermaster General, G–4, and WPD, not one could now be found. Except for the Blossom report, which he had kept on his desk as a reference work these past twenty years, Hartman had practically no written word to guide him.[17] In charting a course for emergency construction, he had to rely primarily on his own judgment and the example of World War I.

Alert to the need for sound construction planning, Colonel Burns endeavored to help by bringing in men from industry. Through the Associated General Contractors, he obtained the names of several prominent men who might be available. One was John P. Hogan, president of the American Society of Civil Engineers. A colonel in the Engineer Reserve, Hogan

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[15] See Stimson's statement, 24 Jul 40. In H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Second Supplemental National Defense Appropriation Bill for 1941*, pp. 107–09.

[16] (1) Memo, Burns for Johnson, 30 Mar 40. ANMB 334 Comm Members and Min. (2) Statement of Gen Hartman, 5 Jul 55, pp. 2, 5–6, 10.

[17] (1) Statement of Gen Hartman, 5 Jul 55, pp. 2, 7. (2) Hartman's Testimony, 12 Aug 41. In Truman Comm *Hearings*, Part 7, p. 2042. (3) Blossom's Testimony, 14 Feb 41. In H Comm on Mil Affs, 77th Cong, 1st sess, *Hearings, Inquiry as to National Defense Construction*, p. 66. Cited hereinafter as May Comm *Hearings*.

had served in France in World War I. As chief engineer of the New York World's Fair of 1939, he had directed a $100 million construction program. Late in March, Maj. Leo J. Dillon, Burns' executive officer, conferred with Hogan in New York. The latter agreed to head a Construction Advisory Committee under the Army and Navy Munitions Board. During April Hogan and Dillon with Roosevelt's help recruited the following outstanding men, all of whom agreed to serve without pay: Stephen F. Voorhees, past president of the American Institute of Architects; Alonzo J. Hammond, president of the American Engineering Council; Malcolm Pirnie, general chairman of the Construction League of America; and, from the Associated General Contractors, Past President E. P. Palmer and Managing Director Harding. It was to take some time for the committee to get organized, and the first meeting did not take place until 20 May.[18] Meanwhile, plans for defense construction were shaping up rapidly.

By late April the mobilization drawings had undergone a hasty overhauling. Working largely from memory, veteran employees of the Construction Division restored many of the original plans, which they then hastily revised. When completed, this latest version of the "700 series" incorporated blueprints for more than three hundred structures of various types and sizes. Included were drawings of barracks, mess halls, hospitals, bakeries, and laundries; of storehouses, shops, and administration buildings; and of recreation halls, post exchanges, and theaters. There were also blueprints for roads and utilities and layouts for typical camps. While these plans resembled the "600 series" of World War I, there were marked differences. The improved standard of living accounted for certain changes. Central heating had replaced stoves. Latrines were now inside the barracks rather than in separate buildings. Other changes resulted from motorization. The stable had given way to the garage, and road nets were more elaborate.[19] Secretary Stimson called attention to still another change-producing factor:

> In 1917 the cantonments were intended to house troops for a shorter period . . . . We then knew that our troops were going to France and that much of their training would be overseas. There was then strong evidence that the contending forces in the war were nearing exhaustion and that, whatever way the decision went, the end was probably not far off.
>
> Today not only are we facing a most dangerous emergency but there is strong evidence that this emergency may be very prolonged.[20]

With this situation in mind, Hartman introduced more durable features into the plans. Two important changes were the substitution of concrete foundation piers for wooden posts and the addition of termite shields. Another, aimed at reducing maintenance costs, was the addition of canopies, or, as they were generally called, "aqua medias" or "eye-

[18] (1) Interv, Troyer Anderson with Col Leo J. Dillon. Anderson File, Folder No. 4. (2) Memo, Burns for Johnson, 30 Mar 40. (3) Ltr, ANMB to Palmer, 15 Apr 40. (4) Memo, ANMB for ASW and ASN, 15 May 40. (5) Memo, ASN for the President, 21 May 40. Last four in ANMB 334 Comm Members and Min.

[19] (1) Statement of Gen Hartman, 5 Jul 55, pp. 2, 7. (2) *Report, Chief Construction Division, 1918*, p. 17ff. (3) *QM Standard Mobilization Drawings, 1940–41*, vols. I, II.

[20] Stimson's Testimony, 15 Apr 41. In Truman Comm *Hearings*, Part 1, p. 6.

brows."[21] When Hitler attacked through the Low Countries, the Construction Division had on hand drawings for quick, cheap, and serviceable camps—drawings that still lacked complete details but could nevertheless be made to do.

Three days before the big German offensive, on 7 May, the G–4, General Moore, asked the division to compute the cost of sheltering 1,200,000 men. The estimating task fell to Major Nurse. It was a formidable assignment. Since sites were still unchosen, he could not forecast requirements for utilities, roads, and railroad spurs—all expensive items. How much clearing and grading would be necessary was any man's guess. The same was true of drainage. Wages and prices were certain to rise; the question was how far. And, while plans for typical buildings were now available, bills of materials were still in the writing. Using the records of the 1939 projects and such other information as he could gather, Nurse arrived at a figure of $800 per man for divisional cantonments. This was a rock-bottom estimate. Keeping within it would probably take considerable doing, but to ask for more was to invite refusal. Hartman checked the figures and double-checked them, as did Joseph A. Bayer of the Funds and Estimates Section. Then, the three men called on General Moore.[22] "When we presented our estimates," Bayer recalled, "he seemed shocked they were so high. We felt that they were low and we did expect difficulty in accomplishing our mission with the moneys we had requested."[23]

Even at this late date, few in the General Staff recognized the need for an all-out construction effort. The hope persisted that large numbers of men might be housed in tents and existing buildings, that the experience of World War I need not be repeated. Describing the General Staff's attitude during the spring of 1940, General Gregory said: "In the original mobilization plans, you see, it was planned to call up a unit and put them in fairgrounds, tents, and buildings. They couldn't seem to get that out of their heads, to realize that they would need something more, that they would need some place in which to train successive groups of men."[24] At a mid-May conference, General Marshall said that the shortage of shelter was "no serious obstacle" to the raising of a million men.[25] The Chief of Staff made no pretense of being an expert in logistics. As a matter of fact, he left logistical matters largely to General Moore.[26]

Confronted with Nurse's figures, the G–4 refused categorically to entertain so high an estimate. Even assuming that divisional cantonments were to be built and that the 700 series plans would be followed—the General Staff had not yet finally accepted either proposition—the price was out of line, he said. Hartman emphatically disagreed, maintaining that

[21] Memo, OQMG War Plans and Tng Br for Rcd, 1940. Opns Br Files, Misc Papers.

[22] (1) Watson, *Chief of Staff*, pp. 166–67. (2) Ltr, Nurse to OCMH, 9 Mar 55. EHD files. (3) 1st Ind, 2 Dec 40, on Ltr, TAGO to TQMG, 16 Nov 40, sub: Statement of Status of Emergency Constr Funds. QM 600.1 (Funds) IX. (4) Hartman's Testimony, 12 Aug 41. In Truman Comm *Hearings*, Part 7, pp. 2045–48. (5) Statement of Gen Hartman, 5 Jul 55, p. 8.

[23] Ltr, Bayer to authors, 4 Jul 55.

[24] Verbatim Rpt, Meeting with Gregory and Hastings, p. 15.

[25] Notes of Conf in OCofS, 20 May 40. OCS, Misc Confs, 20 May–25 Sep 40.

[26] (1) Interv with Lt Gen Leslie R. Groves, 19 Jun 56. (2) Burns Interv, 24 May 56.

the Quartermaster figure could only be trimmed by dropping desirable features, such as paved roads, theaters, and recreation halls. Judging from experience, such action seemed inadvisable. Hartman pointed out that the camps of World War I had barely been started before demands arose for these and similar refinements. Moore nevertheless reduced the estimate to $650 per man by eliminating the "frills." Then, fearing that Congress would refuse even that amount, he slashed the figure again, this time to $400. Hartman, Nurse, and Gregory fought hard for a realistic estimate, but General Moore held firm. In the end The Quartermaster General got orders to use $400 per man as the basis of future requests. At the time, there was speculation as to whether Moore was acting on orders from above.[27] Questioned about this later, he replied:

> I was responsible for cutting the estimates. It was contemplated at that time that all training was to take place in the South where tents could be used. The neutralism in Congress made it expedient to keep estimates as low as practicable. We asked for what we thought we could get. The estimates were checked with what it cost to build a construction town at Fort Peck, Montana, per man, in 1934.[28]

In terms of the construction task ahead, Moore's figure was appallingly low. Before many days had passed, the General Staff accepted the fact that some divisional cantonments would indeed be necessary. Shortly thereafter the Staff adopted the 700 series plans as standard for emergency projects. Colonel Hartman tried to gauge how far $400 per man would go. First he set aside $50 per man for utilities, a small sum but all that Moore would allow. Then he went down the list of facilities the G–4 had approved, counting the cost of each. When the total reached $350, he drew a line. Above it were the bare essentials, barracks, mess halls, storehouses, hospitals, and temporary roads. This much and no more could be had within the limit imposed. Hartman was under no illusions that other features would not soon be added. Although he could not avoid a sizable deficit, he did hope to prevent the shortage of funds from hampering the building effort.[29]

When the Hogan committee met in Washington late in May, the draft of a fixed-fee contract was ready for review. Although the members suggested several changes, they approved the agreement and recommended its use.[30] Noting that work on detailed plans and specifications could not start until sites were picked, they reported to ANMB on 10 June: "Attempts to let competitive contracts without adequate contract drawings inevitably result in confusion, delay, and increased costs over any other method . . . the first priority contracts should and must be done on a management basis."[31] The construction press echoed

[27] (1) Ltr, Nurse to OCMH, 9 Mar 55. EHD Files. (2) Statement of Gen Hartman, 5 Jul 55, p. 8. (3) Hartman's Testimony, 12 Aug 41. In Truman Comm *Hearings*, Part 7, pp. 2046–48. (4) Groves Comments, I, 6.

[28] Replies to Questions, Incl with Ltr, Moore to EHD, 3 Jan 56.

[29] (1) Memo, Moore for Marshall, 28 May 40. G–4/31753. (2) WD Ltr AG 600.12 (6–15–40) M–D–M, 15 Jun 40, sub: WD Constr Policy. G–4/31751. (3) Hartman's Testimony, 12 Aug 41. In Truman Comm *Hearings*, Part 7, pp. 2046–48. (4) Constr Div Table, 17 Jun 40, Estimated Cost—Triangular Div, 8,083 Men. Opns Br Files, Misc Papers.

[30] Memo, Constr Adv Comm ANMB for ANMB, 31 May 40. ANMB–MB 203.4–3.1.

[31] Rpt, Constr Adv Comm ANMB to ANMB, 10 Jun 40. USW Files, 134 Constr.

the committee's views. Advocating use of fixed-fee contracts on emergency projects, the editors of the *Engineering News-Record* argued:

> Its advantages for the government lie in the speed with which work can be gotten underway, in flexibility of handling changes in plans, in increased efficiency through being able to work with the contractor as a partner, and finally in reduced cost by eliminating the necessary contingent items in a competitive bid. To the contractor the negotiated agreement offers freedom from uncertainty of labor rates, material prices, weather, and unforeseen difficulties. It also gives the contractor assurance of a profit. . . . Without question such a contract is the proper instrument for the job at hand.[32]

With these opinions, Colonel Hartman fully agreed. Moreover, from his standpoint, there was still another advantage. Fixed-fee contracts, unlike lump sum, could be let on the basis of "guesstimates."

Toward the end of May, at Woodring's request, the chairmen of the Military Affairs Committees, Senator Sheppard and Congressman Andrew J. May, introduced twin bills to authorize use of negotiated contracts in this country. Although the old law of 1861 permitted waiver of advertising in emergencies, Secretary Baker had been roundly criticized for invoking that authority in 1917. This time the War Department sought congressional approval beforehand. The bills made good progress at first. The House took only three days to act on the proposal. But when the matter came before the Senate on 10 June, a hitch developed, as Senator McKellar offered an amendment to outlaw "what is known as the cost-plus system of contracting." Reminded "how much trouble was caused" by the contracts of World War I, the Senate agreed to the rider.[33] On learning what had happened, Hartman appealed through the Secretary of War to Senator Sheppard, who promised to help. At Sheppard's urging the House and Senate conferees threw out the McKellar amendment and in its place adopted the following clause: "the cost-plus-a-percentage-of-cost system of contracting shall not be used . . . , but this proviso shall not be construed to prohibit the use of the cost-plus-a-fixed-fee form of contract when such use is deemed necessary by the Secretary of War." The Act of 2 July 1940, which empowered the Secretary to let contracts "with or without advertising," contained this clause.[34] Hartman had crossed the congressional hurdle. He had still to convince his superiors that fixed-fee contracting was unavoidable.

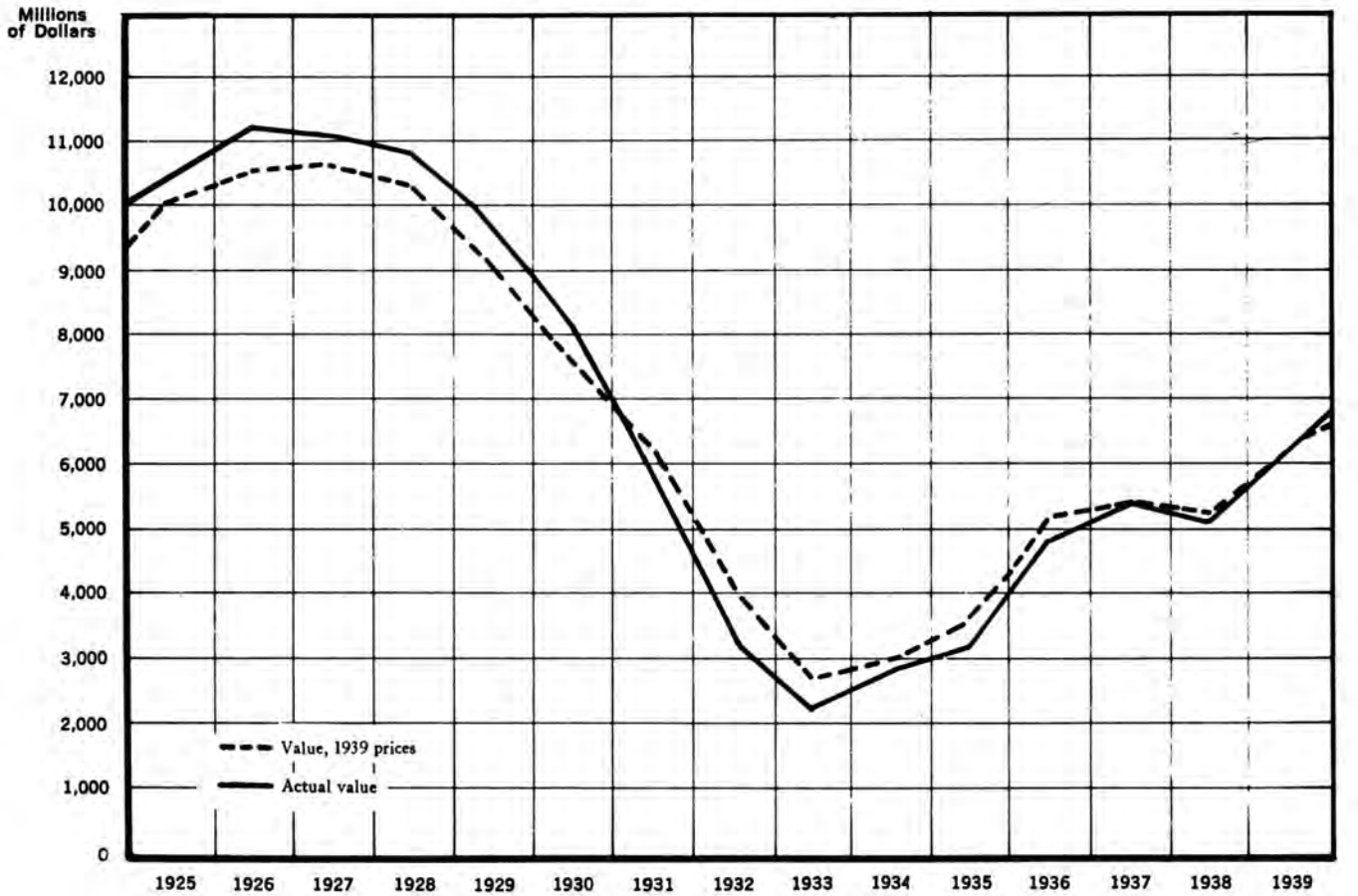
When the fixed-fee measure entered the legislative mill, the Hogan committee turned its attention to another aspect of the problem—the capacity of industry. Through the AGC the committee learned how many construction firms were available and how much work they could handle. According to information furnished by Managing Director Harding, the nation had approximately 112,000 contracting enterprises. Nearly 80,000 functioned as subcontractors, while 17,000 more were small general contractors whose business had amounted to less than $25,000 in 1939. Some 10,000 firms were in the $25,000 to $100,000 bracket and 5,000 were in the

[32] *ENR*, June 20, 1940, p. 51.

[33] 86 *Cong. Rec.* 7841, 7843.

[34] (1) Folder: Nat Def Expediting. Public Law, 703, 2 Jul 40, 76th Cong. OCE Legal Lib. (2) Ltr, Woodring to Sheppard, 13 Jun 40. SW Secret Files, 851–990. (3) 54 *Stat.* 712.

CHART 2—VOLUME OF NEW CONSTRUCTION IN THE UNITED STATES, 1925–1939



Source: H Doc 330, 80th Cong, 1st sess, *Historical Statistics of the United States, 1789–1945: A Supplement to the Statistical Abstract of the United States* (Washington, 1949), p. 168.

TABLE 4—CONSTRUCTION WORKERS IN THE UNITED STATES, JUNE 1940

Classification	Number
Total	2,627,157
Masons	137,934
Carpenters	697,479
Electricians	266,880
Engineers	58,091
Painters	352,127
Plasterers and cement finishers	73,120
Plumbers and steam fitters	213,634
Sheet metal workers	68,789
Laborers, building	372,092
Laborers, road and street	259,523
Apprentices	40,105
Truck and tractor drivers	87,383

Source: Report of the AGC to Constr Advisory Comm, ANMB, Jun 40, sub: Constr Workers in the Continental U.S. USW Files, 134 Constr.

$100,000 to $1,000,000 category. At the top of the industrial pyramid were 500 big concerns whose individual gross receipts had exceeded $1,000,000 during the previous year. As Harding pointed out, these statistics did not tell the whole story. Hit hard by the depression, the industry had not yet fully recovered. (*Chart 2*) Allowing for some shrinkage during the lean years of the thirties, Harding estimated unused construction capacity at about $3 billion dollars. If, as he indicated, there was plenty of contracting talent available, the Army's job would be primarily one of choosing firms wisely and quickly putting them to work.[35]

A second industrial element, construction manpower, also came in for a good deal of study by the Hogan committee. With eight million unemployed in the country, the supply of unskilled labor was for all practical purposes unlimited. But Hogan and his colleagues had reason to think that getting enough skilled workmen might be difficult. The industry, which had employed 3,340,000 persons in 1929, offered jobs to only 1,610,000 a decade later. The sensitivity of construction to changes in the business cycle had lessened its appeal for young men. Moreover, the unions, long dominated by a philosophy of job scarcity, had rigid entrance requirements.[36] At the committee's request, the AGC took a census of construction workers. The count turned up 2,627,157 experienced workmen. (*Table 4*) This number might prove adequate, Chairman Hogan said, "provided all were usefully and advantageously used." He nevertheless predicted trouble. The survey showed that three out of every five workers lived in the New England, Middle Atlantic, and Great Lakes States, far from the probable centers of emergency construction activity, the South, Midwest,

[35] Rpt, AGC for Constr Adv Comm ANMB, Jun 40, sub: Facil of the Constr Industry. USW Files, 134 Constr.

[36] (1) *Ibid.* (2) Commerce and Labor Depts, *Historical Statistics of the United States*, pp. 63, 65.

and Southwest. Furthermore, many skilled craftsmen had enrolled with WPA and might be unwilling to give up their relief status to take temporary defense jobs. Considered from the standpoint of productivity, the outlook was hardly brighter. Throughout most of the industry, hand methods still prevailed. Union workmen were accustomed to a 30-hour and nonunion to a 40-hour week. Under the circumstances, shortages were almost certain to develop. Contractors, pressed for speed, would compete for trained workmen. Wages would spiral and efficiency decline. Although he offered no solution, Hogan recommended that some means be found to prevent local shortages. "Otherwise," he warned, "we will only be repeating conditions that existed during the last World War, which were notorious."[37]

The committee also considered requirements for architects and engineers. At Hogan's suggestion, professional societies began canvassing their members, 115,000 in all, to find out how many would be free to take emergency assignments. The information was to be of great value. The immediate problem, however, was one of time. Reporting to the Munitions Board on the outlook for defense construction, the committee listed lack of detailed plans as "the principal bottleneck."[38] To fit typical blueprints to the sites, to lay out roads and utilities, and to complete contract and working drawings would, they said, take 20,000 engineers, architects, and draftsmen a full year. Early projects would have to start with a minimum of plans, but for later ones thorough preparations could and should be made. The committee recommended that $15 million be granted at once for architectural and engineering services and that $35 million more be added later. In this way, they maintained, six months could be saved on the Army's long-term projects and one year cut from mobilization schedules.[39] The proposal was an excellent one. Unfortunately, Assistant Secretary Johnson did not act upon it.

While accepting the committee's help, Colonel Hartman was consulting men more familiar with emergency construction. During June various leaders of the old Construction Division of the Army showed up at the Munitions Building. Some came to volunteer their services, among them General "Puck" Marshall. Others came at Hartman's invitation. A telephone call to Whitson brought both him and Gunby hurrying to the Capital, where they were joined by Gabriel R. Solomon and Frank E. Lamphere, Gunby's successors in the old Engineering Branch, W. A. Rogers of Bates & Rogers, and several more who had agreed to come to help their wartime buddy, "Baldy" Hartman, get started. Though most of them were now too old for active duty, these veterans were to serve their country again, this time in a different capacity. Forming an unofficial advisory board, they were soon furnishing valuable suggestions as to how to run the program.[40]

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[37] Ltr, Hogan to ANMB, 17 Jul 40. ANMB 334 Comm Members and Min.

[38] Rpt, Constr Adv Comm ANMB to ANMB, 10 Jun 40, sub: Contract Drawings and Technical Pers. USW Files, 134 Constr.

[39] Ltr, Hogan to ANMB, 10 Jun 40. USW Files, 134 Constr.

[40] (1) Interv with Mrs. Pagan, 8 Mar 57; Gunby, 15 Aug 56; Ferdinand J. C. Dresser, 2 Apr 57. (2) H. W. Loving, History of the Construction Division, OQMG (Apr 41). Loving Papers.

Much that Hartman did or attempted to do in the late spring and early summer of 1940 reflected the World War I experience. In 1917 the Army had had to use wood stave piping. With that fact in mind, he persuaded the foundries to start casting two thousand miles of iron pipe. He did this on his own initiative and with no funds in hand. Similar moves which needed War Department backing failed. Knowing that centralized procurement had worked well before, he asked Generals Moore and Marshall to help him obtain $50,000,000 from the Reconstruction Finance Corporation (RFC) for a lumber stockpile. They turned him down. Recalling that confused and slow-moving audits had occasionally handicapped the earlier effort, he appealed to Johnson for money to develop an accounting system for fixed-fee contracts. This, too, met refusal. To obviate the overcrowding and frequent moves that had plagued the wartime division, he proposed to erect temporary offices on the parking lot behind the Munitions Building. As Gregory recalled it, General Moore just "pooh-poohed" the idea.[41] It was with this kind of help from above that Hartman set out to build an emergency organization.

Creating an Organization

The Construction Division was unequal to the task that confronted it. The organization Hartman had inherited from his predecessor was geared to the programs of the past. On the eve of the defense effort the Washington office consisted of three branches—New Construction, Real Estate, and Repairs and Utilities—and four independent sections—Legal, Administrative, Labor, and Funds and Estimates. Manning the division were 14 officers and 1,470 civilians. Field operations were under the supervision of some 75 constructing quartermasters and 8 Vicinity offices. Field employees totaled 2,921. The organization that had performed creditably for many years now required considerable strengthening. Needed were large numbers of officers—Hartman put the total at 3,500—and a host of civilians. Needed, too, was an administrative framework capable of quick expansion.[42] Recalling his struggles to bolster the Construction Division, Hartman said, "We in effect started from scratch."[43]

On 15 June he reorganized his office along the lines of the World War I division.[44] With the help of two executives, Major Nurse and Maj. Mortimer B. Birdseye, Hartman planned to direct the defense program through eleven branches, eight of which would be new. (*Chart 3*) Heading the older units were long-time members of the division: Major Violante, Construction-Lump Sum (formerly New Construction); Colonel Valliant, Real Estate; and Major White, Repairs and Utilities. Mr. Bayer was a logical choice for the Funds and Estimates assignment. To head the Legal Branch, Hartman picked Maj. Homer

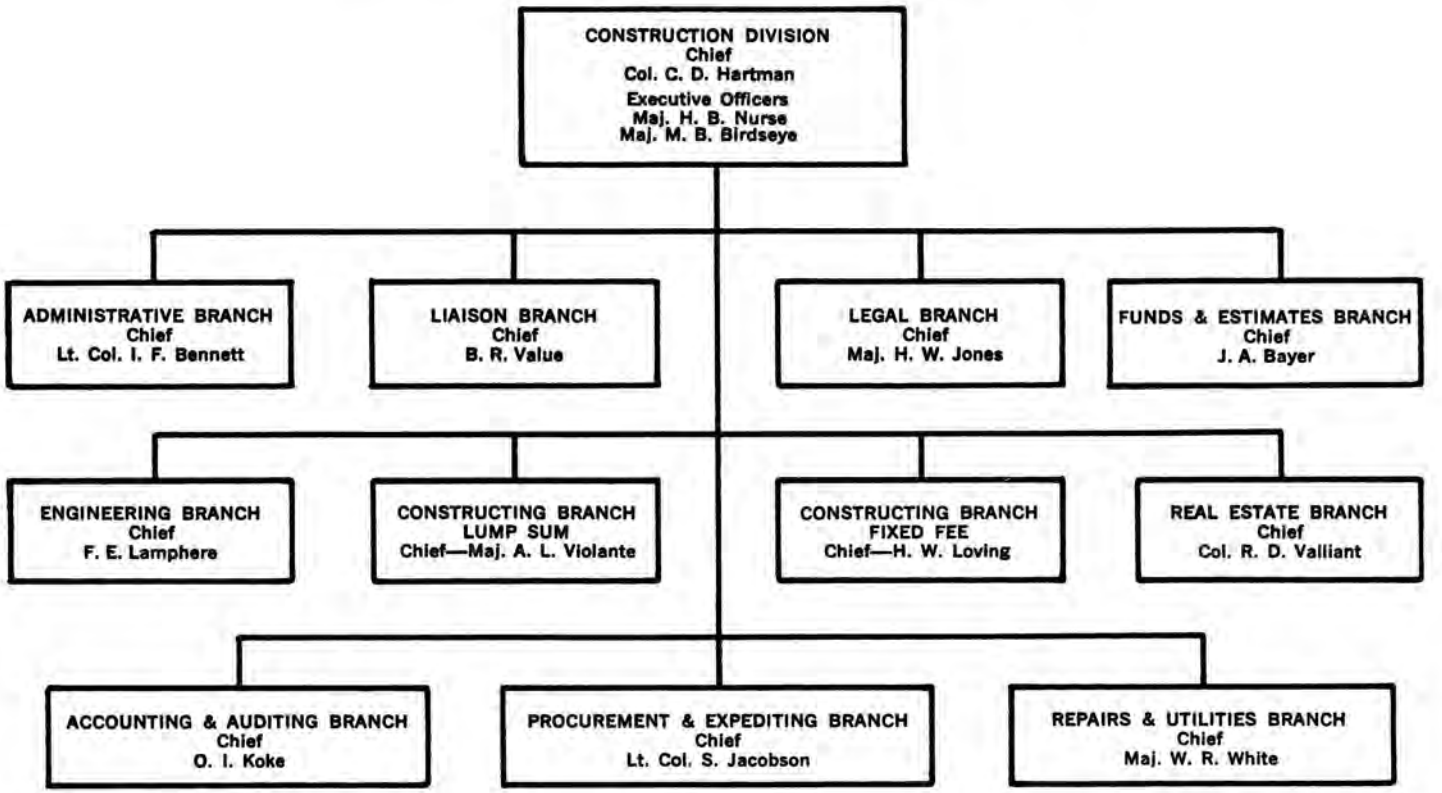
[41] (1) Statement of Gen Hartman, 5 Jul 55, pp. 6, 7–8, 18. (2) Verbatim Rpt, Meeting with Gregory and Hastings, p. 9.

[42] (1) Rpt, Constr Div to TQMG, 26 Nov 41, sub: Rpt on the Activities of the Constr Div, July 1, 1940, to November 1, 1941, pp. 90, 92. Cited hereinafter as, Rpt, Activities of Constr Div, Jul 40–Nov 41. (2) Statement of Gen Hartman, 5 Jul 55, p. 6. (3) Data prepared in EHD, List of Assignments of Constr Os.

[43] Truman Comm *Hearings*, Part 7, p. 2049.

[44] (1) Constr Div OQMG Office Order 29A, 15 Jun 40. QM 020 (Constr) 1921–40. (2) Constr Div OQMG, Orgn Chart, 7 Oct 40. EHD Files.

CHART 3—ORGANIZATION OF CONSTRUCTION DIVISION, OQMG
JUNE–NOVEMBER 1940



Source: Orgn Charts, Constr Div, OQMG, 1940. EHD Files.

W. Jones, an attorney who, after serving many years in the Quartermaster Corps, had transferred in 1939 to The Judge Advocate's Department. A veteran Quartermaster supply officer, Lt. Col. Simon Jacobson brought a wealth of purchasing know-how to the new Procurement and Expediting group. Other branch chiefs came from private life. Burnside R. Value, a distinguished consulting engineer, headed Liaison; Oscar I. Koke, a prominent C.P.A., Auditing and Accounting. Ira F. Bennett, a top engineer at Charles T. Main and a lieutenant colonel in the Quartermaster Reserve, took charge of Administrative. Mr. Lamphere, who had won high praise for his recent work on the Pennsylvania Turnpike project, returned to his old position as chief of Engineering. For the Fixed Fee post, Colonel Whitson suggested Harry W. Loving, secretary of the Carolinas Branch of the AGC, who joined the Division in July. Seven of Hartman's key assistants—Nurse, Violante, White, Jones, Koke, Bennett, and Lamphere—had served with Construction in World War I. All were experts in their fields.

An important adjunct to the division came into being in July. During June Hartman had stressed the need for a board of outstanding civilians who could, like the Starrett committee of World War I, assist in selecting firms for fixed-fee projects. Without contractors of high integrity and superior ability, the fixed-fee system would fail. Hartman insisted that applicants be judged on merit alone and that politics never be a factor. His first thought was to have either NDAC or the Hogan committee handle the work of selection. When both declined—they were not set up to do the job, they said—Hartman decided to go it alone. Early in July he formed the Construction Advisory Committee, OQMG, composed of Francis Blossom, Forrest S. Harvey, and Ferdinand J. C. Dresser. Blossom, a senior partner of the prominent New York firm of Sanderson & Porter, had received wide recognition for his work as chairman of the Board of Review of Construction in 1919. Harvey, a veteran of the Construction Division of the Army, was a civil engineer of unusually broad experience. He came to the committee from Leeds, Hill, Barnard and Jewett of Los Angeles. Dresser, director of the American Construction Council and president of the Dresser Company of Cleveland, had served as a member of the National Board for Jurisdictional Awards, the now defunct "supreme court of the building industry." He had later held important posts in PWA. Since Blossom, the most distinguished member, was approaching seventy, the chairmanship went to Harvey. On 15 July General Gregory took the committee under his wing, making it directly responsible to him, and giving it a threefold mission: to serve as a point of contact with the construction industry; to collect and analyze data relating to architectural, engineering, and construction firms; and to advise Hartman in the choice of contractors for fixed-fee projects.[45]

To carry out their emergency assignment, Hartman and his principal assistants would need a large number of experienced helpers. The Washington

[45] (1) Statement of Gen Hartman, 5 Jul 55, pp. 11–12. (2) Hartman's Testimony, 12 Aug 41. In Truman Comm *Hearings*, Part 7, pp. 2043–44. (3) Draft of Memo, ASW for ASN, 3 Jul 40. (4) Memo, Gregory for ASW, 8 Jul 40. Last two in QM 600.1 (CPFF) I. (5) OQMG Office Order 46, 15 Jul 40.



FERDINAND J. C. DRESSER



FORREST S. HARVEY

FRANCIS BLOSSOM

staff would have to double in size. By early summer dozens of jobs were waiting for engineers, architects, draftsmen, lawyers, real estate men, and consultants of various sorts. The field had countless openings. Scores of projects would soon be starting up and every one of any size had to have a constructing quartermaster along with a crew of assistants. The proposed changeover to fixed-fee contracts would create work for a host of new employees, for these agreements, unlike fixed-price, demanded meticulous government supervision. Since the Army would, in effect, be paying the contractors' bills, the Comptroller General would insist on a thorough scrutiny of all expenditures. In order to safeguard the public interest, Hartman planned to put auditors, accountants, inspectors, timekeepers, and materials checkers on Quartermaster payrolls at fixed-fee projects. Together, the home office and the field would offer jobs to some 40,000 persons in the months to come.[46] Finding so many qualified people was to be immensely difficult.

Public indifference, red tape, and failure of top officials to appreciate what he was up against hampered Hartman's efforts. The mobilization of 1940 evoked no such patriotic response as had the declaration of war in 1917. Throughout the country an atmosphere of business-as-usual prevailed. And the construction business was, at long last, beginning to boom. Since a full colonel received about $6,000 in 1940 and Civil Service pay rates were correspondingly low, men needed a strong sense of civic duty to leave prospering firms or high-salaried jobs and take service with the Constructing Quartermaster General. Some were willing to make the sacrifice. But many of those who offered to help

[46] Rpt, Activities of Constr Div, Jul 40–Nov 41, pp. 90–92.

found their way barred by rules suited rather to peacetime conditions than to a crisis that was bordering on war. The Army stuck, for the most part, to the letter of its regulations. The Civil Service Commission was slow to change its procedures. With adequate topside support, Hartman might have surmounted some of these obstacles. Such support was not forthcoming.

A drive for recruits was under way before the fall of France. Late in May Hartman summoned Major Thomas, then constructing quartermaster at Hill Field, Utah, back to Washington to help. A short time later August G. Sperl, another alumnus of the wartime division, was called down from New York. He arrived to find Major Thomas run ragged. Applications from contractors were pouring in and there was as yet no one else to handle them. The entire division was swamped with work. Reporting to Hartman, Sperl got orders to start organizing. Men were needed at once. It was up to him to get them. Assured of Hartman's backing, Sperl rounded up some more old-timers and got down to business. Hard-pressed though he was, Major Thomas found time to give advice and direction. In mid-June the call went out to professional societies, contracting firms, and colleges and universities: "Send us men." Considering the temper of the times, the response was good. During the next few weeks, some 1,600 construction men offered their services.[47]

Military custom decreed that positions of authority be held by officers. As a rule, only men in the chain of command made decisions and issued orders. That was the Army system. To keep within it would not be easy. Of the 824 Quartermaster Regulars on active duty in June 1940, barely more than 100 were experienced in construction work. The division had no Reserve of its own, and although the parent corps had a sizable one of 6,249 officers, few of them were engineers or builders. Colonel Hartman considered three methods of getting additional officers: one, obtaining Regulars from other branches of the Army; two, tapping the Reserves of other branches; and, three, commissioning men from civil life. The first held little promise. An early request to General Schley for the loan of fifty officers was refused on the grounds that the Corps of Engineers was already stretched too thin, and the Chief of Staff declined to intercede on the Quartermaster's behalf. Of the remaining possibilities, the second method offered easiest access to large numbers of officers; the third, the surest means of obtaining competent professionals.[48]

Begun in May, the quest for Reservists was at first unsuccessful. The Quartermaster General and the Assistant Chief of Staff, G–1, were unable to provide lists of Reserve officers qualified for construction assignments. Neither could the corps area commanders. Moreover, not until Congress acted, as it did four months later, could Reservists be forced to come on active duty. Drawing on his own acquaintance among construction men, Hartman lined up a number of experienced officers but then had difficulty getting them appointed. Other

[47] (1) Loving, History of the Constr Div. (2) Sperl Interv, 18 Jun 56. (3) Statement of Maj Maurice W. Cochran, QMC, 28 May 41. Opns Br Files, Confs.

[48] (1) *Report of the Secretary of War to the President, 1940*, pp. 26, 41. (2) Groves Interv, 19 Jun 56. (3) Groves Comments, IV, 2–3.

branches had prior right to many of these men, a right they were unwilling to surrender. The Adjutant General ruled that men past fifty would not be called to active service. The Surgeon General listed flat feet, false teeth, glasses, high blood pressure, and overweight as grounds for rejection. Yet because the depression years, with their crippling effect on the industry, had produced few construction specialists, most of the men who were best equipped to do the job at hand were of the older generation. To make matters worse, The Adjutant General barred members of the inactive Reserve, a group that included many outstanding professionals who had been too busy with civilian work to take time for training. Deprived of men he badly wanted, Hartman asked to have the rules relaxed. He argued that age, physical condition, and military experience had little bearing on the suitability of officers for desk jobs. Still, The Adjutant and Surgeon Generals refused to take men who might be unacquainted with military customs or who might later claim pensions and disability pay. Even when men turned up who met the War Department's requirements, it took a long time for their orders to go through. Flooded with emergency requests, The Adjutant General's Office was fast becoming an almost impassable bottleneck.[49]

On 22 June Hartman appealed to the corps areas for help. In a radiogram he asked the nine commanding generals to circularize all Reserve officers and invite those with construction experience to apply to The Quartermaster General. The plan was to have qualified Reservists called to duty not by The Adjutant General but by the corps area commanders, who would then detail or transfer the men to the Quartermaster Corps. Hartman would thus be able to get around some of the difficulties that delayed appointments by the War Department. The commanders were cooperative. Soon Sperl was working night and day poring over the papers of some 6,000 applicants. Meanwhile, Gregory persuaded Marshall to give him priority on all Reservists, regardless of branch. Hartman might now enlist any member of the active Reserve who could pass a physical examination and was willing to serve. Although a large percentage of the volunteers were not full-fledged construction men, the arrangement with the corps areas did enable the division to obtain a number of highly qualified officers whose subsequent record of performance was outstanding. It also saved valuable time that would have been lost in awaiting action by The Adjutant General.[50]

Even with the influx of Reservists, the demand for officers far exceeded the supply. In mid-July 1940 the Construction Division had 200 vacancies—10 for colonels, 50 for lieutenant colonels, 105 for majors, and 35 for captains—and 700 more openings were about to materialize. Writing to The Adjutant General on the 18th, General Gregory indicated that it might soon be necessary to commission men from civil life.

[49] (1) Memo, OQMG for TAG, 20 May 40. QM 210.312 1940. (2) Statement of Gen Hartman, 5 Jul 55, p. 7. (3) Memo, Maj Sidney P. Simpson, OASW, for ASW, 19 Sep 40. QM 022 (Constr Div). (4) Rpt, Activities of Constr Div, Jul 40–Nov 41, p. 89.

[50] (1) Ltr, Hartman to TAG, 22 Jun 40. QM 326.21. (2) Statement of Gen Hartman, 5 Jul 55, p. 17. (3) Statement of Maj Cochran, 28 May 41. (4) Ltr, Gregory to TAG, 19 Jul 40. QM 326.21.

As a matter of fact, Colonel Hartman was already moving in that direction. From among the civilians whose applications were on file he had selected sixty who were well qualified by experience and training to head construction projects. These men became the first candidates for direct commissions, many in the coveted grades of colonel and lieutenant colonel. But Hartman had reckoned without the Reserve Officers Association, which stepped in to demand that its members get preference over civilians. He had also reckoned without Stimson and Marshall, who, in contrast to their opposite numbers in the Navy Department, were reluctant to grant direct commissions.[51] "We would have a good man we wanted to commission," General Gregory related. "They would refuse to do it at the General Staff. Mr. Stimson would say that he would have to go to camp first. Then the Navy would make him a lieutenant commander right off the bat."[52] Thus, Hartman lost the services of many of the best men available.

Similar difficulties attended the hiring of civilians. Just as Army regulations limited the choice of officers, so Civil Service rules restricted employment. Wishing to preserve its usual standards of selection, the Civil Service Commission adhered closely to the customary formalities. Hartman was seeking to put through appointments in twenty-four hours. Yet one step in the Civil Service procedure took anywhere from one week to two months; another, from two weeks to three months; a third, about a fortnight. During the seemingly interminable wait, many good prospects gave up in disgust and took other jobs.[53] Equally distressing to Hartman was the commission's insistence that he draw personnel from its lists of eligibles:

> The Civil Service rosters contained many misfits who had lost their positions due to the depression [he later wrote]. A substantial number of these did not live in the Washington area. We found they did not have the money to travel to Washington for an interview and a heavy percentage were not qualified for our undertaking.[54]

An early report from Fort Ord, California, forecast trouble in the field. The constructing quartermaster at Ord had asked the local Civil Service office to furnish him with high-grade administrative and technical personnel. The registers had yielded one draftsman, one engineering aide, two clerks, and four laborers.[55]

Anticipating difficulties of this sort, Hartman had started early to make arrangements for hiring his own top-level personnel. At his request, Congress had on 2 July enacted legislation empowering the Secretary of War to "authorize the employment of supervising or construction engineers without regard to the requirements of civil-service laws, rules, or regulations."[56] Hartman hoped to get a sizable number of building experts on the payroll quickly. He intended to place some of them under

[51] (1) Ltr, Gregory to TAG, 18 Jul 40. QM 326.21. (2) Statement of Maj Cochran, 28 May 41. (3) Rpt, Activities of Constr Div, Jul 40–Nov 41, p. 89.

[52] Verbatim Rpt, Meeting with Gregory and Hastings, p. 20.

[53] (1) Ltr, Gregory to Dir of Pers WD, 26 Jun 40. QM 020 (Constr Div, etc.). (2) Memo, Hartman for Gregory, 27 Jun 40. QM 230.14 (Misc) 1940. (3) 4330 (Nat Def) Part 1.

[54] Statement of Gen Hartman, 5 Jul 55, p. 7.

[55] Ltr, CQM Ft Ord to TQMG, 25 Jul 40. QM 652 (Ft Ord) I.

[56] 54 *Stat.* 712.

bond and put them in complete charge of projects.[57] But this was not to be, for the President opposed the plan. On 9 July the White House asked Acting Secretary Johnson to tell appointing officers "that no employments should be made under this exemption until after consultation is had with the Civil Service Commission to ascertain its ability to handle the recruiting problems involved."[58] Two days later Stimson gave Gregory his orders. Hartman was not to go outside the Civil Service structure without the commission's leave. The legislation may nevertheless have served to strengthen Hartman's hand, for the Commission now displayed a somewhat greater willingness to relax its regulations. Personnel for the Washington office no longer had to come from lists of eligibles. Although employment in the field continued slow, appointments to Hartman's immediate staff began going through more rapidly.[59]

The construction ranks swelled gradually, and by August 1940 the small central office was filled to overflowing. Reinforcements were coming from all parts of the country. Many competent technicians responded to the call of old-timers like Colonel Whitson, who worked zealously to round up qualified men. Some of the newcomers persuaded friends and associates to join them, and these, in turn, persuaded others. A sizable group of experts transferred from PWA, which was going out of existence. Meanwhile, the professional societies kept a steady stream of applications coming. On the whole, the new civilians were well suited for their tasks. As a group the new officers left more to be desired. The supply of qualified Reservists had run out all too soon. Unable to obtain officers from other sources, Hartman dipped more deeply into the Reserve. With the big push in construction about to begin, he took the only expedient course accepting men who were available without quibbling over their qualifications. One of Loving's assistants afterward estimated that only four out of every ten new officers had the necessary background. This lack of experience was in part offset by training. Major Thomas established a school for Constructing Quartermasters, which Reservists had to attend before they went to the field.[60]

By late summer Hartman and his colleagues had put together a serviceable organization. In the months to come they would direct their efforts toward expanding and perfecting it.

Site Selection

As Chief of Construction, Hartman had a vital interest in the location of facilities to house, train, and supply the expanding Army. If mobilization objectives were to be met—if a citizen army were to be quickly raised, the Air Corps speedily enlarged, and a munitions industry created within a year or eighteen

[57] Statement of Gen Hartman, 5 Jul 55, p. 7.

[58] Ltr, Admin Asst to the President to Acting SW, 9 Jul 40. QM 230.14 (Policies, Precedents, etc.) 1940–42.

[59] (1) Memo, Stimson for Gregory, 11 Jul 40. (2) CSC Circ Ltr 2959, 18 Jul 40. Both in QM 230.14 (Policies, Precedents, etc.) 1940–42. (3) CSC Circ Ltr 2990, 13 Aug 40. 4330 (Nat Def) Part 1. (4) Notes of Conf in OCofS, 2 Aug 40. OCS, Misc Confs, 5 May–25 Sep 40.

[60] (1) Loving, Hist of the Constr Div. (2) Intervs with Col Elmer E. Kirkpatrick, Jr., and Mr. Gavin Hadden, 4 Apr 51; Sperl Interv, 18 Jun 56; Thomas Interv, 27 Dec 55. (3) Memo, Hartman for John J. McCloy, OASW, 2 Dec 40. QM 210.312.

months—and if the cost were not to be exorbitant, building sites must lend themselves to rapid and economical construction. Climate, terrain, vegetation, soil, subsurface conditions, and the availability of transportation, utilities, labor, and materials would to a large extent determine both the rate of progress and the final cost. And if acquisition were not to be a stumbling block, sites must be readily obtainable. Balky owners and uncertain titles would force the Quartermaster Corps to take legal action before it could get possession of the land. Even so, Hartman's role in choosing new locations was often that of a bystander.

Military considerations were of first importance in deciding where to build. Troops and planes must guard the coasts against invasion. Divisions must train in varied climates, some in the North where they could accustom themselves to the rigors of winter weather, some in the South where long summers and vast acreage made uninterrupted training and extended maneuvers possible. Pilot instruction must be carried on where weather permitted flying the year round. The munitions industry must be placed well inland, away from likely areas of attack, and plants must be located where conditions favored maximum production.

But the Army was not free to choose locations for purely military reasons. In virtually no other area of defense activity did it feel the pull of so many diverse interests. Establishment of hundreds of new military installations and transfer of large tracts of land from private to public ownership had wide significance. The War Department's choice of sites might mean financial prosperity to communities and individuals—or substantial sacrifice. Many cities entered strong bids for defense projects, while some fought desperately to keep the Army out. Nor was military site selection without political and social implications. The situation presented Senators and Representatives, as well as local officials, with an opportunity to promote the welfare of their constituents. On 31 May 1940 an Oklahoma Congressman told his fellow members of the House Appropriations Committee: "I am enthusiastically supporting the President's billion-dollar program . . . and I am going to insist that at least one of these bases be established in Oklahoma."[61] Such statements were by no means uncommon. The program also opened a way for the Roosevelt administration to spur recovery by locating plants in distressed areas.[62] The Army received many demands for special consideration which were sometimes too strong to be ignored.

Front runner in the race for sites was the Air Corps. Late in May, while Congress was considering a proposal to train 7,000 pilots a year, General Arnold submitted to the General Staff a plan for establishing three large Air Corps training centers. The first, the Southeast, was to consist of Maxwell, Barksdale, and Eglin Fields, and a new station in Alabama. The second, the Gulf Coast, was to include Randolph, Brooks, and Kelly Fields, and two new stations in Texas. The third, the West Coast, was to be made up of Moffett Field and a new station in California. The Staff

[61] H Comm on Appns, 76th Cong, 3d sess, *Hearings on Senate Amendments to Military Establishment Appropriation Bill for 1941*, p. 69.

[62] *Minutes of the NDAC*, pp. 2, 16.



BARKSDALE FIELD, LOUISIANA, IN LATE 1930's

approved the plan on 6 June, and on the 13th, the same day that funds became available, Arnold convened a site board composed entirely of air officers. After a cursory investigation, the board recommended new flying schools at the municipal airports at Montgomery, Alabama, and Stockton, California, old Ellington Field (a World War I flying field near Houston), and an unimproved site at San Angelo, Texas. They suggested placing a fifth school near Selma, Alabama.[63] Arnold promptly sent the board's report to the General Staff, where it got a mixed reception. The Air Corps had acted with great dispatch; no one questioned that. But, according to General Moore, the Staff was "somewhat embarrassed by the lack of detail furnished." While advising Marshall to accept the board's selections, the G–4 warned: "A great deal of basic information had to be taken for granted in the hurry to institute these projects. The system followed is eventually certain to result in the selection of some localities which may be regretted at a later date." On 3 July Moore and Marshall agreed that sites for Air Corps projects should be picked by War Department boards, appointed by the General Staff.[64]

By this time Arnold had formed

[63] (1) 1st Ind, 28 May 40, on DS, Moore for Arnold, 24 May 40. G–4/30552–4. (2) Craven and Cate, *Men and Planes*, pp. 131–32.

[64] Memo, Moore for Marshall, 28 Jun 40, and Concurrence thereon. AG 580 (7–12–40) (1) Sec I (Misc).

another board to select locations for the tactical units to be pulled out of Maxwell, Barksdale, and Moffett Fields and for the additional combat groups authorized by the supplemental appropriation of 26 June. The Air Corps board was short-lived. On 12 July General Moore named three War Department site boards, one for the East, one for the South, and one for the Pacific coast. Each had a Quartermaster representative and an airman along with a General Staff officer who served as president. Barely a week passed before the boards were out inspecting municipal airports. Acting on instructions from G–4, the members checked each place to see what technical facilities, what utilities, and how many acres of land were available and what additional construction would be necessary. They also noted the distance to population centers and surveyed housing, recreation, and public transportation facilities. Finally, they ascertained whether the field could be leased and on what terms.[65]

Finding fields for the Air Corps proved to be a relatively simple task. News that the War Department planned to develop civil airports brought an enthusiastic response from hundreds of cities. The site boards were warmly received everywhere they went. Most of the cities they visited offered to lease municipal fields for one dollar a year and to extend water and power lines. Many pledged land adjacent to the airports. Some went still further. The city of Albuquerque promised to build two new runways. Manchester, New Hampshire, and Spokane, Washington, promised to improve their fields. Fort Wayne, Indiana, agreed to sponsor a housing project for officers and their families. With so many inviting prospects, the boards had little trouble filling their quotas. During the first week in August they recommended no fewer than six sites to the War Department. Even so, General Arnold was sharply critical of their progress. Displaying characteristic impatience, he began early in August to demand more speed. On the 6th The Adjutant General wired the boards to expedite their work, but when Arnold continued to complain, G–4 countered with the allegation that such lags as were occurring could be traced to the Air Corps itself.[66] Lt. Col. Vincent Meyer, the Acting Assistant Chief of Staff, G–4, writing to General Moore, who had recently become Marshall's Deputy, explained:

> The greatest delay in all of this procedure of getting out the construction orders for the Air Corps stations is the inability of G–4 to get accurate data as to what units are going where. . . . it has been necessary to change every program that we have so far issued that relates to the Air Corps . . . , because of inaccurate or inadequate information from the office of the Chief of the Air Corps.[67]

Arnold's protests thus served not only to put more pressure on the boards but also to spotlight bottlenecks in his own office. By 17 August the Air Corps and the General Staff had agreed on a tentative station list, and in mid-September

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[65] (1) Craven and Cate, *Men and Planes*, p. 134. (2) Memo, Moore for TAG, 12 Jul 40. G–4/31809. (3) Memo, G–3 for TAG, 15 Jul 40. AG 580 (7–12–40) (1) Sec I (Misc).

[66] (1) See 686 Part 1 for the following fields: Kirkland, Geiger, Grenier, Baer, Gowen, Harding, Paine, and Morris. (2) G–4/31809.

[67] Memo, Meyer for Moore, 8 Aug 40. G–4/31809.

directives went out for construction at twenty-four fields.[68] By selecting municipal airports, the Army had saved considerable time and expense and, at the same time, satisfied demands of twenty-four cities for defense projects. It had also avoided the multiplicity of problems that attended the location of facilities which were to be built from the ground up.

Of the thirty-five manufacturing plants in the first industrial program, all but six were to be on new sites. Thus the War Department had to find twenty-nine tracts for its munitions projects.[69] The Army's industrial services, principally Ordnance and Chemical Warfare, had long been studying problems of plant location and knew in general where they wanted to put new production and what factors they wished to consider in picking individual sites. The Ordnance Department had in 1938 and 1939 actually chosen sites for two smokeless powder plants, one near Charlestown, Indiana, the other, at Radford, Virginia. Also exemplifying this type of planning were surveys conducted by the Chemical Warfare Service, seeking inland locations for manufacturing war chemicals and equipment. But selection of plant sites was not left to the using services alone. Final decision in every case awaited concurrence of other interested parties, the President, the NDAC, the Assistant Secretary of War, and the industrialists who would run the plants.[70]

As plans matured for a government-owned, privately operated munitions industry, the question—where to build—required a definite answer. On 25 June Acting Secretary Johnson appointed a 6-man War Department Site Committee. Three of its members, including the chairman, Col. Harry K. Rutherford, director of the Planning Branch, OASW, were Ordnance officers. A representative of the Air Corps, a General Staff officer, and Colonel Hartman completed the membership. Johnson asked the committee to establish criteria for choosing plant sites. His instructions were: disperse plants so that an attack will not seriously cripple production; keep out of highly developed industrial areas; and pay close attention to the technical, production, and transportation requirements of individual plants.[71] Rutherford and his colleagues promptly set to work.

Within two weeks they had drawn the boundaries of the new munitions industry. As long ago as 1915 the War College Division of the General Staff had recommended that "as a general military principle, no supply depot, arsenal, or manufacturing plant of any considerable size . . . should be established or maintained east of the Appalachian Mountains, west of the

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[68] (1) Craven and Cate, *Men and Planes*, pp. 134–35. (2) 686–K. (3) G–4/30552–4.

[69] Based on Constr Div OQMG, Constr Progress Rpt 15, 9 Apr 41, pp. 72–73, 78. EHD Files. Issued periodically, Construction Progress Reports are cited hereinafter as Constr PR's.

[70] (1) Compl Rpt, Indiana OW, 6 Nov 42, pp. 15, 5. EHD Files. (2) Memo, OASW for Moore, 1 Apr 40. G–4/30552 1939–40. (3) H Comm on Appns, 75th Cong, 3d sess, *Hearings on Military Establishment Appropriation Bill, 1939*, p. 385. (4) Memo, OCofOrd for OUSW, 26 May 41. USW Files, Legis—H and S Investigating Comm 1.

[71] Ltr, Johnson to Rutherford, 25 Jun 40. EHD Files.

Cascade or Sierra Nevada Mountains, nor within 200 miles of our Canadian or Mexican borders."[72] As the range of aircraft increased, the need for such a policy became strikingly apparent. The Rutherford group agreed that plants must be located between the Appalachians and the Rockies within a zone roughly two hundred miles from the nation's borders. Networks of related factories were to be placed in five general areas within the eastern portion of this zone. (*Map 1*) The committee planned a well-integrated industry centered in the Middle West. Turning to the matter of specific locations, it urged careful study of conditions which might affect construction and maintenance. Rutherford left the initial choice of sites to the using services; he nevertheless reserved the right to veto their selections.[73]

Ordnance, as the service sponsoring the largest number of new plants, was responsible for selecting most of the sites. Its primary aim was greatest production at lowest cost. Rutherford's committee furnished site investigators with a checklist including, among other points, the availability of water, power, fuel, transportation, labor, and materials.[74] General Wesson and his assistants did not rely entirely on their own judgment but continued the long-established practice of consulting such firms as DuPont and Hercules. These companies, as well as others chosen to be operators, played a large part in deciding where to locate the new plants. Indeed, one Ordnance officer said that his department "never selected a site" without the assent of the operator.[75] Both Ordnance and industry believed that quantity production could be achieved most quickly if plants were near centers of industrial activity. As Brig. Gen. Charles T. Harris, Jr., chief of the Ordnance Industrial Service, put it, "The general consideration was to locate the plants conforming to the . . . pattern of existing industry."[76]

The course taken by Ordnance ran counter to the aims of the President's Advisory Commission. Ralph Budd and Chester C. Davis, the advisers on transportation and farm products, fought for a decentralized munitions industry in order to balance regional economic development and help nonindustrial areas in the South and West. Sidney Hillman, who hoped to create more jobs in depressed areas, often joined forces with Davis and Budd. These men found their efforts balked by the War Department's insistence on speed. Because requests for approval of sites were generally coupled with warnings that delay would endanger national security, the NDAC felt obliged to do what the Army asked. Not until December did the commission take a firmer stand. Then it served notice that it would "not . . . accept in the future the arguments of speed and pressure as the

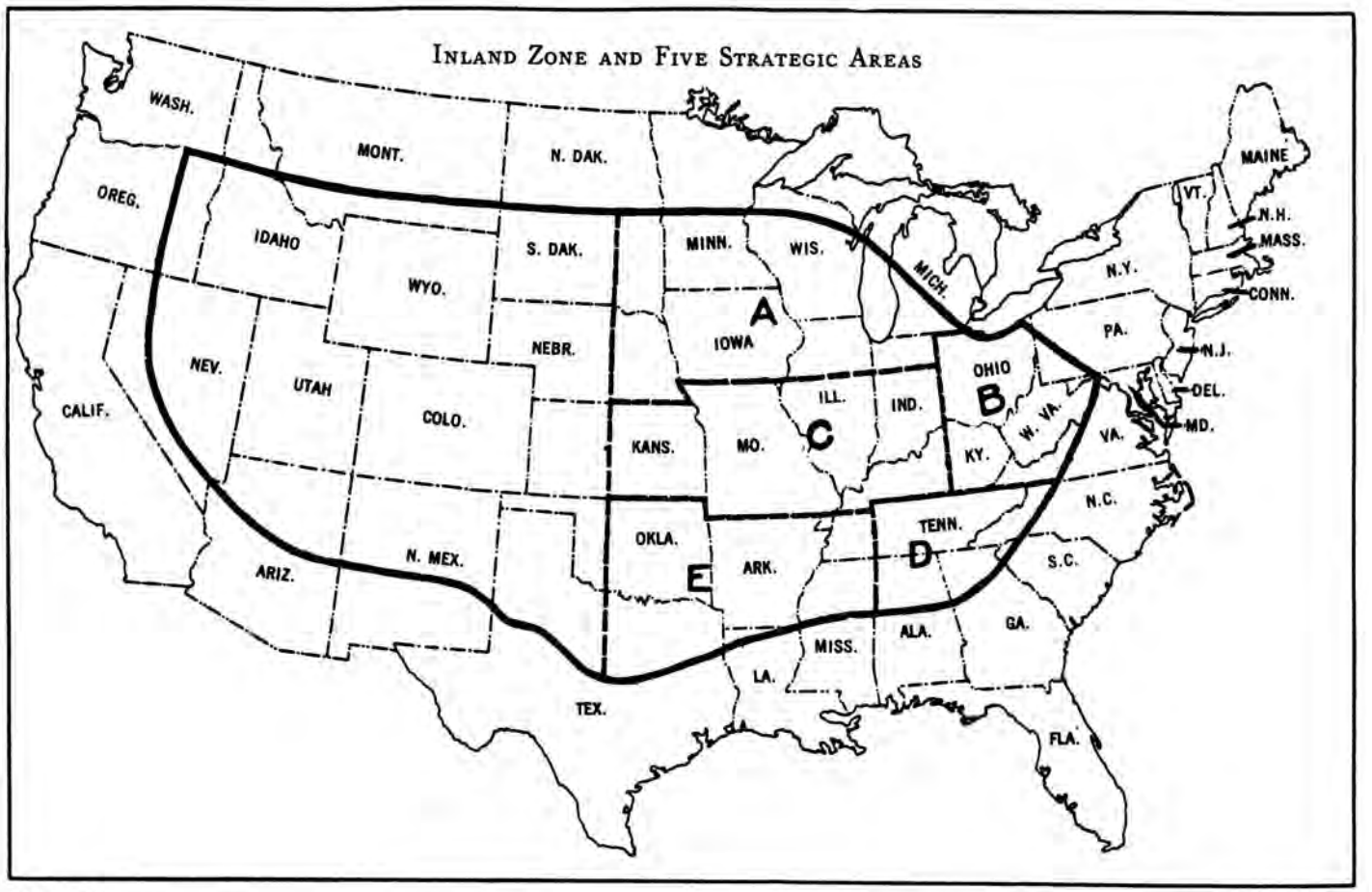
[72] Rpt, War College Div to SW, 11 Sep 15, p. 60. Quoted in S Comm on Mil Affs, 76th Cong, 1st sess, *Hearings* on H R 3791, p. 28.

[73] (1) Memo, with Incls, WD Site Comm for Johnson, 8 Jul 40. EHD Files. (2) For a detailed discussion of the role of strategy in site selection, see the excellent article by Edgar M. Hoover, Jr., and Glenn E. McLaughlin, "Strategic Factors in Plant Location," *Harvard Business Review*, Winter 1942, pp. 133–40.

[74] Memo, Rutherford for Wesson, 22 Jul 40. EHD Files.

[75] Min of Mtg in Gen Harris' Office, 12 Feb 41, p. 15. USW Files, 185.6 (Mun OP Comm).

[76] Memo, Harris *et al.* for USW, 12 Feb 41. Madigan Files, 101.6 (Gen Corresp).


INLAND ZONE AND FIVE STRATEGIC AREAS
WASH.
OREG.
CALIF.
IDAHO
NEV.
MONT.
WYO.
UTAH
ARIZ.
COLO.
N. MEX.
N. DAK.
S. DAK.
NEBR.
KANS.
OKLA.
TEX.
MINN.
IOWA
MO.
ARK.
LA.
WIS.
ILL.
MICH.
IND.
OHIO
KY.
TENN.
MISS.
ALA.
GA.
FLA.
S.C.
N.C.
VA.
W. VA.
PA.
N.Y.
MAINE
VT.
N.H.
MASS.
CONN.
R.I.
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MAP 1

controlling reasons for approving plant sites."[77] The commission acted too late. By December sites for nearly all the early munitions projects had been chosen.

The War Department's refusal to adopt the Advisory Commission's views left the using services in control. Production and transportation thus became the decisive factors in the location of industrial projects. The early ammonia plants, Morgantown and Ohio River, were near the coal fields of West Virginia and Kentucky, where coke, the key ingredient, was readily available. Since oleum was the chief component of TNT, the first plants for the manufacture of that explosive, Kankakee, Weldon Spring, and Plum Brook, were near the heavy acid industries of Chicago, St. Louis, and Cleveland. Smokeless powder factories, which required large quantities of water, were alongside rivers. Radford was on the New River, the Alabama Ordnance Works was on the Coosa, and the Indiana plant was on the Ohio. The location of TNT and powder factories determined the location of loading plants. For example, Elwood, a shell loader, adjoined Kankakee, and New River, a bag loader, was seven miles from Radford. Because a good deal of manpower would be needed in their operation, the original small arms ammunition plants were put just outside St. Louis, Kansas City, and Denver. In locating several types of facilities, safety was a vital consideration. Units for making, loading, and storing explosives had to be dispersed over large tracts so that an explosion would not trigger a chain reaction. Hence, the Ravenna shell loading plant required over 22,200 acres and Kankakee, 21,000.[78]

Despite the fact that the Quartermaster Corps played no major role in selecting industrial sites, places picked by the using services generally met construction standards reasonably well. There were engineering problems, to be sure. Subsurface rock and poor natural drainage threatened to complicate the building of the Indiana Ordnance Works. Unfavorable terrain spelled trouble ahead at the New River bag loading plant. The difficulty of removing three large pipelines that ran beneath the Kankakee-Elwood tract caused General Harris to remark that the Joliet, Illinois, site was "the greatest mistake we made."[79] Yet, serious errors were relatively few. Level, well-drained sites, having access to adequate labor and transportation, were essential to both builder and user. Because the new munitions industry would be centered in the rich Midwestern agricultural and manufacturing region, most of the Quartermaster's troubles were in acquiring the land rather than in building on it.

Just as Ordnance and Chemical Warfare decided questions of plant location, so the General Staff controlled the choice of camp sites. In the late spring of 1940, as plans went forward for mobilization, the Staff considered how to group and where to train a force of 1,200,000 men. General Marshall de-

[77] *Minutes of the NDAC*, pp. 38, 49, 2, 112, 122.

[78] (1) Gustavus G. Williamson, Jr., Industrial Site Selection (MS), pp. 6–24. EHD Files. (2) Constr Div OQMG, *Real Estate Branch Progress Report*, 21 Jul 41, pp. 15–16. Issued periodically, Real Estate Branch Progress Reports are cited hereinafter as Real Estate PR's. EHD Files.

[79] Min of Mtg in Gen Harris' Office, 12 Feb 41, p. 12.

cided to set up divisional camps and cantonments and to build a network of reception and training centers. Troops would be trained in all nine corps areas, and divisions would be placed so that they could readily form corps and armies. Adhering closely to the Protective Mobilization Plan, Marshall proposed to save time and money by expanding old posts before establishing new ones and, if additional stations were needed, to build on federal- and state-owned land. Having affirmed this policy, he left the rest to G–3 and G–4. Responsible for molding draftees, Guardsmen, and Regulars into an effective fighting force, Brig. Gen. Frank M. Andrews, the Assistant Chief of Staff, G–3, was interested primarily in sites that offered training advantages. Such features as large acreage, varied terrain, streams for bridging exercises, and observation points for artillery practice were high on his list of requirements. It was G–4's prerogative to veto any site that was unacceptable from the constructor's standpoint. General Moore reviewed Andrews' selections until early August, when another Engineer officer, Col. Eugene Reybold, took over the G–4 post.[80]

Deciding where to concentrate the Regular Army divisions and where to build the reception centers was relatively easy. General Andrews planned to apportion the nine Regular Infantry divisions among the four existing armies and to pick the best available places for training the two Cavalry and two new Armored divisions. The big permanent posts—Fort Bragg, North Carolina, with 122,000 acres, Fort Benning, Georgia, with nearly 98,000, Fort Lewis, Washington, with 62,500, and Fort Knox, Kentucky, with 33,500—were obvious choices as sites for the Regulars. Also selected as a matter of course were Fort Jackson, South Carolina, Fort Riley, Kansas, and Fort Ord, California, each of which possessed some 20,000 acres and well-developed transportation and utilities systems. Fort Devens, Massachusetts, Fort Houston, Texas, and Fort Custer, Michigan—posts which held divisions in World War I and had since shrunk, but which could again expand—were also earmarked for the Regulars, as was Fort Bliss, a small station in western Texas with practically unlimited room for growth. Only one new reservation, a 40,000-acre tract near Leon, Iowa, which Congress had approved for acquisition in 1936, figured in plans for the Regular divisions.[81] Locating reception centers for inductees was an even less complicated task. "We must have a certain amount of distribution for these reception centers," one member of the General Staff explained. "We can't ship these men long distances to . . . their processing, because some may be rejected and have to be sent home."[82] But because the reception centers were small—the largest was to

[80] (1) Memo, Moore for Marshall, 28 May 40. G–4/31753. (2) G–4/31735. (3) Testimony of Brig Gen Harry A. Twaddle, G–3, 22, 23 Apr 41. In Truman Comm *Hearings*, Part 1, pp. 191–93, 197, 210–12.

[81] (1) Notes of Conf in ODCofS, 5 Jul 40. OCS, Notes of Confs to 26 Sep 40. (2) G–4/32439. (3) Memo, Hartman for Moore, 24 Jun 40. QM 652 (PMP). (4) Rpt, Activities of Constr Div, Jul 40–Nov 41, pp. 168, 146, 155, 145. (5) Real Estate PR 38, 15 Nov 41, pp. 64, 30, 52. EHD Files. (6) Proceedings, Bd of Officers on Land Acquisition, Seventh Corps Area, 2 Aug 40. QM 601.1 (7th CA).

[82] Gen Twaddle's Testimony, 23 Apr 41. In Truman Comm *Hearings*, Part 1, p. 217.

hold only 3,000 men—Andrews had no trouble finding spots for them at posts throughout the country.[83]

Only when he had to choose sites for National Guard camps and for unit and replacement training centers did the G–3 run into real difficulty. Stations for the Guardsmen and centers for trainees had been selected several years before. Attached to the Protective Mobilization Plan was a list of places where the eighteen National Guard divisions would assemble upon the outbreak of war. Some of the Guardsmen were to go to big reservations like Benning and Lewis, but since posts of that size were too few even for the Regulars, the General Staff had been forced to fall back on smaller forts, summer training grounds belonging to the States, and sites used in 1917. The planners had thought of these places as concentration points where troops would spend thirty to sixty days in preparation for shipment overseas, not as camps where divisions would train for one year. Also annexed to the PMP was a blueprint for a system of training centers, but these facilities, like the camps, were designed to meet a war situation in which units and replacements would move rapidly to the fighting front.[84] That numerous shifts in location became necessary was an early sign of weakness in the mobilization plans.

Construction men were the first to challenge the sites named in the PMP. On 20 May, after conferring with the Chief of Staff, General Moore sent Hartman the list of stations for the Guard together with a questionnaire. Moore wished to know what utilities there were at each location, where tents would serve, where barracks would be necessary, and how much it would cost to house the divisions. An authoritative answer would require on-the-spot surveying, and Hartman had no money for that. The most that he could do was to compile data on hand in his office and in the National Guard Bureau. Even this meager information indicated that some of the places were unfit not only for construction but for training as well.[85] Meantime, Capt. Leslie R. Groves, an Engineer officer attached to G–3, had raised objections to the PMP list. On 12 June he wrote and General Andrews signed a memorandum asking G–4 if the stations in the plan were "in such a state as to permit full use in the contemplated manner by the scheduled time."[86] Hartman, replying to Moore's questionnaire on 24 June, also stressed the need for thoroughgoing site investigations. At least six of the proposed locations were likely to cause trouble, he warned. Camp Blanding, Florida, was wooded and probably swampy. Fort Eustis, Virginia, abounded in marshes and streams. Fort Huachuca, Arizona, was too hilly for motorized units. Camps San Luis Obispo, California, and Hulen, Texas, were too small to train divisions. Fort Clark, a second Texas post, was ten miles from the nearest railroad. Information on some of the other Guard camps was so sketchy that Hartman

[83] Constr PR 15, 9 Apr 41, pp. 24–27.

[84] (1) War Dept, Protective Mobilization Plan, 1939, and Annex 2. AG 381 (10–31–38) (Misc) C–M. (2) Gen Twaddle's Testimony, 22, 23 Apr 41. In Truman Comm *Hearings*, Part 1, pp. 189–91, 218–19.

[85] (1) Notes of Conf in OCofS, 20 May 40. OCS, Misc Confs, 20 May–25 Sep 40. (2) Memo, Moore for TQMG, 20 May 40. G–4/31735 Sec 1.

[86] Memo, Andrews for Moore, 12 Jun 40. Opns Br Files, Camp Sites.

did not know what to expect. He urged Moore to take the only practical course, to run an "actual physical survey and study on the ground of the sites under consideration."[87]

Moore had the sites surveyed but not by the Construction Division. To Hartman's astonishment, the assignment went to the corps area commanders. Quartermaster protests were in vain. "I had never considered the Corps Area Commanders as being responsible for any of the work until I received a peremptory order to permit them to select the sites for the camps . . . . I did not believe it was the intention of the War Department until General Moore insisted that it be done," Hartman wrote.[88] What followed confirmed his misgivings. One commander completed the "investigation" of a site nearly 500 miles from his headquarters twenty-four hours after the War Department asked for a report. Other commanders sent staff officers or went themselves to take the lay of the land. Several, adopting more formal methods, convened site boards. In no case was much attention paid to construction factors. Even when Quartermaster and Engineer officers visited the sites, their examinations were necessarily perfunctory, since no time was available for detailed surveys and tests. The corps area reports seldom mentioned engineering features. A number of sites were rejected but not because they would be difficult to build on.[89]

When authority was decentralized, the political pot began to boil. Corps area people were more sympathetic to local problems and more easily approached than that remote and impersonal entity, the War Department. Businessmen, politicians, Guardsmen, and others who sought to influence the choice of camp sites now besieged corps area headquarters. Though some of the petitioners were disappointed, a number got what they wanted. When the Chamber of Commerce of Brownwood, Texas, offered to lease a sizable tract at a nominal rent and to provide water, electricity, and natural gas at low rates, the Army, on the advice of Eighth Corps Area headquarters, accepted. Local interest groups likewise succeeded in bringing projects to Spartanburg, South Carolina, Macon, Georgia, and Chattanooga, Tennessee. In some localities, Guard commanders were also influential. Illustrative of the part they played is the case of Camp Blanding. In 1939 Brig. Gen. Vivian B. Collins, adjutant general of Florida, had chosen a 27,000-acre tract in Clay County to replace Camp Foster, a Guard reservation transferred to the Navy. Situated on Kingsley Lake and lush with palmettos, oaks, and vines, the place was a landscape architect's dream. The climate was salubrious. Nearby was a 66,000-acre ranch, available for lease. Envisioning a splendid camp, Collins late in 1939 began to develop the site. An enthusiastic supporter of the project was Lt. Gen. Stanley D. Embick, commander of the Fourth Corps Area. Named for the Floridian who headed the National Guard Bureau, Camp Blanding soon found a place on the PMP list. When in June 1940 construction men began to talk of swamps and timber, Generals Moore and Andrews flew to Atlanta to consult General Embick, who assured them that Blanding

[87] Memo, Hartman for Moore, 24 Jun 40. QM 652 (PMP).

[88] Statement of Gen Hartman, 5 Jul 55, p. 3.

[89] (1) AG 680.1 (7-11-40) (1) Sec 2. (2) Memo and Incls, Opns Br for Chief Constr Div, 12 Apr 41. Opns Br Files, Misc Papers.

would make a superb division camp. A visit to the site dissolved any lingering doubts they may have had. Further protests from the Quartermaster Corps were unavailing. The Blanding episode was not unique. The story of San Luis Obispo followed much the same outline, and the fine hand of the state adjutants was elsewhere visible.[90] From the sidelines Hartman watched, dismayed, while corps area commanders demonstrated what he regarded as "their lack of understanding and their lack of ability to select a proper camp site."[91]

As reports came in from the corps area commanders, General Andrews revised the list of Guard camps again and again. With the discovery that Fort Eustis had no adequate maneuver area, plans for sending a division there went by the board. Terrain unsuitable for training ruled out Camp Hulen. Their isolation eliminated Forts Clark and Huachuca. Other changes originated not in the corps areas but in Washington. Plans for stationing Guardsmen at Knox and Benning fell by the way when Andrews assigned those posts to the newly created Armored Force. At the request of General Strong, who as head of WPD had care of the Army's strategic deployment, G–3 substituted sites in New Jersey, Pennsylvania, and Massachusetts for locations in Georgia, Louisiana, and South Carolina. Pressure for a camp in the vicinity of the Capital caused Andrews to shift the 29th Division from the Sabine River area of Louisiana to Fort Meade, Maryland. Of the seventeen preferred sites named in PMP only seven remained by late July. On the 31st General Marshall approved the revised list of National Guard camps.[92] This was the first of many such lists that he was to accept before the Construction Division gained a voice in selection.

Viewed purely from a military angle, the ground forces sites were well chosen. While stations would be scattered through some thirty states, most of the training would be in the South. Geographic distribution of the division posts matched General Andrews' requirements and General Strong's as well. Clusters of camps and cantonments reflected the G–3 plan to organize and train nine corps under the existing armies. The heaviest troop concentrations would be in the eastern portion of the country, where in 1940 the danger of attack seemed greatest; yet no corner of the United States would be without protection. Reception centers were conveniently placed to funnel recruits from populous areas to training establishments. Most of the unit and replacement training centers likewise appeared to be ideally located. Some, like the Signal center at Fort Monmouth and the Engineer center at Fort Belvoir, were at the long-time homes of their branches and services, where excellent facilities were already available. Others, like the Field Artillery post at Fort Ethan Allen, in the hills of western Vermont, and the Coast Artillery station at Camp Davis, in the Onslow Bay area of North

[90] (1) G–4/31375 Secs 1, 2. (2) QM 652 vol I for Camps Bowie, Croft, and Blanding. (3) OCS 14586–16. (4) AG 680.1 (7–11–40) (1) Sec 2. (5) Summary prepared by Constr Div (Mar 41), sub: Events Leading Up to the Use of Camp Blanding. Opns Br Files, Misc Papers. (6) G–4/32267–8.

[91] Statement of Gen Hartman, 5 Jul 55, p. 9.

[92] (1) G–4/31375. (2) Memo and Incls, Opns Br for Chief Constr Div, 12 Apr 41. Opns Br Files, Misc Papers. (3) Gen Twaddle's Testimony, 22 Apr 41. In Truman Comm *Hearings*, Part 1, pp. 190–91. (4) Memo, Strong for Andrews, 15 Jul 40. (5) Incl with Memo, Andrews for Marshall, 30 Jul 40. Last two in G–4/31948.



EXCAVATION AT FORT DEVENS, MASSACHUSETTS

Carolina, were highly suitable for specialist training.

That a number of these sites would be hellishly difficult to build on was soon unmistakably clear. Preliminary reports from the field were full of complaints from construction men. On a trip to Florida in early August, Colonel Reybold and Major Groves, now a member of Gregory's staff, were alarmed at Blanding's poor topography. A short time later, surveyors found that portions of the Blanding site were twenty-four feet below the level of Kingsley Lake. Word from Quartermaster officers in California confirmed Hartman's suspicions that San Luis Obispo was too small for a war-strength division. More disturbing was their discovery that a stream which furnished water to the few thousand Guardsmen who camped there every summer was inadequate for 20,000 men the year round. News from some other projects was almost equally as black. The terrain at Devens was rugged, and beds of rock lay just beneath the sandy surface. Camp Davis was partly bog. A heavy stand of hardwood timber covered the site of Camp Forrest, Tennessee. Hilly ground at the Spartanburg tract, the future Camp Croft, made extensive grading there inevitable. Prospects at several more locations were far from promising. By the time the heads of the War Department realized how troublesome construction at many of these places was to be,

the opportunity for corrective action had passed.[93] Only once did the General Staff abandon a site, and then it did so reluctantly and only after engineers had demonstrated that building costs would be prohibitive.[94]

In August 1941 Hartman told a Senate investigating committee, "I never knew until the directive came to me where [a] camp was to be."[95] What was true of camps was essentially true of other projects. But if higher-ups in the War Department did not feel the need for Hartman's help in selecting sites, they nevertheless held him accountable for the speed and cost of construction.

Mounting Pressure

While others chose building sites, Hartman tried to keep abreast of a large and growing program. By early summer construction was in full swing at most of the air bases and depots begun the year before, and new work was starting to flow in. During June directives for some forty jobs totaled over $24 million. Seventy directives, carrying well over $22 million in construction funds, appeared in July. In a steady stream they came—orders to begin two dozen Air training and tactical stations, orders to expand Springfield Armory and Picatinny and Edgewood Arsenals, orders to expand the bomb loading plant at the Savanna Ordnance Depot, orders to put in more barracks at coastal forts, orders to boost the storage capacity at four large depots, orders to house the increase in the Regular Army, orders to build five 1,000-man and five 500-man reception centers, and orders to provide facilities which would enable Regular peace-strength divisions to concentrate at nine permanent stations. All this was merely the beginning. By mid-July Quartermaster officers were thinking in terms of a one and one-half billion dollar program.[96]

By translating the early directives quickly into going projects, Hartman hoped to stay ahead of the game. With the first emergency orders, the drive was on. A new sense of urgency gripped the Construction Division. The staff went on a two-shift basis. The office stayed open seven days a week.[97] Pressure on the field increased, as Hartman, still enjoined from fixed-fee contracting, tried other means of stepping up production. Constructing Quartermasters began receiving "pep letters" from Washington. "The necessity for completing this work at the earliest possible date is most essential," read one broadside from Major Violante, "and necessary steps will be taken to expedite construction in every way. This cannot be too strongly emphasized."[98] For the first time in many years, project heads were free to make important changes in standard plans and to substitute locally available materials for those in the specifications. Where sites had been chosen,

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[93] (1) Memo, Groves for Gregory, 12 Aug 40. Opns Br Files, Rpts of Insp, Div Comments on. (2) G–4/32267–8. (3) QM 671 (San Luis Obispo) I. (4) QM 600.94 (Cp Devens). (5) QM 333.1 (Cp Davis). (6) QM 333.1 (Cp Forrest) I. (7) QM 652 (Cp Croft) I.

[94] For a detailed discussion of this case, see below, p. 207.

[95] Truman Committee *Hearings*, Part 7, p. 2048.

[96] (1) Constr Div OQMG, List of Directives, 15 Mar 41. (2) List, Constr Div OQMG, 30 Sep 41, sub: Status of AC Projects at Time of Transfer to CE. Both in EHD Files. (3) Ltr, Gregory to TAG, 19 Jul 40. QM 326.21.

[97] Thomas Interv, 27 Dec 55; Sperl Interv, 18 Jun 56.

[98] Ltr, Lump Sum Br to CQM Holabird QM Depot, Baltimore, Md., 10 Jul 40. QM 652 (Ft Meade) I; and similar letters in QM 652 for various projects.



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layouts approved, and detailed plans completed in good time, work usually got off to a flying start. But where, as was often the case, these conditions did not obtain, there were hitches and delays. One Constructing Quartermaster, unable to advertise for bids because the corps area was holding up the layout and unable to begin work by purchase and hire because there was a labor shortage in his district, summed up his predicament and that of many of his fellows when he wrote, "It is very difficult to accomplish *wartime orders* with *peacetime restrictions*."[99] The solution, he suggested on 26 July, was to do the job by fixed-fee contract.[100]

Although the fixed-fee law had been on the books for nearly a month, it had yet to be invoked. Within the War Department, opposition to the CPFF contract was still strong. On 2 July, the day the President signed the bill, Johnson passed the word—use competitive methods wherever possible.[101] He permitted negotiation only where it was "essential to expedite the accomplishment of the defense program." Every negotiated lump sum contract amounting to $500,000 or more and every fixed-fee, regardless of size, had to have his approval.[102] Judge Robert P. Patterson, who succeeded Johnson late in July, reaffirmed this policy. Shortly after taking office, he came out against a "general departure from firm-price contracts for construction."[103] No arguments in favor of a change were offered by General Gregory, who made it clear he wanted no contractual innovations.[104] Even among Hartman's own officers there were some inveterate opponents of the fixed-fee agreement.[105] Nor were all groups within the industry ready to accept the so-called "contract of big business."

A comment in the June 13 issue of the *Engineering News-Record* called forth excited protests from the "little man." In an article hailing the return of the fixed-fee contract, the editors remarked, "It is admitted that the negotiation procedure is likely to result in restricting most of the defense construction to a comparatively small number of larger contractors—unless Congress should provide for a great deal more construction

[99] Ltr, CQM Ft Ord to TQMG, 25 Jul 40. QM 652 (Ft Ord) I.

[100] TWX, CQM Ft Ord to TQMG, 26 Jul 40. QM 652 (Ft Ord) I.

[101] Memo, Actg SW for TQMG *et al.*, 2 Jul 40. QM 160 Part 1.

[102] Memo, OASW for TQMG *et al.*, 2 Jul 40. QM 160 Part 1.

[103] Memo, Patterson for Gregory, 5 Aug 40. QM 400.13 (Mun Program–FY 1941).

[104] Memo, OQMG Adm Div for Constr Div, 6 Jul 40. QM 400.13 (Without Advertising) 1940–42.

[105] Thomas Interv, 27 Dec 55.

than it has so far."[106] The magazine was scarcely out before small contractors were appealing to their congressmen for help. On the 17th a member of the House Ways and Means Committee brought the article to Woodring's attention. Terming an alliance with big business "unwise" and "inequitable," he urged that smaller firms be given an important part in the defense effort.[107] The *News-Record* attempted to set matters straight. Its next issue carried the statement:

> The new defense legislation extends the authority of both Army and Navy to use negotiated contracts in the continental United States. It thus is clear that the large majority of government contract work will be on this basis. Whether only the large contracting firms will benefit remains to be seen. However, as work increases in volume it seems reasonable that the smaller firms will get their chance, and even before that some of them no doubt will be given subcontracts by the large companies successful in getting negotiated jobs.[108]

By this time small contractors were closing ranks.

The heating, plumbing, and electrical contractors were particularly concerned. Comprising an important segment of the industry, these specialty firms normally received a portion of every building contract. Through agreements with trade unions and materialmen, they had long ago established subletting of their specialties as standard construction practice. Under fixed-price contracts, this system was profitable all the way around. Specialty firms usually managed to do the work cheaper than anybody else. General contractors saved on overhead, since they did not have to maintain organization and equipment for all types of construction. With fixed-fee contracts, the story was likely to be different. Here the extent of subcontracting helped determine the size of the fee. Principal contractors benefited by subletting as little work as possible. The Navy had been using fixed-fee agreements for nearly a year, and, reportedly, its jobs had no subcontracts. Specialty interests feared that the Army's mammoth program was about to go the way of the Navy's smaller one.[109]

On 9 July a delegation called on Johnson. Representing the national associations of master plumbers and electrical, heating, piping, and air conditioning contractors, this group spoke for 30,000 firms employing more than 350,000 workmen. In answer to their demand for a share of the program, Johnson stated that The Quartermaster General was only just beginning to block out the new contract procedure. He suggested they prepare a memorandum outlining their position. The memo was ready the next day. Presented to Stimson by the associations' attorney, O. R. McGuire, it recognized the urgent need for fixed-fee contracts. Nevertheless, the writers argued, if the War Department did nothing to prevent them, prime contractors would perform all the work themselves. Proposing to save the government time and money, the associations asked that fixed-fee contractors be prohibited by a clause in their

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[106] *ENR*, June 13, 1940, p. 11.

[107] Ltr, Rep John W. McCormack (Mass.) to Woodring, 17 Jun 40. QM 600.1 (CPFF—Misc Corresp) I.

[108] *ENR*, June 20, 1940, p. 51.

[109] (1) William Haber, *Industrial Relations in the Building Industry* (Cambridge: Harvard University Press, 1930), pp. 57–60. (2) John T. Dunlop and Arthur D. Hill, *The Wage Adjustment Board, Wartime Stabilization in the Building and Construction Industry* (Cambridge: Harvard University Press, 1950), p. 10. (3) Incl with Ltr, O. R. McGuire, Wash., D.C., to Stimson, 10 Jul 40. QM 600.1 (CPFF) I.

agreements from doing specialized construction unless they had at least two years' experience in such work. McGuire and his clients attracted quite a following. Companies that specialized in woodworking, painting, masonry, steel erection, and sheet metal work joined in the protest. Suppliers and union leaders joined, too. From California, the Technical Committee of Specialty Contractors advised Colonel Hartman to adopt a contractual safeguard. Otherwise, they warned, principals would set up their own specialty departments, buy unnecessary machinery, and, perforce, do the work with unskilled labor.[110]

It was not Hartman's intention to exclude the specialty firms; but neither did he intend to make subcontracts mandatory. When McGuire contended that fixed-fee contractors ought to be prevented from doing any work that could be done at less cost to the government by others, Hartman readily agreed. But when McGuire demanded that the contract form be altered to require subletting of specialty items, Hartman demurred. "Work may be performed by experienced specialized subcontractors when it is in the interest of the Government to do so, and not otherwise," he said; how its interests would in each case best be served should be left for the government to decide. Hartman meant to settle the question at the time of negotiation, before the contractor was chosen and the fee was fixed. "Otherwise," he explained, "we might have a situation where the general contractor received a fixed fee based on an understanding that his organization would perform the major part of the work and later find that he had by subcontracts turned over to others a major part of the work for which he had been especially selected and paid a fee."[111] In Hartman's opinion, the agreement as written promised the specialists a fair deal. He called attention to the clause guaranteeing the contractor full reimbursement for all payments to subcontractors. He also revealed that the Assistant Secretary's office was reviewing a form for fixed-fee subcontracts. The specialty men received further assurance. With William H. Harrison, chief of NDAC's new Construction Section, Hartman hammered out a statement of policy, which the Hogan committee unanimously endorsed.[112] On 30 July Harrison announced:

> Underlying the whole defense construction program and particularly those projects handled on a cost-plus-a-fixed-fee basis is the intention that the work not only shall be done soundly, expeditiously, and economically, but that it shall be done with due regard to the generally accepted methods and procedures currently followed in the construction industry.[113]

The statement had the desired effect. The protests subsided, as subcontractors settled back to await the flood of emergency orders.

Not one to be diverted from a course he thought was right, Hartman mean-

[110] (1) Ltr, with Incl, McGuire to Stimson, 10 Jul 40. QM 600.1 (CPFF) I. (2) Ltr, Hogan to Dillon, 17 Jul 40. ANMB 334 Comm Members and Min. (3) Ltr, A. S. Whitmore, San Francisco, Cal., to Hartman, 25 Jul 40. QM 600.1 (CPFF) I. (4) *Journeymen Plumbers and Steam Fitters Journal*, September 1940, p. 5.

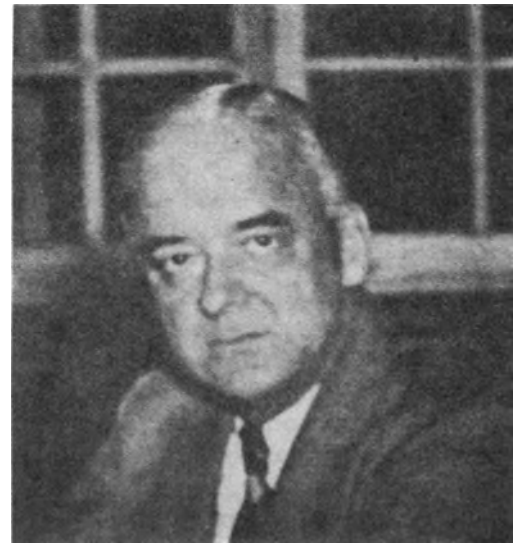
[111] Memo, Hartman for Harrison, 6 Aug 40. QM 600.1 (CPFF—Policy) I.

[112] (1) Ltr, Hartman to A. S. Whitmore, 29 Jul 40. QM 600.1 (CPFF) I. (2) Memo, Harrison for Hartman, 31 Jul 40. QM 600.1 (CPFF—Policy) I. (3) Ltr, Hogan to Dillon, 5 Aug 40. ANMB–MB 203.4–3.1 Constr, etc.

[113] Quoted in *The Constructor*, August 1940, p. 11.

while intensified his efforts to use fixed-fee contracts. Though opposition was still strong, the outlook was improving. Among the many civilians called to high posts in Washington were a number who understood the contracting game. Knudsen was a keen advocate of negotiation. Harrison's views on procurement methods reflected his experience as vice president and chief engineer of the American Telephone and Telegraph Company. Others in NDAC could also be relied upon to favor management agreements. Commissioner Ralph Budd was a veteran railroad construction man, and Gano Dunn, one of Stettinius' lieutenants, was president of the J. G. White Engineering Company. The Hogan committee stood solidly behind the fixed-fee proposition. The return of Benedict Crowell strengthened this lineup greatly. When the Republican Stimson became Secretary of War, one of the first men he turned to for help was his former client, Crowell, a Democrat whose friendship with the President dated back to the Wilson administration. Even before Stimson's Cabinet appointment received Senate confirmation, Crowell was back in the War Department, preparing for his role as a senior adviser. By late July 1940 the way was clear for several fixed-fee lettings.

On the 29th Harry Loving, henceforth the Construction Division's chief negotiator, awarded his first fixed-fee contract, an agreement with Charles T. Main, Inc., for architectural and engineering services at Springfield Armory. Four days later a second fixed-fee contract, this one with Fred T. Ley for construction of the M1 rifle plant at Springfield, was signed by Brigadier General Hartman (the new rank had become effective on 1 August, when General Seaman finished out his terminal leave). Discussions with Whitman, Requardt & Smith of Baltimore led on the 9th to a fixed-fee agreement for architect-engineer services at Edgewood Arsenal and Aberdeen Proving Ground. During the last three weeks of August, Hartman and Loving let six additional fixed-fee contracts, some for design and some for construction. Included were projects at Edgewood, Aberdeen, Picatinny Arsenal, the Philadelphia Quartermaster Depot, and Elmendorf Field in Alaska.[114] Thus all the early fixed-fee jobs were either industrial or air. Hartman had so far been unable to use the high speed contract where speed was needed most—on camps for the million-man Army.



HARRY W. LOVING

Throughout the summer of 1940 he waited anxiously for funds to become available for camp construction. Ap-

[114] H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Third Supplemental National Defense Appropriation Bill for 1941*, pp. 66–67.

propriations for camps were irrevocably bound to those other, more controversial measures, the National Guard and Selective Service bills, for unless Congress voted to call the men, there would be no need to provide money for sheltering them. Months of good construction weather were lost in deliberation and debate. The isolationists put up a fierce battle against the Guard and draft proposals. The President, making his bid for an unprecedented third term, did not at first press for action. As time wore on without a vote on the essential legislation, military leaders became increasingly concerned. On 5 August, six weeks after the introduction of the Burke-Wadsworth bill and two months after the President's request for authority to federalize the Guard, General Marshall appealed to members of the Senate Appropriations Committee:

> Shelter is a serious problem at the present moment. We have known for some time where we wanted to put these people. We had decided on the type of shelter to be erected and had plans and specifications for it. We thought Congress would settle the question of authority to order out the National Guard and the matter of compulsory training by the 1st of August. . . . What has happened is that the weeks have been passing and we have no authority to enter into contracts to provide the additional shelter required.

He warned, "We cannot afford to speculate regarding the security of this country."[115] But Congress failed to heed his injunction. The political fireworks continued. Not until September did General Hartman receive the necessary funds.

As early as July lack of construction money threatened to disrupt plans for bringing men into the Army. The General Staff, anticipating congressional approval, had set 16 September as the tentative date for ordering the first National Guard units into service; soon thereafter, men were to be drafted to bring the Regular Army and the Guard units to war strength. On 30 July Colonel Meyer of G–4 explained the meaning of this plan in terms of construction:

> To bring the Regular Army to war strength will require additional construction for approximately 100,000 men. This construction will require essentially the expansion of existing facilities, and can probably be effected in two months from the time funds become available. To bring in the National Guard will require the occupation of new or partially developed sites which involves major construction of utilities and hospitalization prior to occupancy. Such construction will require a minimum of three months from the time funds become available.[116]

Thus, even if the Quartermaster Corps began to build immediately, enough shelter would not be available at Regular Army posts until October, and National Guard camps would not be ready before 1 November, six weeks after the first Guardsmen were slated to be called.

Alarmed at this situation, Hartman and G–4 looked for some means of beginning construction in advance of congressional action. WPA funds offered one possibility. General Moore encouraged their use in clearing land, digging water and sewer ditches, and building minor structures. By employing relief money the Quartermaster Corps got preliminaries under way at a number of projects. Nevertheless, launching the full-scale program required funds far in excess of those available from WPA. A more promising source of construction money lay in the President's emergency fund. In view of

[115] S Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings* on H R 10263, pp. 4, 2.

[116] Memo, Meyer for Marshall, 30 Jul 40. G–4/31735 Sec 1.

Roosevelt's announced intention of spending his "kitty" for planes and pilots and for antiaircraft guns and gunners, the General Staff at first hesitated to ask him to use any of it for construction. Then someone hit upon the happy expedient of asking him, not for an outright grant, but for a loan. On 29 July representatives of G–3 and G–4 conferred with Nurse and Hartman. All agreed that the problem was primarily one of the new National Guard camps. At established posts additional troops could be crowded in temporarily by double-bunking and other makeshifts. At most of the Guard camps—those in the South—men could live in tents, but only if utilities, hospitals, and storehouses were provided beforehand. In line with this thinking, General Marshall requested funds for these necessities at twelve National Guard sites and for a full division camp at Fort Dix, New Jersey, one of the northern posts where troops would spend the winter. Roosevelt agreed to the proposal, and on 2 August approved a loan of $29.5 million. In less than a month, the money was exhausted.[117]

The loan from the President's kitty went to fourteen different projects. The G–4, Colonel Reybold, allotted part of the money for clearing, grading, and draining divisional camp sites at Edwards, Jackson, Blanding, McClellan, Shelby, Livingston, Claiborne, Robinson, Sill, Bowie, and Lewis and for preliminary work on Coast Artillery firing centers at Stewart and Hulen. These jobs were begun almost immediately by purchase and hire. The remainder of the money went for a cantonment for the 44th Division at Fort Dix. This project was advertised for lump sum bids. On 30 August the Constructing Quartermaster at Dix awarded a $5,535,000 fixed-price contract to the George A. Fuller Company.[118] Years afterward General Gregory recalled, "One of the first camps we built was Dix. That was not a cost-plus-a-fixed-fee contract and it went through pretty good."[119] With one of the world's biggest and best construction organizations on the job, the work did indeed go well. But the contractor took a licking. In an unsuccessful attempt to recoup its losses, the Fuller Company later entered twenty-two claims for additional payment, four of which totaled a million dollars.[120]

With approval of the National Guard Act on 27 August, General Hartman took steps to get the Guard camps fully under way. Although the act carried no money, passage of an appropriation bill was only a matter of time. At a conference in General Marshall's office on the 30th Hartman suggested borrowing $150 million of the funds for expediting production from the Ordnance Department. The Chief of Staff told him to "get it and go ahead." But the Bureau of the Budget turned thumbs down. Hartman then decided to start building, money or no. On the 31st Major Nurse informed G–4 that the Construction Division was proceeding to select contractors and negotiate fixed-fee contracts for eight of the critical projects. Since funds were not yet avail-

[117] (1) WD Ltr AG 600.12 IR (6–6–40) M–D–M, to Chiefs Arms and Servs, 15 Jun 40, sub: WD Policy on Utilization of WPA Funds. AG 600.12 IR (3–11–33) Sec I F. (2) 1st Ind, 23 Jul 40 on Ltr, CG Sixth Corps Area to TAG. QM 121.2 Part 3. (3) Notes of Conf, 29 Jul 40. G–4/31751. (4) Memo and Incl, Meyer for Marshall, 30 Jul 40. (5) Memo, Reybold for Marshall, 30 Aug 40. Last two in G–4/31735 Sec 1.

[118] (1) G–4/32429. (2) Telg, Gregory to CQM Ft Dix, 30 Aug 40. QM 652 (Ft Dix—Tempo Housing).

[119] Verbatim Rpt, Meeting with Gregory and Hastings, p. 17.

[120] QM 158 (Fuller, Geo. A.) 1940–41.

able, "tentative deficits" were being incurred. On 10 September Colonel Reybold gave this action the Staff's blessing. Meanwhile, on the 9th, the President signed the second supplemental defense appropriation bill, which carried approximately $5.4 billion for the War and Navy Departments. This measure provided $201,109,030 for command construction, including $128,107,115 for the Guard camps and, on the industrial side, an additional $325 million for expediting production. It also gave The Quartermaster General contracting authority in the amount of $14 million to be applied to construction work and made available $6,524,336 to the Chief of Engineers for work on seacoast defenses.[121]

Even before Congress voted to call the Guard, G–3 announced a formal schedule for expanding the Army. Four National Guard divisions were to enter federal service on 16 September, to be followed by six more on 15 October, four on 15 November, and four on 15 December. Meanwhile, beginning with 75,000 selectees on 15 October, conscription would proceed at a rate designed to bring the total number of draftees in the Army to 400,000 by 15 January. Both Reybold and Hartman despaired of meeting these dates. Immediately after passage of the National Guard Act, they asked the Chief of Staff to revise the schedule to allow more time for construction. General Marshall listened sympathetically to their proposal, but with the fate of the Burke-Wadsworth bill still in doubt, he hesitated to take a step that might prejudice its chances. While Marshall pondered the question, word came that a change in plans would probably defeat selective service. That settled the matter. On 12 September Reybold gave Hartman the bad news. While the induction of draftees might later be postponed, the Guard divisions would come in on schedule.[122]

Signed by the President on 16 September 1940, the Selective Service Act focused attention on the critical problem of the camps. Under the draft law, no men could be conscripted until "shelter, sanitary facilities, water supplies, heating and lighting arrangements, medical care, and hospital accommodations" had been provided for them.[123] On the 19th General Marshall announced that a similar policy would govern the calling of the Guard. "We are following the progress of shelter more exactingly than any other one item," he told the House Appropriations Committee. "So long as the international situation permits, we will set the dates for the induction of the National Guard and the trainees on the basis of completion of shelter." Asked if enough building funds were on hand, the Chief of Staff replied that they were not, and he added, "Every day counts."[124] Marshall pointed out that the third supplemental defense appropriation bill, then under consideration, contained a total of $367,293,902 for ground and air projects. A breakdown of this figure showed $29.5 million to repay the loan from the President, $8,774,000 for training areas, $19 million

[121] (1) Notes of Conf in OCofS, 30 Aug 40. OCS, Misc Confs, 20 May–25 Sep 40. (2) Ltr, Nurse to TAG, 31 Aug 40, and 1st Ind, 10 Sep 40. QM 600.1 (Misc) 1940. (3) 54 *Stat.* 872.

[122] (1) Memo, G–3 for Marshall, 14 Aug 40. (2) Memo, Reybold for Marshall, 20 Aug 40. Both in G–4/31453–18. (3) Memo, Reybold for G–1, 28 Aug 40. G–4/31048. (4) Biennial Report of the Chief of Staff, July 1, 1941. In *Report of the Secretary of War to the President, 1941* (Washington, 1941), p. 52. (5) Memo, Reybold for TQMG, 12 Sep 40. G–4/31453–18.

[123] 54 *Stat.* 885.

[124] H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings, Third Supplemental National Defense Appropriation Bill for 1941*, p. 40.

for facilities to increase the Air Corps to fifty-four combat groups, and $310,019,902 for shelter. Because wages and prices were rising sharply, this last estimate allowed $450 per man for cantonments and $320 per man for tent camps. The committee acted at once to remedy the lack of funds. Extracting the sums for shelter, airfields, and training areas from the third supplemental, it sponsored a joint resolution which quickly passed both Houses and received the President's signature on 24 September.[125] Thus, as General Marshall noted, the bulk of the money for camp construction became available "as the leaves were beginning to fall."[126]

With passage of the third supplemental early in October, Congress completed the current round of defense appropriations. Approved on the 8th, this act made available approximately $1 billion to the Army and Navy. Included were substantial sums for military construction. The Quartermaster General got nearly $65 million in building funds—$33,717,489 for maintenance, $1,729,357 for the repair of hospitals, and $29.5 million to pay back the loan from the President's kitty. The sum of $122,850 went to the Chief of Engineers for modernizing seacoast fortifications. For expediting production, there was a total of $178 million in cash and contract authority, part of which was for building government-owned aircraft plants.[127] Congress had granted every request made to it for construction funds. But Congress had not been asked for all that would be necessary. Questioned on 19 September as to whether the latest estimate for tent camps would hold good, General Hartman replied, "The estimate of $320 was made about three weeks ago, and within the last week lumber has jumped from $6 to $8 per thousand feet."[128] Testifying before a Senate committee ten days later, General Marshall said, "We are not at all certain that the funds provided for shelter are sufficient. It is impossible to say at this moment whether they are or not. If they do prove insufficient, we will request the necessary additional funds when Congress convenes in January."[129]

General Hartman was in a precarious position. Time was short. Winter with its bad construction weather loomed ahead. Unsuitable sites, inadequate engineering data, and uncertain markets were but some of the factors that threatened delay. If induction dates were to be met, the Construction Division would have to do a job of unusual difficulty with unprecedented speed. But speed meant money. Building funds were insufficient to pay for the program even if rigid economy were practiced. To complete the camps on schedule and to keep within the available funds was impossible. But that was Hartman's assignment—an assignment he reportedly accepted only "because of the constant reiteration by Moore that, if he did not, the work would be assigned to the Corps of Engineers and that would be the end of the Construction Quartermaster."[130]

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[125] (1) *Ibid.*, pp. 33–34, 57–58. (2) Gen Marshall's Testimony, 30 Sep 40. In S Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings* on H R 10572, p. 1. (3) 54 *Stat.* 958.

[126] Biennial Report of the Chief of Staff, 1941, in *Report of the Secretary of War to the President, 1941*, p. 52.

[127] 54 *Stat.* 965.

[128] H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Third Supplemental National Defense Appropriation Bill for 1941*, p. 58.

[129] S Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings* on H R 10572, p. 7.

[130] Gen Groves Comments on Second Draft, MS, Construction in the United States, IV, 4. Cited hereinafter as Groves Second Draft Comments.

CHAPTER V

Launching Defense Construction

During the fall of 1940 work flowed into the Construction Division with unprecedented speed. Beginning shortly after Labor Day, the flood of directives reached its crest in October. On 11 September orders arrived for 9 large camps and one general hospital. Three mornings later the stack of mail on General Hartman's desk contained authorizations for 8 additional camps and 2 lesser ground force projects. On the 19th, when 9 more camps, 7 miscellaneous housing projects, 2 airfields, and a munitions plant were added to the rapidly growing list, one of Patterson's assistants informed him: "Work is now arriving and amounts to a total which was not reached until nine months after war was declared in 1917."[1] The total continued to climb. By late October Hartman had on file more than 300 emergency directives for jobs ranging in size from a single structure costing a few thousand dollars to a 75-million-dollar smokeless powder plant. With these directives came orders for the inevitable extras—service clubs, guest houses, infirmaries, dental clinics, officers quarters, induction buildings, chapels, painting, and paved roads.[2] To get this program under way was Hartman's first objective.

In ordinary times launching construction was a complicated process consuming months and sometimes years. Plans and specifications were prepared beforehand and in full detail. Estimates were figured with scrupulous exactitude. Sites were thoroughly surveyed, and layouts were drawn with care. Land was acquired by negotiation with the owners, which often meant much patient bargaining, or by condemnation, which might drag slowly through the courts. In neither case could building commence until the Attorney General had cleared the title; a law of 1841 forbade it. Another source of delay was the Bacon-Davis Act of 1931, which assured most laborers and mechanics working for government contractors wages not less than those prevailing on similar jobs in the locality. The task of determining the prevailing rates fell to the Secretary of Labor, who normally took from four to six weeks to complete the process.[3] It was customary to make a separate "predetermination" for each contract. "Thus," as Hartman's adviser on labor relations, Leslie E. Brigham, explained, "if one building was to be constructed the whole process of determining wages . . . was gone through with. Then, if two weeks later another building was put up across the

[1] Memo, Maj Simpson, OASW, for ASW, 19 Sep 40. QM 022 (Constr Div).

[2] (1) Constr Div OQMG, List of Directives, 15 Mar 41. EHD Files. (2) Constr PR's 15 and 29, *passim.*

[3] (1) 5 *Stat.* 468. (2) 46 *Stat.* 1494. (3) 49 *Stat.* 1011. (4) Ltr, Seaman to TAG, 10 Oct 39. OCE Legal Div, Labor (Dept of) to 4-29-43.

street involving exactly the same trades, the process was again repeated."[4] Underlying much of the slowness with which most peacetime projects started was the law requiring competitive bids. Not until plans were firm, sites available, and minimum wage rates fixed could the machinery for advertised lettings go into motion.

With the emergency of 1940 "time is of the essence" became the watchword and speed became the "paramount consideration." But, before it could rally to these slogans, the Construction Division first had to free itself from the shackles of peacetime procedures. This it attempted to do and with considerable success. The Act of July 2, 1940, the negotiation statute, cut through the tangle of competitive red tape. An understanding between Brigham and officials in the Labor Department put an end to duplicate predeterminations; wage rates were henceforth determined for a given locality and applied to all jobs undertaken there during a 90-day period. Legislation urged by Colonel Valliant and enacted on 9 October 1940 permitted construction to begin before property titles had been proved valid.[5] Removing these procedural obstacles helped clear the way for action. Still there remained the task of starting a billion-dollar program almost overnight.

The sudden surge of directives transformed the central office into a hive of frantic activity. "Nowhere in these high-pressure days is the heat any hotter and the pressure any greater in Washington than in the Construction Division of the Quartermaster Corps," wrote columnist Jerry Kluttz early in October.[6] To members of the Hartman team the description seemed apt. It was hectic, one man recalled. Another likened the division to a madhouse. The still relatively puny force was nearly snowed under with work. Mail arrived by the truckload. One small section of the Engineering Branch soon had a backlog of 1,100 unanswered letters. Calls swamped the switchboard. The halls teemed with visitors, as contractors, materialmen, equipment dealers, and a good many others beat a path to the men with a billion dollars to spend. Only by unremitting effort was the division able to keep abreast of it all.[7]

In the Munitions Building space was at a premium. With scores of new employees already at work and more arriving daily, the division had to utilize every available inch. Even storerooms served as offices, and some areas were so jam-packed that people had to climb over desks in order to move about. Hartman, who had been battling for larger quarters since spring, attributed these cramped conditions to "a total lack of appreciation by the Space Procurement Officer of the War Department and General Gregory of the office space needed."[8] Gregory was at length won over. "It seemed to me," he later said, "that

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[4] Rpt, Brigham to Bennett, 30 Sep 40. EHD Files.

[5] (1) *Ibid.* (2) Memo of Understanding, Dept of Labor Office of the Solicitor for Bennett, 28 Sep 40. OCE Legal Div Lib, Labor Wage and Hour Decisions. (3) Draft of Ltr, Woodring (RDV) to Chrm H Judiciary Comm (Jun 40), and notations thereon. QM 601.1 I. (4) 54 *Stat.* 1083.

[6] Washington *Daily News*, October 7, 1940, p. 14.

[7] (1) Intervs with Col Simon Jacobson, 7 Jun 55; Henry J. Klein, 29 May 57; Gen Dreyer, 27 Feb 59. (2) Ltr, Gavin Hadden to EHD, 22 May 53. (3) Answers to Questionnaire, Col Violante to EHD, 25 Sep 57.

[8] Statement of Gen Hartman, 5 Jul 55, pp. 7–8.

one of the things we had to fight every minute was getting more office space . . . . Finally, after much clamoring and so forth, we got what was known as the Railroad Retirement Building."[9] The division moved to its new quarters early in October. But even then, Hartman complained, "there was just about half the space required . . . . This necessitated sending part of the personnel outside of the building with consequent loss in efficiency."[10]

Despite many vicissitudes, the division's morale was good. Everyone worked long and hard. The chief himself set the pace, taking time out only when he could keep awake no longer. Key officers stayed at their jobs until eleven o'clock seven nights a week, and, although the War Department had approved no overtime pay, civilians stayed, too. Most of the younger men took it in stride. One 34-year-old captain reported that the effort was no strain. But to men in their 50's and 60's these were arduous days. Jacobson, who was 52, wondered at times how long he could last, and Lamphere, at 59, allowed that he was not "so full of vinegar" as in 1917. If there was plenty of hard work, there was also plenty of jollity.[11] Even from the front office, where events flowed fastest, came sounds of laughter now and then. There Major Nurse maintained a daily log. "General Hartman was aware of this diary," Nurse related, "in fact, he encouraged me in keeping it up. When things got especially tough and he felt in the mood for a laugh (God knows he needed it on occasion), he would come to my desk and glance through my remarks and sketches which were often of a humorous sort."[12] Hard pressed though they were, Hartman and his crew generally displayed good humor, enthusiasm, and a will to do.

September found preparations well advanced and all the branch chiefs pushing their phases of the operation. The fixed-price end of the program was under Violante's firm control. Bennett in Administrative, White in Repairs and Utilities, Koke in Auditing and Accounting, and Value in Liaison had their departments well in hand. Jacobson in Procurement and Expediting was ordering such varied items as kitchen equipment, laundry machinery, fire engines, furniture, and stoves. Jones in Legal was reviewing contracts and devising ways to get things done and still keep within the law. Bayer in Funds and Estimating was putting out a new manual for Constructing Quartermasters. The free lance, Major Thomas, worked at many jobs, establishing a system of progress reporting, trying to set up audit machinery, running the school for Constructing Quartermasters, breaking in new employees, and more. Yet in these critical weeks of getting started, the burden of responsibility fell with special weight on certain individuals and branches, on Lamphere and Engineering, Valliant and Real Estate, the Construction Advisory Committee, Loving as chief negotiator, and, most heavily, on General Hartman.

[9] Verbatim Rpt, Meeting with Gregory and Hastings, p. 9.

[10] Statement of Gen Hartman, 5 Jul 55, p. 8.

[11] Intervs with August G. Sperl, 18 Jun 56; Col Thomas, 27 Dec 55; Gen Dreyer, 27 Feb 59; Col Jacobson, 7 Jun 55; Mr. Lamphere, 26 Jun 56.

[12] Ltr, Nurse to OCMH, 9 Mar 55. EHD Files.

Policies and Policymakers

Undertaking the first mobilization program in more than twenty years, Hartman proceeded with the lessons of history in mind. As in World War I, military construction was to be largely a civilian endeavor. Heavy reliance was placed on industry. Rejecting the theory that the Army itself might do the work, using purchase and hire, Hartman turned to contractors and architect-engineers. He asked manufacturers of construction materials to double and treble their output. He appealed to workers in the building trades for co-operation. He designed the Army-industry team for getting work done fast. Nevertheless, he was keenly aware of his responsibility for protecting the public interest. It was, he emphasized, the duty of every construction officer "to see that all money is wisely and honestly expended."[13] Once again dollars would be traded for days but somewhat less freely than in 1917.

Under emergency conditions, cost-plus-a-fixed-fee was, as Dresser put it, "the only way."[14] The CPFF contract was not merely a timesaver; it could, if skillfully administered, save money as well. "I have always been convinced," said Hartman, "that this form of contract is an economical one, provided that proper safeguards are thrown around the cost accounting of the project and also that strenuous efforts are made to keep politics and political appointees out of the picture."[15] His solution to the political problem was the Construction Advisory Committee, which would choose contractors without fear or favor and on the basis of merit alone. His auditing system confirmed the promise he had made to Congress in 1939, that all expenditures would be subject to absolute check and control. The new fixed-fee contracts promised reimbursement only for such "actual expenditures in the performance of the work as may be approved or ratified by the Contracting Officer," and one of the chief duties of Constructing Quartermasters was to make certain that the government received full value for money paid out.[16] Nor did the effort to marry speed and economy end there, for Hartman tried by every means he knew to get the most for every fixed-fee dollar.

CPFF contracts made possible substantial savings on bonds, insurance, and taxes—expenses lump-sum contractors passed on to the government in the price of their bids. Because the Construction Advisory Committee was selecting contractors of outstanding ability and unquestioned integrity, performance bonds were unnecessary; and, since fixed-fee contractors would receive no reimbursement for labor and materials until they turned in vouchers, the requirement for payment bonds was superfluous. At Hartman's prompting, Congress excepted fixed-fee contracts from the law that made bonding mandatory. Since it was government policy to self-insure against fire, and since fixed-fee contractors were, in fact, agents of the War Department, fire insurance was nugatory. Additional savings were made by reducing the amounts the government

[13] OQMG Manual, Supplement to Guide for CQM's, Rev 1940, Covering FF Projects, 27 Aug 40, p. 1. EHD Files.

[14] Dresser Interv, 2 Apr 57.

[15] Statement of Gen Hartman, 5 Jul 55, p. 11.

[16] CPFF Form 1, approved by the ASW, 12 Jul 40, art. II.

indirectly paid in taxes. Fixed-fee contractors were exempt from certain federal levies, including transportation, communications, and manufacturers' excise taxes. Moreover, Hartman resisted collection of state and local taxes from these contractors, maintaining that the burden would fall on the United States. Of twenty-two states imposing sales, use, and similar taxes, eighteen granted full or partial exemptions, while four continued to exact payment.[17] Although savings on these items amounted to a considerable sum, they were negligible compared with savings possible on materials and labor.

As the Army, the Navy, and other federal agencies got defense construction under way and private industry began expanding for war production, the demand for building materials rose rapidly. Scarcities developed, deliveries slowed, and prices started to climb. Hartman took steps to combat shortages and high costs. First, he tailored requirements to fit supplies. When the lumber industry revealed that it had on hand huge quantities of 10-foot joists—a short, nonstandard length which had been stockpiled as culls—he ordered structural blueprints altered to take the shorter studs. In the Engineering Branch, Lamphere made similar changes, adjusting specifications to productive capacity whenever possible. As a second step, appeals for help were broadcast to industry. The response was gratifying. The Southern Pine Association formed a special war committee to co-operate with the Army. The Lehigh Portland Cement Company placed its nationwide organization at the division's disposal to assist with procurement. Meanwhile, Hartman was banking heavily on a third expedient, centralized purchasing, to help stabilize lumber prices and keep his projects supplied. Colonel Jacobson waited only for the necessary funds before swinging into action.[18]

Even more troubling than the materials outlook was the specter of the silk-shirted construction worker of World War I. Nothing, as far as national policy was concerned, prevented contractors from going into the labor market and bidding as high as they wished, for the administration made no attempt to control wages on a nationwide basis until after Pearl Harbor. A spiral seemed inevitable unless Hartman himself could control wages. Practical considerations compelled him to make the attempt. Slim construction budgets made no provisions for wage boosts. Furthermore, lump sum contractors, trying to keep within a prearranged price, would be deprived of workers if fixed-fee contractors "snowballed" wages. Hartman sought to prevent unnecessary increases by placing a ceiling on wages. What he did was to declare the minimum Bacon-Davis rates set by the Department of Labor to be

[17] (1) Draft of Ltr, SW to the Speaker, H R (n.d.). QM 600.1 (Misc) 1940. (2) 54 *Stat.* 873. (3) Memo, Jones for FF Br, 1 Oct 40. QM 600.1 (Ins Risk). (4) Ltr of Instr, Hartman to CQM's, 5 Nov 40. QM 600.1 (CPFF—Policy) I. (5) Constr Div OQMG CPFF Ltr 13, 23 Oct 40. EHD Files. (6) Incl with Ltr, JAGO to Rep Robert L. Doughton, 2 Mar 42. OCE Legal Div Lib. States granting exemptions were: Arizona, Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Michigan, Mississippi, Missouri, New Mexico, North Carolina, Ohio, Oklahoma, South Dakota, Utah, Washington, and West Virginia. Those enforcing payment were: Alabama, California, North Dakota, and Wyoming.

[18] (1) Dreyer Interv, 27 Feb 59; Sperl Interv, 18 Jun 56. (2) Col Fred G. Sherrill, Lumber in the War (MS), I, p. 5. EHD Files.

the maximum. Fixed-fee contractors who paid higher rates without his approval in writing would do so at their own expense. He thus retained the final, even if he did not possess the initial, say on wage rates.[19]

There remained the question of premium pay. Most agreements between contractors and the building trades unions called for time and a half or double time for work in excess of so many hours a week and on Saturdays, Sundays, and holidays. Labor had insisted on these provisions in order to shorten the work week, and contractors normally scheduled construction to avoid paying the almost prohibitive rates. In addition, unions sometimes demanded bonus rates and special concessions for shift work. With time the vital factor in defense, many of Hartman's projects would be working six or seven days a week on multiple shifts. If labor costs were not to be excessive, he had to find a way to escape the usual heavy penalties. Major Jones pointed the way to a solution, by calling attention to the fact that the law required only one premium payment, time and a half for work in excess of eight hours in any one day. With this in mind, Brigham devised a plan he thought fair both to labor and the War Department.[20] "We feel," he explained to an official of the Carpenters' Brotherhood, "that due to the emergency . . . the men should be willing to work on a basis of forty hours a week and eight hours a day for any one man, and at least two shifts a day on straight time. This would permit staggering the crews so as to permit work every day of the week with two shifts and completing the job in time for the troops to move in."[21] Loving instructed his field officers whenever possible to schedule work to eliminate premiums.[22]

Only within certain limits was Hartman free to chart his course, for he had to comply with directives of The Quartermaster General, the Chief of Staff, and the Assistant Secretary of War and to respect the overall policies of the President. These men viewed construction from somewhat different angles. To General Gregory it was but one of several duties. In construction matters he usually followed the lead of his superiors. General Marshall's supervision of the program was, with rare exceptions, exercised through Generals Moore and Reybold. As a rule, the General Staff considered construction from the user's standpoint rather than from the builder's. Judge Patterson, as business head of the War Department, looked upon construction as a most important trust. He was anxious to do his job honestly and well and to avoid any taint of scandal. Roosevelt approached construction questions in a spirit compounded of New Deal liberalism, political realism, and grave concern for national security. Alongside the regular authorities there arose in mid-1940 a new group—advisers, coordinators, and inspectors, agencies and individuals—who were to have great impact upon the building program.

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[19] CPFF Form 1, approved by the ASW, 12 Jul 40, art. IX, par. 2.

[20] (1) Memo, Bennett for Brigham, 20 Sep 40. EHD Files. (2) Memo prepared by Jones, sub: Notes on Hours of Labor, 12 Sep 40. OCE Legal Div Lib, Instr Re CPFF, I. (3) Incl with Memo, Brigham for Bennett, 9 Oct 40. QM 600.1 (Labor–Gen).

[21] Memo, Brigham for H. W. Blumenberg, 21 Sep 40. OCE LR Br, Cp Edwards, Gen Corresp.

[22] Constr Div OQMG FF Ltr 2 (n.d.). EHD Files.

With the principal new defense agency, NDAC, General Hartman had two chief points of contact. One was the Office of the Coordinator of Defense Purchases, headed by Donald M. Nelson, executive vice president of Sears, Roebuck & Company. Named to this post on 27 June 1940, Nelson had the duties of preventing government bureaus from competing among themselves, advising the President on questions of priorities and allocations, and expediting procurement all along the line.[23] Afterward General Hartman commented, "My relations with Mr. Nelson were always very cordial and he was very complimentary." With Harrison, the member of the commission's staff who was most immediately concerned with construction, Hartman also dealt easily at first. Recalling their association, he wrote, "With reference to Mr. Harrison, he was a very plausible individual . . . . I was early informed in my relationship with him that he was Phi Beta Kappa and held an important job in New York City. Furthermore, he represented himself as being a man anxious to do a good job in the program without regard to personal matters."[24] Hartman's secretary, Mrs. Mary B. Pagan, referring to this early period, said of Harrison, "He was in our office almost every day."[25] While the commissioners themselves seldom worked directly with the Construction Division, they nevertheless helped to guide it. In June, shortly after the President asked NDAC to review important purchases, Hillman began urging adoption of principles to govern the letting of contracts. It was to be some time before the commissioners agreed what their policies should be.[26]



CAPT. LESLIE R. GROVES. (*Photograph taken in 1939.*)

July marked the entrance on the construction stage of a man who was to play an increasingly prominent role in the direction of the program. He was Maj. Leslie R. Groves, who became Gregory's personal assistant for construction on the 22d. A 1918 West Point graduate whose career included study at the Engineer School, the Command and General Staff School, and the Army War College; service with troops in the States, Hawaii, and Nicaragua; tours with the Galveston District, the Missouri River Division, the Chief's office, and the War Department General Staff, Groves had a reputation as a doer, a driver, and a

[23] (1) CPA, *Industrial Mobilization for War*, p. 35. (2) Smith, *The Army and Economic Mobilization*, p. 530.
[24] Statement of Gen Hartman, 5 Jul 55, p. 13.
[25] Pagan Interv, 2 Jun 55.
[26] *Minutes of the NDAC*, pp. 2–3, 82–83.



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stickler for duty. His new job, as he described it, "was to inspect in the field, spending not over a day at a camp, and seeing just what The Quartermaster General would have seen if he had been there."[27] The General Staff had advised Gregory to pick a good officer to check on the progress of construction. Gregory asked for Groves. The two men had been on familiar terms for many years—Groves was the son of an Army chaplain who had been Gregory's close friend—and they had a great affection for each other. To the officers of the Construction Division the appointment came as a shock—a slap in the face, many of them called it. Most of them regarded Groves as an agent for the Engineers, despite the fact that such a role would have been completely out of keeping with his character. Aware of his delicate position, the new inspector tried to word his reports so that no feelings would be hurt. But the hostility against him was too strong.[28] "It was felt at the time," said Thomas, "that this officer's reports were prejudiced and unreasonable and given with the intent to discredit the . . . Quartermaster Corps in order to help the Engineer Corps to take over the Construction Division."[29]

As far as construction was concerned, one of the most influential figures to emerge during this period was Michael J. Madigan, who became Judge Patterson's special assistant on 23 September. Able jurist that he was, Patterson understood the laws that governed federal construction. In Col. John W. N. Schulz, his Director of Purchases and Contracts, he had, moreover, a faithful exponent of the Army regulations. Nevertheless, both Patterson and Stimson felt the need for an adviser who knew the score in the public works contracting game, someone, as they laughingly put it, who could keep them out of jail. Such a one was Madigan. Senior partner of Madigan–Hyland, engineers of New York City, he was a man of humble beginnings, a onetime water boy, who had become a millionaire by 1940. Having been associated with Robert Moses in the Triborough Bridge Authority and other municipal projects in New York, he was politically astute. He had little formal schooling but was endowed with great native intelligence. He was also somewhat intuitive, playing

[27] Col Groves' Testimony, 30 Apr 41. In Truman Comm *Hearings*, Part 2, p. 533.

[28] Intervs with Malcolm Pirnie and Stephen F. Voorhees, 14 Feb 58; Gen Groves, 19 Jun 56; Col Clarence Renshaw, 13 Feb 59; Mr. Sperl, 18 Jun 56; and Col Donald E. Antes, 3 Jun 58.

[29] Replies to Questionnaire, Thomas to EHD, 31 May 56.

hunches that frequently proved to be happy. Brought to Patterson's attention by William H. Draper of Dillon, Read & Company and by James V. Forrestal, who had recently become Under Secretary of the Navy, Madigan welcomed the appointment. He viewed it, he later said, as an opportunity to serve the country which had given him the chance to succeed. Before leaving for Washington, he told his partner that their firm would have to forego its share of military contracts.[30]

Madigan's reception was, on the whole, a warm one. Patterson gave him carte blanche to act on construction matters; Harrison expressed the hope that they might work closely together; and General Moore hastened to offer a helping hand. Sociable and informal, the New Yorker made friends easily. Before long he was calling the old-line Regular, Colonel Schulz, by his nickname, "Pop." Madigan's operating method was in a class by itself. He formed no organization and hired no staff. He preferred to look around, talk to people, visit projects, and then retire to his hotel room to mull over his findings and emerge with a full-blown plan to give to Patterson. Thus began what he later termed "the happiest years of my life." There was one discordant note. Madigan and Hartman did not hit it off. Discovering, as he quickly did, that the estimates were far too low, Madigan leaped to the wrong conclusion—that Hartman was responsible. He put the Chief of Construction down as "a nice old gentleman who was used to being bawled out by colonels' wives" when their furnaces broke down.[31] Hartman viewed the newcomer with misgivings. He wrote:

> My relationship with Mr. Madigan was always on a most guarded basis. I early sized him up as an opportunist who was on the lookout for a profitable contract for his firm in New York City. His name never came to my attention through the Construction Advisory Committee. However, I was certain after having been informed of his relation with General Somervell when that officer was on duty with WPA and relief organizations in New York City that Mr. Madigan was out to feather his own nest . . . . Frankly, I did not trust him.[32]

Meantime, on 6 September, NDAC wrapped up its statement of contracting principles. While recognizing speed as the prime consideration in placing defense contracts, the commission emphasized that quality and price should also have due weight. Those making awards should take into account not only the contractor's experience and ability but his character and financial standing as well. Keeping in mind effects on the economy and general welfare, they should also try to distribute contracts widely, to prevent congestion of transportation and utilities systems, and to safeguard consumers and labor. Where necessary to achieve defense goals, NDAC approved using negotiation. In a supplementary statement, the commissioners set forth their ideas on labor more specifically. Suggesting that the program might

[30] (1) Troyer S. Anderson, History of the Office of the Under Secretary of War, 1914–1941 (MS), VI, 41–42, 52–53. (2) Interv with Michael J. Madigan, 18 Jun 56. Madigan-Hyland did no work for the War Department during Madigan's term of service in Washington. The firm's participation in the war effort was through contracts with the Navy, the largest of which was for a $25,000,000 job at Roosevelt Roads Naval Base, Ensenada Honda, Puerto Rico.

[31] Madigan Interv, 18 Jun 56.

[32] Statement of Gen Hartman, 5 Jul 55, p. 13.

serve "to reduce unemployment and otherwise strengthen the human fiber of our Nation," they viewed site selection as a vehicle for social good. Moreover, they insisted on limiting working hours to forty a week until unemployment disappeared. If, in emergencies, projects worked more than forty hours or on Saturdays, Sundays, and holidays, overtime and premium rates would be obligatory. Discrimination because of "age, sex, race, or color" would be taboo, the commissioners declared. Finally, workmen's health and safety would be a grave concern and adequate workers' housing would be a must. Sent by the President to Congress with a message of indorsement on 13 September, the statement henceforth stood as administration policy.[33]

To Hartman the statement was a mixed blessing. By affirming the need for negotiated awards, the commission underpinned his position. In the wake of the President's message, Patterson relaxed restrictions on CPFF agreements to permit their use "in all cases where the accomplishment of the national defense program may be expedited or aided thereby."[34] Furthermore, the commission's criteria for selecting contractors were almost identical to some Hartman had adopted earlier as a guide for the Construction Advisory Committee. Nevertheless, from the construction standpoint, several of the labor principles were impractical. Even before the statement became public, Secretary Stimson had informed the President that shortages of skilled mechanics would force suspension of the 40-hour rule. Whether the policy on premium wage rates would be applicable to construction remained to be seen.[35]

As the election campaign gathered momentum, the President renewed the pledge he had given in May, that there would be no "cancellation of the great social gains" made under the New Deal. At dedication ceremonies for the Chickamauga Dam on Labor Day, he declared, "We understand now what we did not understand in 1917 and 1918—that the building up of the Army and Navy . . . ought not to result in a waste of our natural resources and at the same time ought not to break down the gains of labor or the maintenance of a living wage." That same day he told a gathering at the opening of the Great Smoky Mountains National Park: "We need not swap the gain of better living for the gain of better defense. I propose that we retain the one and gain the other."[36] This theme recurred in the speeches he delivered during the remaining weeks of the campaign.[37] In vain did the War and Navy Departments argue against a policy promising "all things to all men—adequate national defense, full employment, higher living standards, the recovery of business, and the consolidation of labor's New Deal gains, in short, both guns and butter."[38]

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[33] (1) *Minutes of the NDAC*, pp. 82–83. (2) H Doc No. 950, 76th Cong, 3d sess, 13 Sep 40, *National Defense Contracts*.

[34] Incl (n.d.), with Memo, Schulz for Gregory, 9 Oct 40. QM 400.13 (Without Advertising) 1940–42.

[35] (1) Notes of Conf in OCofS, 23 Aug 40. OCS, Misc Confs, 20 May–25 Sep 40. (2) Memo, Brigham for Bennett, 7 Oct 40. QM 600.1 (Labor–Gen).

[36] *Public Papers and Addresses of Franklin D. Roosevelt, 1940*, pp. 237, 363, 374.

[37] *Ibid.*, pp. 412, 493–94, 520, 547, 549–50.

[38] William L. Langer and S. Everett Gleason, *The Undeclared War, 1940–1941* (New York: Harper and Brothers, 1953), p. 182.

At the same time that he refused to sacrifice the New Deal on the altar of national security, the President extolled the progress of defense preparations. Branding as false his opponent's allegation "that the rearming of America is slow," he declared, "We are going full speed ahead." One of the few military programs then well started and, as such, one of the prime targets visible to the opposition, the Army's construction effort came in for a share of Republican criticism and Democratic praise. GOP standard-bearer Wendell L. Willkie charged that new camps would not be ready when troops moved in, and on 30 October Roosevelt countered:

> I cannot help but feel that the most inexcusable, most unpatriotic misstatement of fact about our Army—a misstatement calculated to worry mothers of the Nation—is the brazen charge that the men called to training will not be properly housed.
>
> The plain fact is that construction on Army housing is far ahead of schedule to meet all needs, and that by January fifth, next, there will be complete and adequate housing in this Nation for nine hundred and thirty thousand soldiers.
>
> And so I feel that, very simply and very honestly, I can give assurance to the mothers and fathers of America that each and every one of their boys in training will be well housed . . . .[39]

It fell to the Construction Division to redeem the President's promise.

A few days after the passage of the Selective Service Act, Representative Edward T. Taylor told Hartman, "Whatever you do, you will be criticized."[40] As time went on, Taylor's prediction seemed increasingly likely to come true. Besieged by numerous and ofttimes conflicting demands, Hartman could not satisfy everyone. But he could and did forge ahead, providing plans, acquiring land, and placing construction quickly under contract.

Engineering

The work of converting appropriations into finished construction began in the Engineering Branch. To this, his largest unit, General Hartman gave the task of establishing the common yardsticks or standards of design that would govern almost every feature of the program—buildings, roads, runways, docks, power plants, trackage, drainage, water supply and sewerage systems, plumbing, lighting, heating, fire protection, installed equipment, and the like. It was Lamphere's duty, as chief of Engineering, first to consider the War Department's policies, the users' requirements, the money allotted, the time allowed, the condition of materials markets, the availability of labor, and the cost of maintenance and, then, with these factors in mind, to develop blueprints, specifications, bills of materials, estimates, and layouts for projects of virtually every type. These plans would go to jobs throughout the country. Although Constructing Quartermasters would have considerable leeway in adapting standards to local conditions, Hartman insisted that fundamental changes be cleared with Washington. He thus preserved the system of centralized design most construction men thought proper.[41]

[39] *Public Papers and Addresses, 1940*, pp. 500, 151, 517. See also: Memos, Lt Col R. H. Brennan, OCofS, for SGS, 2, 4 Oct 40. OCS, Notes on Confs, 26 Sep 40; Samuel I. Rosenman, *Working With Roosevelt* (New York: Harper and Brothers, 1952), pp. 243–44.

[40] H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Third Supplemental National Defense Appropriation Bill for 1941*, p. 59.

[41] OQMG Office Order 29A, 15 Jun 40. QM 020 (Constr).



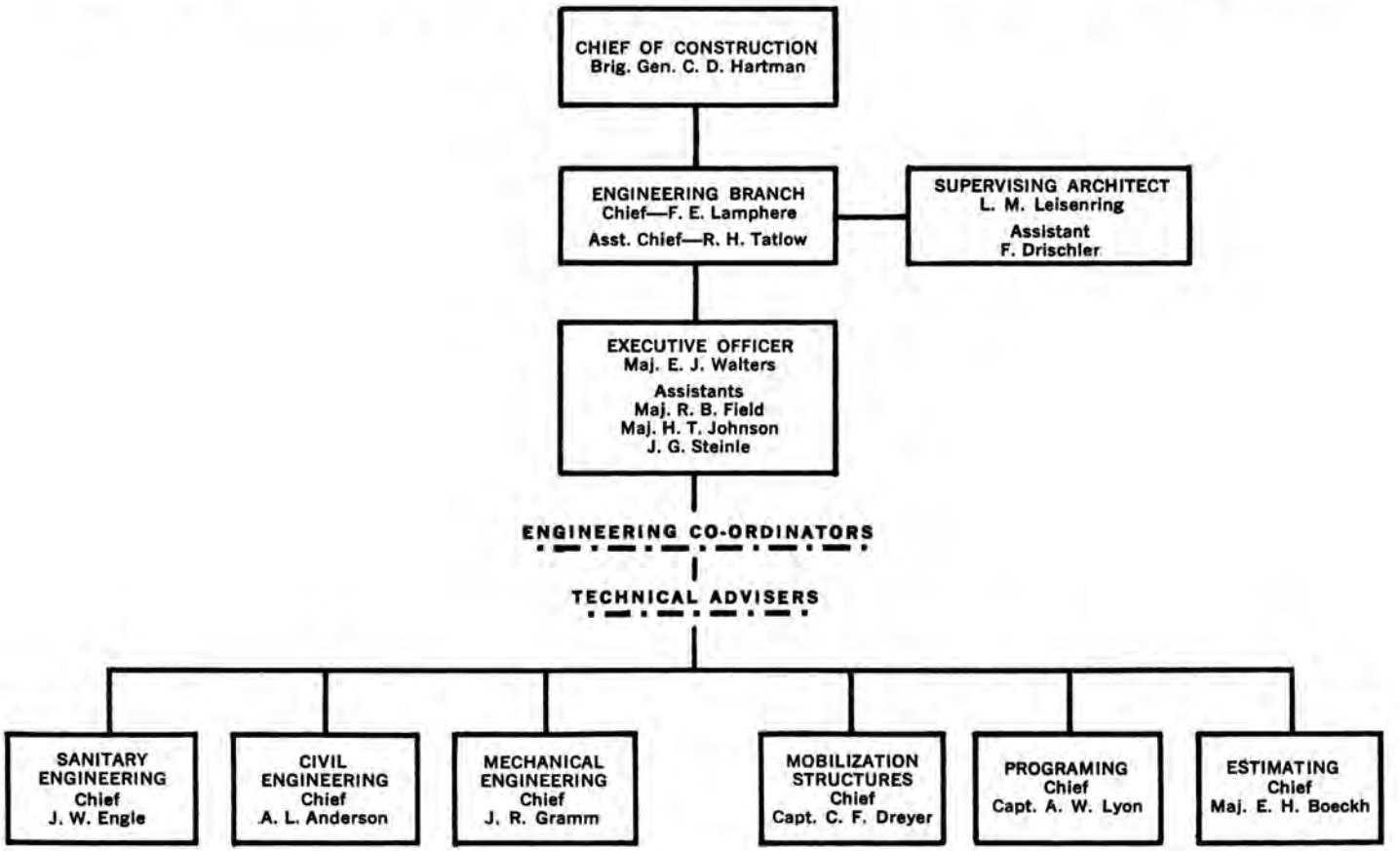
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The new Engineering Branch was built upon the solid foundation of the peacetime organization. Consisting during the late 1930's of a few carefully selected officers and some four hundred civilians, the division's technical staff ranked among the best in Washington. During August 1940 Lamphere reorganized this force along the lines of Colonel Gunby's World War I outfit. (*Chart 4*) The main work of design and engineering he assigned to six sections—Civil, Mechanical, and Sanitary Engineering, Mobilization Structures, Programing, and Estimating. To maintain close liaison with his clients, he appointed nine technical advisers: a hospital specialist to work with the Medical Corps, an industrial expert to work with Ordnance, and so on. To expedite the flow of vital information to the field, he named six engineering co-ordinators, each responsible for one or more corps areas or departments. A majority of the top posts went to division veterans. Maj. Elsmere J. Walters, a construction officer since 1918, became Lamphere's executive. Like Walters, four of the principal civilians, Steinle, Leisenring, Drischler, and Anderson, had been on the job since World War I. Two others, Gramm and Engle, had between them a total of thirty-nine years with the Quartermaster Corps. Though younger than their colleagues, Captains Dreyer and Lyon, both West Point graduates with advanced degrees from leading schools of technology, were seasoned professionals. Most of the advisers and co-ordinators also came from the permanent roster, as did key assistants throughout the organization.[42] But, although they lent great strength to the emergency effort, the experienced men were too few to cope with the avalanche of work that crashed in on them.

Beginning in July 1940, Lamphere staged a vigorous drive for recruits. Among the first to join up was Richard H. Tatlow III, a junior partner of Harrington and Cortelyou, who became deputy chief. "A very smart, young, peppy fellow," Lamphere said of him. Another early arrival was Arthur L. Sherman, a distinguished sanitary engineer and veteran of the Construction Division of the Army, who agreed to help with the hiring of professional firms. The list grew longer. Frederick H. Warren, a young West Point graduate and former Engineer officer, became chief of co-ordinators. Fred S. Poorman,

[42] (1) OCE Mil Constr, Comparison of Prewar and Postwar Pers Reqmts, 1 Jun 47. EHD Files. (2) Orgn Chart of Engrg Br, 26 Aug 40. EHD Files. (3) Engrg Br Constr Div OQMG Office Bull 39–1940, 5 Sep 40. Engrg Br Files, Info Office File I.

CHART 4—ORGANIZATION OF ENGINEERING BRANCH, CONSTRUCTION DIVISION, OQMG, SEPTEMBER 1940



Source: Orgn Charts, Constr Div, OQMG, 1940. EHD Files.

an able highway engineer who had been with Lamphere on the Pennsylvania Turnpike project, took over the planning of transportation systems. Maj. Robert B. Field, who had retired in 1938 after more than twenty years as a construction officer, returned as Walters' assistant. A Reservist who headed a nationwide building costs service, Maj. Everard H. Boeckh, came in as chief of the Estimating Section. And there were many, many more. In fact, some four hundred men responded to the call. Small wonder that Lamphere likened the growth of the Engineering Branch to an explosion.[43]

Just as private architects and engineers first consult their clients, so Lamphere started with War Department policies. Very early in the program, on 27 May 1940, General Marshall announced that G–4 would be the arbiter on construction matters. During the next few weeks, General Moore laid down principles to govern emergency work. Emphasizing the need for speed first, economy second, and serviceability last, he prescribed these rules: hold construction to the minimum; make maximum use of existing buildings; and erect no permanent structures where temporaries will suffice. At new stations hospitals would be temporary, but at old-line posts permanent barracks would serve as wards. Wherever possible, Regulars would double up to make room for Guardsmen and selectees. Additional housing would be of mobilization type, tent camps in the South and cantonments in the North. Both buildings and utilities would have a five-year life. Moore cut requirements to the bone. Family quarters, garages, swimming pools, painting, landscaping, and all such nonessential features were out for the duration—or so he said at the beginning. While recognizing that munitions plants, depots, and communications systems would have to be at least semipermanent, Moore insisted that there be no embellishments.[44] Describing to Congressman John Taber what the new Ordnance works would be like, General Wesson said on 25 July: "We will have simple but durable plants. We figure that this emergency is not here today and gone tomorrow, and that these facilities should be built on a basis that would make them available for the next twenty years." Pointedly he added, "There are to be no high-fallutin' gargoyles on these buildings."[45]

Translating Moore's broad policies into detailed plans and specifications was the Construction Division's responsibility. Too vast and too complex for Lamphere's group to tackle alone, the job was shared with private firms hired under negotiated contracts. Industrialists provided many of the basic designs for munitions plants. Nearly every project of any size, whether a plant, camp, airfield, or depot, had its own architect-engineer to fit standard plans and layouts to the site, design utilities and road nets, and supervise construction. Concerns specializing in particular fields of engineering occasionally acted as consultants. For example, two nationally known firms of sanitary engineers, Metcalf & Eddy of Boston and Greeley & Hansen

[43] Lamphere Interv, 26 Jun 56.

[44] (1) Memo, SGS for G–4, 27 May 40. G–4/31751. (2) WD Ltr AG 705 (6–5–40) M–D–M to Chiefs Arms and Servs, 7 Jun 40. G–4/31757. (3) WD Ltr AG 600.12 (6–15–40) M–D–M, 15 Jun 40. G–4/31751.

[45] H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings . . . on the Second Supplemental National Defense Appropriation Bill for 1941*, p. 203.

of Chicago, reviewed plans for sewerage and sewage disposal at fifty camps and airfields and advised architect-engineers how best to handle this important aspect of design. All this help notwithstanding, the Engineering Branch carried a heavy load, doing much of the planning itself and overseeing the rest.

When Lamphere took over in July, Major Walters was one jump ahead of the directives, which were starting to trickle in. Since March, when Hartman had begun his salvage operation, the mobilization drawings had come a long way. At the Fort Myer warehouse, a group of forty men, headed by Major Field, had redrawn most of the 700 series plans. Some technical difficulties had yet to be ironed out. One particularly thorny problem involved heating and steam distribution systems for mobilization hospitals, the largest of which would include some eighty buildings connected by 100-foot corridors. Paint shops in motor vehicle repair buildings posed another tough problem: the question here was how to minimize fire hazards in these large wooden structures. Serious complications sprang from the creation of the Armored Force, which needed wider roads and more water than older branches, and radically different layouts as well. By midsummer requests were coming in for extras—guest houses, service clubs, dental clinics, and field houses—which Moore had recently authorized or indicated he might authorize soon. Orders of this kind were comparatively easy to fill, since standard details could often be incorporated into the blueprints. A flock of orders for Air Corps structures—hangars, repair shops, parachute drying towers, bombsight storage buildings, and the like—were harder to execute, for they required much original design. Challenging though they sometimes were, these purely technical jobs were well within the staff's capabilities. To the men in the crowded drafting rooms, the major stumbling block was the necessity of doing everything so fast.[46] Meanwhile, their superiors grappled with problems of another sort.

During the fall of 1940, as it drew lessons from military operations abroad, the General Staff continually reorganized the Army. Construction suffered in the process. Looking back on the early months of defense preparations, Nurse reflected: "One of the principal delays in getting off to as early a start as we desired on cantonment construction was due to G–3 being unable to arrive at a definite table of organization. It was constantly being changed."[47] The size of the infantry company, the basic unit around which most of the camps were designed, was not firmly fixed until construction was under way. Original orders from G–4, issued in June, envisaged a company of 125 men, and Lamphere planned accordingly. He laid out cantonments in blocks consisting of two 63-man barracks plus a mess hall, a recreation building, and a supply room of appropriate size; he left space for a third barracks should the need for one arise. When, on 1 October, G–3 set the company's war strength at 217, he had to redo the layouts to make room for a

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[46] (1) Intervs with Gen Dreyer, 27 Feb 59; W. R. Deininger, 13 Mar 59; S. Sandler, 5 Mar 59. (2) Ltr, Groves to OCMH, 22 Jul 55. EHD Files. (3) Memo, Anderson for Violante, 11 Oct 40. QM 600.1 (Mobl). (4) *ENR*, October 23, 1941, pp. 112–14.

[47] Ltr, Nurse to OCMH, 9 Mar 55. EHD Files.

fourth barracks and larger messing, recreation, and supply facilities. So late were decisions on the makeup of the new tank companies, and so scant the information as to what they would require, that he could complete no typical diagrams of armored division camps during 1940. These instances were by no means unique. October marked the publication of 35 new tables of organization and equipment; November, of 379; and December, of 30. Tables for units of thirteen types did not appear until January 1941.[48]

Once requirements were clear, planning of camps and cantonments proceeded fairly smoothly, for the Army was on familiar ground; the design of munitions plants was vastly more complicated. Structures had to accommodate complex processes and specialized machinery. Roads, railroads, utilities, shops, and laboratories had to be on a par with those at other large plants in heavy industry. Designs for storage magazines reflected the ever-present danger of explosion. Security against sabotage was always a consideration. Plans on hand at the beginning of the emergency were inadequate. On becoming assistant chief of the Industrial Service, Facilities, in June 1940, Lt. Col. Levin H. Campbell found that the Ordnance Department had very little in the way of factory layouts, equipment diagrams, and building specifications. The situation called into being a three-way partnership of using service, Quartermaster, and industry. The half dozen companies with experience in munitions manufacture served as design contractors. Engineers from other large industrial concerns, after a period of training at Army arsenals, also planned production units. Lamphere furnished blueprints for magazines, warehouses, shops, administration buildings, workers' housing, transportation systems, and utilities. The using service and the Quartermaster Corps supervised the operation jointly. All plans were subject to review by the Construction Division, but, in order to expedite the work, Hartman told his field officers to start building first and get his O.K. later. Control by the using service was much more rigid. No plan could go to an Ordnance project until the Wilmington suboffice had approved it.[49] "We are dealing with smokeless powder, with high explosives of all types," Campbell explained. "We are all in fear and trembling" lest the plants "blow up on us due to poor workmanship or poor knowledge or lack of 'know-how'."[50] Cumbrous though the system was, it produced results. By November Lamphere could start work on standard designs for industrial plants.[51]

Although they were then regarded as the least difficult, technically, of all defense projects, the new Air Corps installations produced many headaches. Under the regulations, General Arnold's office could set functional requirements, make initial estimates, and recommend layouts. Actually, the airmen were dab-

[48] (1) WD Ltr AG 600.12 (6-15-40) M-D-M, 15 Jun 40. G-4/31751. (2) Answers to Questionnaire, Violante to EHD, 25 Sep 57. (3) Dreyer Interv, 27 Feb 59. (4) T/O 7-17, 1 Oct 40. (5) List of T/O's, 1 Jan 41.

[49] (1) Ltr, Campbell to OCMH, 10 Mar 55. EHD Files. (2) Notes of Conf, Hartman, Campbell, Harrison, *et al.*, 13 Aug 40. QM 095 (Hercules Powder Co.). (3) Ltr, Constr Div to CQM St. Louis OP, 2 Nov 40. 635 (St. Louis OP) Part 1.

[50] Campbell's Testimony, 26 Feb 41. In May Comm *Hearings*, Part 1, p. 187.

[51] Ltr, Constr Div to CQM Iowa OP, 5 Nov 40. 635 (Iowa OP) I.

bling in design and had been for years. Col. Frank M. Kennedy, chief of Arnold's Buildings and Grounds Division and himself a graduate engineer, insisted on furnishing plans to the Quartermaster Corps. The Construction Division tried to go along with Kennedy's ideas but could not always do so. Some of his designs, according to Leisenring, had a safety factor of zero. Others, supposedly for temporary structures, incorporated many permanent features and carried estimates reflecting funds available rather than funds required: one drawing for an administration building came bearing a price tag of $13,260; Lamphere's men figured the cost at $77,000. Referred to the General Staff, plans of this sort usually met a quick death at the hands of G–4. Efforts by the Air Corps to freeze specifications for runway pavements before service tests were run were blocked by Colonel Reybold. Although helpful at times, Kennedy's incursions into design frequently cost the Engineering Branch a good deal of lost motion.[52]

Station hospitals proved to be a hornet's nest. Part of the trouble stemmed from General Moore's policy of using permanent barracks as wards, a policy adopted over General Hartman's objections. Barracks, Hartman had pointed out, were seldom near permanent station hospitals, which housed laboratories, clinics, and operating rooms. Besides, conversion would cost far more than temporary construction. The Surgeon General, Maj. Gen. James C. Magee, also opposed the plan at first, but, pressed by Moore, he at length gave in. Announced on 7 June 1940, the policy drew immediate protests from the field. Nevertheless, G–4 held to the decision for nearly four months.[53] Finally, on 20 September, Magee appealed to Moore's successor in G–4, Colonel Reybold. Calling attention to "the patent impracticability of providing appropriate hospitalization in this way," he asked that the policy be revoked.[54] Reybold agreed, and on the 26th ordered the building of temporary hospitals at permanent Army posts. Much time and engineering effort had been wasted. Sudden jumps in requirements were a further vexation. As the troop distribution changed, many hospitals had to expand. One planned for Fort Custer grew from 350 to 750 beds; one for Fort Bragg, from 200 to 2,000. To make matters worse, in September the General Staff directed Hartman to redesign all hospitals so that they could later be enlarged by 20 percent.[55]

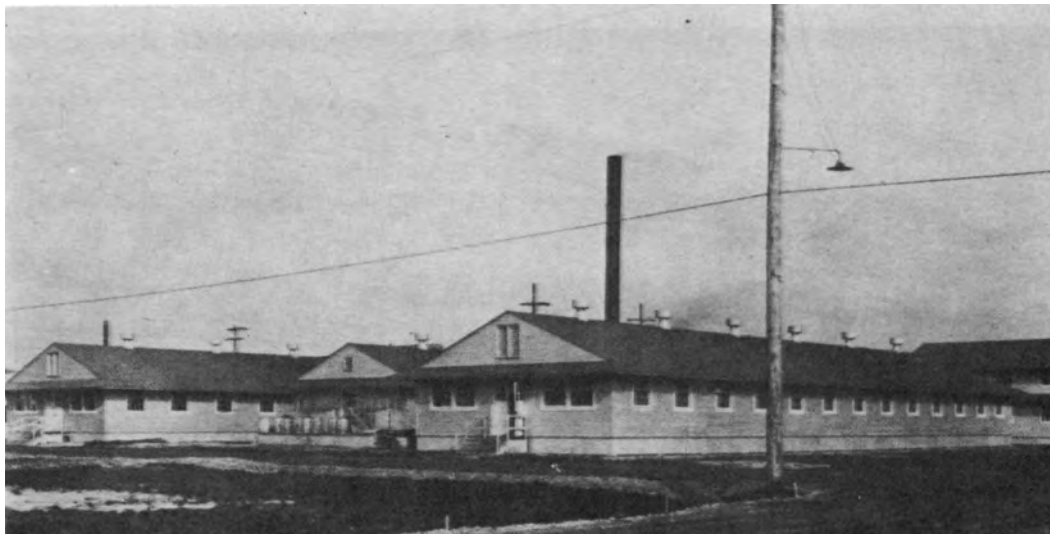
Difficulties notwithstanding, the Engineering Branch delivered the goods. By fall its catalogue of standard blueprints listed barracks for 25, 45, and 63

[52] (1) AR 95–5, 8 Jun 40. (2) Ritchie Interv, 26 Apr 56; Leisenring Interv, 5 Jun 57. (3) Ltr, CQM Mitchel Fld to OQMG, 8 May 40, and Inds. 600.1 (Mitchel Fld) Part 1. (4) Ltr, OQMG to TAG, 5 Sep 40, and Inds. AG 600.12 (1–23–36) (1) (sec. 1–D Constr Program). (5) D/S, Reybold to TQMG, 9 Sep 40. G–4/30552–4. (6) Ltr, OCofAC to TAG, 1 Nov 40, and Inds. 686 (Airfields) Part 5.

[53] (1) Memo, Hartman for G–4, 28 May 40. G–4/31757. (2) Ltr, SGO to TAG, 29 May 40. (3) Memo, Constr Sec G–4 for Moore, 5 Jun 40. Both in QM 632 (Dispensaries) 1941. (4) Clarence McKittrick Smith, *The Medical Department: Hospitalization and Evacuation, Zone of Interior*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1956), pp. 15–18. Cited hereinafter as Smith, *Hospitalization and Evacuation*.

[54] Memo, Magee for Reybold, 20 Sep 40. G–4/31757.

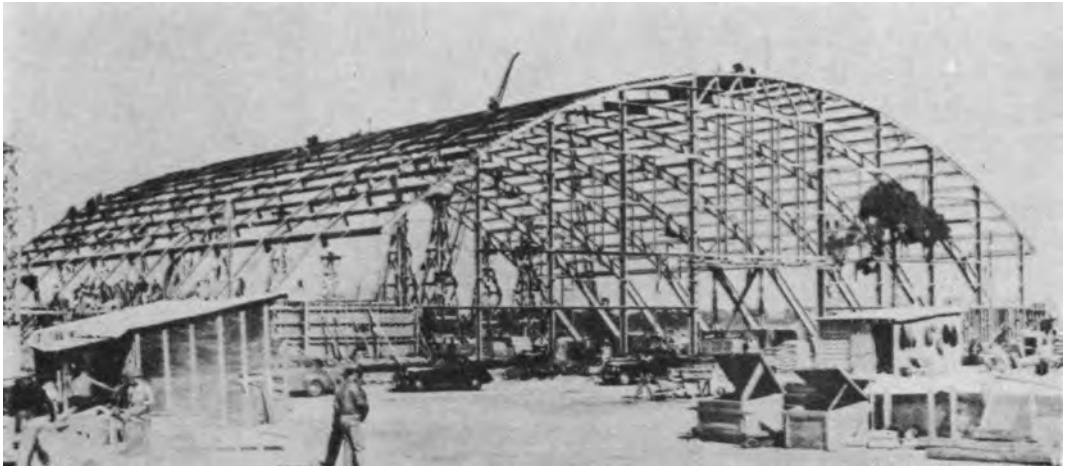
[55] (1) WD Ltr AG 600.12 (9–25–40) M–D to Arms and Servs, 26 Sep 40. 600.12A Part 9. (2) Smith, *Hospitalization and Evacuation*, pp. 13–14, 18. (3) QM 632 Cp Custer and Ft Bragg.



MESS HALL, 1,000-MAN CAPACITY (700 SERIES), CAMP GRANT, ILLINOIS

men, mess halls with seating capacities of up to 1,000, hospitals ranging in size from 25 to 2,000 beds, dispensaries, guard houses, cold storage plants, fire stations, control towers, telephone exchanges, freight terminals, and numerous other structures. Specifications were available for everything from flagpoles to 500,000-gallon gasoline storage and distribution systems. Layouts for most types of ground and air stations were in the hands of Constructing Quartermasters. To be sure, a number of the plans left something to be desired. Thoroughness had necessarily been sacrificed to speed. In the rush to send drawings to the field, some details had gone unchecked. Lack of funds had occasionally dictated the choice of inferior materials; for example, the 55-pound roofing paper specified for the 700 series buildings was the lightest and cheapest on the market. There were, moreover, several gaps in the plans, one of the most notable being the absence of a layout for armored camps. But, by and large, planning was well and quickly done.

Once he had established engineering standards, Lamphere faced an exacting task in getting them accepted. Interest in the Quartermaster plans was widespread and intense. Producers and suppliers of building materials had a great deal at stake. According to the estimators' rule of thumb, fifty cents of every construction dollar would go for materials. How orders totaling roughly half a billion would be apportioned among the materials industries depended on Quartermaster plans. The various construction trades would also be affected, carpenters benefiting if wood were specified, bricklayers, if masonry. Congress, too, was naturally attentive. In addition, a number of prominent persons were intent upon enhancing the beauty and amenities of the camps. Among them was Mrs. Roosevelt. All these groups



HANGAR CONSTRUCTION, MACDILL FIELD, FLORIDA

watched developments closely. It was a rare engineering decision that failed to call forth comment from one or more of them.

Howls of protest greeted the announcement that the Army would build temporary frame housing. Manufacturers of excluded products promptly attacked the 700 series. The Clay Products Association of the Southwest warned against "*spending* Federal funds in a frenzy of excitement and haste, as was regrettably done during the World War," in other words, against building camps of perishable wood, suggesting instead the "calm, wise, and business-like" procedure of "*investing*" in permanent buildings of brick and tile.[56] Makers of concrete blocks, cement siding, structural steel, asbestos sheeting, and prefabricated buildings took up the cry for less restrictive designs. The bricklayers union demanded work for its members. Congressmen, at the urging of constituents, asked the War Department to reconsider. Advocates of sturdier construction appeared in some quarters of the Army. Lt. Gen. Hugh A. Drum of the Second Corps Area strongly recommended that more durable materials than wood be used in his command. Major Groves entered a plea for heavier roofing and higher grade screening. Dissatisfaction spread. Before long, Captain Dreyer was spending much of his time listening to people who visited Lamphere's office to advocate changes in plans.[57]

As the program unfolded, suggestions multiplied. Senator Rufus C. Holman of

[56] Ltr, Clay Products Assn. of the Southwest to Sen Tom Connally, 5 Jul 40. QM 652 1922–40.

[57] (1) QM 652 1922–40. (2) QM 600.1 (Prefabs) 1937–41. (3) Lamphere Interv, 26 Jun 56; Leisenring Interv, 5 Jun 57; Dreyer Interv, 27 Feb 59. (4) Ltr, Stimson to Rep Hatton W. Sumners, 26 Aug 40. SW Files, Constr Work, 251–650. (5) Ltr, Drum to TAG, 30 Jul 40. QM 600.1 (2d CA Tng Cps) 1937. (6) Memo, Groves for Gregory, 3 Aug 40. Opns Br Files, Rpts of Insp.

Oregon, protesting plans for a steel arch hangar, argued the advantages of timber trusses. Mrs. Roosevelt recommended that the streets of the camps be curved. Major Groves, after a visit to Fort Benning one hot summer day, when water consumption exceeded 180 gallons per man, wished to up water allowances and make provision for possible future increases in camp populations. Like many proposals Lamphere received, these were impractical. Because the new hangars were huge affairs, 275 feet across and 90 feet high, timber framing would cost much more than steel. Curved streets, however attractive, would be longer, and therefore more costly and less quickly traversed, than the straight, right-angled roads that had characterized military camps since Roman times.[58] After studying Groves' suggestion for more ample water supplies, Hartman reminded Gregory: "This office is constantly laboring under demand of higher authority to keep costs to a minimum . . . . Though we invariably provide a quite liberal average to provide for any nominal increase, we could not well defend an expenditure of many thousands of dollars to provide a supply for an unanticipated increase of population."[59] Now and then a suggestion turned up that seemed worth trying. Manufacturers of steel siding and window sash who contended they could beat the price of competing wood products got a chance to prove it. But occasional changes of this kind did little to quiet the general uproar. In fact, lumber men raised a frightful clamor when steel men bid against them.[60]

To outsiders who challenged its building plans, the War Department presented a united front. Secretary Stimson answered advocates of permanent housing by explaining that camps had to be designed for economy and for speed of erection, and he gave two reasons why barracks of brick, tile, and concrete blocks were out of the question. First, durable materials would cost half again as much as wood; and, second, their use would add 10 to 15 percent to the time needed for construction. Judge Patterson told makers of prefabs that mobilization buildings would be cheaper to construct and to maintain than portables. Hartman offered additional reasons for rejecting durable materials and prefabs. Concrete would be too damp. Prefabs were not available in large quantities and would be difficult to transport. New plans and specifications would be necessary and it would take six weeks to prepare them. Refusals to make changes in the plans were softened by assurances that nearly every product would find a market in the program. General Gregory promised suppliers of brick, tile, and steel that their materials would be in brisk demand for depots, munitions plants, and Air Corps technical buildings.[61] These arguments fell on deaf ears. The protests continued.

The commotion eventually caught the attention of NDAC. As a champion of the view that all should share the

[58] (1) CE 411.1 (Lumber) I. (2) Lamphere Interv, 26 Jun 56. (3) Memo, Groves for Gregory, 3 Aug 40. Opns Br Files, Rpts of Insp.

[59] Memo, Hartman for Gregory, 12 Aug 40. Opns Br Files, Rpts of Insp.

[60] Dreyer Interv, 27 Feb 59; Interv with Everard H. Boeckh, 21 Jun 59.

[61] (1) Ltr, Stimson to Sen Elbert D. Thomas, 28 Aug 40. G–4/31932. (2) Ltr, ASW to Green Lumber Co., Laurel, Miss., c. 20 Jul 40. QM 600.1 (Prefab Bldgs) 1937. (3) Memo, Hartman for G–4, 19 Jul 40. G–4/31409. (4) Ltr, Gregory to Sen Tom Connally, 31 Jul 40. QM 652 1922–40.

benefits of the defense program, the commission could not ignore charges that the Army was excluding certain products. Concern lest orders be unduly concentrated led Harrison to hire one of the country's leading architect-engineers, Holabird & Root of Chicago, to make a comprehensive review of the 700 series plans. On 18 September Holabird & Root submitted a report, praising the Quartermaster drawings but suggesting the possibility of alternate designs based on such materials as terra cotta, cinder blocks, concrete, and asbestos. They also recommended preserving the natural beauty of the sites. Major Nurse hastened to remind the field that typical layouts should follow contours of the land and that trees left standing would camouflage camps and improve their appearance. The commission had acted too late to effect further changes at jobs scheduled for completion in 1940 or early 1941. Time did not permit preparation of new designs for projects already under way. Hartman and Harrison agreed that, for the time being, construction had to proceed on the basis of existing plans.[62]

Painting interests benefited by the only major change made after 1 September. General Moore originally excluded paint from the cantonment plans in order to help reduce requests to Congress. His dictum provoked emphatic protests. Hartman advised Gregory that "temporary construction should be given protective painting as soon as erected in order to reduce maintenance costs."[63] Col. Stephen J. Chamberlin, chief of the Construction Section, G–4, held the same opinion.[64] The Painting and Decorating Contractors of America and the Brotherhood of Painters, Decorators, and Paperhangers asked NDAC to intercede. In an appeal to Harrison, George S. Stuart of the contractors' association maintained that no building was complete without paint. Paint, he wrote, made a building habitable, beautified it, made it sanitary, protected it from insects and termites, dampproofed it, and, to some extent, rendered it resistant to fire. On a sentimental note, he added, "It will be a forlorn contrast for our boys to be brought from their painted and decorated homes and offices to Government buildings that are neither protected nor beautified with paint."[65] Harrison urged the Army to paint. And so did Mrs. Roosevelt. With no funds to pay for such a project, G–4 asked Hartman to see about painting the camps with WPA labor. But before the Army could take any action, the President intervened. On an inspection of Camp Meade, Maryland, he said he wanted the buildings painted. Assured of Roosevelt's backing, the General Staff decided to let contractors do the job using skilled workmen. On 4 November Reybold instructed Hartman to include painting in all contracts for temporary buildings. This directive resulted in the largest order for exterior paint in the history of the paint industry,

[62] (1) Notes of Conf in Harrison's office on 18 Sep 40, dated 24 Sep 40. QM 652 (Canton Constr) 1941. (2) Ltr, Nurse to Architect-Engineers, 28 Sep 40. QM 652 (Cp McClellan). (3) Memo, Harrison for Patterson, 16 Oct 40. Madigan Files, 101.1 (Canton Design & Constr).

[63] Memo, Hartman for Gregory, 20 Aug 40. Opns Br Files, Rpts of Insp.

[64] Memo, Chamberlin for Col Mallon, 8 Jul 40. G–4/31751.

[65] Ltr, Stuart to Harrison, 1 Oct 40. Madigan Files, 101.1 (Canton Design & Constr).

945,062 gallons, and a deficit of $11 to $12 million for the Construction Division.[66]

The most serious challenge to Quartermaster designs came from within the War Department itself. In a situation where every day counted, Hartman had told Lamphere to complete standards quickly and rush them to the field. Such minor adjustments as were needed could be made locally. This arrangement, however expeditious, was unwelcome to the chiefs of the using services, and particularly to Arnold and Magee, who were reluctant to let their field representatives settle questions of layout and design. The Surgeon General forced the issue early in the program by insisting on numerous changes in standards for mobilization hospitals, plans his office had helped prepare and had once approved. Blueprints were ready for mailing to the field, when Lt. Col. John R. Hall, chief of the Surgeon's Hospital Construction and Repair Division, demanded more toilets, storerooms, and offices. These changes took several weeks. Hall next served notice that he would furnish a layout for each station hospital. Since no two of his layouts proved to be alike, the Engineering Branch had the troublesome job of custom-designing heating systems. The Air Corps' Colonel Kennedy followed Hall's example. As delays developed (the Camp Custer hospital waited a month for plans from Washington), and as confusion mounted (the Orlando Air Base hospital went through three redesigns), Hartman appealed to G–4. The result was a "freeze order." Declaring most changes unnecessary, the General Staff on 22 August decreed no further revision of the standards without G–4 approval. Typical plans and layouts were to go, without further ado, to be adapted in the field.[67]

Heavy responsibilities devolved on Constructing Quartermasters. Superintending development of detailed layouts, reviewing work of architect-engineers, and helping to plan utilities systems and design footings for typical structures were but some of their technical duties. Hartman directed his field officers to use initiative. When, in their judgment, changes in the standards would speed completion, save money, or improve the finished product, they were to act promptly, forwarding revised plans to Washington as soon as possible. At the same time, Hartman expected Constructing Quartermasters to resist local pressures for changes that might slow progress, increase costs, or lower construction quality. He reminded them that they were answerable only to him.[68] Seasoned construction officers—Regulars like Colonel Thomas, who left Washington in September to head the Ogden and Vicinity office in Utah, Lt. Col. Lawrence L. Simpson, the veteran CQM at Fort Bragg, and Capt. Carl M. Sciple, the West Point careerist at Springfield Armory—understood their

[66] (1) Memo, Constr Div OQMG for G–4, 17 Jan 41. Opns Br Files, Painting. (2) Lamphere Interv, 26 Jun 56. (3) Rcd with Memo, Reybold for TAG, 2 Nov 40. G–4/31751. (4) WD Ltr AG 600.12 (11–4–40) M–D–M to Arms and Svcs, 4 Nov 40. 600.12A Part 10. (5) Rpt, Activities of Constr Div, Jul 40–Nov 41, p. 62. (6) Truman Comm *Hearings*, Part 1, p. 175.

[67] (1) WD Ltr AG 600.12 (8–15–40) M–D to TSG, 17 Aug 40, and Inds. QM 600.1 (Designs). (2) D/F, G–4 to TAG, 19 Aug 40. G–4/31840. (3) G–4/31751. (4) WD Ltr AG 600.12 (8–19–40) M–D to TQMG, 22 Aug 40. QM 600.1 (Mobl).

[68] OQMG Manual, Supplement to Guide for CQM's, Rev 1940, Covering FF Projects, 27 Aug 40, pp. 1–2. EHD Files.

assignment and knew how to carry it out. Inexperienced project officers had to learn by doing.

Real Estate

Recalling the role of the Real Estate Branch in the defense build-up, Colonel Valliant said, "No one could move until we got the land for them."[69] The size of the job was unprecedented. On 30 June 1940 the War Department owned about two million acres of land, the accumulation of a century and a half of gradual expansion. Needed at once were eight million more—fourteen times the area acquired in World War I. New Ordnance and Chemical Warfare plants required 263,000 acres; camps, firing ranges, hospitals, and depots, over two and one-half million; airfields and bombing ranges, five and one-third million. At scores of locations in some forty-two states the Army reached out for land.[70] The Real Estate Branch was under enormous pressure for speed. Colonel Burns, concerned primarily with industrial preparedness, warned Valliant, "If you delay this munitions program, you will be crucified for it";[71] and Colonel Chamberlin, speaking for the General Staff, told him "that no matter how fast he worked, it would not be fast enough."[72]

In the late spring of 1940 Colonel Valliant made plans for expediting a large-scale effort. His first big problem was personnel. Mirroring its peacetime mission, the Real Estate Branch numbered only two officers and seventeen civilians. The executive, Capt. Clinton J. Harrold, had ably assisted Valliant in the 200,000-acre program of 1939. Acquisition expert William F. Turton and leasing chief Edward T. Lindner, both veterans of the World War I Real Estate Service, directed experienced staffs. But a mere handful of specialists could not cope with the huge task ahead. In 1918 the Real Estate Service had needed 150 persons for a program far smaller than the one now contemplated. On 10 June 1940 Valliant explained to Colonel Chamberlin how he proposed to muster an adequate force. He envisioned a nationwide network of agents. Although the chief of Real Estate was the only man who could bind the War Department on land transactions, corps area quartermasters had for many years assisted in arranging leases and disposing of surplus property. Their duties would now include some purchasing negotiations. CQM's would also serve as agents. Meanwhile, Valliant planned to expand the Real Estate Branch as rapidly as he could. Men from the central office would handle the most complicated jobs. All agents would report directly to Washington, where Valliant and his top assistants would stand ready to speed to any site where trouble threatened.[73]

After two decades of meager budgets, the Real Estate Branch was suddenly glutted with funds. Within a 4-month period, Valliant received some $52,600,000 for land acquisition. During June

[69] Valliant Interv, 11 Jun 56.

[70] (1) Rpt, Activities of Constr Div, Jul 40–Nov 41, p. 37. (2) Real Estate PR 33, 30 Sep 41.

[71] Comments of Col Valliant, 24, 28 Mar 55. EHD Files.

[72] Memo, Chamberlin for Moore, 10 Jun 40. G–4/30881 Sec I.

[73] (1) Lt Col David B. Gideon, History of Military Real Estate Program, 1939–1945 (MS), pp. 10, 13. EHD Files. Cited hereinafter as Gideon, Mil RE. (2) Memo, Hartman for Valliant, 25 Jun 40. QM 601.1 (Misc) 1940.

1940 Congress voted $8,239,824 for ground and air reservations. In July Ordnance turned over nearly $28,000,000 for plant sites. With passage of the National Guard and Selective Service Acts in August and September, $16,374,885 became available for land.[74] Valliant found himself with an embarrassment of riches. "They just dumped the money in my lap," he said later, "and I couldn't get rid of it all immediately."[75] But impressive though the totals were, they gave little indication of program size, for most of the new acreage cost the army practically nothing.

More than 6 million acres, over three-quarters of all the land required, came from the public domain. Four bombing and gunnery ranges staked out on federal land were the largest in area of all defense projects: Choctawatchee in Florida covered 380,000 acres; Mojave Desert in California, 640,000; Wendover in Utah, 1.5 million; and Tonopah in Nevada, 3.5 million. Smaller but still quite extensive, 60,000 to 90,000 acres each, were several camp sites carved from national forests. Transfer of these public lands to the War Department lightened the burden on the Real Estate Branch appreciably. Purchasing such vast tracts would almost certainly have meant uprooting entire communities and dealing with hundreds of owners. As it was, the custodians, in most cases the Interior and Agriculture Departments, readily agreed to release the lands, insisting only that the Army minimize damage to improvements and take precautions against forest fires. The Quartermaster Corps had merely to arrange details of transfer and to settle mineral and grazing rights.[76]

Valliant leased four hundred thousand acres, mainly for maneuver areas, training grounds, landing fields, and temporary additions to existing posts. One National Guard camp, Bowie, was on a 90,000-acre site rented from the city of Brownwood, Texas, for one dollar per acre annually; and Camp Roberts, a replacement training center, occupied the 37,000-acre Nacimiento Ranch near Paso Robles, California, leased from its owners for $125,000 a year. These were exceptional cases. Most of the leaseholds were smaller—25,000 acres or less; and half of them contained fewer than 1,000 acres apiece. From Valliant's viewpoint, leasing offered marked advantages. First, lessors were, on the whole, a willing group. Only once did he have to condemn in order to lease. Second, for a short-term program, it was more economical to lease than to buy. Rents paid during 1940 ranged from 7 to 15 percent of appraised values. Third, leasing avoided conflicts with local authorities over removal of properties from tax rolls. Fourth, it eliminated the problem of eventually disposing of surplus land. Finally, corps area quartermasters could do much of the work.[77]

But leasing was often impossible. During World War I Ordnance had built a number of plants on leased land. Subsequent forced sales of these valuable structures at junk prices had caused the

[74] 54 *Stat.* 350, 599, 628, 705, 872, 958, 1030.
[75] Valliant Interv, 11 Jun 56.

[76] (1) Real Estate PR, 21 Feb 41. (2) 601.4 SWD. (3) Ltr, Harrold to QM Ninth Corps Area, 6 Nov 40. 601.1 (9th SvcC) I.

[77] (1) Real Estate PR, 21 Feb 41, pp. 28–31. (2) 1st Ind, 22 Jan 41, on Ltr, QM Ninth Corps Area to TQMG, 17 Jan 41. 601.1 (9th CA) II. (3) Ltr, RE Br Constr Div OQMG to USW, 28 Feb 41. USW Files, 601 (Land Acquisition).

Comptroller General to prohibit permanent improvements on privately owned land. Because of this prohibition and because many desirable sites were available only through purchase, Valliant had to buy more than one and one-third million acres.[78]

Two courses were open to him: negotiate with the owners or take the land by condemnation. While the power to condemn was a potent weapon, he preferred not to use it. A hate-provoking action, condemnation was often also slow and costly. When the government filed a declaration of taking, the normal procedure in such cases, it turned control over to the court. Although title vested in the United States as soon as a declaration was filed and the amount of estimated compensation was deposited with the court, it was the judge who decided when the government could take possession. Under the Imminence of War Statute enacted during World War I, the government might in an emergency take possession immediately upon filing a petition in condemnation and giving a perimeter description of the land; but title did not pass to the United States until final settlement. Where dockets were crowded and other important cases were awaiting trial, condemnation hearings were frequently postponed. Moreover, in finding fair values, local juries tended to favor their neighbors' claims; as recently as the spring of 1940, a Massachusetts jury had awarded $1,000,000 for land appraised at $300,000. Court charges and interest due owners added to the expense of condemnation. Hence, Valliant sought to reach voluntary agreements whenever titles were clear.[79] By accepting the idea that the government would "pay somewhat more than the going price . . . in view of the fact that the owners will be immediately dispossessed and, therefore, put to great inconvenience," he avoided mass condemnations at all but a few sites.[80]

Whether he bargained with owners or took them to court, Valliant needed large numbers of surveyors, appraisers, and attorneys to assist him. Efforts to recruit such men were, for the most part, unavailing. The Civil Service Commission was unable to furnish lists of eligibles, and federal salary scales were too low to attract many real estate experts. By 1 November only nine civilians had joined the Washington staff, and several of them were clerks. Locating officers with real estate experience was even harder. During 1940 Valliant found but one, a Reservist who had worked for the Interstate Commerce Commission. Corps area and Constructing Quartermasters experienced similar difficulties. Valliant had to look elsewhere for help. The Soil Conservation and Forest Services, the Farm Credit Administration, the Home Owners' Loan Corporation, and other federal agencies agreed to furnish personnel. Attorneys from the Department of Justice conducted many closings of direct purchase cases. These assistants rendered valuable service, but some of them were too accustomed to

[78] (1) *Blossom Report*, pp. 273–74. (2) 1st Ind, 20 Dec 40, on WD Ltr AG 600.12 IR (12–9–40) M–D to JAG, 11 Dec 40. QM 600.3 (Funds) 1936. (3) Real Estate PR, 21 Feb 41.

[79] (1) 46 *Stat.* 1421. (2) 40 *Stat.* 241, 518. (3) Memo, Chamberlin for Moore, 10 Jun 40. G–4/30881 Sec I.

[80] Memo of Agreement between Valliant and Chicago Title & Trust Co., 10 Sep 40. 601.1 (Kankakee OW) III.

the leisurely pace of peacetime activities to act with the speed demanded.[81]

Valliant turned in his predicament to private brokers. The Atlas Powder Company, operator for the shell-loading plant at Ravenna, Ohio, helped point the way. Early in August 1940, with the Ordnance Department's approval, Atlas engaged the Bankers Guarantee Title & Trust Company of Akron to buy the Ravenna site. A 5-percent commission on the gross sale price was payable by the vendors. Later that month, after running into difficulties, Atlas assigned the Bankers Company contract to Colonel Valliant. Under his direction, the Akron firm produced quick results. Seeing in the brokerage arrangement a possible means of relieving his overburdened staff, Valliant consulted Turton, who advised him that a similar expedient had worked in World War I. During the next three months, with the help of Ordnance, NDAC, the Baltimore and Ohio Railroad, and local chambers of commerce, Valliant chose brokers for eight of his most urgent jobs—six Ordnance projects and two camps—involving a total of 1,692 tracts and 151,274 acres. He offered the brokers substantially the same terms Atlas had given the Akron concern: seven would receive commissions of 5 percent; the eighth, who undertook an unusually large and complicated job at Jefferson Proving Ground, Indiana, would get 6.5 percent. By hiring brokers Valliant obtained much-needed expert assistance. If his agreements with them resembled cost-plus-a-percentage contracts, recently prohibited by Congress, he was unaware of it.[82]

Knowing that advance publicity would encourage speculation and send real estate prices soaring, Valliant proceeded cautiously. Until his agents could enter an area, take a number of options, and stabilize land values, he fought shy of politicians and reporters. He did his traveling by day coach to lessen the chance of anyone's learning who he was or where he was going. Hartman, Patterson, and Reybold helped throw a cloak of secrecy around new locations. Nevertheless, leaks occurred. One Ohio congressman announced the coming of the Ravenna plant at a public meeting. A series of untimely rumors was traceable to Chester Davis in NDAC. Local officials and business leaders in whom site boards had confided also passed the word along. During August and September 1940, leaks cost the Army an estimated $500,000. While Hartman and Valliant demanded greater secrecy, Stimson, in response to outside pressure, chose a very different course. Early in October he announced that sites would be made public at the time of their selection.[83]

News of the Army's coming provoked intense excitement. Eight-column banner

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[81] (1) Gideon, Mil RE, pp. 13–16. (2) Tab, Civilian Pers in Constr Div, 1 Nov 40. Opns Br Files, Pers. (3) Orgn Chart, Constr Div OQMG, 11 Dec 40. EHD Files. (4) Notes, Conf of Corps Area QM's, 29 Jan 41, pp. 75–82. QM 377 (CA QM) 1940.

[82] (1) 601.1 (Ravenna OW) I. (2) Outline Data on RE Brokers, prepared in Constr Div OQMG, Apr 41. EHD Files. (3) Memo, Gregory for Patterson, 23 Dec 40. QM 601.1 (Misc) 1940.

[83] (1) Valliant Interv, 11 Jun 56. (2) Memo, Hartman for Wesson, 27 Aug 40. (3) Memo, Patterson for Rutherford, 16 Aug 40. Last two in QM 600.1 (Ord) 1939–40. (4) D/S, G–4 to G–2, 5 Sep 40. G–4/30881 Sec II. (5) Memo, Wilson for Reybold, 6 Sep 40, and notation thereon. 624 Part 1. (6) Tel Conv, Campbell and Groves, 10 Dec 40. Opns Br Files, Ord. (7) WD Press Release, 7 Oct 40. 601.1 (Weldon Spring) I.

headlines on page one of the Joliet *Herald-News* hailed the decision to locate two plants, Kankakee and Elwood, in northeastern Illinois. According to the paper, a boom was on the way. Farmers would be well paid for their land. Jobs would be plentiful and wages high. Within six months to a year, the *Herald-News* prophesied, the population of Will County would increase from 114,000 to 154,000, and 8,000 new homes would go up in Joliet alone. In community after community, optimism ran high. People on relief were jubilant at the prospect of working again. Chambers of commerce looked forward to a period of prosperity. But though many hoped to gain by the presence of military installations, other expected to lose. Taking thousands of cultivated acres would produce a major upheaval. In the rich agricultural areas of Ohio, Indiana, Illinois, and Missouri, 4,000 farm families would be uprooted. Whole villages faced extinction as the Army threatened to take the land on which they stood. Foreseeing much hardship, these people refused to give in without a fight.[84]

While townsfolk rejoiced at their good fortune, the countryside was in a ferment. Farmers held mass meetings, drafted petitions, and sought injunctions. Delegations went to Washington. Men wired their congressmen, and women wrote to Mrs. Roosevelt. The protests evoked a pathetic picture.[85] "Some four hundred farm people will be thrown out in Iowa winter weather," read one appeal to Vice President-elect Henry A. Wallace. "Stock, machinery, and household goods will have to be sacrificed. We are heart broken and desperate. Can't you help us?"[86] "Tragic, if not stunning," an Illinois group described the blow.[87] Many urged the Army to take waste lands instead of cultivated acreage. But the War Department argued military necessity. In answer to a plea that he spare an old homestead, Patterson wrote: "I agree with you that it is hardly a pleasant thing to give up a home that one's family has occupied for nearly eighty years, but it is hardly a pleasant thing to have to build an ammunition plant. Ours, unfortunately, is a world in which such things are necessary."[88]

At the first signs of unrest, Colonel Valliant hastened to the scene. Talking to the owners, he was understanding but firm. While he sympathized with the farmers and expressed sincere concern for them, he made it clear that individual interests must give way to the national interest.[89] Complimenting the Real Estate chief on a speech to an angry gathering at Wilmington, Illinois, a judge of the State Court of Appeals said, "You handled it beautifully and left those

[84] (1) Joliet *Herald-News*, September 25, 1940. (2) Comments of Col Valliant, 24, 28 Mar 55.

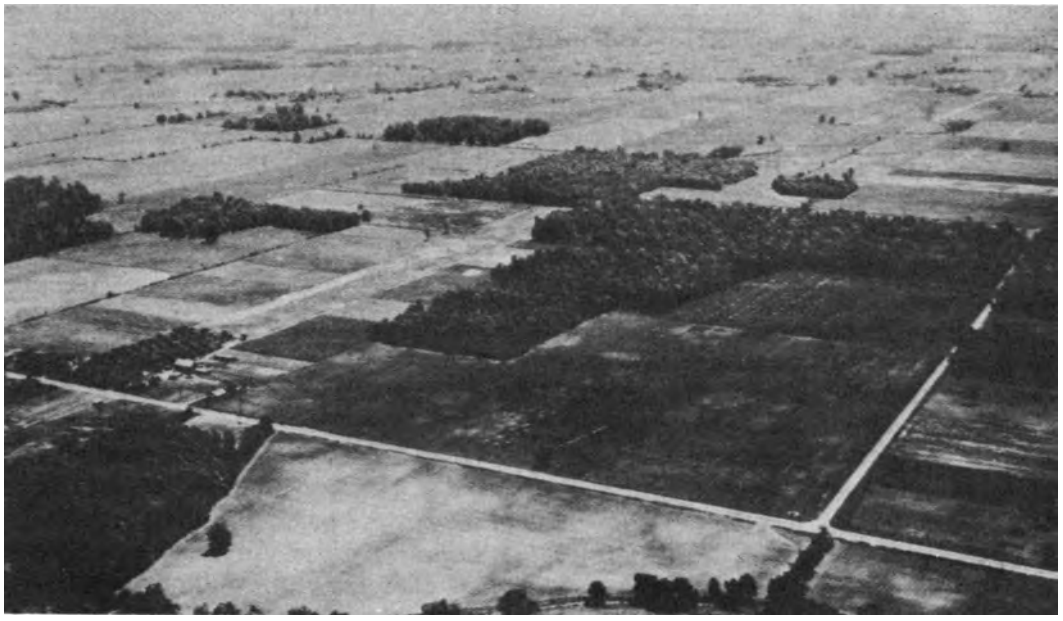
[85] (1) Constr Div OQMG, RE Br, Annual Rpt, FY 1941, p. 8. Gideon File, 6A3. (2) 601.1 Ravenna OW, Kankakee OW, Anniston OD, Iowa OP, Jefferson Pr Grnd, Ft Knox, and others. (3) Memo, Groves for Gregory, 23 Sep 40. Opns Br Files, Convention in Chicago.

[86] Ltr, Mabel L. Moore, West Burlington, Iowa, to Henry A. Wallace, 8 Nov 40. 601.1 (Iowa OP) I.

[87] Ltr, R. G. Richards *et al.*, Wilmington, Ill., to Sen Scott W. Lucas, 25 Sep 40. 601.1 (Kankakee OW) I.

[88] Ltr, Patterson to Mrs. C. E. Woolley, South Bend, Ind., 2 Nov 40. QM 601.1 (Kingsbury OW) 1940–41.

[89] (1) Memo, Valliant for Gregory, 29 Aug 40. 601.1 (Ravenna OW) I. (2) Ltr, Valliant to Miss Bessie A. Lee, Anniston, Ala., 11 Dec 40. 601.1 (Anniston OP) I. (3) Ltr, Mrs. Walter H. Miller, Middletown, Iowa, to the President, 14 Nov 40. 601.1 (Iowa OP) I. (4) Ltr, R. Newton McDowell, Kansas City, Mo., to . . ., 24 Oct 40. 601.1 (Weldon Spring OW) I.



SITE OF PLUM BROOK ORDNANCE WORKS, OHIO

farmers in a much better frame of mind when they left the meeting than when they came."[90] Valliant made no extravagant promises, but with natural humanity, he frequently succeeded in calming the farmers down.

What proved more difficult was bringing them to terms. Arriving at the Army's newly selected sites, Quartermaster agents were met by demands for high prices. Some claims, though large, were reasonable. Many sites, particularly those for munitions projects, included prize agricultural land. Indeed, the features that made for good industrial tracts—firm, level ground, ample water, and nearness to roads and railroads—also made for profitable farms. But many asking prices were clearly out of line; some were as much as thirty times appraised values. Perhaps the greatest stimulus to high prices was the Army's insistence on immediate possession. One attorney reported sharp advances when farmers began "to realize the enormity of the task" of moving within thirty days.[91] Rumors that speed was all-important and price was no object caused many owners to expect much more than they had ever before dreamed their properties were worth. Scalpers made a bad situation worse. Lashing out against the activities of "land option sharks," a Quartermaster spokesman said, "When the owner whose land we take over attempts to move into the adjoining area, he finds the prices there have been skyrocketed and he is unable

[90] Ltr, Judge Frank H. Hayes, Springfield, Ill., to Valliant, 25 Sep 40. 601.1 (Kankakee OW) I.

[91] Ltr, Charles S. Smith, Akron, Ohio, to Valliant, 10 Sep 40. 601.1 (Ravenna OW) I.

to buy at a fair price."[92] At several places Valliant cut costs by redrawing site boundaries to avoid payment of severance damages and exclude expensive buildings and commercial properties. Generally, he told his agents to try to satisfy the owners but to remember that Uncle Sam was not Santa Claus.[93]

Reviewing options taken in the field, Valliant and Turton noted a startling development. Not only were valuations high, but sums had frequently been added to cover "disturbance damages." A father was to get $2,000 for training his blind daughter to find her way around a new farm. A congregation was to receive $1,000 for the trouble of relocating its church; the preacher, $695 for lost salary. A dairyman had been promised extra compensation for driving his cows a few miles down the road—he said it disturbed their milk production. Though some claims were farfetched, others stemmed from genuine hardship.[94] "In almost every instance," one agent wrote, "we are purchasing somebody's home, which means disruption of their family life, moving immediately from the premises, disposing of large quantities of livestock, farm machinery, feed, and other property, storing of household goods, renting of new quarters for living, etc. All of these inconveniences are considered by us."[95] Whether losses were real or fancied, there was no legal basis for such claims. The government was obliged to pay fair market value, no less and no more.

The source of the trouble was soon clear. Valliant learned that NDAC had asked the Attorney General for a ruling in favor of disturbance damages and had been refused. Correspondence on the subject between Chester Davis and professors at the University of Illinois came to light. Reports from the field told a fuller story. From agents in Ohio, Indiana, Illinois, Missouri, and Iowa came word that Davis' top assistants, Arthur C. Ringland and John B. Hutson, had been out talking to the farmers. Lists of disturbance factors, compiled by NDAC, were passing from hand to hand. Indorsed by the Advisory Commission were claims for the following: rent for family quarters until new farms could be found; storage for equipment; housing for livestock; decreased milk production while herds adjusted to new surroundings; unused pasturage; unrealized benefits from fertilizing, plowing, and seeding; value of labor expended in moving; and losses of various types, including those sustained in forced sales of animals and machinery. Representatives of the Farm Bureau, the CIO Farmers Union, and the Farm Security Administration supported these demands. At some projects, agents refused to countenance disturbance damages, but at others, pressure was so extreme that they allowed such claims. Inclusion of disturbance items was increasing option prices as much as 40 percent.[96]

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[92] Testimony of John J. O'Brien, 18 Mar 41. In May Comm *Hearings*, Part 1, p. 252.

[93] Gideon, Mil RE, p. 17.

[94] Memo, Constr Div OQMG for Patterson, 21 Mar 41. USW Files 601 (Land Acquisition) (Disturbance Damages).

[95] Ltr, A. J. Cockrell, Burlington, Iowa, to Valliant, 6 Dec 40. 601.1 (Iowa OP) I.

[96] (1) Memo, Constr Div OQMG for Patterson, 21 Mar 41. USW Files, 601 (Land Acquisition) (Disturbance Damages). (2) Memo, Ringland for Rcd, 17 Oct 40. 601.1 (Kankakee OW) I. (3) Memo, Turton for Valliant, 21 Oct 40. 601.1 (Elwood OP) I. (4) Memo, Chief RE Br to Chief Constr Div OQMG, 11 Apr 41. Opns Br Files, House Investigation.

Valliant took what steps he could to force prices down. He returned options containing disturbance items, unsigned. Valuations up to $90 an acre he usually let go unchallenged, since time did not permit careful investigation of every parcel; but he checked larger claims against assessments. He used various means to bring the owners around. His agents tried persuasion and take-it-or-leave-it offers. His policy was to "give the farmers a break," and whenever possible to let them graze cattle, cut timber, harvest crops, and salvage improvements after the government took possession. Nevertheless, some owners remained obdurate. At fourteen projects Valliant condemned all or part of the site. Among the larger tracts taken in this way were 1,678 acres for the Utah General Depot, 2,080 acres for the Denver Ordnance Plant, 16,246 acres for the Fort Dix target range, and 31,600 acres for expansion of Fort Jackson. A tense situation at the Ordnance project near Burlington, Iowa, received more delicate handling. Options on this site, taken by A. J. Cockrell, a local realtor working under a brokerage arrangement, showed an overall cost of $4 million, double the amount originally estimated. Farmers in the area, having just lost a furious fight to keep the Army out, were in an ugly mood. Warned that riots might occur if the government condemned, Valliant hired John J. Wagner of Cedar Rapids to make an independent appraisal.[97] From Burlington, Wagner reported "that even a slight hint that our conclusions might be less than option prices would be . . . dangerous." He nevertheless agreed to see the job through. In reappraising the site, Wagner set prices at "the highest level of value which . . . could, in any circumstances, be justified."[98] But Valliant feared that these prices would be unacceptable and established new ones averaging 18.5 percent above Wagner's appraisals. Cockrell was able to renegotiate his options on this new basis, thereby cutting $650,000 to $700,000 from the cost of acquisition and possibly preventing unfortunate incidents.[99]

Disappointed and worried farmers took their troubles to NDAC's Agricultural Division, bombarding Davis with complaints. Visits from delegations, long-distance calls, and numerous letters impelled the veteran farm leader to investigate. Since many of the early protests were from the Kankakee–Elwood area, he began there.[100] By 17 October his assistant, Ringland, had completed a report. Criticizing Raymond E. Herman, the Chicago broker in charge of acquisition, Ringland wrote: "A number have complained that they were informed in a ruthless manner, 'You might as well stop that plowing because the Government is going to take possession in thirty days.' This caused a great deal of emotional distress and misunderstandings that still exist." He went on to deplore Valliant's use of city men and Herman's dealings with tenants. Calling the tenant

[97] (1) Valliant's Testimony, 15 Jan 41, Exhibit B, p. 36, with Memo, TIG for USW, 19 Feb 41. IG 333.9 (Jefferson Pr Grnd). (2) Valliant Interv, 11 Jun 56. (3) Real Estate PR, 21 Feb 41, pp. 26–27, 21–22, 13–14. (4) 601.1 (Iowa OP) I.

[98] Ltr, Wagner to Valliant, 13 Dec 40. 601.1 (Iowa OP) I.

[99] (1) Memo, RE Br for Constr Div, 17 Feb 41. USW Files, 601 (Land Acq). (2) Memo, RE Br for Constr Div, 4 Feb 41. 601.1 (Iowa OP) I.

[100] Ltr, Hutson to May, n.d., and Incls. In May Comm *Hearings*, Part 1, pp. 252–57.

"the forgotten man," he explained:

> In all cases the broker has been dealing only with the owner, informing him that the tenant must look to the owner for the settlement of his rights. In the purchase price, however, it has been the general practice to be generous and to include . . . an additional amount to compensate the tenant. But this leaves it to the owner to decide how much he will pass on to the tenant, and in some cases compensation for the tenant has been forgotten completely or is quite inadequate . . . . Some tenants, knowing their rights, are ready to file suit to recover adequate damages from the owner. Such action would cloud the title and make for delay in the settlement of the project.

Ringland concluded by recommending, one, that the Army safeguard tenants' interests, two, that it recognize disturbance factors, and, three, that federal appraisers replace private realtors.[101]

The first point was quickly settled. On 18 October Ringland, Hutson, and Turton agreed to a procedure that would protect the tenants. Before taking an option, Quartermaster agents would insist that owner and tenant come to an agreement. The tenant would be paid his share directly, not through the owner as before. But there was no accord on points two and three. On 23 October and again on the 25th, Davis brought these questions before the Advisory Commission. With his colleagues' approval, he called a conference of representatives from various federal land agencies and laid his case before them. Upholding Davis' views, the conferees advised the War Department in effect: dismiss the brokers, turn the projects over to us, and thus ensure that owners and tenants will receive sympathetic treatment and that purchase prices will include disturbance damages.[102] On 5 November Patterson issued a statement. The Quartermaster General would try "to secure the good will of the community to the maximum extent possible, consistent with fair prices and the availability of the land at the time and in the location needed," and "to cause the least hardship and inconvenience." Patterson made no mention of brokers or disturbance damages. In fact, he did little more than set the War Department's seal on Colonel Valliant's policies.[103]

Renewing the attack, Davis concentrated his fire against the brokers. Under mounting pressure, Patterson turned to The Quartermaster General for advice. Early in December Gregory replied with a defense of the brokerage arrangement. While conceding that city brokers might be unfamiliar with farm problems, he pointed out that they almost invariably hired local men to help them. He went on to state that the brokerage system had saved money by cutting overhead costs from the 8 percent averaged by government departments to 5 percent. He further argued that because private realtors did "not have to conform to established and sometimes time-consuming practices of the Government," they could work more swiftly than federal agents. Gregory nevertheless gave ground. "Hereafter," he wrote, "this office will make increased use of the facilities of other Government agencies and will not resort to special agents on a commission basis except in a very exceptional

[101] Memo, Ringland for Rcd, 17 Oct 40. 601.1 (Kankakee OW) I.

[102] (1) Memo, Turton for Valliant, 21 Oct 40. 601.1 (Elwood OP) I. (2) *Minutes of the NDAC*, pp. 104, 107. (3) Incl with Ltr, Hutson to May.

[103] Memo, Patterson for TQMG, 5 Nov 40. QM 601.1 (Misc) 1940.

case, in which case your office will first be consulted." Gregory's answer failed to satisfy Patterson, who was beginning to worry on another score—that the brokerage contracts might fall within the definition of cost-plus-a-percentage. On 26 December he prohibited further use of brokers without his express approval.[104] At the same time he explained to Davis that "if real estate agents were used on future projects the fee would be fixed and not related to the purchase price of the land."[105] When, in late December, Valliant wished to hire a private realtor for the Plum Brook Ordnance Plant in Ohio, Patterson agreed on condition that the broker receive a lump sum agreed to in advance.[106]

Having won a partial victory in the matter of the brokers, Davis returned to the subject of disturbance damages. For a time Colonel Valliant gave in to some extent, directing his agents to allow for tangible damages though not to itemize them in the options. Pressing his advantage, Davis next demanded that the War Department earmark part of its next appropriation for disturbance payments. Valliant opposed the plan. Asked for an opinion, the Attorney General again pointed out that Davis was on shaky legal ground and suggested another approach—give the Department of Agriculture relief funds to assist in the relocation of needy families. The result was that the farm security agency took over the handling of disturbance cases and the Real Estate Branch went back to rejecting damage claims.[107]

While he referred to Davis as "my bête noire," Valliant had other critics to content with. Ordnance was dissatisfied with his progress. According to the commanding officer, contractors at Kankakee had waited three weeks while the Real Estate Branch trifled with options. A spokesman for General Wesson maintained that slowness in obtaining land had held up the Iowa shell loading plant one month. Valliant denied delaying construction at any project and stated that many difficulties were traceable to Ordnance itself. Declaring that the Real Estate Branch was often the last to learn of impending projects, he cited the Wolf Creek plant at Milan, Tennessee, as an example. Ordnance first requested authority to build the plant on 14 November, but Valliant heard nothing of the matter until 27 December, when he got orders to acquire the tract. In the six weeks that elapsed before he learned of Ordnance's intentions, he might have completed preliminary work.[108]

Despite the hue and cry that accompanied acquisition, Valliant's record was a creditable one. By late December 1940

[104] (1) Memo, Gregory for Patterson, 4 Dec 40. (2) Memo, Patterson for Gregory, 26 Dec 40. Both in 601.1 I.

[105] Incl with Ltr, Hutson to May.

[106] (1) Memo, Gregory for Patterson, 30 Dec 40. (2) Memo, Gregory for Patterson, 31 Dec 40, and approval thereon. Both in 601.1 I.

[107] (1) Incl with Ltr, Ringland to Turton, 26 Dec 40. 601.1 I. (2) Ltr, Valliant to Ostendorf-Morris Co., Cleveland, Ohio, 7 Jan 41. 601.1 (Plum Brook OW) I. (3) Ltr, Davis to Patterson, 29 Jan 41. (4) Ltr, Asst Atty Gen to Patterson, 27 Feb 41. (5) Ltr, Patterson to Davis, 6 Mar 41. Last three in USW Files, 601 (Land Acquisition). (6) Memo, RE Br for Chief Constr Div OQMG, 11 Apr 41. Opns Br Files, H Investigation.

[108] (1) Valliant Interv, 11 Jun 56. (2) Memo, OCofOrd Industrial Serv Facil for TQMG, 6 Nov 40. 601.1 (Kankakee OW) I. (3) Memo, Valliant for Hartman, 29 Nov 40. 601.1 (Weldon Spring OW) I. (4) Tel Conv, Maj Thomas (Ord) and Groves, 31 Dec 40. Opns Br Files, Burlington OP. (5) Memo, Valliant for Patterson, 31 Dec 40. 601.1 I.

he had obtained initial possession of some 65 tracts. Much of this work had gone forward with remarkable speed. Given advance notice, Valliant was able to open 20 sites to contractors on the same day he received directives. During the last half of 1940 his average time for gaining access was just under 27 days per project. By February 1941, when the first full progress report appeared, the Army had acquired all or part of 85 sites. Valliant by that time had accepted options on more than a million acres and had transferred several million more from the public domain—this in addition to leasing land at 38 projects and renting 2 million square feet of warehouse, office, and garage space. The work of proving titles, making settlements, dismantling structures, moving utilities lines, closing roads, and fencing or removing cemeteries dragged on, for these were time-consuming jobs; but rarely did contractors have to wait before they could commence to build.[109]

Selecting Contractors

Seeking to make the most of available contracting talent, Hartman reviewed his requirements for constructors and architect-engineers. For munitions projects he would need concerns with industrial experience and skill in heavy construction; for camps and cantonments, firms familiar with mass housing and municipal and sanitary work; for airfields, specialists in grading and paving. Above all, he would need reliable contractors with the managerial, technical, and financial strength to meet emergency demands. Under the competitive method of award, by which a majority of the smaller, less urgent jobs were let, his choice was restricted to the lowest qualified, responsible bidder. But under the negotiatory method, used on most of the big crash projects, he was able to pick his own man. Choosing among the thousands of potential contractors was a delicate and exacting task.

In May 1940 Hartman began assembling information on candidates for fixed-fee contracts. Announcing that all applicants would receive consideration, he invited interested parties to submit their qualifications and performance records. Constructors were to furnish details as to how their firms were organized, what their financial resources were, how much equipment they owned, and what their experience was with fixed-fee and lump sum work. Architects and engineers were to list personnel and recent commissions. Answers rained in from all over the country, as contractors hastened to offer their services. When Major Thomas arrived in Washington on 14 June, he plunged immediately into sorting and classifying the applications. He and his small staff of engineers and clerks separated constructors from architect-engineers, listed them by states, and began an alphabetical index. Upon formation of the Construction Advisory Committee in July, he turned over to Chairman Harvey files on 320 architect-engineers and 1,140 construction companies.[110]

Hartman, meantime, was establishing selection criteria. He set rigorous stand-

[109] (1) Real Estate PR, 21 Feb 41, *passim*. (2) Constr Div OQMG RE Br, Annual Rpt, FY 1941, pp. 5–6. Gideon File, 6A3.

[110] (1) Final Rpt, Constr Adv Comm, 15 Mar 42, pp. 5–7. EHD Files. (2) Loving, History of the Fixed-Fee Branch, Apr 41. Loving Papers. (3) WD Press Release, 22 Jul 40, sub: Civilian Experts to Aid Army Speed Constr. EHD Files.

ards. To qualify, a firm would have to offer a strong, going organization backed by the capital, experience, and key personnel to complete a given project in the least possible time. Work performed over the past five years would be an important factor; no concern could qualify unless its recent volume of business was more or less commensurate with the estimated cost of the job at hand. Current commitments would also carry weight, for Hartman wished to prevent contractors from accepting more work than they could handle. Ideally, the firm selected would be able to grasp the requirements of the project, provide an adequate force of seasoned, competent men, anticipate problems, distinguish between essentials and refinements, attain maximum speed and efficiency, achieve unbroken progress, and faithfully fulfill the contract. Determined to maintain absolute impartiality, Hartman made it a fixed rule that representations on behalf of applicants by congressmen and others would receive no weight whatever. He made but one concession to politics: other things being equal, he would draw contractors from the section of the country in which the project was located and preferably from the same state. As a matter of sound policy, he intended to spread the work among as many firms as possible. Except in unusual circumstances, the principle would apply: one contract to a contractor.[111]

In mid-July, the newly created Construction Advisory Committee got to work. On the 17th the members made their first recommendation—for the architect-engineer contract at Springfield Armory. During the next few weeks they were immersed in hiring a staff of fifteen, analyzing a continuing flood of applications, and nominating contractors for a handful of secondary projects, most of which were arsenal roundouts. A good deal of their time was taken up by company officials who came to solicit contracts. After talking to these visitors, the committee made "a very rough attempt at grading them as to size, personality, and energy." Chairman Harvey emphasized: "We do not reject anybody. . . . Every contractor—'most every contractor at least—is qualified for something if the right job should turn up."[112] The real work of selection had yet to begin. Since the earliest command construction contracts were lump sum, they lay outside the committee's jurisdiction. And while the new munitions plants were fixed-fee propositions, Quartermaster participation in awarding these contracts awaited settlement of differences with Ordnance.

In June, about the time the first defense construction funds became available, the War Department had informed NDAC of "an internal problem between the Quartermaster Corps and the Ordnance Division as to who should have supervision over the building of plants." The dispute had arisen over the contract for the new smokeless powder factory at Charlestown, Indiana, the initial project in the industrial preparedness program.[113] Without a by-your-leave to Hartman, General Wesson was proceed-

[111] (1) Memo, Hartman for Admin Div OQMG, 18 Jul 40. QM 400.13 (Mun Program—FY 1941). (2) Memo by Constr Adv Comm, 31 Jan 41, pp. 4–6. EHD Files. (3) Final Rpt, Constr Adv Comm, 15 Mar 42, pp. 3–5. EHD Files. (4) Statement of Gen Hartman, 5 Jul 55, p. 12.

[112] Testimony of Forrest S. Harvey, 12 Feb 41. In May Comm *Hearings*, Part 1, p. 2.

[113] *Minutes of the NDAC*, p. 38.

ing to negotiate an agreement with Du Pont for design, construction, and operation of the plant.[114] This move, though contrary to the Defense Act, was hardly unexpected. Ordnance officers had long favored a decentralized construction setup similar to the one that existed before the autumn of 1917. In their view the agency that would run the plants should also design and build them. "*Ordnance* was charged with the responsibility of producing munitions in specified quantities and schedules," one of them explained. "The Construction Division was not. In war, end results count, not preliminaries."[115] Additional pressure toward decentralization came from the industrialists on whom Ordnance had to rely. The so-called "merchants of death" were naturally reluctant to expose themselves to another ordeal like the Nye investigation. Accepting a defense role as a patriotic duty, they were in a position to insist on their own terms. As prospective plant users, they wished to control construction and design. Thus, Wesson's arrangements with DuPont followed a certain logic. But from the Quartermaster standpoint this logic was sophistical. Fearing a return to the chaotic conditions of early 1917, Hartman made strenuous objections.

Colonel Burns tried to reconcile these differences. There was, he felt, no easy answer. As an Ordnance officer with thirty-six years' service, he could well appreciate Wesson's position. Equally clear to him was the fact that the plants were part of Hartman's program.[116] With his executive, Major Dillon, also an Ordnance officer, Burns outlined a procedure, a fair and proper way, he thought, of handling munitions projects. The using service would name firms to operate the plants and to act as "management agents" during construction; Hartman would choose building contractors "in consultation with and subject to the concurrence of the interested service." The Quartermaster and Ordnance or Chemical Warfare would draft the contracts together, the using service "determining all questions of a technical nature involving final operation" and the Quartermaster taking responsibility for "all construction phases." Supervision of projects would be in accordance with these principles. Any disputes between the services would go to the Assistant Secretary. Johnson approved the procedure on 11 July.[117] But things did not turn out as Burns had planned. Not only did Wesson avoid compliance, signing his agreement with DuPont on the 17th and speeding negotiations with the Chrysler Corporation toward a single architect-engineer-constructor-operator contract for the new tank arsenal at Detroit, but he also attempted to divorce the Quartermaster Corps from the Ordnance program by seeking changes in the Defense Act.

Secretary Stimson had been in office only a few days when Wesson asked him to sponsor a rider to the supplemental appropriation bill recently introduced in Congress. The proposed amendment would empower the Secretary to assign construction projects to any arm or service. Uncertain of his ground, Stimson consulted Benedict Crowell, who op-

[114] Completion Rpt, Indiana OW, 6 Nov 42, p. 5. EHD Files.

[115] Comments of Gen Campbell, VIII, 58. EHD Files.

[116] Burns Interv, 24 May 56.

[117] Memo, Burns for Johnson, 11 Jul 40, and approval thereon. 470 Part 1.

posed the change[118]—and informed opinion was solidly behind the ex-Assistant Secretary. "All the logic of experience," said Harrison, "indicates that under one central authority . . . the program ought to be carried out more soundly, more expeditiously, and more economically than would be the case were the execution of construction handled by the several services."[119] A similar statement came from the Hogan committee.[120] Meantime, the Construction Division offered a spirited defense of the existing law. Maintaining "that much loss of time and money will be caused by the failure to appreciate that the prospective user is seldom the one best qualified to construct the plant," Hartman blasted the Ordnance amendment. "It would be little short of a calamity," he warned, if the clock were turned back to early 1917.[121] Although General Moore saw merit in the single contract plan for certain industrial projects, he nevertheless considered the suggested change too sweeping. Confronted by such widespread opposition, General Wesson wavered. Finally, on the last day of July, he withdrew the proposal and agreed to follow the procedure outlined by Colonel Burns.[122]

During August a contracting pattern emerged. At projects, such as Ordnance chemical and explosives works, where experience in difficult processing techniques was essential, a single firm contracted for design, construction, and operation. The Quartermaster Corps made arrangements for architect-engineering and construction. Thus, Hartman negotiated the construction clauses of an agreement signed with Hercules on 16 August for a powder plant at Radford, Virginia, and at the same time approved Chrysler's choice of Albert Kahn Associates as engineering subcontractor for the Detroit Tank Arsenal. At projects requiring less experience—bag loading plants, shell loading plants, small arms ammunition factories, and the like—the Quartermaster Corps normally awarded separate contracts for architect-engineering and construction. The shell loading plant at Ravenna, Ohio, was the first handled in this way. On 28 August Ordnance signed an agreement with the Atlas Powder Company for operation of the plant. A few days later, Hartman, acting on the advisory committee's recommendations, awarded the architect-engineer contract to Wilbur Watson and Associates of Columbus, Ohio, and the construction contract to the Hunkin-Conkey Company of Cleveland. The compromise satisfied no one. The Quartermaster General disliked the single contract, which tended to make industrialists arbiters in construction matters, while Ordnance would have preferred to use it "altogether if we could, because it facilitates . . . the transition from construction to operation by having the same contractor."[123] Nevertheless, both services had one end in view—to get the plants built; and toward that end, they co-operated.

[118] (1) G–4/31858. (2) Stimson Diary, 24 Jul 40.

[119] Memo, Harrison for Burns, 31 Jul 40. SW Files, Gen Corresp, 1932–42, Constr Work.

[120] Memo, Hogan for Dillon, 17 Jul 40. ANMB 334 Comm Members and Min of Mtgs. (3) See also Ltr, Hogan for ANMB, 1 Aug 40. SW Files, Constr Work 261–650.

[121] Memo, TQMG (CDH) for G-4, 23 Jul 40. QM 600.1 (Misc) 1940.

[122] (1) Handwritten notes by General Moore, 23 Jul 40. G–4/31858. (2) Memo, Schulz for Wesson, 29 Jul 40, and 1st Ind, 31 Jul 40. SW Files, Gen Corresp, 1932–42, Constr Work.

[123] Testimony of Col Francis H. Miles, Jr., 5 Mar 41. In May Comm *Hearings*, Part 1, p. 220.

Late in August the floodgates opened. Upon passage of the National Guard Act, the Construction Advisory Committee was deluged with work. During the next month and a half, the committee nominated firms for sixty fixed-fee contracts, the bulk of which were for troop housing. Then, as the pace of camp selections slackened, there came a surge of industrial jobs, followed by waves of replacement training centers, general hospitals, and depots. Before the year was out, Harvey, Blossom, and Dresser had helped choose more than 140 contractors. Only rarely, as when Ordnance suggested a firm favored by one of its operators, did Hartman proceed without consulting the committee. The advisory group came into the picture when Loving or Lamphere called for nominations. Guided primarily by data in their files, the members first selected a number of firms, perhaps as many as ten. A quick investigation followed. Dun & Bradstreet furnished financial reports; the Bureau of Contract Information, performance ratings. Telephone inquiries went to trade associations and professional societies. Prospective contractors came in for questioning. After narrowing the field to the three it believed best qualified, the committee recommended them in order of preference to General Hartman. The branch chief concerned—Loving or Lamphere—reviewed the recommendations and made a tentative selection. He then cleared his choice with Patterson's office and with NDAC, sending the contractor's name to Hartman for final approval.[124]

At first the Construction Advisory Committee was besieged by demands for preferential treatment. "Political pressure from members of Congress to award work to their constituents was a strenuous problem," General Hartman related. "Furthermore, the White House almost daily called on the telephone in reference to work for specified firms."[125] Observing that the placement of emergency contracts "was too big a thing for the politicians not to get mixed up in it," Dresser exclaimed: "They were on our necks. Believe me, the heat was terrific."[126] There was also plenty of heat on congressmen and the President. Many, many firms were soliciting their help in landing defense contracts, and as one Representative pointed out to Harvey, "Of course, we have to run for office and you do not."[127] In dealing with political requests, the Construction Division proceeded tactfully but resisted pork-barrel contracting. Hartman invariably suggested that congressmen ask their constituents to file formal applications with the Construction Advisory Committee. At his direction, a letter went to all leading contractors, outlining the method of selection and emphasizing that there were no strings to pull. With Patterson's help, he publicized the policy of giving local concerns first consideration, a policy legislators heartily approved. A meeting at which Quartermaster officers briefed congressional leaders served further to clarify misunderstandings. Gradually the pressure eased. Attempts to sway the committee became increasingly rare.[128]

[124] (1) Constr Adv Comm, Recommendations Book. EHD Files. (2) Memo, Constr Div OQMG for USW, 11 Apr 41. QM 600.1 (CPFF) 1941, II.

[125] Statement of Gen Hartman, 5 Jul 55, p. 13.

[126] Dresser Interv, 2 Apr 57.

[127] May Comm *Hearings*, Part 1, p. 53.

[128] (1) Circ, OQMG to various contractors, 15 Aug 40. EHD Files. (2) Memo, Schulz for Gregory, 13 Sep 40, and related corresp. QM 600.1 (CPFF) (Policy) I. (3) QM 600.1 (CPFF) (Misc Corresp) 1939–40.

Influence peddlers offered the most serious threat to the Quartermaster's reputation for impartiality. The earliest fixed-fee contracts carried the following "convenant against contingent fees":

> The Contractor warrants that he has not employed any person to solicit or secure this contract upon any agreement for a commission, percentage, brokerage or contingent fee. Breach of this warranty shall give the Government the right to terminate the contract, or in its discretion, to deduct from payments due the Contractor the amount of such . . . fee. This warranty shall not apply to commissions payable by Contractors upon contracts or sales secured or made through bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business.[129]

But persons who claimed they could procure contracts through inside connections were already at work. Conspicuous among them was a firm that openly advertised its services. Although Hartman repeatedly warned contractors against having dealings with such people, a number of companies hired intermediaries or bought advice from persons "in the know." One case hit close to home. Late in September, while negotiations were in progress with the Consolidated Engineering Company of Baltimore for construction at Camp Meade, Hartman learned that Consolidated had agreed to pay Gen. Richard C. Marshall a commission on any work he was helpful in securing. Reportedly several other big concerns were clients of the onetime Chief of Construction. Marshall's activities put the division in an awkward position, for although Quartermaster Regulars had little to do with him, the returned veterans of the World War I construction crew were frequently in his company. At Loving's insistence Consolidated broke off with Marshall before signing the Meade contract. After telling Patterson what had happened, Hartman adopted a new safeguard: henceforth every fixed-fee contractor had to sign an affidavit that he had paid no one to assist him in any manner whatever to obtain the award.[130] Satisfied that the War Department was in the clear, Patterson wrote to a friend, "I am confident that there is no fancy stuff going on."[131]

Resisting pressure was clearly a negative approach to selection; the main job was one of choosing wisely among applicants. Although plenty of concerns believed themselves capable of handling emergency assignments, only a small minority could meet Hartman's criteria. Comparatively few enterprises possessed the experience required for the Army's high-speed fixed-fee projects, most of which were estimated to cost between $5 million and $30 million. "You take a $5,000,000 job that has to be done in three months," Harvey explained, "and it is equivalent to a $20,000,000 job on an annual basis. In fact, because the organizing time is so short, it takes considerable ability to do that amount of work in that amount of time and do it efficiently or with any pretense of efficiency." It took considerable capital, too. To finance a fixed-fee job, a constructor had to put up about 20 percent of the total cost. At the time the program began, raising several million dollars was

[129] CPFF Form 1, approved by the ASW, 12 Jul 40, art. XIV.

[130] (1) Memo, Hartman for Burns, 18 Nov 40. SW Files, Constr Work 251–650. (2) Truman Comm *Hearings*, Part 2, pp. 581–603, 491–93. (3) Dresser Interv, 2 Apr 57; Marshall Interv, 23 Sep 55; Pagan Interv, 8 Mar 57.

[131] Ltr, Patterson to Richard C. Evarts, Boston, Mass., 17 Oct 40. SW Files, Constr Work 251–650.

an impossible feat for most. Personality was another limiting factor. Some reputable and well-to-do firms were passed over because their key officials were too old and lacking in drive to cope with crash deadlines. The advisory committee hoped to find the right contractor for every job, but, as Harvey pointed out, there was no scientific way of doing this. "It is entirely a matter of judgment," he said, "as to who will serve the Government best."[132]

Determined to take no chances that might jeopardize success, the committee sought top-grade talent for the initial camp projects. In states, such as California, Texas, Illinois, Pennsylvania, and New York, which abounded in first rate contractors, they had no difficulty picking local outfits. But in some areas of intensive camp construction, particularly in the South, they encountered a shortage of qualified concerns. As a result, a number of early projects went to distant firms with wide experience and ample resources.[133] Harvey defended the selection of Starrett Brothers and Eken of New York as constructors for Camp Blanding, Florida, stating that "$10,000,000 to be done in three months looked like a whale of a job, and we were scared to death to put anybody on it but pretty big contractors."[134] Although the committee justified choices of this kind, local interests complained bitterly. One Alabama congressman upbraided the War Department for pursuing a policy which seemed "to take care of the big people, make the big still bigger, and leave the little people struggling to get along out in the cold."[135] In the face of numerous protests, Patterson tightened enforcement of the local preference rule. On 13 September he told Hartman to get his permission before selecting any more out-of-state concerns. Another of Hartman's informal spread-the-work rules became War Department policy in November, when Patterson directed him to choose no contractor for a second job if other competent firms were available and, when repeat contracts were necessary, to select only organizations that had completed previous assignments in a highly commendable way.[136]

Meanwhile the advisory committee found ways to broaden the basis of eligibility. During September it began performing "shotgun marriages," naming several medium-sized concerns to act as joint venturers. Two Atlanta firms teamed up to build Camp Stewart, Georgia, and two companies from Memphis undertook construction at Camp Forrest, Tennessee. To make these combinations doubly strong, the committee pooled specialists—utilities experts, earthmovers, and the like—with general contractors. "What we needed," said Dresser, "was reserve power, so that one thing going wrong wouldn't upset the whole job."[137] Still there was much risk involved, for if the partners proved to be incompatible, the project was sure to suffer. The committee went as far with this method as it dared, employing it during 1940 on some thirty-eight con-

[132] Harvey's Testimony, 12, 13 Feb 41. In May Comm *Hearings*, Part 1, pp. 8, 13, 44, 2, 27.

[133] OQMG, Constr Contracts Awarded or Approved, 12 Nov 41.

[134] Harvey's Testimony, 25 Apr 41. In Truman Comm *Hearings*, Part 1, p. 335.

[135] May Comm *Hearings*, Part 1, p. 50.

[136] (1) Memo, Schulz for TQMG, 13 Sep 40. QM 600.1 (CPFF) (Policy) I. (2) Final Rpt, Constr Adv Comm, 15 Mar 42, p. 3. EHD Files.

[137] Dresser Interv, 2 Apr 57.

tracts, including two dozen for camp construction and engineering work.[138] The Assignment of Claims Act, approved on 9 October, altered the situation more profoundly. Under its provisions, a contractor could, to use Harvey's expression, "hock his contract at the bank and borrow money on it."[139] Many competent firms whose limited assets had heretofore barred them from consideration were now in the running for camp contracts.

The magnitude of industrial projects and the complexity of the manufacturing processes involved precluded wide distribution of munitions work. True, the Quartermaster Corps succeeded, to some extent, in awarding the less challenging loading and small arms ammunition plants to regional concerns and to combinations of local firms with companies of national reputation. In cases of this kind, the committee exercised utmost care. Reviewing the selection of four constructors for the Hoosier Ordnance Plant, Harvey said: "As to a camp if you make a mistake it is not so terribly vital, but as to an ammunition plant it is extremely vital that it be handled properly. For that reason we thought we should get all of the powerful companies we could find that were not already engaged in that type of work."[140] Enlisting contractors for Ordnance chemical and explosives works was the hardest task of all. Because there had been no projects of the kind in the United States since World War I, only a handful of experienced men were available. For design and construction of these installations the Army had to rely almost entirely on a few industrial specialists centered in the metropolitan areas of Cleveland, Detroit, Chicago, Los Angeles, Boston, and New York and the engineering departments of such corporations as Du Pont and Hercules.

To make certain completed plants would be acceptable to operators, the Construction Division usually followed their recommendations. For example, at the suggestion of the Proctor & Gamble Defense Corporation, the committee selected the H. K. Ferguson Company of Cleveland to design the Wolf Creek shell loading plant near Milan, Tennessee, and to act in combination with a local road builder as constructor. Occasionally, Quartermaster contracts went to the operator himself. In September, when the time came to place agreements for the shell loading plant at Elwood, Illinois, Ordnance requested that the operator, Sanderson & Porter, also serve as architect-engineer and builder. Hartman agreed and thus bypassed the advisory committee—a circumstance which later had the unanticipated result of clearing Mr. Blossom of any connection with the award to his own company. Similarly, Day & Zimmermann of Philadelphia, who were to operate another shell loader, the Iowa Ordnance Plant, were named, in this case by the committee, to design the installation. Hard pressed to find industrial engineers, and generally at the insistence of the using service, the division accepted several firms for second or third contracts. Smith, Hinchman and Grylls, especially qualified by their long experience with plants in the Detroit area, designed two of the early small

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[138] Constr Adv Comm, Recommendations Book. EHD Files.

[139] (1) 54 *Stat.* 1029. (2) May Comm *Hearings*, Part 1, p. 16. (3) OQMG Circ Ltr 92, 7 Nov 40. OCE Legal Div Lib.

[140] May Comm *Hearings*, Part 1, p. 3.

arms ammunition factories, Lake City and Denver. The DuPont Company, offering superior technical knowledge and demanding that certain processes be kept secret, received architect-engineer-construction contracts for both the Indiana powder plant and the ammonia works at Morgantown, West Virginia, and, in addition, served as consultant on the TNT plant at Kankakee, Illinois.[141]

For their work in selecting fixed-fee contractors, Harvey, Blossom, and Dresser were alternately damned and praised. Criticism was inevitable in a noncompetitive system of selection. Disappointed contractors and their sponsors voiced many protests. Some accused the Construction Advisory Committee of prejudice in favor of big business. Others hinted that the Quartermaster Corps was running a racket or playing politics. To those who knew the facts such talk was nonsense. Within the War Department the committee's performance was recognized as outstanding. "I believe the work performed by the members . . . was eminently satisfactory and successful and was handled honestly and patriotically," said General Hartman. "With the limited salaries that I was able to pay these men it meant a great financial sacrifice on the part of all three."[142] Patterson summed up his opinion of the committee's work as follows: "Careful scrutiny has convinced me . . . that the system which has been followed provides safeguards against the selection of incompetent contractors, that selections have been honestly and capably made, that personal favor or political influence has played no part in the choice of contractors."[143] In December 1940, after personally thanking the committee members, Secretary Stimson noted in his diary, "They have done a fine piece of work"[144]—a judgment the record abundantly confirmed.

Negotiating Contracts

To company officials who waited expectantly in the corridors of the Construction Division, a nod from Loving or Lamphere signaled success. Ushered into a soundproof office, the prospective contractor learned he was under consideration for such-and-such a job. He then was handed a draft of the contract, a cost estimate, and a description of the work. In addition, he received a questionnaire about his resources, organization, personnel, policies, and plans for the project. Presently a team of negotiators arrived for the first of several conferences leading toward a formal contract. Loving and Hartman were usually on hand to bargain with construction contractors; Lamphere, Sherman, and Tatlow conducted talks with architect-engineers. Negotiations were secret and generally required two or three sessions. Because the division's representatives were sorely pressed for time, these meetings frequently took place at night.[145]

A dearth of engineering data handicapped the negotiators. Descriptions of

[141] (1) Memo, Constr Div OQMG for USW, 16 Jan 41. QM 600.1 (Misc—Jan, Feb, Mar) 1941. (2) Memo by Constr Adv Comm, 31 Jan 41, pp. 47, 33, 39. EHD Files. (3) May Comm *Hearings*, Part 1, pp. 197, 166. (4) OCE, Mil Constr Contracts, May 46, Part I, Sec 1, p. 43; Part II, Sec 1, p. 151.

[142] Statement of Gen Hartman, 5 Jul 55, p. 12.

[143] 29 Apr 41. In H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on Military Establishment Appropriation Bill for 1942*, p. 76.

[144] Stimson Diary, 17 Dec 40.

[145] (1) Loving, Hist of the FF Br, Apr 41, pp. 3–10. (2) Interv with Arthur L. Sherman, 14 Oct 59.

the jobs were necessarily vague. Loving and the others usually knew what types of buildings were to be built, how much money was budgeted for a project, the number of men to be housed at a given camp, and the planned daily output of a particular munitions plant. Beyond this, they had little specific information. In the absence of detailed site surveys, they knew almost nothing "as to the actual extent of utilities to be constructed or the conditions under which the work would be undertaken, that is, whether rock would be encountered, or quicksand and water, or good clay."[146] Contractors would find out what was what only after they took over the projects. As far as difficulty and extent of work was concerned, the Construction Division offered them a blind bargain.

Agreement on terms was more or less a routine affair, since the contracts followed standard forms. Among other things, building contractors agreed to start work immediately, maintain a responsible resident manager at the site, use the best available labor and materials, incorporate into the project any materials furnished by the government, keep complete records and accounts which would be open to inspection at all times, take advantage of all discounts, rebates, and salvages, and do everything necessary to complete the job in an acceptable manner and with all possible speed. Under the terms of their contracts, architect-engineers pledged to run surveys, draw maps, make layouts, prepare estimates, adapt standard plans to the sites, design structures for which no typical drawings existed, and supervise construction. Contractors would receive a fee for their services and reimbursement for virtually all expenditures except interest, off-site overhead, and company officials' salaries. The government reserved the right to terminate the contracts at any time and for any cause.[147]

A noteworthy feature of the fixed-fee construction agreement was a provision that bound the contractors to lease their equipment to the government. Rents would follow a schedule prepared by Loving and endorsed by the AGC. Because contractors were supposed to derive profits solely from their fees, the schedule was designed to reimburse them for the costs of ownership only, that is, for insurance, taxes, and depreciation. To protect its equity in leased equipment, the Construction Division inserted a recapture clause into the contracts. This clause provided that title would pass to the government when accrued rentals equaled the value of a machine plus one percent for each month used. Upon completion of a project, the government would have the right to recapture additional pieces of equipment by paying the difference between accrued rentals and value, plus the one percent per month.[148]

In their talks with contractors, Loving and Lamphere tried to reach understandings on matters not covered by written agreements. They questioned each constructor as to how he would equip and organize his project, how many key men he would assign, what parts

[146] Loving's Testimony, 25 Apr 41. In Truman Comm *Hearings*, Part 1, p. 342.

[147] (1) CPFF Form 1, approved by the ASW, 12 Jul 40. (2) CPFF Form, Architect-Engineer Svcs (1940).

[148] (1) CPFF Form 1, approved by the ASW, 12 Jul 40, art. II, par. 2. (2) Constr Div OQMG, Contractors Equip Rental Schedule, Jul 40. 481 Part 1.

of the work he would sublet, and whether he would run an open or a closed shop. They asked each architect-engineer who his top men on the job would be, how large a staff he expected to hire, whether he would farm out any of the planning to other professional concerns, and how he proposed to co-ordinate his work with that of the constructor. They also tried to familiarize contractors with the problems ahead. For example, Loving told representatives of Starrett Brothers and Eken, "You undoubtedly know and realize that there is tremendous pressure being brought from all localities to utilize . . . local talent . . . ." He advised the New York firm to give Florida men "first consideration" for subcontracts at Camp Blanding.[149] But, because they recognized that contractors must be free to make decisions on the job, the negotiators did not ask for solemn commitments on such questions. Nor did they try to dictate methods and procedures. "As a matter of fact," Loving explained, "we selected these men because we had confidence in their experience and ability to organize the job, and we didn't feel it incumbent upon us to tell them exactly what they should do. We felt we were hiring them to tell us what to do."[150]

Negotiations frequently hinged on questions of fee. The upward limits were prescribed by law. The Act of August 7, 1939, permanently established the maximum payment for architect-engineer services at 6 percent of estimated cost. This statute also provided that fees for construction work must not exceed 10 percent of estimated cost. On 28 June 1940 Congress reduced the allowance for construction services to 7 percent. Two months later it adopted a 6-percent limitation on constructors' fees, which remained in effect throughout the war. Although Congress insisted that fees be set at the time of award and adjusted only when there was a substantial change in the scope of the contract, it prescribed no formula for determining them.[151]

Shortly after Loving joined the division, Hartman told him to be guided by a schedule of minimum construction fees developed by the Hogan committee and approved by ANMB. This schedule established a graduated scale, the fee percentage decreasing as the estimated cost increased. (*Table 5*) Thus, a one-million-dollar contract would pay at least 5.24 percent, while the minimum for a 20-million-dollar job would come to 2.5 percent. As the Hogan group pointed out, cost was only one measure of a project's scope. Recognizing that some projects would require a longer time to complete, greater resources, and more highly specialized management than others, Hartman and Loving adopted a scale of maximum fees, ranging up to 20 percent higher than the ANMB minimums. Meanwhile, after consulting the American Society of Civil Engineers and studying the general fee practices of federal, state, and municipal agencies, Hartman drew up a schedule for architect-engineers. (*Table 6*) These fees were average rather than minimum. Lamphere was to pay more for complicated work and less for simple, but to

[149] Transcript of Negotiations Between Reps of Constr Div and Starrett Bros and Eken, 8 Sep 40. Opns Br Files, Confs.

[150] 20 May 1941. In Truman Comm *Hearings*, Part 4, p. 1004.

[151] (1) 53 *Stat.* 1239. (2) 54 *Stat.* 676. (3) 54 *Stat.* 881.

TABLE 5—SCHEDULE OF MINIMUM FEES FOR CONSTRUCTION SERVICES

Estimated Cost of Project	Fixed Fee
$ 100,000 or under	$ 6,000
300,000	17,200
500,000	27,400
1,000,000	52,400
2,000,000	94,900
3,000,000	127,000
5,000,000	175,000
10,000,000	300,000
20,000,000	500,000
(Intermediate amounts to be interpolated)	

Source: Memo, Hogan Comm, 19 Jun 40, sub: FF Constr Contract. ANMB 334 Comm Members and Min.

keep within 20 percent of the scheduled fees.[152]

Before making an offer, Quartermaster negotiators considered the type of project involved and the extent of the services to be rendered by the contractor. In figuring compensation for relatively simple, short-term jobs, such as camps and hospitals, Loving adhered rather closely to the minimum schedule for construction work. His offers for TNT, smokeless powder, and other complex manufacturing plants approached maximum rates. Projects of intermediate difficulty, such as depots, arsenals, and ammunition plants, commanded fees about midway between the minimum and maximum scales. The amount of responsibility a contractor would assume weighed heavily in Loving's computations. He gave the top fee for a project of any given type and cost to contractors who would render "complete service." Thus the largest fees, in terms of percentage, went to contractors who agreed to furnish all equipment, procure all materials, finance all costs, and perform all work not normally subcontracted. For anything short of complete service, Loving made appropriate reductions. Lamphere used a similar procedure in appraising professional services. He, too, set fatter fees for tougher jobs and paid maximum rates only to architect-engineers who did complete design, made all surveys and investigations, helped place orders and subcontracts, and supervised construction.[153]

Contractors displayed mixed reactions to Construction Division proposals. Some were "satisfied thoroughly," but many protested that their fees were too low. A number pointed out that profits on defense work would compare unfavorably with earnings on ordinary commercial ventures.[154] Offered $268,298, or 3.5 percent, for the Blanding job, Andrew

[152] (1) Loving, Hist of FF Br, p. 10. (2) Rpt, Activities of Constr Div, Jul 40–Jul 41, p. 106.

[153] (1) Loving's Testimony, 25 Apr 41. In Truman Comm *Hearings*, Part 1, pp. 348–49. (2) Rpt, Activities of Constr Div, Jul 40–Nov 41, pp. 74–75. (3) OCE, Contract Negotiation Manual (Rev 1943), pp. 7–8. EHD Files.

[154] Loving's Testimony, 25 Apr 41. In Truman Comm *Hearings*, Part 1, pp. 349–51.

TABLE 6—SCHEDULE OF AVERAGE FEES FOR ARCHITECT-ENGINEER SERVICES

Estimated Cost of Project	Fixed Fee
$ 100,000	$ 3,000
500,000	12,000
1,000,000	19,500
2,000,000	30,000
3,000,000	37,000
4,000,000	42,500
5,000,000	48,000
10,000,000	75,000
Over 10,000,000	*

* 0.75 percent of estimated project cost.

Source: (1) Memo, Hartman for Harrison, 6 Aug 40. QM 600.1 (CPFF) (Policy) I. (2) QM 333.9 (Senate Investigation) Part 1.

J. Eken said, "Well, I don't consider 3.5 percent a very luscious fee. On the other hand, we are down here not just for business but also we sincerely want to do our part." He accepted the proposition but reminded Loving, "I still say that is a darned low fee."[155] Others were less amenable than the president of Starrett Brothers and Eken. "We have in several instances had to talk to them rather plainly," Loving disclosed, "that we thought they were making their contribution to national defense, toward preserving the market for free enterprise as we have known it in the past."[156] Although contractors frequently complained that the Construction Division drove hard bargains, they nevertheless accepted its offers.

In choosing the cream of the building industry, Hartman selected contractors who normally set a high price on their services. Fees barely acceptable to top-notch constructors and architect-engineers were far more attractive to those with less impressive qualifications. In fact, there were plenty of firms willing to work for smaller profits. But Hartman was not looking for cut-rate talent. He realized that efficient contractors were worth their hire, that money spent for good management was never wasted. His attitude was summed up in a statement of the Hogan committee:

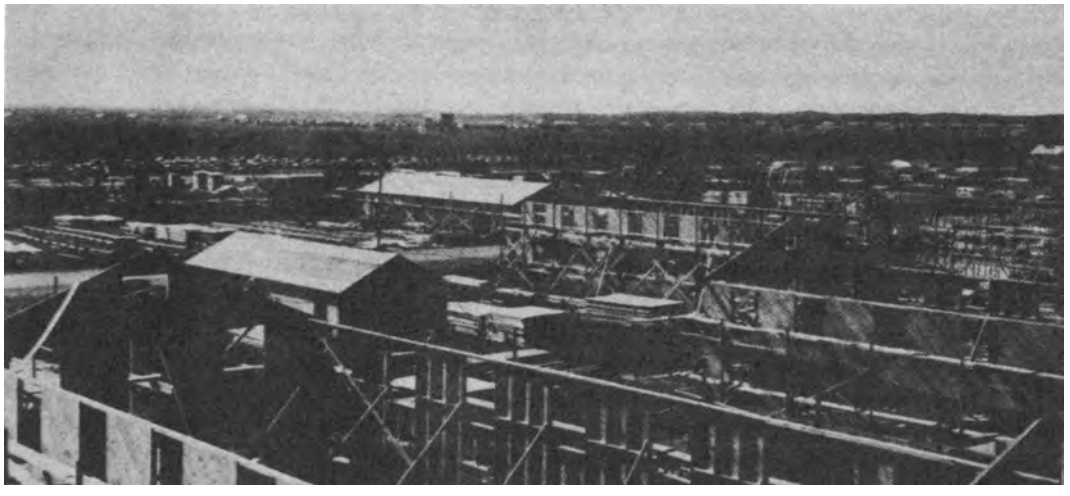
> The Government as owner is far less interested in the amount of the fee paid to these agencies than in the savings that can be effected in the actual work by proper design and proper supervision. These amounts far outweigh the combined fees on any work . . . . Furthermore, competition in fees does not necessarily produce the best and most trustworthy engineer or contractor. Partners cannot be selected on a competitive basis.[157]

Although prominent, gilt-edge concerns were the mainstay of defense construction, little fellows also had a part. During the early months of the program, fixed-price contracts made the talents

[155] Transcript of Negotiations between Reps of Constr Div and Starrett Bros and Eken, 8 Sep 40.

[156] 25 Apr 41. In Truman Comm *Hearings*, Part 1, p. 350.

[157] Ltr, Hogan Comm to Patterson, 30 Jan 41. 600.1 Part 8.



CANTONMENT CONSTRUCTION, CAMP EDWARDS, MASSACHUSETTS, *October 1940.*

and resources of many small contractors available to the Army. Unequal to the big, fast fixed-fee jobs, minor firms that normally did a local business were often well qualified for lump sum contracts at smaller and less urgent projects. Moreover, their knowledge of local conditions and their low overhead gave them a competitive advantage over companies operating on a national or international scale. Totaling some $100,000,000 during the second half of 1940, the fixed-price program was handled largely by local outfits. Of 150 advertised contracts amounting to $40,000 or more awarded from July through December, 86 percent went to firms in the same state as the project or in neighboring states. The proportion of negotiated fixed-price contracts placed locally was even higher; of 25 such agreements let during this same period, only one went to a distant concern. In addition, small builders and specialty firms shared profitably in the program as subcontractors on fixed-fee projects.[158]

With the signing of contracts, the way was clear for the actual work of moving earth and erecting buildings. The preliminaries had gone swiftly. Between issuance of directives for the National Guard camps and start of work by fixed-fee contractors, an average of only eleven days elapsed. The time required for other types of projects was not much greater, seldom more than three weeks.[159] Off to a running start, Hartman had reason to be fairly hopeful. If the contractors took hold quickly, if work could be pushed despite the shortage of funds, and if winter came late, critical deadlines might still be met.

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[158] (1) OCE, Mil Constr Contracts, Part 1, Sec. 2, *passim.* (2) OQMG, Constr Contracts Awarded or Approved, 12 Nov 41, *passim.*

[159] (1) G–4, Constr Hist at Major Stations, 1940–41. G–4/32439. (2) Constr Div OQMG, List of Directives, 15 Mar 41. EHD Files. (3) OQMG, Constr Contracts, Awarded or Approved, 12 Nov 41.

CHAPTER VI

The First Camps

As contractors took the field, pressure for speed was growing more acute. After the fall of France, Britain lay in mortal danger. The new Konoye government in Japan embarked on a course of expansionism. The signing of the Tripartite Pact on 27 September 1940 brought into being the Rome-Berlin-Tokyo axis. A month later Italy invaded Greece. This same period witnessed positive measures by the Roosevelt administration to insure Great Britain's survival and curb Japanese aggression. The application of economic sanctions against Japan was followed shortly by the destroyer deal with Britain and promises to Churchill of large-scale aid. American neutrality was thus reduced to a fiction. Meeting preparedness deadlines assumed vital importance. The Army would have to be ready when the call came to fight, or the nation would face disaster.

In launching the defense program, President Roosevelt had outlined two major objectives: first, a protective force and, second, the planes, guns, tanks, and ammunition to make this force effective. The industrial capacity to equip and maintain a modern army could be built up only over a period of several years; but men could be mobilized and training begun almost immediately. The War Department was therefore concentrating first on increasing the size of the Army. If plans to call the National Guard and to conscript a citizen army were to succeed, camps would have to be provided quickly. Emphasizing the critical importance of this phase of construction, General Marshall stated in September 1940, "It should be understood first of all that shelter is the decisive factor in our plans."[1]

During August 1940, in response to a request from Congress, Hartman made known his latest estimate of the time required for carrying out the camp program. Housing for one to two million men could be ready three or four months after locations had been decided on and funds had been voted. "Inasmuch as certain basic data is available covering the existing reservations," he explained, "temporary shelter at these reservations can be constructed complete with utilities within three months. At new locations certain basic data must be determined which . . . will require approximately one month's time." In these calculations, Hartman assumed ideal conditions. He warned that strikes, bad weather, or shortages of materials would cause delays.[2]

General Marshall demanded of Hartman not what was feasible but what he believed was necessary. Schedules imposed on the Construction Division

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[1] S Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings* on H R 10572, p. 5.

[2] Memo, TQMG for ASW, 12 Aug 40. QM 400.13 (Mun Program—FY 1941).

TABLE 7—SCHEDULE FOR HOUSING NATIONAL GUARD DIVISIONS
At Peace Strength—12,978 Men

Priority	Division	Station	Occupancy Date
I	30th	Jackson (S.C.)	16 September 1940
I	41st	Lewis (Wash.)	Do
I	44th	Dix (N.J.)	Do
I	45th	Sill (Okla.)	Do
II	27th	McClellan (Ala.)	15 October 1940
II	31st	Blanding (Fla.)	Do
II	32d	Beauregard (La.)	Do
II	35th	Robinson (Ark.)	Do
II	36th	Bowie (Tex.)	Do
II	37th	Shelby (Miss.)	Do
III	34th	Claiborne (La.)	15 November 1940
III	38th	Shelby (Miss.)	Do
III	40th	San Luis Obispo (Cal.)	Do
III	43d	Blanding (Fla.)	Do
IV	26th	Edwards (Mass.)	15 December 1940
IV	28th	Indiantown Gap (Pa.)	Do
IV	29th	Meade (Md.)	Do
IV	33d	Grant (Ill.)	Do

Source: Memos and Incls, BOWD for Chiefs Estimating Agencies, 23 and 26 Sep 40. AG 111(9-24-38) (1) Sec 3.

reflected Marshall's anxiety over the low state of the country's defenses. With the Army numbering about 270,000 men, a big increase in personnel was imperative. Slashing Hartman's estimate, Marshall allowed but two or three months for camp construction instead of three or four. Going still further, he resorted to a risky expedient. To hasten the calling of the Guard, he decided to place some units in temporary tent camps pending completion of winter quarters.[3]

The original timetable for housing Guardsmen and selectees was a construction man's nightmare. The schedule for the Guard camps was particularly rigorous. Counting from 9 September, the day appropriations became available, Hartman had from one week to three months to ready camps for the Guard divisions. (*Table 7*) He also had to accommodate 132 nondivisional militia units of battalion size or under—22 of them in September, 9 in October, 54 in November, and 47 in December. The schedule for inducting the draftees introduced additional complications. Between 15 October and 15 January the fall quota of 400,000 selectees would go into Regular Army and Guard units. Regulars and Guardsmen could rough it for a time, using field tents and latrines. But, Congress made it clear, draftees could not. Snug barracks, toilets, showers, heating, and electric lights would have to be available when they arrived. In other words, camps would have to be virtually completed. The plan for in-

[3] (1) Memo, G–3 for CofS, 14 Aug 40. (2) Ltr and Incls, BOWD to Chiefs of Estimating Agencies, 26 Aug 40. Both in AG 111 (9–24–38) (1) Sec 3. (3) Memo, G–4 for G–1, 28 Aug 40. G–4/31948.

TABLE 8—REVISED INDUCTION SCHEDULE FOR FALL 1940 QUOTA OF SELECTEES

Date	Strength	Employment
15 November 1940	74,142	To bring Regular Army units (except Air Corps) in southern Corps Areas to war strength and Regular Army units in northern Corps Areas part way to war strength.
5 December 1940	49,765	To bring the First Priority National Guard to war strength.
15 December 1940	65,872	To bring the Second Priority National Guard to war strength.
15 January 1941	112,347	To complete bringing Regular Army units in northern Corps Areas to war strength, to bring the Third Priority National Guard to war strength, and to establish a replacement center for the Armored Force.
15 February 1941	97,874	To bring the Fourth Priority National Guard to war strength and to activate certain inactive nondivisional units of the Regular Army.

Source: Memo, Reybold for TQMG, 12 Sep 40. G-4/31453-18.

ducting the spring quota of selectees would force the Quartermaster Corps to build under most adverse conditions. To be called between 1 April and 15 June 1941, the 400,000 men of this second levy would, with few exceptions, go directly to replacement training centers. Slated to begin in October and November, construction of these centers would span the winter months when outdoor work normally was suspended.[4]

Although Marshall eased induction schedules slightly, he made no corresponding changes in construction deadlines. The Selective Service Act provided that the first "goldfish bowl" drawing would not take place until 16 October 1940 and the first draftees would not report before 15 November. Marshall revised the schedule for the fall quota of selectees accordingly. (*Table 8*) Reports from corps areas indicated that lack of shelter might delay certain Guard inductions. On advice from the commanding generals, Marshall wrote question marks beside entry dates for some of the Guard divisions. Still, pressure on Hartman did not abate. He could not safely assume that Marshall would postpone calls to any Guard divisions. Nor could he get additional time to prepare housing for the draftees. Reybold, knowing it would be difficult and costly for a contractor first to build for a peace strength division of 13,000 Guardsmen and then, after these troops moved in, to work for several months expanding facilities to take the 5,000 draftees who would bring the division to war strength, ruled out such "piecemeal construction." The date Guardsmen were slated to arrive was, in most instances, the completion date for the entire camp.[5]

Despite the extreme demands made upon him, General Hartman appeared

[4] Memo, G-3 for Marshall, 14 Aug 40. G-4/31453-18.

[5] (1) Watson, *Chief of Staff*, p. 204. (2) Notes of Confs in OCofS, 29, 30 Aug 40. (3) Notes of Conf in Office DCofS, 6 Sep 40. Both in OCS, Misc Confs, 20 May to 25 Sep 40. (4) Memo, SGS for G-4, 30 Aug 40. G-4/31948. (5) Memo, Reybold for Marshall, 30 Aug 40. G-4/31735-1.

confident. To Congressman Taber's question, "The Guard setup may be ready or completed, perhaps by December 1?" he replied, "Yes, sir. Some of [the camps] . . . will be completed before that time."[6] Hartman was under no illusion that he could finish every item of construction on schedule. That was patently impossible. But he could fill minimum requirements in time for mobilization to proceed generally according to plan.

The Administrative Setup

Directing construction operations was an organization patterned on the model that had proved successful in World War I. Now, as then, a central headquarters formulated policies, issued standard instructions, checked on progress, field costs, and accounting, and rendered assistance to forces in the field. From Washington the line of authority ran directly to the job sites. There, Constructing Quartermasters were virtually supreme. In Hartman's opinion, an organization of this type ensured close co-operation between the Construction Division and the projects. Moreover, it eliminated delays which inevitably occurred when work was controlled through regional offices.

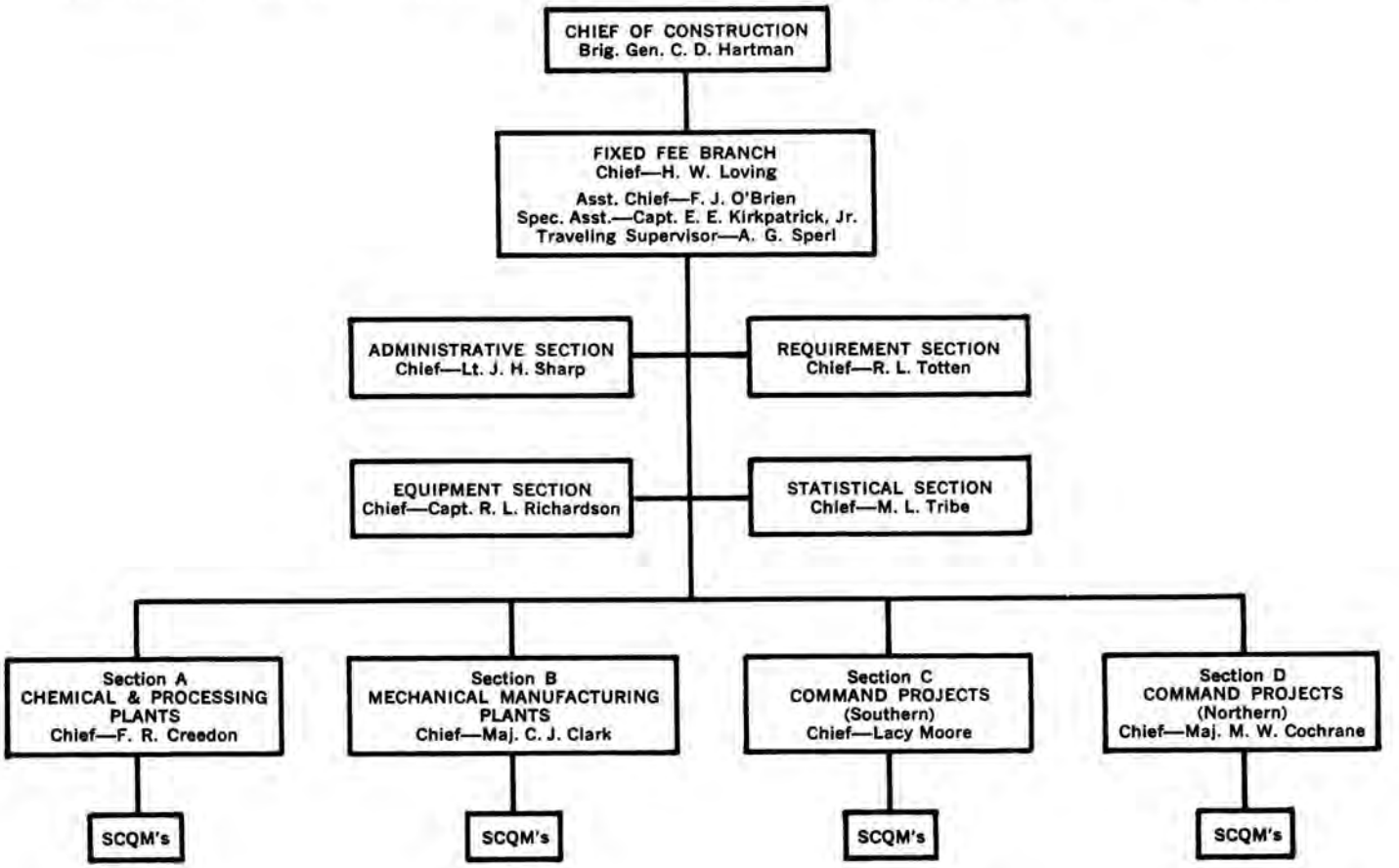
One of two headquarters groups charged by Hartman with overseeing construction in the field, Major Violante's Lump Sum Branch was a going concern when the emergency began. Under other names, Building and New Construction, the branch had served since the early twenties as the principal point of contact between the central office and the CQM's. As the defense program took shape, Violante strengthened the organization for a big endeavor. He chose as his executive Maj. Orville E. Davis, a construction officer since 1920. He called from the field one of the young West Pointers, 1st Lt. William A. Davis, Jr., and drew from the Reserve Corps an able civil engineer, Capt. Donald E. Antes. He assembled a staff of fifty civilians. Successful in obtaining bids for early harbor defense and troop housing projects, he proposed to Hartman that camps, depots, hospitals, and plants be constructed by the lump sum method. A switch to fixed-fee, he contended, was "unwarranted and unjustified."[7] Hartman disagreed. He considered Violante's plan unworkable.

Overshadowing the Lump Sum Branch in size and importance was Loving's Fixed Fee Branch. Established in June 1940, the organization resembled the Building Division of World War I. (*Chart 5*) Adopting the same plan that Colonel Whitson had employed in 1917–18, Loving appointed a number of Supervising Constructing Quartermasters (SCQM's), each responsible for five or six projects of similar character. He placed groups of SCQM's under lettered sections which specialized in construction of particular types. Chiefs of these sections reported to Loving, who drew assistance from four staff sections, Administrative, Equipment, Requirements, and Statistical. Designed for flexibility, the organization could be readily expanded. As the program grew, more

[6] Hartman's Testimony, 19 Sep 40. In H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Third Supplemental National Defense Appropriation for 1941*, p. 57.

[7] Ltr, Violante to EHD, 25 Sep 57. See also Orgn Chart of Lump Sum Br, 15 Oct 40. EHD Files.

CHART 5—ORGANIZATION OF FIXED FEE BRANCH, CONSTRUCTION DIVISION, OQMG, NOVEMBER 1940



Source: (1) H. L. Loving, History of FF Br, Apr 41. Loving Papers. (2) Orgn Chart of FF Br, 5 Nov 40. EHD Files.

SCQM's could be added and, if need be, whole new lettered sections formed. Hartman gave the Fixed Fee Branch a critical assignment. It would direct all fixed-fee forces in the field. It would serve as his principal inspection agency. Most important, it would be accountable for the progress, quality, and cost of every fixed-fee project.[8]

Like Whitson in 1917, Loving assembled an organization of experienced construction men. Totaling about one hundred persons by 1 November, his staff included but one Quartermaster Regular, Captain Kirkpatrick. The others came from civil life. Robert L. Totten was a prominent civil and mining engineer. Francis J. O'Brien had been a top engineer in the Tennessee Valley Authority. Lacy Moore had been engineer of construction for the Southern Railway System. Frank R. Creedon had been assistant regional PWA director in New York City. Sperl, who became Loving's principal troubleshooter, had served in a similar capacity in World War I. Of the officers, all except Kirkpatrick had come from the Reserve Corps or had received direct commissions. Before joining Loving, Capt. Robert L. Richardson was an equipment dealer and designer, Maj. Maurice W. Cochran was a successful highway engineer and contractor, and Maj. Chester J. Clark was an industrial construction man who had superintended plant projects for General Motors and U. S. Rubber. Highly qualified men occupied many subordinate positions. Of course, the organization included some who were not so well qualified. The general shortage of construction specialists prevented Loving from filling all openings with experienced men.

Much depended on Quartermaster forces in the field. On fixed-fee projects the position of Constructing Quartermaster was a demanding one. Limited only by general instructions from Washington, the CQM was responsible for the conduct of his job. He dealt with local commanders, coordinated efforts of the constructor and architect-engineer, approved all purchases and subcontracts, and had charge of reimbursing contractors for their expenditures. He had to submit regular progress reports to Hartman and advise him immediately if normal purchasing procedures seemed likely to break down or other troubles threatened. He had to employ every means to complete the project within the funds and time allotted. To carry out his assignment, the CQM needed a competent staff of commissioned officers and a large number of trained employees.[9]

Among Hartman's CQM's, Reservists outnumbered Regulars five to one. Except for a dozen or so retained at central headquarters, virtually all of his career officers were in the field. The ablest and most experienced headed Vicinity offices or directed key jobs. The rest had charge of lesser projects or served as assistants. Other Quartermaster Regulars, experts in supply and transportation with some background in post maintenance, served as construction officers. Ordnance officers became Con-

[8] (1) OQMG Office Order 29A, 15 Jun 40. QM 020 (Constr). (2) Tab, Constr Div OQMG, 1 Nov 40, sub: Civ Pers, Washington and Vicinity. Opns Br Files, Pers.

[9] OQMG Manual, Supplement to Guide for CQM's, Rev 1940, Covering FF Projects, 27 Aug 40. EHD Files.

TABLE 9—RESERVE OFFICERS ON ACTIVE DUTY WITH CONSTRUCTION DIVISION
13 DECEMBER 1940

Branch	Lieutenant Colonels	Majors	Captains	1st Lieutenants	2d Lieutenants	Total (by Branch)
Grand Total						686
Total (by Rank)	12	68	261	254	91	
Corps of Engineers	1	19	81	58	14	173
Infantry	2	15	63	64	24	168
Quartermaster Corps	4	17	31	37	32	121
Field Artillery Corps	2	6	41	39	10	98
Coast Artillery Corps	1	5	13	39	8	66
Cavalry		1	18	13	1	33
Ordnance Department	2		4	1	2	9
Signal Corps		1	3	1		5
Chemical Warfare Service		3	1			4
Sanitary Corps		1		1		2
Finance Department			2			2
Special			2			2
Military Intelligence Division			1	1		2
Judge Advocate General's Department			1			1

Source: Memo, OQMG Constr Div for Admin Div, 14 Dec 40. QM 326.21—Assignment of Reserve Officers for Active Duty.

structing Quartermasters at six of the early plants. Still there were scarcely more than 120 Regulars on duty outside Washington. Only by liberal use of his priority on Reserve officers could Hartman staff his projects. By 13 December 686 Reservists had answered calls to construction duty. (*Table 9*) About fifty of these officers remained in the central office, the others went to the field. The Reservists represented a wide range of training and experience. There were contractors, architects, and men from every branch of engineering. There were former CCC officers, road builders, bridge builders, dam builders, power plant specialists, railway construction men, estimators, surveyors, a trucking firm executive, and a hardware merchant. There were men with advanced degrees and men with high school diplomas, men with outstanding qualifications and men whose principal recommendation was their availability.[10] The field officers, Regulars and Reservists, were the best that could be had at the time and, by and large, the best was quite good. "There were some bad eggs," Kirkpatrick said, "but on the whole they were as hardworking, conscientious, and intelligent a group as anyone will ever be able to get together in so short a time."[11]

Efforts to provide Constructing Quartermasters with adequate staffs of civilian assistants were not wholly successful. At the outset hiring was obstructed by the

[10] (1) List of CQM's (Dec 40). Opns Br Files, Weather Rpts. (2) Incls with Memo, OQMG Admin Br for Maj Garrison H. Davidson, 9 Aug 41. Opns Br Files, CQM.

[11] Incl with Ltr, Kirkpatrick to EHD, 2 Jun 53.

Civil Service rule that employees must be drawn from lists of eligibles. These lists yielded few persons with the required skills. Repeated complaints from the field at length caused Gregory to appeal to Commissioner Arthur S. Flemming, who agreed to relax the rule; but district offices of the Civil Service, presumably misled by the vague language of the commission's directives, refused to change their methods. When Constructing Quartermasters continued to complain, Gregory asked the commission to step aside and let Hartman do his own hiring. Flemming refused but made concessions. He agreed to send a special representative to every new project with orders to fill all jobs immediately with or without benefit of Civil Service registers. He also agreed that a Constructing Quartermaster might, in the absence of a special representative, hire whomever he wished with assurance of the commission's eventual approval. Put into practice late in September, the new system virtually eliminated delays in hiring. But it could not supply a full, competent staff for every project. The nationwide shortage of experienced personnel, the comparatively low level of government salaries, the lack of adequate housing near project sites, the brief duration of most construction jobs—these difficulties severely handicapped the work.[12]

Hartman entrusted the main work of construction not to the Quartermaster field but to contractors. Having hired the best architectural, engineering, and construction firms available, he gave them a large measure of independence. Constructing Quartermasters got orders "to go the contractor's way, so long as fundamental laws are not violated and the Government's interests are protected." In a circular to the field, Kirkpatrick summed up the attitude of the Construction Division:

> The contractors selected to cooperate with the Government and contribute their resources, experience, and skill toward the accomplishment of the projects include in their organizations men of unquestionable integrity and patriotism. Their success in the commercial world establishes their abilities. Their judgment along the lines of their qualifications is entitled to the highest of faith and credit. The monetary compensation they will receive is comparatively modest as indicated by the fees allowed. The general intent of the special legislation, the negotiations thereunder, and the contracts is clearly that the contractors shall be made whole for their out-of-pocket expenditures . . . . Any action which conforms to such general intent is entitled to approval.[13]

Although fixed-fee agreements gave Hartman "power of the purse" over his contractors, he did not wish to use that power to dictate working methods to leading architect-engineers and constructors.

Preliminary Work at Camp Sites

Contractors took on their assignments, determined to succeed. The AGC pledged its members to do all that was asked of them and more.[14] Company officials

[12] (1) CSC Circ Ltr 2990, 15 Aug 40. EHD Files. (2) OQMG Circ Ltr 69, 16 Sep 40. EHD Files. (3) Ltr, Flemming to Patterson, 24 Sep 40. (4) CSC Circ Ltr 3045, 26 Sep 40. Last two in Opns Br Files, Pers, Dec 40–Apr 41. (5) Memo, Maj S. P. Simpson, OASW, for ASW, 12 Nov 40. Madigan Files, 100.3 FF Br, Constr Div—Orgn.

[13] OQMG Constr Div FF Ltr 5, 7 Oct 40. See also Constr Div OQMG, Supplemental Guide for CQM's, 27 Aug 40, p. 4; Constr Div OQMG FF Ltrs 1, 24 Sep 40, and 9, 15 Oct 40.

[14] *The Constructor*, July 1940, p. 51.



CLEARING SWAMPS AT CAMP BLANDING, FLORIDA

promised as much. "Our conception of our mission here [at Camp Edwards]," declared a spokesman for the Walsh Construction Company, "is that we are to throw all our talents and resources into the accomplishment of this work."[15] During negotiations for the Blanding contract, Andrew Eken assured Loving: "We will do everything faithfully and with all zest. We are going to get right on this project." Loving had to restrain Eken from starting work before signing the contract.[16] Other contractors displayed the same spirit. Hurrying to the job sites, builders pressed to get work under way, while architect-engineers hastened their preparations.

The first men on the ground were usually soils engineers and surveyors out "running the gun." As they took topo, sank bore holes, and analyzed samples of soil, these men gave an engineer's appraisal of the sites. Many of the tracts

[15] Ltr, C. D. Riddle to CQM Camp Edwards, 10 Oct 40. 652 (Cp Edwards) I.

[16] Transcript of Negotiations Between Reps of Constr Div and Starrett Bros and Eken, 8 Sep 40. Opns Br Files, Confs.

were excellent—level, well drained, and easy to build on. Others posed only minor problems. Some were clearly undesirable. At one place surveyors had to go in boats to take property corners. Elsewhere reconnaissance parties found rugged terrain, thick vegetation, subsurface rock, swamps, bogs, and boiling sands. The engineers suggested abandoning a number of locations. But time would be lost in moving. So urgent was camp construction that the Army refused, except in the most unusual circumstances, to find better locations and start over again.[17]

The only site abandoned was a 40,000-acre tract near Leon, Iowa. Congress had authorized acquisition of this land in 1939 but had voted no funds for its purchase. Nothing further happened until the summer of 1940, when a corps area board went to investigate. Generally favorable, the board's report listed an abundant water supply among the site's advantages. Feeling that the Army was committed to the Iowa site, General Marshall approved Leon for a 35,000-man cantonment, to be named for General Leonard Wood, even though the corps area commander recommended another, larger site near Rolla, Missouri. Hartman had already let the contracts when he discovered in mid-October that something was wrong. Checking through appraisals in Colonel Valliant's office, he saw that land in south-central Iowa, which had brought $250 an acre during World War I, was now bringing $16 an acre. He ordered an immediate investigation by the architect-engineers. Their preliminary report, completed on 25 October, disclosed a critical shortage of water. Since 1918 the water table had dropped sixty feet. The nearest surface supply was a small stream thirty miles distant that normally ran dry in summer. The cost of impounding enough water for the camp would run to $1,250,000. On the basis of this report and a similar one from an Engineer Reservist, an Iowan on duty with the Seventh Corps Area, Reybold on 31 October suspended work at Leon. Six days later Marshall transferred the project to Rolla. It was a leap from the frying pan into the fire. The new site was seventeen miles from the nearest railroad. Estimating that a spur track would cost at least $1,400,000, Hartman suggested placing the camp closer to the main line of the St. Louis and San Francisco.[18] In no mood to entertain such a proposal, Reybold replied, "It is not desired to delay this project by further search for a more suitable site."[19] That settled the matter. But construction was a bigger job than anyone anticipated. Passing through the foothills of the Ozarks and over the Big Piney River, the railroad cost more than three million dollars and took nearly five months to build.[20]

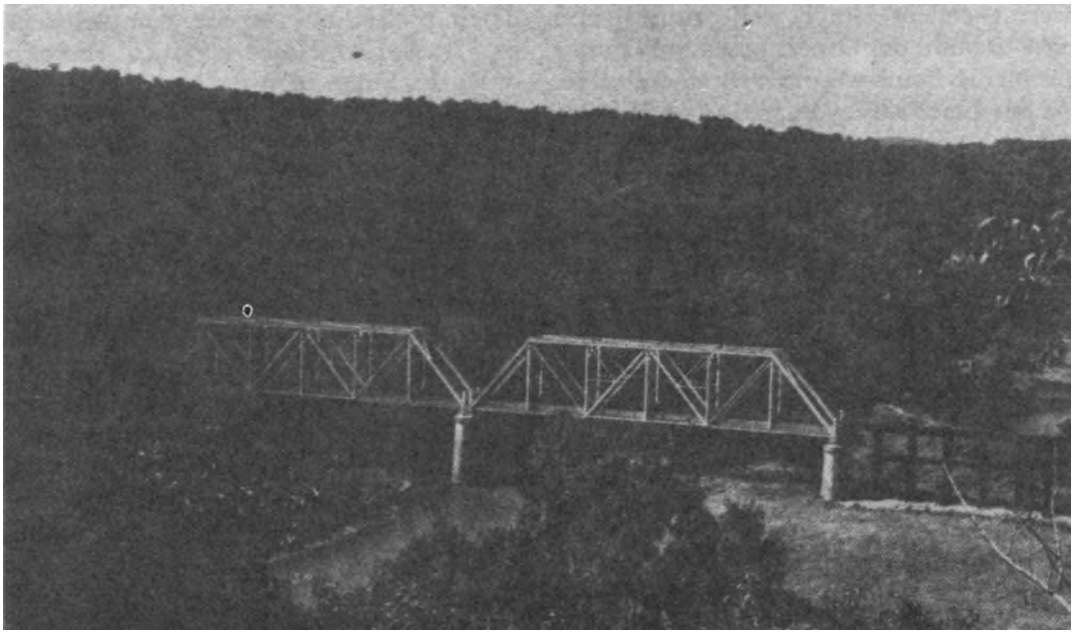
As reports came in from survey parties,

[17] (1) Rpt, Activities of Constr Div, Jul 40–Nov 41, p. 7. (2) Answers to Questionnaire, Thomas to EHD, 31 May 56. (3) QM 333.1 (Cp Davis). (4) G–4/31981.

[18] (1) Summary, Constr Div OQMG, n.d., Events Leading Up to Acquisition and Use of Ft Wood, Mo. Opns Br Files, Misc Papers. (2) QM 601.1 (7th CA). (3) Truman Comm *Hearings*, Part 2, pp. 612, 693–703. (4) Statement of Gen Hartman, 5 Jul 55, p. 9. (5) AG 680.1 (7–11–40) (1) Sec 2. (6) G–4/30997. (7) Memo, Hartman for Reybold, 24 Nov 40. 600.94 (Ft L. Wood).

[19] D/S, G–4 to TAG, 27 Nov 40. 600.94 (Ft L. Wood).

[20] (1) Ltr, Alvord, Burdick & Howson to CQM Ft Leonard Wood, Mo., 23 Apr 41. 600.94 (Ft L. Wood). (2) Ltr, OQMG to ICC, 28 Jul 41. 617 (Ft L. Wood).



RAILROAD BRIDGE OVER BIG PINEY RIVER, CAMP LEONARD WOOD, MISSOURI

architect-engineers started adapting typical layouts to sites. Incomplete and tentative, the typicals nevertheless served as good working guides. From them the engineers quickly ascertained the Army's principal requirements. Every unit, large and small, would remain intact. Companies would be grouped into battalions and battalions into regiments. Regimental areas would adjoin a central parade ground. Hospitals would be in isolated spots, away from noise and dirt. Storage depots and motor parks would be near railway sidings or along main roads. To prevent the spread of fire, one-story buildings would be at least 40 feet apart; two-story buildings, 50. Firebreaks, no less than 250 feet wide, would be spaced at 1,000-foot intervals throughout the length of the camp. Showing grid-platted streets and straight rows of buildings, the typicals envisaged a quadrangular arrangement. Seldom could this pattern be adhered to strictly, and radical changes were often necessary to adjust the standard layouts to local terrain and conditions.

In laying out camps, architect-engineers labored under serious handicaps. Except to the half dozen or so firms with World War I experience, the task was unfamiliar; most had never before attempted a layout involving so many different buildings and such vast acreage. Virtually no lead time was available, for engineers were seldom more than a few paces ahead of constructors. Conditions at some hastily chosen sites precluded good layouts. For instance, the cantonment area at Indiantown Gap, Pennsylvania, was a narrow stretch of rolling land at the foot of a mountain.

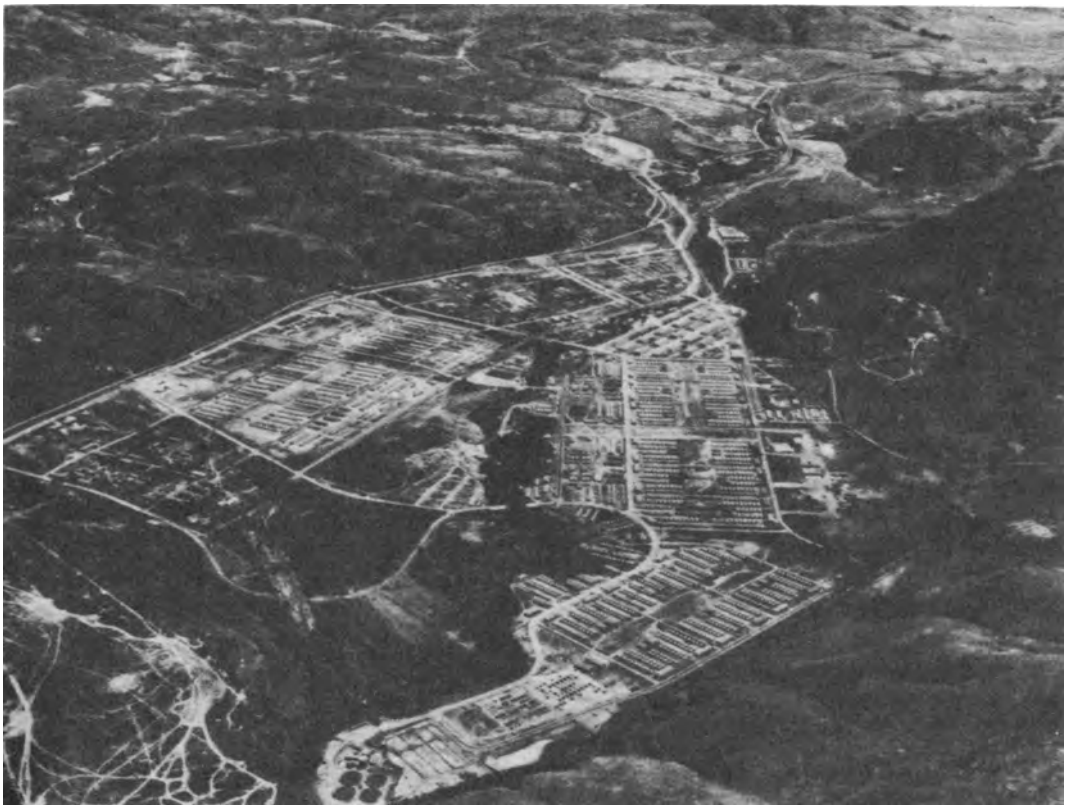
The only practical solution was to extend the camp in a straight line for three and one-half miles along the bottom of the slope. To cite another example, at San Luis Obispo, California, where a hilly reservation hugged the Coastal Range, regimental areas had to be scattered to take advantage of stretches of relatively flat ground. Even this arrangement required removal of two million cubic yards of earth.[21] Finally, there was the problem of military commanders versus construction specialists.

By the late summer of 1940 corps area commanders had become virtual dictators in matters of layout. In June General Moore had decided that, in order to save time, questions of layout would be settled on the spot. Accordingly, Hartman told his Constructing Quartermasters to confer with local commanders and try to satisfy their requirements. As soon as a tentative layout was ready, construction would begin. The plan would then come to the Construction Division for review and approval. Under this arrangement, commanders had their way much of the time, for Regular major and lieutenant generals headed corps areas, while captains, majors, and lieutenant colonels, many of them Reservists, served as Constructing Quartermasters. Still the corps area commanders were dissatisfied. They demanded authority to approve or disapprove layouts, and General Moore gave it to them. Hartman protested strongly but in vain. Henceforth, commanders had the power to overrule professional engineers and construction officers. Some commanders used this power to insist on layouts which offered minor training advantages, enhanced the beauty of the camps, or favored long-range interests of the National Guard, but which ignored sound engineering principles. At Meade, Edwards, Forrest, Blanding, and several other key projects, plans imposed by corps area commanders greatly increased construction costs and hindered progress.[22]

Major Groves, making his rounds of the projects, was struck not so much by the commanders' neglect of engineering factors as by their inability to appreciate end-use requirements. At Camp Shelby, Mississippi, he saw a layout which placed units a long way from maneuver areas. If this plan went through, many hours of training time would be lost in moving men back and forth. At Camp Bowie, Texas, he learned that, for no apparent reason, the warehouse area was to be outside the camp proper. At Fort Ord, California, he found that the layout allowed almost no room for expansion. The same was true of other projects in the Ninth Corps Area. In fact, some battalion areas at San Luis Obispo were so small that buildings already authorized

[21] (1) Rpt, Slaughter, Saville & Blackburn, Inc., to Chief Constr Div OQMG, 13 Jan 41, Analysis of Deficiencies on Lump Sum and FF Contracts for Constr, pp. 5–6, 11–12. EHD Files. Cited hereinafter as Slaughter, Saville & Blackburn Rpt. (2) Rpt, Constr Div OQMG, n.d., Explanation of Increased Costs at Indiantown Gap. Opns Br Files, Loose Papers. (3) Memo, TIG for CofS, 18 Nov 40. Opns Br Files, IG Rpts. (4) Ltr, CQM Cp San Luis Obispo to TQMG, 19 Feb 41. 600.94 (San Luis Obispo).

[22] (1) WD Ltr AG 600.12 (6–15–40) M–D–M, 15 Jun 40, sub: WD Constr Policy. G–4/31751. (2) Memo, Moore for Hartman, 15 Jul 40. 652 (Ft Knox) I. (3) Ltr, Constr Div to CQM Ft Lewis, 10 Jul 40. 652 (Ft Lewis) I. (4) TWX, TAG to CG Ninth Corps Area, 25 Jul 40. 652 (Ft Ord) I. (5) Memo, Lump Sum Br for Hartman, 3 Oct 40, and notation thereon. Opns Br Files, Rpts of Insp. (6) Statement of Gen Hartman, 5 Jul 55, p. 9.



CAMP SAN LUIS OBISPO, CALIFORNIA

could not be squeezed into them. Largely because of Groves' efforts these mistakes were corrected before construction began. That such mistakes occurred at all was, in his opinion, a strong argument for centralized control.[23]

Handicapped as they were, the Quartermaster Corps and its engineering contractors did a commendable job with layouts. Camps designed in the summer and fall of 1940 functioned effectively as training centers throughout the war. Some of them served as models in subsequent planning. Produced by engineers of the J. B. McCrary Corporation, who had only the typical for an Infantry brigade to guide them, the layout for Camp Stewart, Georgia, influenced the design of later antiaircraft firing centers. The armored division camp at Fort Benning, laid out by the CQM, Lt. Col. James R. Alfonte, with the help of tank corps officers, became the prototype for projects of its kind. Frequently cited as

[23] (1) Memos, Groves for Gregory, 9 Sep 40, 12 Aug 40, 1 Oct 40, 30 Aug 40. Opns Br Files, Rpts of Insp. (2) Groves Comments, VI, 3-4. (3) Memo, Groves for Gregory, 28 Oct 40. Opns Br Files, Convention in Chicago. (4) Ltr, Groves to OCMH, 22 Jul 55.

the ideal layout, the plan for Camp Robinson, Arkansas, became a widely used model. Black & Veatch, the architect-engineers, had laid out Camp Pike at the same location during World War I. Noteworthy features of their plan for Robinson included a compact arrangement of regimental areas; short roads and utilities lines; a centrally located storage depot; and an unusually good concept for landscaping and site development. Other first-rate plans, particularly those for Bowie, Custer, and Shelby, helped point the way to solutions of troublesome layout problems.[24]

Once they had layouts under way, architect-engineers fell to work on structural plans and blueprints. It was a big undertaking. Camp Edwards, a cantonment, had 1,400 buildings. Including tent frames, Camp Livingston had nearly 9,000. And buildings were but part of the job. Architect-engineers also had to plan water, gas, and electric lines; sanitary sewers and sewage disposal plants; and streets, roads, and railroads. Only by adhering closely to the Quartermaster typicals could they possibly accomplish all this work within the allotted time. Hartman's orders to them emphasized this fact. In adapting standard plans to the locale, they were to recommend changes that would expedite construction, but to avoid drastic, wholesale revisions. Such alterations as were necessary had to be made quickly. CQM's had authority to approve minor changes, but they had to clear major ones by telephone or telegraph with Washington. Hartman warned architect-engineers to forget perfection. Their principal goal, as he defined it, was not quality but speed.[25]

That much sound planning could be accomplished swiftly was demonstrated at Camp Edwards by the firm of Charles T. Main. Colonel Gunby, a director of the company, was the project's chief engineer. On 12 September, the same day the contract was signed, he moved to the site with his key men and set up offices in barracks belonging to the Massachusetts National Guard. He rapidly increased his staff to 300 men. Pushing work at top speed, he made a few desirable changes in Quartermaster typicals; for example, he relocated hot air ducts to reduce fuel requirements and redesigned foundations to cut down on excavation. He turned the revised typicals over to the Walsh Construction Company, whose draftsmen assembled all details for a given building on a single sheet. After checking these sheets, Gunby sent them to his blueprint department, which worked around the clock to supply construction foremen with working drawings. To expedite planning of communications and utilities systems, he called in expert consultants. So rapid was Gunby's progress that workmen started pouring foundations on 18 September. Moreover, his plans were

[24] (1) Memo, Groves for Chief Engrg Br, 10 May 41. Opns Br Files, Cps & Cantons. (2) Truman Comm Rpt 480, Part 2, p. 15. (3) Rpt, OTIG to TIG, 21 Oct 40. Opns Br Files, IG Rpts. (4) Memo, Groves for Gregory, 31 Oct 40. Opns Br Files, Convention in Chicago. (5) Black & Veatch, Cp Robinson, Ark., Landscape Development Plan, Nov 40. Opns Br Files, Land Dev Plan.

[25] (1) Rpt, Activities of Constr Div, Jul 40–Nov 41, pp. 148, 164. (2) Circ, Constr Div OQMG, 28 Sep 40, Exterior Utilities. EHD Files. (3) Ltr, Nurse to CQM Cp Forrest, 27 Sep 40, sub: Instrs and Data for A-E's. 652 (Cp Forrest) Part 1. (4) Constr Div OQMG CPFF Ltrs 1, 24 Sep 40, and 9, 16 Oct 40.

so well suited for defense construction that the Army later reproduced them for use at other projects.[26]

For many architect-engineers the going was hard at first. Some started their projects with insufficient knowledge of what they were to do. At Camp Shelby the firm of Lockwood-Greene, confused as to its duties, made a weak beginning. Sent to investigate, Sperl found a small group reproducing Quartermaster typicals, while construction forces marked time waiting for layouts and working drawings. No member of the firm was there to take charge. When Sperl explained what needed to be done, three officials of Lockwood-Greene hastened to the scene, bringing reinforcements with them. The building contractor, the J. A. Jones Construction Company, pitched in and helped the engineers. Soon the job was humming. At other projects the story was much the same. The work was more complicated and extensive than the architect-engineers had anticipated. For example, Koch & Fowler arrived at Camp Bowie believing that architectural work had been virtually completed by Lamphere and his aides only to find that, because of a decision to heat with Texas natural gas instead of coal, building plans had to be revised. In their early phases, projects were frequently delayed for lack of plans, but such delays were usually of short duration. Displaying the abilities that had won them their contracts, architect-engineers quickly mastered the techniques of emergency design and were soon keeping pace with constructors.[27]

Inexperienced Constructing Quartermasters, like architect-engineers unversed in emergency methods, were apt to make mistakes. In the interest of speed, project officers had assumed an important role in planning. How far typicals would be altered was largely up to them. It was a test of their firmness and good judgment, for local commanders besieged them with demands for better facilities and architect-engineers attempted to embellish the Quartermaster's simple designs. Awed by the commanders' rank, impressed by the engineers' professional standing, uncertain of their own authority, many of the new construction officers failed to enforce mobilization standards strictly. An elaborate road net at Camp Bowie and costly utilities lines at Fort Riley were conspicuous instances of overdesign.[28] At Camps Livingston and Claiborne, Hartman's temporary designs underwent such radical changes that, in the words of one inspector, there remained "nothing of a temporary nature about the camps, except the

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[26] (1) Compl Rpt, F. M. Gunby, 4 Jun 41, A–E's Rpt on Cp Edwards. (2) Memo, Tatlow for Rcd, 9 Nov 40. QM 333.1 (Cp Edwards) 1940. (3) Ltr, Walsh Constr Co. to Sperl, 13 Aug 56. EHD Files.

[27] (1) TWX, Gregory to CQM Cp Shelby, 21 Sep 40. 652 (Cp Shelby) I. (2) Sperl Interv, 18 Jun 56; Kirkpatrick Interv, 4 Apr 51. (3) Memo, Groves for Gregory, 1 Oct 40. QM 333.1 1939–40. (4) Ltr, Maj John A. Hunt, IGD, to OTIG, 5 Oct 40. G–4/31735 Sec II. (5) Compl Rpt, Cp Bowie, pp. 2, B1–B2. (6) Memo, FF Br for Hartman, 29 Oct 40. QM 600.914.

[28] (1) Ltr, Lump Sum Br to CQM Cp Bowie, 21 Dec 40. 652 (Cp Bowie) I. (2) Ltr, ZCQM Chicago to TQMG, 28 Jan 41. 652 (Cp Grant) I. (3) Compl Rpt, Cp Callan, 30 Aug 41, p. 9. (4) Memo, TIG for CofS, 23 Oct 40. Opns Br Files, IG Rpts. (5) Ltr, Long-Manhattan-Watson, Ft Riley, Kans., to H Comm on Mil Affs, 31 May 41. Opns Br Files, Loose papers.

tentage . . . ."[29] Countless other deviations occurred. Fortunately most of them were slight. Given the speed of the program and the inexperience of many Constructing Quartermasters, there was little Hartman could do to improve control over planning in the field.

While waiting for plans, construction contractors prepared to build. Skeleton staffs from their home offices got preliminaries under way. Personnel men interviewed applicants, surveyed workers' housing, and arranged transportation to and from the projects. Superintendents formed crews to clear and drain the land, stake out supply roads, and erect temporary office buildings, storage sheds, and timekeepers' shacks. Project managers checked the facilities of nearby railroads and the condition of neighboring highways. At some isolated projects, gangs started putting in spur tracks and access roads. As contractors sent out calls for workers and orders for materials, two questions were uppermost in their minds: would supplies of labor, materials, and equipment be adequate and would hirings and deliveries keep pace with requirements.

Lumber and Other Materials

"The essence of the preparedness program," according to the NDAC, was "the getting of an adequate supply of materials of the proper quality in the shortest space of time."[30] In the early stages of mobilization, requirements for construction materials were particularly critical. The quantities were huge and the need was immediate. Most important of all building materials was lumber. Cement, plumbing and electrical supplies, and fixed equipment for heating plants, kitchens, laundries, and bakeries also bulked large. A host of other materials—roofing, pipe, sand, gravel, glass, nails, paint, and so forth—went into the building of a camp. Much depended on timely procurement. A shortage of any item might upset completion schedules. A failure in the lumber supply would be calamitous.

Conditions in the lumber market threatened serious trouble. A shortage seemed inevitable unless mills increased production. In September 1940 Hartman aired his view of the situation in an exchange with Representative Louis Ludlow:

> Mr. Ludlow. . . . Do you have difficulty in obtaining lumber, especially in the South?
>
> General Hartman. There is some difficulty. The normal production of lumber on a one-shift basis is about 51,000,000 feet a week. We will require something like 550,000,000 or 600,000,000 feet in the next 60 days. We are having a meeting with the mill owners in an endeavor to have them speed up their production by going either on a two-shift or a three-shift basis.[31]

Although records for 1939 showed an output of more than 23 billion feet board measure (FBM) of softwood lumber, the highest since 1929, Hartman's concern was well founded. The industry had slumped during the first half of 1940. Now, in addition to the Construction

[29] Memo, Constr Div Opns Br Housing Sec Unit B for Chief Housing Sec, 14 Feb 41. QM 333.1 (Cp Claiborne) 1940.

[30] H Doc 950, 76th Cong, 3d sess, 13 Sep 40, *National Defense Contracts*, p. 1.

[31] H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Third Supplemental National Defense Appropriation Bill for 1941*, p. 59.

Division, a dozen federal agencies were calling for lumber. Concentration of camps in the South tended to exclude products of the other great softwood region, the Pacific Northwest, and to throw the burden chiefly on Southern mills. Scarcity, of course, meant high prices. Softwoods had averaged $20.57 per thousand board feet during 1939. By September 1940 they were bringing as much as $40 per thousand, and prices promised to go even higher.[32]

It was in this unstable market that Hartman launched what was to be one of the biggest procurement operations of the war—centralized purchasing of lumber. He did so with the backing of Donald Nelson, who agreed that central control was necessary to steady prices and to give priority to jobs with early completion dates. The plan was this: Colonel Jacobson, as chief of Procurement and Expediting (P&E), would solicit offers on the total footage for a project, reserve the lumber with low bidders, and tell the contractor where to buy. Until the system was functioning smoothly, most contractors would continue to procure their own lumber, but prices paid would be subject to Jacobson's approval. Denied funds for an earlier start, Hartman had to introduce centralized purchasing while construction was in progress. Proceeding with necessary caution, he chose Camp Edwards for the initial trial.[33]

The Edwards purchase taught some valuable lessons. On 11 September Jacobson opened bids on 34 million board feet for the Massachusetts cantonment and found that the best offers averaged out to $41.40 per thousand. The next day he asked successful bidders to start shipping at once. Soon Edwards was swamped with lumber. Madigan, visiting the project at the end of the month, saw 250 freight cars backed up on sidings between Providence and Falmouth, collecting demurrage charges. The contractor, who had three shifts unloading fifty to sixty carloads a day, could not keep pace with incoming shipments. Huge piles of lumber, spotted throughout the project, were creating a fire hazard. The Constructing Quartermaster reported another difficulty: part of the millwork was the wrong size. Before renewing the experiment, Hartman and Jacobson wanted to have more accurate bills of materials and delivery schedules.[34]

By the beginning of October they were ready to try again. Early that month Jacobson invited bids on lumber for four more cantonments: 21,491,420 board feet for Indiantown Gap; 30,100,700 for Meade; 32,246,000 for Devens; and 38,259,791 for Forrest. The response was overwhelming: more than a quarter million separate prices bid. To tabulate and analyze these bids was an appalling task. Borrowing thirty accountants that

[32] (1) *Historical Statistics of the United States, 1789–1945*, p. 125. (2) Memo, Constr Div OQMG for Nelson, 25 Jan 41. 411.1 (Lumber) II.

[33] (1) Memo, NDAC, Hiram S. Brown, for Nelson, 9 Jan 41. WPB–PD File, 411.33 Constr Projs Mil–Jun 40–41. (2) Ltr, CQM Cp Edwards to Sec C, FF Br, 9 Sep 40. QM 411.1 (Cp Edwards) 1940. (3) Telg, TQMG to CQM Ft Bragg, 17 Sep 40. QM 411.1 (Ft Bragg) 1940–41.

[34] (1) Table, Constr Div OQMG (n.d.), Lumber Awards, Totals, and Average Prices (Rev to 31 Jan 41). Opns Br Files, Lumber. Cited hereinafter as Table of Lumber Awards to 31 Jan 41. (2) QM 411.1 (Cp Edwards) 1940. (3) Memo, Madigan for Gregory, 30 Sep 40. Madigan Files, Cp Edwards. (4) Memo, Groves for Gregory, 11 Oct 40. Opns Br Files, Rpts of Insp. (5) Jacobson Interv, 7 Jun 55.

Koke was about to send to the field, Jacobson set them to work. Twenty typists helped them, and even then it took ten days to tally all the bids. By the time the successful bidders received word, stocks on which they had based their bids were depleted. As far as prices went, the results were encouraging: $40.40 per thousand board feet for Devens; $39.65 for Indiantown Gap; $38.42 for Meade; and $36.97 for Forrest. But clearly the purchasing procedure would not serve. Hartman had either to devise a new method or to turn back procurement to the contractors.[35]

Many favored the latter course. Most contractors were opposed to having the Army buy lumber for them. All the big concerns had their own purchasing departments and regular sources of supply. Nearly every project manager felt he could do the job better than someone in Washington. Loving was among those who questioned the wisdom of continuing centralized purchasing. In his opinion, "the responsible contractors of the South and West had a better idea as to where lumber could be secured than anyone in the Construction Division during the latter months of 1940." General Gregory was another who took a dim view of Hartman's lumber venture. He was "not enthusiastic," Jacobson said wryly. Putting it bluntly, one of Nelson's associates stated that centralized buying of lumber "did not have proper support by the Quartermaster Corps."[36]

It was Nelson who decided what the future course would be. His interest was broader than the military program: if procurement for camps upset lumber prices, the cost of all defense construction would go up. In his opinion centralized purchasing offered the best hope for a stable market. After talking to Hartman and Loving, Nelson agreed to let contractors buy lumber for four more projects. But there he drew the line. He asked that P&E make all other purchases. Quoting the prices Jacobson had paid so far, Nelson maintained that a downward trend already was apparent. As for difficulties with bidding procedures, they could be surmounted. He suggested inviting future bids on one project at a time.[37]

Jacobson found a better solution to the bidding problem. A long-time supply officer whose specialty was clothing, he remembered auctions held after World War I to sell off surplus wool. Each buyer at these sales received a wooden paddle with a number on it. As each lot of wool went on the block, those who wished to bid held up their paddles. The auctioneer's assistants passed among them, collecting slips on which bidders had written their number and price. Clerks then tabulated the offers and award went to the highest bidder. Jacobson saw he could use the same scheme in buying lumber, only bidding would be down instead of up. With the help of Walter T. Deadrick, one of his assistants, and Walter Parlour of the Southern Pine

[35] (1) Table of Lumber Awards to 31 Jan 41. (2) Sherrill, Lumber in the War, ch. I, pp. 2–3. (3) Maj. Gen. Eugene Reybold, "They Deliver the Woods," *The Timberman*, June 1943, pp. 10, 12.

[36] (1) Ltr, Loving to EHD, 6 Aug 55. (2) Jacobson Interv, 7 Jun 55. (3) Memo, NDAC Industrial Materials Div, J. W. Watzak, Jr., for W. A. Harriman, 11 Jan 41. 411.1 (Lumber) II.

[37] (1) Ltr, Nelson to Hartman, 23 Oct 40. (2) Memo, Nelson for Hartman, 18 Oct 40. Both in QM 411.1 (Lumber) 1940. (3) Telgs, Gregory to CQM Pine Cp, 19, 21 Oct 40. QM 411.1 (Pine Cp) 1940. (4) Ltr, Hartman to Nelson, 25 Oct 40. QM 411.1 (Lumber) 1940.

Association, Jacobson planned a series of auctions or "lumber buys" at points throughout the country. Introduced during November 1940, the new procedure was an immediate success. Purchasing costs dropped to almost nothing. Purchasing time was greatly reduced. With adoption of the auction method, opposition to centralized procurement began melting away.[38]

Jacobson had two more battles to fight, one against inaccurate requirements, the other against delinquent suppliers. He would win the first but lose the second. In ordering lumber, he had to rely on quantity surveys prepared by the Engineering Branch. He bought what Lamphere told him, no more, no less. As reports came in from the field, it became clear that the quantities had been greatly underestimated. By mid-October Camp Edwards was short eight million board feet. Soon other projects were calling for large additional shipments. Instructing contractors to buy what they needed in the open market, Jacobson appealed to Lamphere, who put Major Boeckh on the problem. Boeckh discovered that in figuring requirements the Engineering Branch had erred 15 to 20 percent by failing to allow for form lumber, scaffolding, and waste. The mistake was quickly rectified. Meanwhile, Jacobson failed to prevent suppliers from defaulting on their contracts. Most of the mills and lumber yards which had received awards from P&E were fulfilling their commitments, but a few were not. Jacobson took a tough line with the delinquents, holding them to the terms of their agreements. Strong protests against this policy prompted Gregory to relieve him from P&E on 28 November. Defaults on lumber contracts were to be a problem for some time.[39]

Maj. Milton E. Wilson, who replaced Jacobson in late November, took over a going concern. Since its establishment five months before, the P&E Branch had grown to an organization of sixty people. Adoption of the auction method had been a giant step forward. Centralized procurement seemed to be turning out well. Lumber prices were steadily declining. P&E paid an average of $39.06 per thousand board feet during October, $37.18 during November, and $35.81 during December. Increased production, as mills switched to two and three shifts, undoubtedly contributed to the downward trend. Nevertheless, its proponents gave the bulk of the credit to centralized procurement.[40] Under Major Wilson's direction, P&E would attain undisputed leadership among federal lumber agencies. The pioneer work performed by Colonel Jacobson contributed materially to this success.

The record of the P&E Branch told an incomplete story of lumber in the early months of defense construction. During 1940 thirty-eight projects figured in P&E's purchases. Contractors re-

[38] (1) Jacobson Interv, 7 Jun 55. (2) Sherrill, Lumber in the War, ch. I, pp. 3–6.

[39] (1) Jacobson Interv, 7 Jun 55; Boeckh Interv, 21 Jun 59. (2) Ltr, Nat Lumber Mfgrs Assn to NDAC, 19 Oct 40, and Incls. QM 411.1 (Cp Edwards) 1940. (3) Telg, Gregory to CQM Pine Cp and other FF projects, 9 Nov 40. QM 411.1 (Pine Cp) 1940. (4) QM 411.1 (Lumber) 1940. (5) QM 411.1 (Indiantown Gap) 1940–41. (6) QM 411.1 (Cp Devens) 1940–42. (7) Ltr, Jacobson to authors, 23 Jun 55.

[40] (1) Table of Lumber Awards to 31 Jan 41. (2) Memo, Watzak for Harriman, 11 Jan 41. (3) Memo, Constr Div OQMG for Nelson, 25 Jan 41. 411.1 (Lumber) II.

mained in exclusive control of lumber procurement at the rest. P&E had bought approximately 587 million board feet by the end of the year. As of 31 March 1941, contractors had purchased almost one billion board feet. Because builders were prohibited from buying large quantities after 6 January 1941, the bulk of the March total represented orders placed during 1940.[41] Although their methods differed, contractors and P&E faced common problems. Both were affected by production difficulties within the lumber industry.

Workers in the lumber mills of Washington and Oregon struck on 1 October. Five days later the West Coast maritime unions walked out. By mid-October tugboat operators and more mill workers had joined the strikers. Returning from a trip to the Ninth Corps Area on the 28th, Groves reported to Gregory, "If they [the strikes] are not settled immediately it will result in serious delay and greatly increased cost in our camp construction." He added, "The supply of lumber in California is becoming very much reduced."[42] The strikes continued. By November West Coast projects were feeling the pinch. The contractors at Fort Lewis despaired of meeting their completion date unless deliveries resumed at once. An arrangement, sponsored by Hillman's office, whereby workers at one of the larger mills went back to work under a temporary agreement, brought some relief to Lewis, but the situation there continued critical. Meanwhile, lumber prices at San Luis Obispo rose $6 to $8 per thousand board feet as a result of the shipping tieup. Cut off from sources of northwestern fir, contractors in California turned to native redwood and uncured lumber. An agreement reached on 4 December sent the maritime unions back to work, but a general settlement with the mill workers did not come until 16 December.[43]

As stocks of seasoned lumber dwindled, buyers moved closer to the saw. Many faced a choice of green lumber or none at all. Hartman took what steps he could to prevent use of substandard material, calling for rigid inspections and tests of moisture content. But there was no way he could prevent stocks of cured lumber from being consumed faster than they could be replenished. The camp program was taking an entire year's cut of longleaf pine from the southeast area. The kilns and cooling sheds did not exist which could dry all that lumber in a few months. Rumors that green lumber was going into the camps were later confirmed.[44] In January 1941 the Army explained, "The demand on the lumber industry has been so heavy in recent

[41] (1) Table of Lumber Awards to 31 Jan 41. (2) Table, Constr Div OQMG (n.d.), Lumber Purchases, Accrued Totals to 31 Mar 41, Inclusive. Opns Br Files, Lumber. (3) Constr Div OQMG Gen Fld Ltr 40, 6 Jan 41. EHD Files.

[42] Memo, Groves for Gregory, 28 Oct 40. Opns Br Files, Convention in Chicago.

[43] (1) Truman Comm *Hearings*, Part 1, Supplemental Data, pp. 389, 391. (2) Ltr, CQM Ft Lewis to TQMG, 7 Nov 40. 652 (Ft Lewis) I. (3) Memo, Cochran for Loving, 2 Nov 40. QM 333.1 (Cp San Luis Obispo) 1941. (4) Ltr, Peter Kiewit to CQM Ft Lewis, 7 Nov 40. 652 (Ft Lewis) II. (5) Rpt, IGD to TIG, 12 Nov 40. Opns Br Files, Rpts of Insp. (6) Incl, 13 Dec 40, with Ltr, CQM San Luis Obispo to OQMG, 16 Dec 40. 600.914 (Cp San Luis Obispo) I.

[44] (1) Memo, Patterson for Hartman, 26 Aug 40. SW Files, Constr Work 251–650. (2) Ltr, Hartman to Sen Hattie W. Caraway, 7 Oct 40. QM 411.1 (Lumber) 1940. (3) FF Ltr 14, 28 Oct 40. EHD Files. (4) QM 411.1 (Cp Forrest). (5) Ltr and Incls, Constr Div OQMG to C of Engrs, 2 Jan 41. Opns Br Files, Ft Belvoir.

months, that proper drying has been impossible."[45]

Although lumber was the most serious bottleneck, it was not the only one. Hard-to-get items included hospital and kitchen equipment, sheet metal, furnaces, and stoves. Production problems lay at the bottom of most of these shortages. Manufacturers were unable to meet the sudden demand for noncommercial sizes. Scarcities of aluminum and stainless steel restricted output of several items. Even when industry could produce, misunderstandings as to who was buying what occasionally upset delivery schedules. Along with the Construction Division and its contractors, depot Quartermasters, post commanders, and the Surgeon General were purchasing for the program. This situation inevitably produced confusion and delay. To make matters worse, a number of contractors placed orders with jobbers who promised early delivery dates but failed to meet them. Answers to questionnaires circulated by the AGC indicated the extent to which materials shortages were affecting the program. Fifty-seven percent of the contractors included in a poll of 15 November reported deliveries behind schedule. A poll taken ten weeks later showed 65 percent delayed for lack of one material or another.[46]

Construction Equipment

Between fifty and sixty million dollars' worth of construction equipment was required for the camp and cantonment projects. Filling this requirement was a difficult thing to do. Principal contractors could furnish only a fraction of the needed equipment. Big general contracting firms seldom maintained extensive plants. A few bought equipment for each new project and sold it when the job was over. Most relied on rented machinery. To purchase the necessary equipment was out of the question. Hartman had no funds for this purpose. Moreover, manufacturers could not promise early deliveries and dealers were reluctant to sell irreplaceable stocks. In these circumstances, Hartman had but one recourse—to rent from distributors, dealers, small contractors, and other third parties.

Adopting a method that had proved successful in World War I, he agreed to reimburse contractors for the cost of leasing third-party equipment. The fixed-fee contract set forth the conditions that would apply. Equipment must "be necessary for the proper and economical prosecution of the work." It must be "in sound and workable condition." Agreements for third-party rentals must follow a form prescribed by the Secretary of War. They must include the same recapture clause as the principal contract. Rental rates and other terms must meet the approval of the contracting officer.[47] In his instructions to the field, Hartman made Constructing Quartermasters responsible for approving valuations and rental rates. He promised a schedule of allowable rents and a standard form of agreement at an early date. Meanwhile, he told contractors to get

[45] Ltr, Constr Div OQMG to Nelson, 25 Jan 41. 411.1 II.

[46] (1) Memo, Wilson for Opns Br, 9 Apr 41. Opns Br Files, Questions and Answers for Truman Comm. (2) FF Ltr 6, 24 Sep 40. EHD Files. (3) FF Ltr 30, 10 Dec 40. EHD Files. (4) Memo, Chief Constr Div for Groves, 29 Jan 41. Opns Br Files, Projects Behind Schedule.

[47] FF Form 1, approved by ASW, 12 Jul 40, art. II, par. 1c.

started. As soon as they could determine their requirements, they were to make temporary arrangements with third-party owners and begin assembling equipment.[48]

When Captain Richardson reported to Loving on 10 September 1940, fleets of equipment were already moving to the job sites. Contractors were making their own terms with third-party renters. The Mechanical Equipment Section was a name on an organization chart, nothing more. Hurriedly assembling a small staff, Richardson buckled down to work. Within a week or so, a schedule for third-party rentals, based on the contractors' schedule but including an allowance for profit, was on its way to the field. Before the month was out, all the big machinery companies had been canvassed and lists of equipment for rent had been compiled. During October, Richardson, with help from the Legal Branch, revised an agreement used in peacetime on purchase and hire projects for use in the current emergency. Two significant features of the new form were the required recapture clause and a provision making owners responsible for major repairs. Upon its approval by Assistant Secretary Patterson, Richardson rushed the agreement to Constructing Quartermasters with instructions to use it on all future third-party rentals and to bring outstanding leases quickly into line.[49]

As it turned out, third-party rents were determined not by the Quartermaster schedule but by the law of supply and demand. At the beginning of October only eighteen million dollars' worth of used equipment was available throughout the country. New machinery was hard to come by. Rents were beginning to soar. On the 11th Richardson, in an effort to hold leasing costs within bounds, told contractors to ask for bids. Bidders would set a valuation on their equipment and quote a monthly rate, but with machinery at a premium, bidding was seldom competitive. Lively competition did exist, but it was among contractors struggling to attract equipment to their projects rather than among owners anxious to rent. Third-party agreements became so profitable that contractors pressed for higher rates on their own equipment. One of the joint venturers at Fort Belvoir went so far as to rent some of his equipment to the contractor at Meade. Where competition failed, the recapture clause became the sole bulwark against spiraling rates, for the larger the monthly rent the sooner would the equipment belong to the government.[50]

Owners were understandably hostile toward recapture. Small construction firms could not afford to lose their stock in trade. Dealers and distributors, unsure of future deliveries, hesitated to risk capture. The fact that the Navy did not adopt a similar provision made the

[48] OQMG Manual, Supplement to Guide for CQM's, Rev 1940, Covering FF Projects, 27 Aug 40, 4–5, 14–15.

[49] (1) Testimony of Capt Richardson, 29 Jul 41. In Truman Comm *Hearings*, Part 6, pp. 1667–70, 1678–79, 1676. (2) Memo, Richardson for Violante, 8 Oct 40. QM 022 (Constr) Oct 40–Dec 41. (3) Truman Comm *Hearings*, Part 6, Exhibit 91, Equipment Rental Agreement, pp. 1886–89.

[50] (1) Richardson's Testimony, 29 Jul 41. In Truman Comm *Hearings*, Part 6, p. 1679. (2) Memo, Richardson for Sec Chiefs FF Br, 11 Oct 40. 481 Part 1. (3) Ltr, FF Br to CQM Cp San Luis Obispo, 25 Oct 40. QM 481 (Cp San Luis Obispo) 1940–41. (4) Constr Div OQMG FF Ltr 35, 17 Dec 40. EHD Files. (5) Truman Comm Rpt 480, Part 2, pp. 26–27, 29.

Army's bargaining position all the more precarious.[51] Although Hartman assured owners that they would receive fair treatment, many refused to rent on his terms. Some offered to lease equipment only in blocks which included obsolete and useless items. Others demanded subcontracts. Those who bid on a recapture basis generally set valuations high enough so that recapture would bring them a tidy profit.

Quartermaster officers, trying desperately to speed construction, occasionally joined owners and contractors in opposing recapture. Insistence on a provision that inflated rents, discouraged bidders, and might, in the end, put many small contractors out of business seemed unwise to them. One Constructing Quartermaster favored striking the recapture clause from the agreement. Another promised to release equipment before it reached the recapture stage. A third permitted owners to jack up valuations as much as 60 percent above retail list prices, thus insuring that recapture, if it occurred at all, would be highly profitable. Major Cochran of the Fixed Fee Branch threw caution to the winds and openly scrapped the provision. Cochran, whose section oversaw seventeen projects, including such important camps as Edwards, Meade, San Luis Obispo, Indiantown Gap, and Devens, boasted of his ability to cut red tape.[52] At a meeting with subordinates on 11 November, he announced: "We are having difficulty with the recapture clause in equipment rental. Throw it away." He went on to explain:

> Take the man who owns a $10,000 shovel or special equipment. He is not interested in selling that equipment. He cannot buy any more now. The shovel people are three months behind on deliveries. If you are in a hurry, take one bid. Use your judgment and get a fair price. Speed is the essential thing. This money is being spent for winter construction. It costs money to go to war, boys. Two or three weeks on a training schedule of men may be a serious proposition.[53]

In discarding recapture, Cochran gained a temporary advantage for his projects but blunted Richardson's drive to standardize rental agreements.

Despite complications, renting got results. Fixed-fee contractors succeeded in leasing large amounts of equipment. To illustrate, Walsh at Edwards leased 1,132 items; Starrett Brothers and Eken at Blanding, 2,500. True, renting created problems for which there were no easy solutions. True, too, its cost was high. Nevertheless, it offered the quickest method of assembling equipment and the best means of controlling distribution during a period of shortage.[54]

Labor

Completing the camps on schedule depended heavily on the achievement of three major objectives in regard to labor. First, every project had to have

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[51] Navy Department, Bureau of Yards and Docks, *Building the Navy's Bases in World War II* (Washington, 1947), I, 104.

[52] (1) Transcript of Verbal Rpt, CQM Cp Edwards to FF Br, 21 Oct 40. 600.914 (Cp Edwards) I. (2) Ltr, L. B. McLeod to Starrett Bros and Eken, 8 Jan 41. 481 (Cp Blanding) I. (3) QM 481 (Cp San Luis Obispo) 1940–41. (4) Statement of Maj Cochran, 28 May 41. Opns Br Files, Confs.

[53] Min of Mtg, Cochran and CQM Reps, 11 Nov 40. Quoted in 2d Ind, CQM Cp Grant to OQMG, 14 Jan 41, on Ltr, CQM Cp Grant to OQMG, 19 Dec 40. 481 (Cp Grant) I.

[54] Ltr, Constr Div OQMG to Truman Comm, 11 Jun 41. 481 Part 1.

enough workmen. Second, production had to be continuous. Last, and to some extent least, came considerations of cost. Hours of work, wage rates, and efficiency had to be watched carefully so that neither time nor money would be wasted. Attaining these objectives was primarily the contractor's responsibility and was in fact an important part of the service for which he received his fee. Nevertheless, the Construction Division was ultimately accountable for completion of the program and for its cost. When progress and costs were affected, and only then, the division took an active role in labor relations and management.

The group within the Construction Division most active in labor matters was the Labor Relations Section of the Administrative Branch. Established in August 1940, the section had the duties of obtaining wage rates from the Department of Labor and making certain that contractors paid at least these rates, as required by the Bacon-Davis Act. In addition, it supervised labor, dealt with labor representatives, and co-operated with interested federal agencies. Heading the organization was Leslie E. Brigham, a former professor of hydraulics who was identified neither with the unions nor with industry. The "old professor," as he styled himself, considered his mission threefold: "facilitating the greatest possible speed in construction; providing the greatest possible economy both in money and manpower; [and] getting the job done with the least possible friction and dispute."[55]

Between July 1940 and the end of the year, the number of men employed on military construction projects rose from 5,380 to 396,255. (*Table 10*) Although some were paid by WPA and some directly by the Army, the vast majority of these workers were contractors' employees. Project forces grew with impressive speed. Camp Edwards, which started out with 165 men shortly after Labor Day, attained its peak employment of 18,800 early in November. By December there were some 9,000 men on the payroll at Camp Robinson, 13,800 at Blanding, 14,900 at Claiborne, and 19,000 at Forrest. Where did all these workers come from? A nationwide survey in the summer of 1940 turned up only 366,000 unemployed workmen with any skill in the building trades.[56]

As far as the Construction Division was concerned, a contractor's recruiting methods were his own affair. He might advertise, post notices, get in touch with employment agencies, and choose among applicants who presented themselves at the gate; or he might call upon union business agents to send him men. General contractors in the South and Southwest, still largely open shop territory, preferred the first method; those in other sections of the country, the second. For big contractors in the North, the East, and the Pacific coastal area, relations with labor had come increasingly to mean relations with the building trades unions of the American Federation of Labor. Efforts of the CIO to organize construction workers had met with little

[55] Rpt, Brigham to Bennett, 30 Sep 40. EHD Files.

[56] (1) Table, prepared by the Bureau of Labor Statistics, Dept of Labor, Average Employment on Selected Mil Constr Projects, Monthly, By Geographical Area. EHD Files. (2) Richard J. Purcell, Labor Policies of the National Defense Advisory Commission and the Office of Production Management, May 1940 to April 1942 (WPB Spec Study 23, 31 Oct 1946), pp. 67–68. Cited hereinafter as Purcell, Labor Policies.

TABLE 10—NUMBER OF PERSONS EMPLOYED ON PROJECTS UNDER JURISDICTION OF CONSTRUCTION DIVISION, OQMG JULY–DECEMBER 1940

Month	Average
July	5,380
August	7,172
September	19,103
October	78,855
November	255,592
December	396,255

Source: Constr PR 9, 26 Feb 41, p. 91.

success. Affiliated with AFL were nineteen autonomous craft organizations, each with its own officers, initiation fees, dues, working rules, and regulations. Holding them together was the Building Trades Department, AFL, headed since August 1939 by John P. Coyne. For the year 1939 the building trades unions reported a combined average membership of 822,593.[57] With hundreds of thousands of defense jobs open, the unions could not afford to be inactive. The preparedness program presented them with a challenge and an opportunity. The circumstances dictated an organizing drive which would bring pressure on both the contractors and the Construction Division.

Eager to assume responsibility for referring workers to defense projects, the unions professed to have not only the men required but also the machinery for referring these men when and where they were needed. "To set up within our building-trades department a great defense-employment exchange was not difficult," President William Green of the AFL explained in 1941, "for our international unions already serve their membership as Nation-wide employment offices."[58] A link with the United States Employment Service (USES) strengthened the unions' position as referral agencies. When the defense program began, nearly six million unemployed were enrolled with USES. The NDAC wanted this roll used "as far as possible" in filling defense jobs.[59] During the summer of 1940 the unions worked out agreements with USES: unemployed members would register at USES offices, which would try to "preserve the established union placement channels."[60] Potential rivals thus became partners. But arrangements with USES did not automatically assure AFL that all construction workers would be channeled

[57] *Report of Proceedings to the Thirty-Fourth Annual Convention of the Building and Construction Trades Department, American Federation of Labor,* November 1940, p. 167. Cited hereinafter as Bldg Trades Dept, *Proceedings,* Nov 1940.

[58] Statement of William Green, 14 Jul 41. In H Select Comm Investigating Nat Def Migration, 77th Cong, 1st sess, *Hearings,* Part 16, p. 6414. Cited hereinafter as Nat Def Migration *Hearings.*

[59] (1) Purcell, Labor Policies, p. 68. (2) H Doc 950, 76th Cong, 3d sess, 13 Sep 40, pp. 2–3.

[60] Nat Def Migration *Hearings,* Part 16, pp. 6415–16.

through its unions. Only when a contractor agreed to employ union members exclusively would USES clear all workers for a project through AFL locals.[61]

Hiring at defense projects came increasingly under union control. In a strong position to begin with, the unions fought to extend their influence. Strikes and threats to strike, refusals by union members to work with nonmembers—all the usual pressures were brought to bear.[62] Benefiting from policies of the Roosevelt administration and from the emergency situation, the AFL advanced toward its goal of unionizing all military construction jobs. A study of 78 representative fixed-fee projects, made in March 1941, revealed that only 6 were operating strictly on an open shop basis. Twenty-two required workers in some crafts to belong to unions. Thirteen operated as preferential shops, which meant that union members received first call on jobs and nonmembers had to join a union after they were hired. Thirty-seven projects, nearly half the total, operated as closed shops, which meant that a man had to be a union member before he was even considered for employment. Of the 78 principal contractors on these projects, only 30 had regularly operated closed or preferential shops before the defense program began. That 50 were operating such shops in March 1941 was indicative of the unions' progress during the early months of the emergency.[63]

Military construction projects attracted hordes of applicants. As contract awards became public, as calls went out for workers through newspapers and radio, as "caravans" of sound trucks toured the countryside broadcasting offers of employment, thousands flocked to the job sites. Sperl, detailing the success of caravans in recruiting workmen in rural Mississippi and Kentucky, said in his clipped way: "Got thousands—barefoot and like-a-that—but thousands—old jeans, no shoes, needed haircuts—but got them in working."[64] Considerable interstate migration occurred. Fort Bragg in North Carolina drew labor from South Carolina and Georgia; Camp Jackson in South Carolina, from North Carolina and Georgia. Maryland, Ohio, and Louisiana reported a large influx of people from nearby states. There were many more applicants than jobs. At Camp Edwards, 9,000 men were turned away; at Shelby, 11,000; at Meade, 29,000; and at Bragg, 36,000. All the other big projects had similar surpluses.[65] Whether in a densely populated area

[61] (1) Testimony of James Doarn, Missouri State Employment Serv, 26 Nov 41. In Nat Def Migration *Hearings*, Part 23, pp. 8896–99. (2) Rpt of William L. Hutcheson, President, *Proceedings of the Twenty-Fourth General Convention of the United Brotherhood of Carpenters and Joiners of America*, December 9–16, 1940, p. 42. Cited hereinafter as Carpenters and Joiners *Proceedings*, Dec 40. (3) Incl, 8 Feb 41, with Ltr, Pres Int Brotherhood of Electrical Workers to OQMG, 10 Feb 41. 600.1 (Wolf Creek OP) (Labor).

[62] (1) Table, prep by EHD, Work Stoppages on Mil Constr Jobs, Jun 40–Dec 40. EHD Files. (2) Ltr, Sen H. C. Lodge, Jr., to TQMG, 25 Oct 40. 600.1 (Cp Edwards) (Labor) I. (3) Memo, Groves for Hartman, 7 Nov 40. 600.1 (Indiantown Gap) (Labor) I. (4) Ltr, CQM Cp Lee to TQMG, 10 Nov 40. 600.1 (Cp Lee) (Labor) I. (5) Carpenters and Joiners *Proceedings*, Dec 40, p. 42.

[63] Incls with Memo, Statistical Unit Labor Rel Sec Constr Div OQMG for Chief Labor Rel Sec, 28 Apr 41. OCE LRBr Files.

[64] Sperl Interv, 18 Jun 56.

[65] (1) Statement of Fred R. Rauch, Acting Commr, WPA, 6 Dec 1940. In Nat Def Migration *Hearings*, Part 9, pp. 3626–27. (2) Ltrs, CQM's at various projects to Rep John H. Tolan, Chm H Select Comm to Investigate the Interstate Migration of Destitute Citizens, Mar 41. OCE LRBr Files.

or in the backwoods, a defense project never lacked for applicants. As far as quantity was concerned, contractors had more than enough labor.

A hail of grievances soon erupted, mainly because a majority of the job-seekers were not AFL members. Some belonged to the CIO. Some were Negro craftsmen barred from the building trades unions because of their race. A great many were "barnyard mechanics," "hatchet and saw carpenters," handymen, people with little or no skill, destitute migrants searching desperately for work, and local residents out for big construction wages. With the AFL exerting broad control over hiring, friction was bound to develop. The building trades unions came in for much bitter criticism. Home folks complained of being edged out by union hooligans from distant places. Jobless Negroes blamed the unions for their failure to get work. CIO members protested that they could not ply their trades unless they went over to the AFL. Newspapers throughout the country carried reports that the unions were levying exorbitant fees for the privilege of working. Many persons were convinced that "union racketeers" had taken over the Army's construction program and were running it in anything but a patriotic manner.

Racket and *shakedown* were terms frequently applied to the exaction of union fees and dues from workers at defense projects. Scattered figures give an idea of what a workman had to pay to join a union local. The initiation fee for carpenters was $35 at Pine Camp, $50 at Blanding, and $80 at Dix. The plumbers union charged $50 at McClellan and $200 at Lawson General Hospital. At Belvoir the electricians charged $300. In addition, the unions collected dues, generally under $5 per month. There were many seeming abuses. At project after project men paid their money, joined a union, and went to work, only to be fired a short time later as incompetents. Several locals increased their fees. A number refused to honor membership cards of other locals, demanding a sizable sum for permitting "outsiders" to work within their jurisdiction. Receipts of some locals reportedly ran into hundreds of thousands of dollars; where the money went was a mystery. Complaints poured into Washington. The press spotlighted alleged abuses. Public resentment ran high. Concerned, top union leaders joined officials of the War Department and NDAC in bringing pressure on locals.[66] But reform was slow in coming.

The project most severely hurt by the unions' organizing drive was Blanding, a closed shop job in an open shop state. Starrett Brothers and Eken had long been union contractors. When they moved south in September 1940 to build the camp, they took with them a following of some 2,000 men—superintendents, foremen, and workmen—all trade unionists. Members of this group automatically assumed control over hiring and firing. Pressure on nonunion craftsmen to join up encountered stiff resistance. Blanding was torn by dis-

[66] (1) Data on union fees and dues compiled in EHD. (2) 600.1 (Labor) (Initiation Fees). (3) Memo, Brigham for Bennett, 8 Nov 40. QM 600.1 (Labor). (4) Interv with James P. Mitchell, 5 Nov 49. (5) OCE Legal Div Files, Press Clippings, Aug–Dec 40. (6) Tel Conv, Brigham and Coyne, 3 Dec 40. OCE Legal Div Files, Bldg & Constr Trades Dept, 8/40–3/43. (7) Address by Joseph D. Kennan, 13 Nov 40. Bldg Trades Dept, *Proceedings*, pp. 192–93. (8) Memo, OASW, John H. Ohly, for Huntington Thom, 10 Jan 41. Ohly Files, Labor–Constr Policies & Problems 1.

sension, as organizers from New York told local workmen to pay up or get off the job and Floridians damned the Yankees and their unions. Morale suffered, and production fell.[67] By late October the job, reportedly, was "progressing 25 percent slower than it should due to interference of union activities."[68] Efforts to remedy the situation were largely unsuccessful. To Maj. Leander Larson, the CQM, the reason for this failure was obvious. He questioned whether any other closed shop contractor would have fared better at Blanding.[69] Dresser, reviewing the record of the Construction Advisory Committee, termed the selection of a New York concern for work in Florida as "one of our chief mistakes."[70]

Taking a neutral position on the question of union control, the Construction Division made no attempt to dictate policy to either the contractors or the unions. Hartman refused to "dictate or express any preference or negotiate in any way to see that the job was made either union or open shop."[71] He left the decision to the contractor. Moreover, he made no attempt to interfere in union affairs. "You will appreciate," Gregory wrote Senator Lodge, "that the rules under which the unions operate are entirely a matter within their own jurisdiction."[72] Unions could not set up offices within projects or collect dues during working hours. Union organizers were barred from job sites. But, Gregory emphasized, "Activities of these people off the reservation are no concern of this office."[73] One fortunate effect of this hands-off policy was that Brigham was spared involvement in controversies over the unions. Problems of wages and hours demanded his full attention.

Strong monetary inducements were necessary to draw skilled workers to jobs which were otherwise unattractive. Camp projects offered only a few months' employment. Most were far from centers of population. Furthermore, miserable living conditions often prevailed in the vicinity of the sites. Conditions in the little town of Tullahoma, near Camp Forrest, Tennessee, illustrated the sort of thing a workman might find. At Tullahoma, whose normal population was 5,100, an influx of 15,000 construction workers created "a health hazard almost beyond description."[74] "Many employees live in crackerbox shelters built on small broken-down trucks and automobiles," an inspector reported. "Many house owners in the town rent bunk space in basements. In some cases, men spend the night in sheltered doorways."[75] Another visitor observed streets littered with garbage and human excrement. The Constructing Quartermaster, fearing an outbreak of typhoid or smallpox, ordered mass vaccinations and had garbage removed and streets

[67] (1) Ltr, Starrett Bros and Eken to Truman Comm, 23 May 41. Opns Br Files, Loose Papers. (2) OCE LRBr Files, Cp Blanding to 2/11/41.

[68] Ltr, 1st Lt. R. C. Haas to Lt. E. C. Parks, Jr., 25 Oct 40. 600.1 (Cp Blanding) (Labor) I.

[69] Incl with Ltr, Larson to Gregory, 4 Jan 41. QM 652 (Cp Blanding) 1941.

[70] Dresser Interv, 2 Apr 57.

[71] Ltr, CQM Cp Lee to TQMG, 10 Nov 40. 600.1 (Cp Lee) (Labor) I.

[72] Ltr, Gregory to Lodge, 9 Nov 40. 600.1 (Cp Edwards) (Labor) I.

[73] Telg, Gregory to CQM Ft Warren, 3 Dec 40. 600.1 (Ft Warren) (Labor) I.

[74] Ltr, Carey to Harrison, 30 Nov 40. WPB–PD File, 411.33 Constr Projs—Mil—Jun 40–41.

[75] Rpt, Maj Hunt, IGD, to TIG, 11 Dec 40. QM 333.1 (Cp Forrest) 1940–41.

cleaned at government expense.[76] To be sure, communities larger than Tullahoma provided better accommodations, but workers still had to expect high prices, overcrowding, and other inconveniences.

The maximum wage rates that Hartman authorized fixed-fee contractors to pay—the minimum Bacon-Davis rates set by the Department of Labor—had less appeal for craftsmen than for unskilled workers. Early reports from the field disclosed widespread difficulties in recruiting artisans. The CQM at Bragg complained that his project was not attracting enough skilled workmen. The CQM at McClellan despaired of getting adequate numbers of craftsmen at Labor Department rates. Sheet metal workers protested the wage at Fort Riley. Bricklayers spurned the pay at Camp Shelby as "too low."[77] At Camp Edwards, on the southern end of Cape Cod, the situation was critical. On 28 September Madigan telephoned Hartman from Boston: "You have about 900 carpenters, 930 to be exact, at Camp Edwards. You can use about 1,000 or 1,500 more . . . . We have got to get something done about carpenter rates if you are going to get that camp finished."[78] The CQM at Edwards, like others in his predicament, blamed the lack of carpenters on "inadequate and ridiculous" wage rates established by the Department of Labor.[79]

Much trouble resulted from the Labor Department's practice of confining its wage rate studies to the immediate vicinity of the projects. On many jobs in small towns or rural areas, the department's rates were too low to attract craftsmen from distant places. At Edwards, for example, the department "set up wage scales, which, while entirely pertinent to existing local conditions, where an occasional summer cottage was the limit of construction operations, offered no attraction whatsoever to outside labor." Skilled workmen in Boston were naturally unwilling to go to Cape Cod for less money than they could earn at home.[80] Additional complications arose whenever the Labor Department established higher rates for a new project than those being paid on a going job nearby. Then, workers rapidly deserted the old project for the new. Pointing to these difficulties, Coyne, Hillman, and others with prolabor views argued that Hartman ought to abandon his attempt to "freeze the minimum wages into maximum wages."[81]

The Construction Division's solution to the problem was less drastic. Where Labor Department rates clearly lacked sufficient drawing power, it authorized contractors to pay higher rates. Anxious to avoid unnecessary increases, it waited until a contractor complained about shortages of workmen before considering new rates for his project. Then, it weighed his recommendations carefully. If he

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[76] (1) Ltr, OCQM Cp Forrest to Brigham, 15 Nov 40. OCE, LRBr Files, Cp Forrest. (2) Groves Comments, IV, 8.

[77] (1) Telg, CQM Ft Bragg to TQMG, 17 Sep 40. 600.1 (Ft Bragg) (Labor) V. (2) Memo, Brigham for FF Br, 30 Sep 40. 600.1 (Ft McClellan) (Labor) I. (3) Incls, 27 Sep 40 with Memo, Brigham for Violante, 2 Oct 40. 600.1 (Ft Riley) (Labor) I. (4) Ltr, Kirkpatrick to CQM Cp Shelby, 30 Sep 40. 600.1 (Cp Shelby) (Labor) I.

[78] Tel Conv, Madigan and Hartman, 28 Sep 40. OCE LRBr Files, Cp Edwards, Gen Corresp.

[79] Memo, Cochran for Loving, 2 Nov 40. 600.914 (Cp Edwards) I.

[80] *Ibid.*

[81] Memo, Simpson for Patterson, 16 Oct 40. Madigan Files, 102 Labor.

could demonstrate his inability to recruit enough workmen at the current rate, he received an increase. He did not need to show that he had gone to extraordinary lengths to secure workers. But he did have to prove that other contractors in the same general locality were paying more. This system enabled the Construction Division to grant justifiable increases and at the same time to maintain its overall ceiling on wages. Nearly every fixed-fee job received a boost in one or more crafts, but few received across-the-board increases.[82]

Overtime premiums, not basic wage rates, were Brigham's biggest headache. As already noted, principles adopted by NDAC required the payment of premiums in accordance with "local recognized practices" for more than eight hours a day or forty hours a week and for work performed on Saturdays, Sundays, and holidays.[83] On 12 September 1940, the day before the President promulgated this policy, Major Jones and his assistants in the Legal Branch completed a memorandum entitled Notes on Hours of Labor. This document, though technically correct, implied a policy contrary to NDAC's in two important respects. It stated, first, "There are no statutory limitations (except overtime for over eight hours) as to work on Saturdays, Sundays, or holidays," and, second, "There are no statutory limitations as to the number of hours . . . employees may work per week or per month."[84] Although the Construction Division did not receive a copy of Patterson's memorandum of 27 September directing adherence to NDAC policy, Brigham knew of a letter from Stimson to Hillman promising compliance.[85] He also knew that Coyne had written to all local building trades councils, calling attention to the policy.

Convinced that the War Department should not be forced in an emergency to pay rates looked upon as prohibitory in ordinary times, Brigham refused to accept the "local practices" formula as final. On 7 October he pointed out to Bennett that Hartman had ordered projects to work forty-eight and fifty-six hours a week apparently on the assumption that straight-time wages would be paid. That assumption, Brigham indicated, might yet prove correct. Suggesting that public opinion would not support union demands for excessive overtime, he asked permission to negotiate with AFL leaders, to try to win them over to "a 40-hour week and 8-hour day for any one man, continuous operation through Saturdays, Sundays, and holidays, at straight time, payment of time and one-half for overtime, as required by law, and sufficient shift work at a reasonable increase in rates, as may be required to complete the job on time."[86] Brigham's language echoed the Notes on Hours of Labor prepared by Major Jones.

If the Labor Department, NDAC, and

[82] (1) Memo, Birdseye for Bennett, 9 Oct 40. OCE LRBr Files, Constr Div. (2) Ltr, Hartman to CQM's, 30 Nov 40. 600.1 (Radford OW) (Labor). (3) Statistics prepared by Labor Rel Sec Constr Div OQMG (n.d.), sub: Increases in Hourly Rates Approved for CPFF Projects, 1 Jul 40 to 31 Dec 41. OCE LRBr Files.

[83] See p. 161, above.

[84] Memo, prepared by Jones, 12 Sep 40, sub: Notes on Hours of Labor. OCE Legal Div Files, Labor—Gen.

[85] Memo, Huntington Thom, OASW, for Patterson (n.d.), sub: Status of Labor Policy. Madigan Files, 102 Labor.

[86] Memo, Brigham for Bennett, 7 Oct 40. OCE LRBr Files, Cp Edwards, Gen.

AFL were prepared to accept such conditions, they gave no sign of it, for they denounced unequivocally Major Jones' Notes. On 15 October Coyne, Maxwell Brandwen of Hillman's office, and Daniel W. Tracy, former head of the electrical workers union and now Assistant Secretary of Labor, discussed the matter with Maj. Sidney P. Simpson, Patterson's special assistant for personnel. Brandwen began somewhat heatedly, "We want to find out ways and means so that what the Assistant Secretary of War says will be done and not be circumvented by lawyers." Coyne and Tracy cited instances of contractors working their employees fifty-six hours a week at straight time and said this had to stop. Major Simpson went along with the others, suggesting, "Chop off a few heads, that's what I say."[87] At Simpson's urging, Judge Patterson on 19 October directed General Gregory to comply strictly with NDAC policy. Three days later Patterson rewrote Jones' Notes and told Gregory to send the revised version to the field. Under the new instructions, workers would be compensated in accordance with "local recognized practice" if they worked more than forty hours a week or on weekends and holidays.[88]

Just before Patterson restated his position, 200 carpenters at Camp Meade struck for time and a half on Saturdays and double time on Sundays. On Thursday morning, 17 October, Maj. James A. Noxon, the CQM, had telephoned to report the union's demands. His SCQM said there was no authority for paying premium rates and advised him to write to Brigham. That afternoon Noxon phoned again to say that the union had called a strike for the following day. This time he got orders "to make sure that the labor representatives fully understand that such action would place full responsibility for delaying work upon them."[89] On Friday the carpenters walked out. It was the first strike of any size in the military construction program. By this time Brigham knew what was going on and telephoned H. W. Blumenberg, general representative of the Carpenters Brotherhood: "Tell those boys to get back to work and we will look into it . . . ." Blumenberg put him off with a promise to visit the site that afternoon.[90] The strike continued until Monday, the 21st, when Coyne intervened to send the men back to work. On the 23d Blumenberg went to Brigham's office to try to reach a settlement. While the two men were talking, word came to Brigham that Hillman's office had just notified the press that the union's demands would be met. The strike had been settled, not by the Construction Division, but by the NDAC.[91]

Deploring the "surrender" to the unions, the *Army-Navy Journal* predicted strikes at jobs throughout the country.

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[87] Notes of Conf, Coyne, Brandwen, *et al.*, 15 Oct 40. Ohly Files, Labor-Constr—"Notes on Hours of Labor" or "The QM Crisis."

[88] (1) Memo, Simpson for Patterson, 16 Oct 40. Madigan Files, 102 Labor. (2) Memos, Patterson for Gregory, 19, 22 Oct 40. OCE LRBr Files, ASW. (3) Ltr, Hartman to CQM's, 24 Oct 40. 600.1 (Labor) (Eight-Hour Law) 1940.

[89] Résumé of Tel Convs, Noxon and H. G. Wray and Hadden, 17 Oct 40. OCE LRBr Files, Ft Meade, Gen.

[90] Tel Conv, Brigham and Blumenberg, 18 Oct 40. OCE LRBr Files, Ft Meade, Gen.

[91] (1) Tel Conv, Brigham and Coyne, 21 Oct 40. (2) Notes of Conf, Brigham and Blumenberg, 23 Oct 40. Both in OCE LRBr Files, Ft Meade, Gen.

On 26 October the *Journal* told its readers:

> It is apprehended that the cantonments will not be completed on schedule, in spite of the urgency with which the constructing Quartermasters have been pressing the work. If this be so, the fathers and mothers of the young men not provided with proper housing should place the blame where it belongs, upon the Labor Unions, which put extra compensation above responsibility to the lads called to protect them and their country.[92]

The article's emotionalism and antilabor tone alarmed Judge Patterson.[93] On 9 November, after rejecting the idea of a letter to the *Journal*, he released to the newspapers a statement of the War Department's labor policy, the same policy handed down by NDAC. Praising American workers for their patriotism and co-operation, he assured them that existing "standards as to wages, hours of work and overtime . . . must be maintained if the defense program is to go effectively forward." He dismissed the strike at Meade as unimportant, ascribing it to "a temporary misunderstanding of the policy of the War Department as to overtime pay" and asserting that it had not affected the camp's completion schedule.[94]

Convinced that the local practices formula was no longer open to question, Brigham did what he could to limit overtime. Twice during November, on the 4th and on the 30th, he warned CQM's that only one overtime payment would be automatic—time and a half for over eight hours a day, as required by law. Strict regulations governed Saturday, Sunday, and holiday premiums. Although Constructing Quartermasters could authorize up to time and a half on weekends and holidays if the situation was urgent and the rate was "established local custom," final approval of all such premiums rested upon a contract change order rather than upon a simple authorization. All double time had to have Hartman's sanction.[95] But even under these rules, the bill for overtime would be huge.

Construction officers faced a dilemma. To work weekends at premium rates would mean deficit spending. To suspend work on Saturdays and Sundays would delay mobilization. On 23 October Hartman had made his position clear: for each weekend worked, premiums would total about $100,000 at Meade and $200,000 at Edwards; the expense would be heavy at nearly every project. Meeting deadlines would mean spending money.[96] Constructing Quartermasters were, on the whole, more cautious than their chief. Many of them hesitated to authorize premium work. The CQM at Forrest closed down his project over the long Armistice Day weekend rather than pay $114,000 in premiums. He thus lost three days of good construction weather which he could not redeem at any price. Such shutdowns were fairly common.[97] Not

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[92] *Army-Navy Journal*, LXXVII, No. 8 (October 26, 1940), p. 213.

[93] Memo, Simpson for Patterson, 4 Nov 40. Ohly Files, Labor-Constr—Policies & Problems 1.

[94] WD Press Release, 9 Nov 40, sub: WD Labor Policy on Cantonment Constr. Ohly Files, Labor-Constr—Policies & Problems 1.

[95] (1) Ltrs, Hartman to CQM's, 4, 30 Nov 40. OCE Legal Div Lib, FF Ltrs. (2) Note, Brigham to EHD, Jul 49.

[96] Ltr, Hartman to TAG, 23 Oct 40. G–4/32220.

[97] (1) Memo, Huntington Thom, OASW, for Patterson (Nov 40). OCE Legal Div Files, USW. (2) Ltr, CQM Cp Forrest to TQMG, 11 Nov 40. 600.1 (Cp Forrest) (Labor) I.

until late November, when CQM's received new instructions—"work overtime whenever it becomes necessary to complete your project on time"—was a 7-day week the norm.[98]

As labor costs soared higher, the thinking in Patterson's office changed. First John H. Ohly, one of Simpson's assistants, and then Simpson himself swung around toward the Quartermaster view.[99] "There is no place for penalty provisions in defense contracts," Simpson wrote to Coyne on 11 November.[100] At the Building Trades Convention at New Orleans three days later, Simpson tried to talk union leaders into giving up peacetime privileges. He returned from the meeting convinced that "no immediate agreement" was possible.[101] When talks resumed in Washington a short time later, spokesmen for the unions said they would accept a universal time and a half rate for over forty hours a week—an arrangement under which labor would have sacrificed little if anything; but they refused even to consider surrendering premiums, whether time and a half or double time, for Saturday, Sunday, and holiday work. Taking the unions' side, Hillman argued that labor had a right to "such excess gravy" because the jobs were temporary and away from home.[102] Summing up the situation, C. Huntington Thom of Patterson's staff presented a gloomy picture:

> At present the government is being asked to make all the concessions and there is much less reason for us to do this in the case of the Building Trades than in many other industries where wage scales for laborers and mechanics are appreciably lower. All of the people in the War Department with whom I have discussed matters have demonstrated their desire and efforts to be just and equitable in treating labor problems on construction work. At the same time there is unanimity of feeling that at present the government has hold of the smaller end of the stick.[103]

While many of the labor troubles that beset camp construction were inherent in the program's size and speed, some might have been averted had the Army and the unions been able to agree. But the Roosevelt administration's attitude doomed efforts to arrange a fair settlement. Addressing the Building Trades Convention, Coyne said of the NDAC:

> The work of this Commission and its accomplishments are exemplified by the conditions which apply on national defense projects and the recognition given to the building and construction trades organizations on the many defense projects now under construction in different sections of the Country. Also the recognition by the Government of the 40-hour work week and the payment of overtime rates for work performed on Saturday, Sundays, and holidays is in itself an accomplishment that cannot be minimized. This is the first time that the Government, under similar circumstances, has ever accorded such recognition to the building and construction trades unions.[104]

Asking the unions to give up any of the

[98] Ltr, FF Br to CQM Cp Forrest, 23 Nov 40. 600.1 (Cp Forrest) (Labor) I.

[99] (1) Memo, Ohly for Simpson, 23 Oct 40. (2) Memo, Simpson for Hillman, 12 Nov 40. Both in Ohly Files, Labor-Constr–Policies & Problems 2.

[100] Memo, Simpson for Coyne, 11 Nov 40. Ohly Files, Labor-Constr—Policies & Problems 2.

[101] Memo, Simpson for Coyne, 16 Nov 40. Ohly Files, Labor-Constr—Policies & Problems 2.

[102] Draft Memo, Thom for Patterson (n.d.), sub: Work in Excess of 40 Hours a Week or on Saturdays, Sundays or Holidays. OCE LRBr Files, USW.

[103] Draft Memo, Thom for Patterson (n.d.), sub: Status of NDAC Labor Policy. OCE LRBr Files, USW.

[104] Bldg Trades Dept, *Proceedings*, November 1940, p. 223.

ground they had gained was asking a great deal. Reaching an agreement with them would take time and patient bargaining.

Management and Supervision

To complete the camps on schedule with the labor, equipment, and materials available, contractors needed not only experience but adaptability as well. Ordinarily money, not time, mattered most in construction. Jobs were planned in minute detail and carried out in a way calculated to hold down cost and promote profits. Contractors assumed full control of their projects and conducted operations as they thought best. With the emergency, the Army made exceptional demands upon its contractors—exceptional in that it asked them to produce at several times their normal rate, without the usual well-laid plans, and, to some extent, without their usual independence. Few camp contractors had faced such a challenge before.

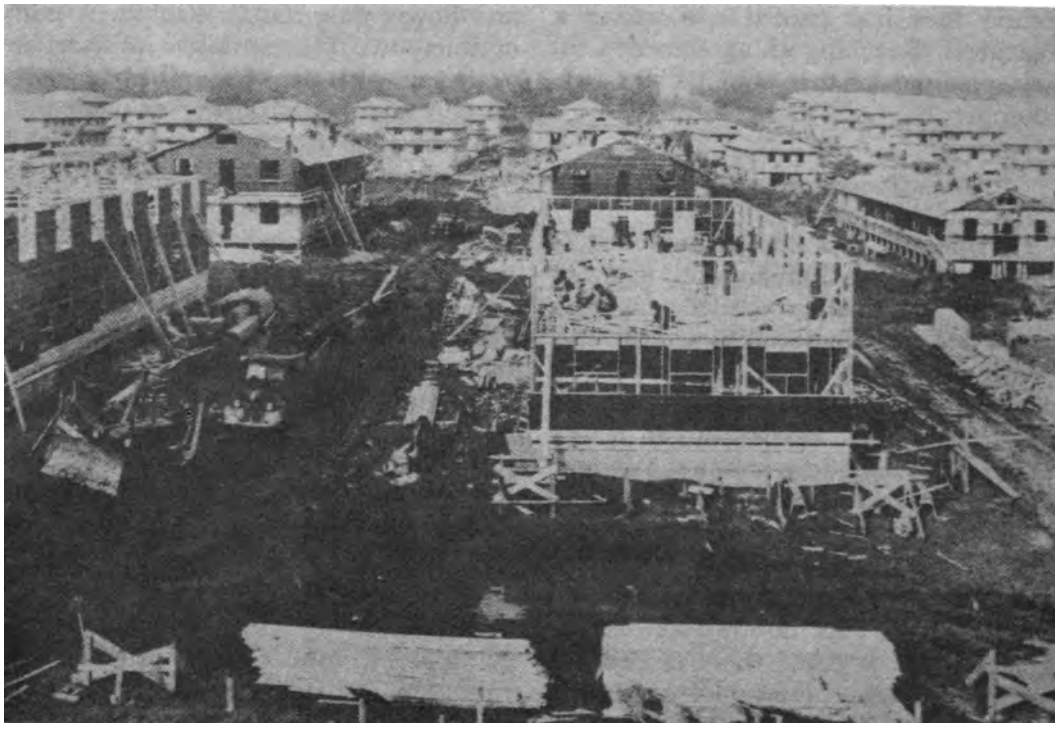
Chosen primarily for their managerial strength, fixed-fee contractors felt obliged to staff their projects well. At virtually every job, firm members or other top executives assumed direction of the work. These men, unlike their subordinates, whose salaries the government agreed to pay, took their earnings out of profits. How many such men participated and how much time they spent at the site varied from job to job. Thirteen executives of the Consolidated Engineering Company helped direct the Camp Meade project, eight of them devoting between 50 and 90 percent of their time to the work. Although Meade had the heaviest concentration of executive talent, Wolters, Knox, Riley, Eustis, McClellan, and Bowie were not far behind. A study of thirty-two representative projects revealed an average of four men on nonreimbursable salaries, the equivalent of two full-time executives, per project.[105] Along with company officials and top managerial personnel went groups of trusted employees who formed the backbone of project organizations. Nonetheless, few firms, if any, regularly employed enough key men for jobs as large and difficult as the camps and cantonments.

General Hartman put but two restrictions on hiring key personnel. First, he placed a ceiling of $9,000 per year on reimbursable salaries. Second, he insisted that appointments be subject to CQM approval. He was interested in making sure that projects were well staffed rather than in controlling salaries. Kirkpatrick told CQM's to bear "in mind that to complete these projects in the time required, a high calibre type of personnel must be employed by the contractor and, in order to secure that type of personnel, the contractor must of necessity pay a substantial salary." He justified salaries in excess of previous earnings by pointing to the long hours required, and the short duration of the jobs. He emphasized that many of the men would have to maintain two residences.[106] CQM approval became more or less routine; contractors generally set salaries and filled posts without interference. Salaries averaged approximately 20 percent above the employees' previous

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[105] Data prepared by Constr Div OQMG (Apr 41), sub: List of Resident Officers of A–Es and Contractors Showing percentage of Time Spent on Project on Nonreimbursable Basis. Opns Br Files, Gen Addl Data.

[106] OQMG Constr Div, FF Ltr 5, 7 Oct 40. EHD Files.



BUILDING BARRACKS, CAMP LEONARD WOOD, MISSOURI

earnings, an increase the Army considered "equitable, if not insufficient."[107]

In the race to complete the camps by Christmas, contractors faced a severe test. Speed called for radical departures from custom. Ordinarily construction was scheduled in logical sequence. First, land was cleared, drained, and graded. Next, roads and utilities were put in. Only when easy access to building sites had been provided did structural work begin. Contractors usually divided large housing projects into areas. Excavating crews dug foundations in one area and then moved on to another. They were followed at each area, in turn, first by masons and carpenters and then by electricians, plumbers, and painters. Estimates put the time required to build a division camp by this method at one year. Clearly, faster methods had to be devised. Major Larson endorsed a popular solution to the problem when he wrote, "On a ninety-day program, all phases of construction must be carried on simultaneously."[108]

Contractors wasted little time on preliminaries. Most abandoned their customary procedure and began everything at once. Carpenters, usually among the

[107] Testimony of Maj Garrison H. Davidson, 20 May 41. In Truman Comm *Hearings*, Part 4, p. 1014.

[108] Ltr, Larson to Gregory, 21 Dec 40. 600.94 (Cp Blanding).

last to begin, started work almost immediately. Whatever else might remain undone, contractors intended to have housing completed when troops arrived. Dunn and Hodgson, given thirty-four days to prepare a division tent camp at McClellan, found it "necessary to waive and disregard a normal plan of good construction scheduling."[109] Starrett Brothers and Eken, acting on advice from Major Larson, gave structures priority over grading and drainage at Blanding. At Riley, Long-Manhattan-Watson began barracks and roads at the same time. Many contractors started building operations throughout an entire project instead of in a single area. At several job sites conditions precluded an immediate start on barracks, hospitals, and other buildings, but nowhere was structural work long deferred.[110]

Knowing work would be slow until roads were in, contractors pushed grading and surfacing work, but unfavorable weather conditions hampered their efforts. Unusually heavy rains transformed unfinished roads into seas of fluid muck. The situation was particularly bad at sites with poor natural drainage, such as Blanding and Forrest, and at those with viscous clay soil, such as Meade. As trucks, graders, and bulldozers sank into the ooze, contractors brought in draglines. They spread thousands of tons of gravel, crushed stone, slag, and tailings in attempts to provide reasonably stable surfaces. The work progressed slowly. Without roads, contractors devised novel methods of delivering materials to building sites. Some used tractors to drag supply-laden sleds through the mud. Some rigged skips of buckets or baskets on aerial ropeways. Some laid corduroy roads. Costly and inefficient though these expedients were, contractors had no choice but to try them.

Most contractors attempted to hasten construction through liberal use of manpower. At eleven camps and cantonments, average peak employment during the last three months of 1940 was 11,212.[111] A study begun in December 1940 revealed overtime operations at all and extra shifts "at a considerable number" of 50 fixed-fee and 136 lump sum projects. These practices were costly—at times inordinately so. In hiring masses of men, contractors took a large percentage of incompetents and thus paved the way for high turnover and low production rates. Overtime meant premium wages; extra shifts, low efficiency. Moreover, a shortage of experienced foremen made it hard to get an honest day's work from labor. Although large numbers of men working long hours undoubtedly helped speed construction, output per man per hour was far below usual peacetime standards.[112]

Leading contractors tried still other ways of saving time. The Walsh Construction Company, unable to recruit enough skilled labor, sped carpentry work at Edwards by a mass-production

[109] Ltr, CQM Cp McClellan to TQMG, 2 Feb 41. 652 (Ft McClellan) II.

[110] (1) Opns Br Files, QM-CO, Cp Blanding. (2) Ltr, Long-Manhattan-Watson to H Comm on Mil Affs, 31 May 41. Opns Br Files. (3) Memo, TIG for CofS, 5 Dec 40. Opns Br Files, IG Rpts. (4) Ltr, Constr Div OQMG to G-4, 6 Jun 41. QM 600.1 (Defects).

[111] Table, prepared by Bureau of Labor Statistics, Dept of Labor, Average Employment on Selected Mil Constr Projs, Monthly, By Geographical Area. EHD Files.

[112] Slaughter, Saville & Blackburn Rpt, pp. 10–13.



PREFABRICATING YARD AND SAWMILL, CAMP BLANDING, FLORIDA

system of job breakdown and specialization. Each workman learned a simple task which he repeated from building to building. The method was fast and not unduly expensive. Attacking the same problem in a somewhat different fashion, Starrett Brothers and Eken stationed experienced carpenters next to inexperienced ones to show them what to do.[113] The contractors at Blanding were also among the first to test another practical timesaver, prefabrication. Erecting a sawmill at their lumber yard, they manufactured buildings in sections. "The operations were so well developed at the mill," said Major Larson, "that a standard size messhall was manufactured in ten minutes, and a time test of the erection of the building was accomplished in the field on the foundation in twenty-five minutes."[114] At least five other contractors also set up mills. One of these firms, the W. E. Kier Construction Company, earned high praise for its methods. At Camp Callan, Kier not only established an efficient prefabricating system but, to a large extent, mechanized his organization. He set up his own central concrete plant and delivered mix to various parts of the project by truck,

[113] (1) Memo, FF Br Sec D for Loving, 6 Nov 40. QM 333.1 (Cp Edwards) 1940. (2) Interv with Ernest J. Semmig, Vice Pres, Starrett Bros and Eken, 26 Oct 56.

[114] Incl with Ltr, Larson to Gregory, 4 Jan 41. QM 652 (Cp Blanding) 1941.

hired quantities of trenching and other modern equipment, and even succeeded in persuading the unions to permit spray painting. Delighted with the results obtained by these and other progressive concerns, Hartman encouraged rank-and-file contractors to do likewise.[115]

The limit to which a contractor could go in "trading dollars for days" was set by the Constructing Quartermaster. Charged on the one hand with expediting completion, and on the other with safeguarding public funds, CQM's found themselves in a tight spot. Because they passed on every dollar spent by fixed-fee contractors, they influenced both the rate of construction and its cost. The power conferred on the CQM's was, in Madigan's opinion, a major defect of the fixed-fee method. Soon after coming to the War Department, he cautioned General Gregory: "The Army is going to have a great time protecting itself where a contractor is hired for his knowledge and experience to keep him from catering to all the decisions of the Quartermaster's representative, regardless of their merit, on the grounds that he is paying the bill." He added, with pointed irony, that he had no objection to letting the CQM direct construction provided he was "equal in experience and mentality to the heads of the contracting firm."[116] These observations prompted Colonel Thomas to remark that he doubted if Madigan knew there was a Comptroller General. Viewing the problem from the standpoint of the Quartermaster field, Thomas commented:

> One can imagine the situation of a Constructing Quartermaster called in from civil life, where he was rated as a first class engineer and one who had had considerable responsibility, and placed in charge of one of these large camps for housing up to 40,000 men, knowing nothing of military customs of the service, but he had heard in a vague way that the Comptroller of the Treasury was watching all expenditures and if he was not careful with Uncle Sam's money he might have to pay for things, not properly authorized, out of his own pocket.[117]

Seen from any angle, it was a fine line the CQM's had to tread.

With millions upon millions going into fixed-fee projects, Hartman took precautions against irregularities and mistakes. The auditing system he adopted erected positive safeguards against dishonesty and waste. Designed by Lincoln G. Kelly, vice president of the American Institute of Accountants, and Oscar I. Koke of the Accounting and Auditing Branch, the system provided for a current, detailed, and independent audit of contractors' accounts. At each fixed-fee project, a field auditor, selected by Koke, saw to it that the contractor recorded costs accurately and received reimbursement only for authorized expenditures. Knowing that contractors needed money to keep going, Kelly and Koke prescribed a continuous, "minute to minute" preaudit. Members of the auditor's

[115] (1) Ltr, Long-Manhattan-Watson, Ft Riley, Kan., to H Comm on Mil Affs, 31 May 41. Opns Br Files, Loose Papers. (2) Memo, A. J. Hammond, Consulting Engr, for Chief Constr Div, 23 Jan 41. QM 333.1 (Cp Forrest) Jul–Aug 41. (3) Ltr, Sound Constr and Engrg Co. and Peter Kiewit Sons' Co. to CQM Ft Lewis, 7 Nov 40. 652 (Ft Lewis) II. (4) Ltr, IGD to TIG, 9 Sep 40. Opns Br Files, IG Rpts. (5) Compl Rpt, Camp Callan, pp. 3–6. (6) OQMG Constr Div, FF Ltrs 2 (n.d.), and 9, 15 Oct 40. EHD Files.

[116] Memo, Madigan for Gregory, 30 Sep 40. Madigan Files, Cp Edwards.

[117] Replies to Questionnaire, Thomas to EHD, 31 May 56.

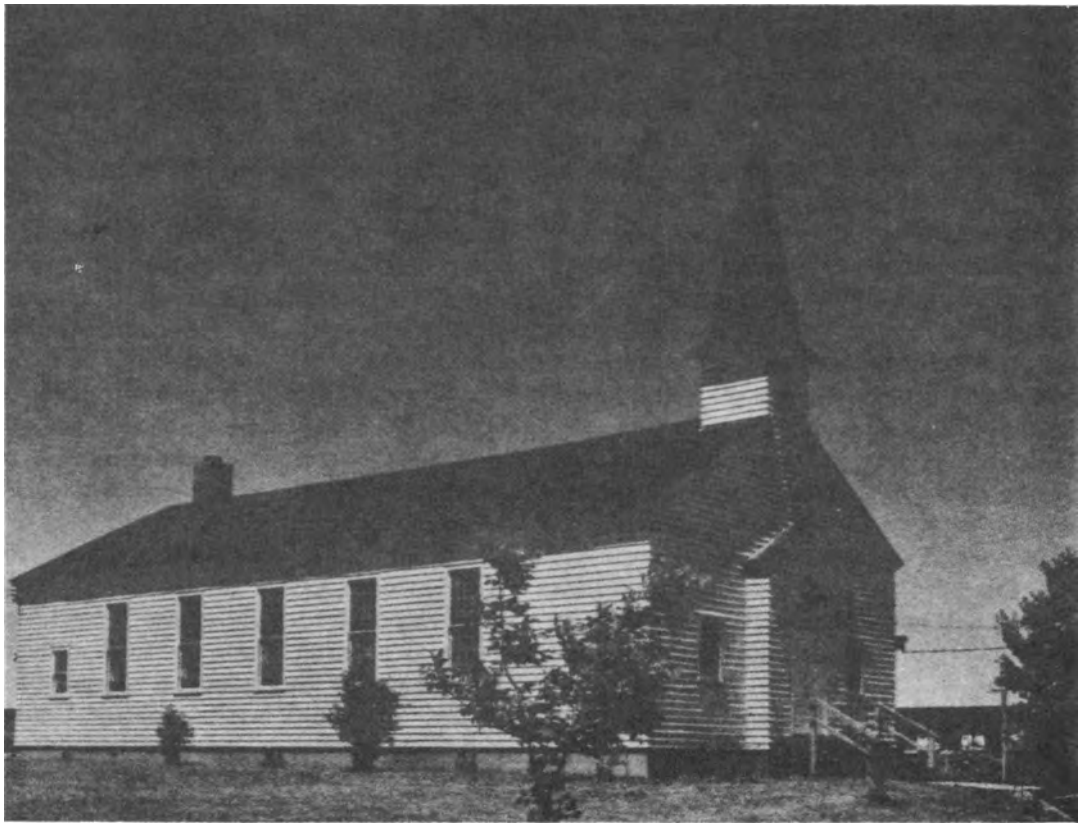
staff examined all shipments of materials and checked them against invoices, kept the time worked by each employee and checked it against the contractor's payroll, and investigated each claim against the contractor before he made payment. Hence, when he presented his vouchers for reimbursement, the auditor could quickly verify them and submit them for approval by the CQM, who would, in turn, send them on to the nearest Army finance office for payment. In their administration of this audit-reimbursement machinery, CQM's tried both to curb expenditures and avoid delays—a twofold objective not easily attained.[118]

To set up the audit machinery and get it to running smoothly was in itself a big undertaking. Nowhere was the shortage of trained men more acute than in accounting. Koke, wishing to appoint top professionals to field auditor's posts, discovered that such men were hard to recruit. At many projects, construction was well under way before auditors turned up. Meanwhile, unpaid bills accumulated. When auditors finally arrived, they faced a backlog of old work and a steadily increasing volume of new. Shortages of timekeepers, bookkeepers, shipping clerks, and materials checkers further complicated the auditing task. Contractors, similarly handicapped by personnel shortages, were sometimes slow in submitting vouchers for reimbursement and frequently neglected to furnish sufficient evidence to support their claims. To make matters worse, projects were often hundreds of miles from the nearest regional finance office. Because the Chief of Finance made his officers audit all vouchers themselves, Constructing Quartermasters had to send supporting papers along with requests for payment. There were delays and more delays, as bottlenecks developed in field auditors' departments, tons of paper moved from the projects to the finance offices, and a second, seemingly superfluous, audit was performed.[119]

How to streamline the audit and still maintain adequate safeguards was a controversial question. The procedure recommended by Kelly and Koke and approved by the Comptroller General involved meticulous checks and double checks. Every timekeeper or materials checker employed by the contractors had a counterpart on the field auditors' staffs. This system, however sound in theory, proved impractical under emergency conditions. Duplication had to be curtailed. There were two ways to do it. First, the government could reduce the auditing detail, using spot checks instead of preauditing every transaction; or, second, it could persist in making a complete check but ask contractors to discontinue their timekeeping and inspections and accept field auditors' records. Used successfully in World War I, the second method had many staunch advocates. Koke nevertheless insisted the first method was the only acceptable one. He felt the purpose of the audit would be lost if the government helped keep contractors' records. By early October he had instituted spot checks at

[118] (1) Constr Div OQMG, Manual for Field Auditors on CPFF Contracts, 6 Sep 40. EHD Files. (2) Ltr, Kelly to authors, 1 May 59. (3) Replies to Questionnaire, Koke to EHD, 25 May 59.

[119] (1) Memo, Constr Div OQMG for Rcd (Apr 41), sub: Delays in Payments and Reimbursements. Opns Br Files, Delays. (2) Opns Br Files, IG Rpts. (3) Memo, Lt Col B. B. Somervell for Gregory, 9 Dec 40. EHD Files.



STANDARD CHAPEL (700 SERIES), EXTERIOR VIEW

several projects, among them Blanding and Edwards. Maj. John A. Hunt of The Inspector General's Department, after a visit to Blanding on the 11th, pronounced the experiment a success. So enthusiastic was his report that Reybold instructed Gregory to study the Blanding system with a view to adopting it at all projects.[120] Meantime, however, Major Groves had gone to Edwards and found the audit there "decidedly inadequate."[121] In response to Groves' criticism, and without informing Koke, Loving on 16 October ordered CQM's to use the second method. Because the projects were slow to comply, he repeated this order on 28 November.[122]

Whatever the method, auditing was an uphill job. Rarely could a Constructing Quartermaster keep reimbursements

[120] (1) Memo, Koke for F. L. Yates, Office of the Comptroller Gen, 27 Jul 40. EHD Files. (2) Thomas Interv, 27 Dec 55. (3) Rpt, Hunt to TIG, 18 Oct 40. Opns Br Files, IG Rpts. (4) WD Ltr AG 600.12 (10-18-40) M-D to TQMG, 30 Oct 40. QM 333.1 (Cp Blanding) 1940.

[121] Memo, Groves for Gregory, 11 Oct 40. Opns Br Files, Rpts of Insp.

[122] (1) Memo, Kirkpatrick for SCQM's, 16 Oct 40. (2) Memo, Hartman for Gregory, 23 Oct 40. Both in Opns Br Files, Rpts of Insp. (3) Ltr, FF Br Constr Div to CQM's, 28 Nov 40. 600.1 (Elwood OW) (Labor) I.

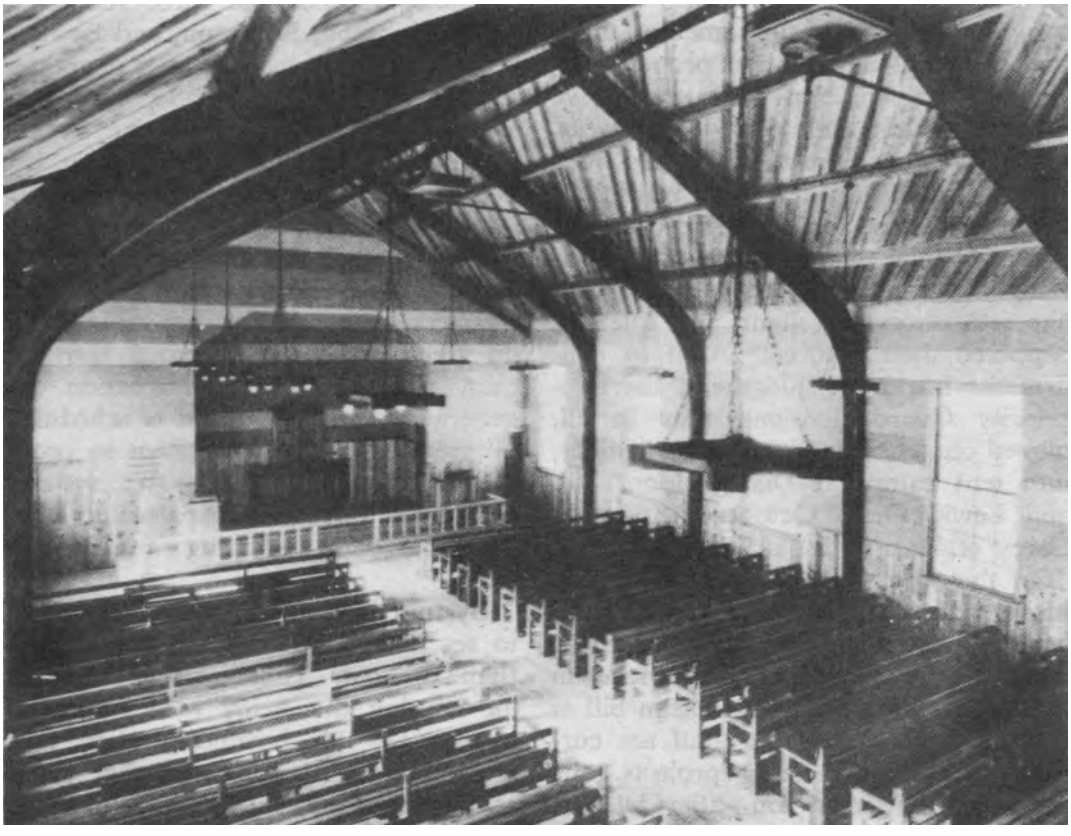
current. Project after project reported serious delays. Large unpaid balances developed, some totaling in the millions. Few construction firms had cash reserves big enough to cover such contingencies. Contractors had to borrow, some to the limits of their credit. Many failed to pay their bills when due and thus lost discounts for prompt payment; worse, they lost the confidence of suppliers. In attempts to speed collections, creditors wrote dunning letters, threatened to withhold further shipments, and even appealed to Congress—all to little avail. Nor did efforts to streamline auditing procedures produce a marked improvement in the rate of reimbursement. However it was handled, the auditing on fixed-fee projects—the innumerable checks and verifications, the great amount of paper work, the tedious detail—took time.[123]

Complicating relationships between contractors and CQM's was the shortage of appropriated funds. That the estimates General Moore had imposed on Hartman were far too low was increasingly apparent. On a visit to Camp Edwards in late September, Madigan learned that Walsh had already spent more money than the Army had allotted for the entire job. Soon other projects were calling for additional funds. Small at first, the sums requested rapidly grew larger, jumping from five to six figures and then from six to seven. Early in November Hartman asked for revised estimates from all camp and cantonment projects. Replies indicated that costs would far exceed appropriations. In addition to funds originally allotted, Forrest would need nearly $6 million; Blanding, some $7.5 million; Edwards, about $13 million. And so the answers went. By the first week in December the known deficit had climbed to $140 million. Many projects had yet to be heard from. Moreover, the new estimates did not cover recently authorized extras, such as chapels, field houses, and psychiatric wards.[124] For the CQM's, as for Hartman, the situation posed a serious dilemma, whether to cut expenditures by slowing construction or to push the work at top speed and go deeper and deeper into the red.

Without sufficient funds, many inexperienced CQM's hesitated to sanction expensive, high-speed methods. Hartman's instructions to field officers put increasing emphasis on speed. But, legally, he could not authorize deficit spending; only the President could do that. On a tour of southern camps during October, General Reybold found CQM's "in doubt as to their authority and hesitant to proceed." Diagnosing the trouble, he suggested to Gregory, "This may have been caused by meager information furnished to them by your office, together with only a partial allotment of funds. Constructing Quartermasters apparently are uncertain that they could go ahead with the entire project in the absence of full amount of funds re-

[123] (1) Opns Br Files, IG Rpts. (2) Memo, TIG for CofS (Dec 40). QM 333.1 (Cp Claiborne) 1940. (3) Rpt, IGD to TIG, 18 Dec 40. QM 333.1 (Cp Blanding) 1940.

[124] (1) Madigan Interv, 18 Jun 56. (2) 652 files, various projects. (3) Ltr, Birdseye to CQM's (n.d.), sub: Status of Funds Rpt. QM 600.1 (Rpts) 1941. (4) Memo, TIG for CofS, 10 Dec 40. Opns Br Files, IG Rpts. (5) Ltr, Solomon & Keis to Maj Larson, 4 Nov 40. 600.94 (Cp Blanding). (6) Memo, Hartman for Patterson, 7 Dec 40. 652 (Cp Edwards) I. (7) Ltr, Hartman to TAG, 7 Dec 40. QM 600.1 (Funds) IX. (8) Memo, G–4 for Files, 4 Dec 40. G–4/32243.



STANDARD CHAPEL (700 SERIES), INTERIOR VIEW

quired."[125] CQM's were indeed uncertain. Their orders, like Hartman's, were to meet all deadlines and stay within allotted funds. Attempts to carry out these conflicting instructions frequently took the form of alternating pressures and restrictions on contractors.

That delays developed and mistakes occurred was understandable. Haste, inexperience, and inadequate funds were explanation enough. It was up to the Washington office to remove obstacles and to supply the extra push needed to reach construction goals.

Nearing the Goal

By November 1940 the program had reached its critical stage. Winter was closing in; time was running out; and pressure was increasing with each passing day. Military leaders were more and more uneasy about progress at the camp sites. The Quartermaster organization, hastily put together and woefully undermanned, was under an almost intolerable strain. Climaxing twenty years of un-

[125] Memo, Reybold for Gregory, 21 Oct 40. QM 600.1 (Misc.) 1940.

realistic mobilization planning and of compromise on the fundamental question of where construction properly belonged, the situation produced grave concern within the War Department.

Early reports from the field had been encouraging. On their first rounds of the camps, inspectors found no cause for alarm. In fact, their accounts of progress were almost uniformly optimistic. Words like satisfactory, excellent, and splendid peppered their reports.[126] As if to confirm the inspectors' judgment, the first-priority Guard divisions, four in all, moved on schedule, late in September, into tent camps at Dix, Jackson, Sill, and Lewis. On 7 October William F. Carey of Harrison's staff told his chief, "On the whole, I was quite favorably impressed with the organization and general progress of these cantonments."[127] A short time later Harrison himself gave the program a clean bill of health. "Members of our staff are currently visiting the larger projects," he informed Patterson on 16 October. "From their visits it is clear good progress is being made."[128]

During October trouble spots began to appear. Around the first of the month, Carey noted potential delays at two southern camps, McClellan and Blanding. During the next fortnight, project after project was reported behind. Contrary to predictions, three of the second-priority Guard camps—McClellan, Livingston, and Shelby—were ready to accommodate divisions on schedule. But the three remaining ones—Blanding, Robinson, and Bowie—were unable to meet October deadlines. Claiborne, Forrest, Meade, San Luis Obispo, Indiantown Gap—one by one the camps slated for occupancy in November and December moved into the doubtful column. Some observers questioned whether the units living in tents at Dix, Lewis, and Sill would be in winter quarters when cold weather set in.[129] On 29 October Loving informed Hartman that, while building construction was generally "up to or ahead of schedule," progress on utilities was "not so promising." Problems with water systems, heating, sewers, and roads would upset timetables for bringing troops into camp.[130]

By this time, an effort was under way to set new target dates, more realistic than the old. That existing schedules for housing the Army were impossible to meet was now beyond question. General Marshall's assumption that camps at new locations could be built in ninety days was manifestly false. Hartman's minimum of four months appeared to be more like it. Still the original deadlines held. Probing into the situation, Madigan found the demand for such great speed not only unreasonable but unnecessary. Shrewd politician that he was, he scoffed at plans for calling up National Guard units on the eve of the Christmas holiday. He considered it "ridiculous" and told Patterson and Stimson so.[131] On 17

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[126] (1) Opns Br Files, IG Rpts and Rpts of Insp. (2) QM 600.914 various projects.

[127] Memo, Carey for Harrison, 7 Oct 40. Madigan Files, Cantons—Tp Housing—Current Projects.

[128] Memo, Harrison for Patterson, 16 Oct 40. Madigan Files, 101.1 Canton Design and Constr.

[129] (1) Memo, Carey for Harrison, 7 Oct 40. (2) Opns Br Files, IG Rpts. (3) D/S, Reybold to Gregory, 21 Oct 40. G-4/31735-1. (4) OCS, Notes of Confs, 26 Sep 40—.

[130] Memo, Loving for Hartman, 29 Oct 40. QM 600.914 1931—.

[131] Madigan Interv, 18 Jun 56.

October Patterson asked Reybold to "check on the relationship between the present designated completion dates and the time of expected arrival of troops in order to ascertain whether . . . we are demanding completion at more than a reasonable length of time ahead of the arrival of the various increments of troops."[132] The answer was yes. The Guard was pressing for postponements and was likely to get them. Shortages of uniforms and equipment would slow the intake of draftees considerably. Because Guardsmen were to help train selectees and both were being called for one year's service, the rate of Guard inductions would also have to be reduced. More time was needed not only for construction but for orderly expansion of the Army as well. By early November the General Staff had revised the mobilization schedule. Of the eleven Guard divisions still awaiting induction, three would come in about 1 December, the rest in January and February. Only token calls of draftees would be made in 1940. The Army's change in plans became public late in November.[133]

Meanwhile, salvos of criticism assaulted the Construction Division. Delays, high costs, poor living conditions at the camps, production bottlenecks, equipment shortages, spiraling wages, and muddy sites—all these were laid to the Quartermaster Corps. Numerous complaints appeared in newspapers. Political interest in construction sharpened. The Army had to defend itself against imputations of incompetence, ineptitude, and stupidity. As public confidence declined, official dissatisfaction deepened. More and more inspectors roved the field, and their reports were increasingly unfavorable. Much of the criticism was misdirected. And much was picayune. Nevertheless, scrutiny did reveal flaws in the construction setup. One was the practice of scheduling individual projects for completion all at once rather than piecemeal. Another was the absence of a modern cost accounting system. A third, vitally important, was in the Fixed Fee Branch. Responsible at the same time for negotiating contracts and supervising construction, Loving was finding it humanly impossible to do everything demanded of him.[134]

After Armistice Day, Gregory and Hartman acted to strengthen the Fixed Fee Branch. On 12 November they informed Major Groves that, as soon as an order promoting him to colonel went through, he would replace Loving as branch chief. Groves' assignment to the Construction Division had been talked of for some time, but Hartman had held back, fearful of lowering morale. While Groves took off on a quick trip to Blanding, Hartman briefed his senior officers: Groves would take over the Fixed Fee Branch within a day or two; everyone would give him full support; Loving would continue as chief negotiator.[135] Returning to Washington on the

[132] Memo, OASW for Reybold, 17 Oct 40. Madigan Files, 101.1 Canton Design and Constr.

[133] (1) OCS, Notes of Confs, 26 Sep 1940—. (2) OCS, Daily Summary of Papers Cleared Through OSGS. (3) Table, prepared in EHD, National Guard, Induction, Completion and Occupancy Schedules, Jul 40–Mar 41. (4) *Time*, November 25, 1940, pp. 18–19.

[134] (1) Ltr, John J. McCloy to authors, 13 Aug 57. (2) Memo, Madigan for Burns, 13 Nov 40. Madigan Files, 100.3 FF Br.

[135] Groves Interv, 19 Jun 56.

14th, Groves assumed his new rank and duties. Recalling the situation that confronted him, he said:

> During the first week that I was on duty there, I could not walk out of my office down the corridor to Hartman's office without being literally assailed by the officers or civilian engineers with liaison responsibility for the various camps. It is no exaggeration to state that during this period decisions involving up to $5,000,000 were made at the rate of one about every 100 feet of corridor walked. Usually four or five men would keep trailing me to take the place of the man who had first gotten hold of me. The reason for this, I believe, was that they had been completely overwhelmed with the decisions that they had to make and that they had not been able to obtain any decisions or advice or even to see their single superior, Mr. Loving, on their direct problems.[136]

The new chief had his work cut out for him.

With Hartman's advice and approval, Groves made a number of changes. In rapid succession, he took the following steps: installed a telephone for each of the SCQM's and told them the sky was the limit on calls; demanded weekly progress reports from the CQM's; set a time limit of one week for processing reimbursement vouchers; sent an expediter to every project reporting a shortage of lumber; and held four regional conferences of architect-engineers, contractors, and CQM's. Above all, he emphasized the importance of meeting construction deadlines. He told contractors to hire special equipment, pay premium prices for quick deliveries, and take whatever shortcuts they deemed necessary.[137] Mindful "that the world situation did not permit any delay in getting our troops into training," Groves bent every effort toward early completion of the camps.[138]

Perhaps the most important of his early innovations was a more practical method of scheduling construction. Acting on instructions from G–4, Hartman had given each contractor the final completion date for his project at the time of negotiations. Because the Army did not intend to send troops into camp until construction forces had moved out, contractors were free to schedule their operations as they saw fit. On 23 November Groves announced a new policy. Henceforth, contractors would co-ordinate their plans with the scheduled dates of troop arrivals. Barracks and mess halls would have top priority, and so would hospital wings for first arrivals. Soldiers would move into finished portions of the camps while builders completed the remainder.[139] By "changing policy in the middle of construction," Groves hoped to keep pace with induction schedules.[140]

Unlike Loving, who, as chief negotia-

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[136] Groves Comments, X, 12a.

[137] (1) Telg, FF Br to CQM's, 14 Nov 40. EHD Files. (2) Ltr, Constr Div to CQM's, 22 Nov 40. QM 600.1 (CPFF Policy) I. (3) Ltr, FF Br to CQM's, 23 Nov 40. 107 (Progress Schedules). (4) Notes for Discussion, Mtgs of Contractors, A–E's, and CQM's, 25 Nov 40, at Washington, D.C., 27 Nov 40, at Atlanta, Ga., 2 Dec 40, at St Louis, Mo., and 5 Dec 40, at Los Angeles, Cal., prepared by FF Br. EHD Files. (5) Ltr, FF Br to CQM Cp Forrest, 23 Nov 40. 600.1 (Cp Forrest) (Labor) I. (6) Notes of Conf held at Washington, D.C., 25 Nov 40. WPB–PD File, 411.33 Constr Proj—Mil—Jun 40–41. (7) Constr Div OQMG, FF Ltr 27, 3 Dec 40. EHD Files.

[138] Groves Comments, V, 4.

[139] Memo, FF Br to all CQM's, 23 Nov 40. 652 (Indiantown Gap).

[140] Testimony of Col Groves, 30 Apr 41. In Truman Comm *Hearings*, Part 2, p. 571.

tor, could seldom leave Washington, Groves spent one-third of his time on the road. During his first month in the Fixed Fee Branch, he inspected a dozen projects in the East, South, and West. These visits sometimes led to sweeping changes. At San Luis Obispo, he relieved the CQM. At Roberts, he ordered preparation of a new layout. At Forrest, he fired six thousand workers, eliminated 27 percent of the buildings, and extended the completion date.[141] His energetic leadership produced results. Carey, visiting Camp Forrest a week after Groves had been there, found conditions much improved. "The reduced forces are now much better spread out, and the organization is going about its work with a pep and confidence woefully lacking in the past," he told Harrison. "The net result will be that this work, in my judgment, will meet the revised dates set up by Colonel Groves, and at a very substantial saving in the total cost."[142]

By the second week of December, construction officers felt the worst was over. More than half a million men were under arms, and revised mobilization schedules were being met. General Hartman estimated that the housing program originally assigned to him, the barracks, kitchens, storehouses, and essential hospitals for two million men—not the innumerable extras added later—was approximately 95 percent complete. Finishing the camps and cantonments was, in his opinion, only a matter of weeks.[143] Colonel Groves was also optimistic. On 10 December he told Madigan, "I think it is going much better. I have gotten so I can sleep at night."[144] Years later, Groves reflected: "Actually, the great crisis where the Army was really in danger of being overwhelmed, beside which all other crises were insignificant, was the situation at the time I joined General Hartman in November of 1940."[145] By mid-December, he maintained, the crisis was past.[146]

How did the heads of the War Department, Secretary Stimson and General Marshall, view the performance of the Quartermaster Corps? The answer became clear as the long struggle over the construction function reached its denouement.

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[141] (1) List, Constr Div (19 Dec 40), sub: Insp Trips Made by Col Groves From Jul 22 Through Dec 19. Opns Br Files, Gen. (2) Tel Conv, Groves and CQM San Luis Obispo, 6 Dec 40. Opns Br Files, San Luis Obispo. (3) Notes of Conf at San Miguel, Calif., 3 Dec 40. Opns Br Files, Cp Roberts.

[142] Memo, Carey for Harrison, 22 Dec 40. WPB–PD File, 411.33 Constr Proj—Mil—Jun 40–41.

[143] Statement of Gen Hartman, 5 Jul 55, p. 17.

[144] Tel Conv, Groves and Madigan, 10 Dec 40. Opns Br Files, Ord.

[145] Groves Comments, X, 12a.

[146] Groves Interv, 19 Jun 56.

CHAPTER VII

The Reorganization of Late 1940

While defense preparations went forward, a concatenation of circumstances led to changes in the War Department's construction organization. As emphasis shifted from civil works to military projects, the Corps of Engineers sought new assignments. As men identified with the old Construction Division of the Army reappeared on the scene, agitation for a separate corps revived. Under emergency pressures, flaws in the existing setup became increasingly apparent. An issue evaded for twenty years demanded solution. Long-smoldering controversies rekindled and old rivalries intensified. The ensuing struggle brought reorganization, decentralization, and new leadership for the construction effort.

The Engineers' Predicament

From 1919 to 1939 the Engineers expended nearly $2.5 billion dollars on rivers and harbors, flood control, and fortifications. Their civil activities, including such large projects as the Bonneville and Fort Peck Dams, extended into every state and territory. The red crenelated castle, emblem of the Corps, was displayed at hundreds of sites where work went forward on levees, dikes, breakwaters, jetties, locks, dams, reservoirs, channel improvements, and seacoast defenses. To carry out its construction mission, the Corps maintained the Engineer Department, a permanent field organization consisting of 11 Divisions and 46 Districts in 1939. During the year preceding the outbreak of war in Europe, 225 officers and 49,000 civilian employees conducted the department's work.[1]

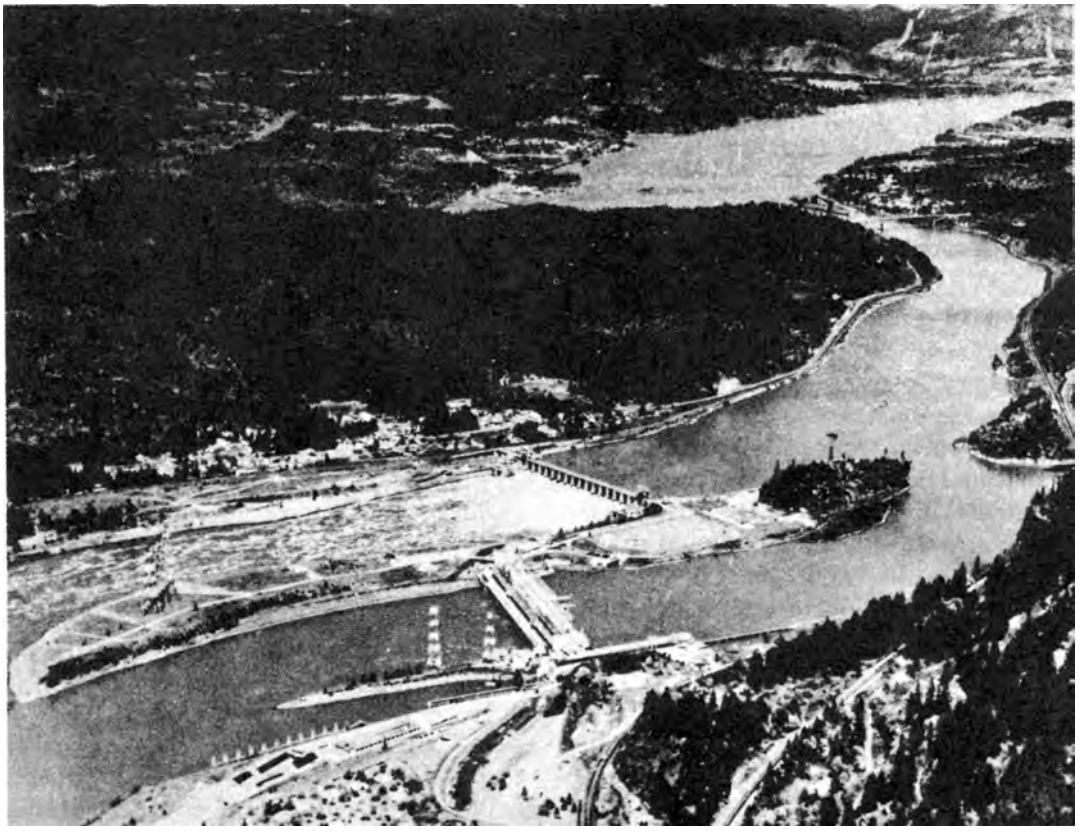
With the upsurge in military construction, civil works began to decline. In fiscal year 1940, $180,141,467 was available for rivers and harbors and flood control projects as against $289,244,842 in the preceding fiscal year.[2] In the spring of 1940, as Congress considered budgets for the coming year, President Roosevelt called for drastic cuts in public works and opposed new construction not urgently needed for defense. When Congress passed an authorization bill for rivers and harbors, the President vetoed it. "Regardless of every other consideration," he said in his veto message of 21 May, "it seems to me that the nonmilitary activities of the War Department should give way at this time to the need for military preparedness."[3] He did not retreat from this position. Discussing the

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[1] (1) Table, prepared by OUSW (Sep 41), Constr Opns, FY's 1920–39. USW Files, Constr, Transfer QM–CE. (2) Map, OCE R&H Sec, Engr Dept, R&H Divs and Dists, 1 Jan 39. EHD Files. (3) OCE, Chart and Tabs Showing Costs of Engr Dept Work, FY's 1926–39, p. 24. EHD Files.

[2] *Annual Report of the Chief of Engineers, U.S. Army, 1940*, Part 1, vol. 1, p. 1; *Ibid.*, 1939, Part 1, vol. 1, p. 3.

[3] 86 *Cong. Rec.* 6513.



BONNEVILLE DAM

next budget with newsmen in November 1940, he stated:

> Now, of course, you have to remember this, that if the Congressmen from a portion of Chesapeake Bay wanted such and such a creek deepened from four to six feet, so that the oyster boats could get in and out more handily, we probably would have all kinds of briefs up here to prove it was a matter vital to national defense. Almost everything in the way of public works, some people try to tie in with national defense. Now, I am trying to lay down a very strict rule that *national defense means actually national defense*, primarily munitions, and not things like highways.

"And oysters?" a reporter asked. "And oysters," said the President.[4]

While they still had plenty of work to do, the Engineers were in a precarious position. A $133 million backlog of authorized projects and an unexpended balance of $380,258,000, which General Schley reported in mid-1940, were residue from better years. An appropriation of $172,800,000, approved on 24 June 1940, was for projects already on the books. Few, if any, new jobs were in sight. The

[4] *Public Papers and Addresses, 1940*, pp. 582–83.

stream of civil projects was drying up. As the civil workload diminished, the Engineer Department would face drastic cuts in personnel—a prospect Schley viewed with serious apprehension. Because the Corps had too few Regulars to cope with its expanding military functions, he foresaw no difficulty in finding new assignments for surplus officers. But surplus employees would have to go. The civilian organization, the backbone of the Engineer Department, was in danger of being crippled.[5]

To make matters worse, the Engineers' old adversaries were rallying again. Surrounding Hartman were veterans of the Construction Division of the Army, most of whom were still intensely loyal to their wartime outfit and its chief. Cold-shouldered by Quartermaster Regulars, General "Puck" Marshall was nevertheless much in evidence, the center of a devoted group of oldtimers who wished to resurrect the separate construction corps of World War I. A brigadier general in the Reserve Corps, Marshall was a possible candidate for chief of an independent Construction Division. In the late spring of 1940 members of his group tried unsuccessfully to enlist the support of the Hogan committee. Overtures to Colonel Hartman were rebuffed. But with the return of Benedict Crowell to the War Department, the outlook changed. As one of Stimson's closest advisers, Crowell was highly influential. The years had not dimmed his enthusiasm for a separate construction corps. Shortly after he assumed his new duties, the General Staff had before it a proposal for divorcing the Construction Division from the Quartermaster Corps. Construction appeared to be heading down the same road it had followed in World War I—a road that led to trouble for the Corps of Engineers.[6]

General Schley had a battle on his hands to preserve his organization and forestall formation of a separate corps. It was a battle the Engineers could not afford to lose.

Growth of the Engineer Mission

On 10 June 1940 the newly formed Hogan committee made its initial report to the Army and Navy Munitions Board. Calling attention to the limited size of Hartman's technical staff, the committee recommended that construction for the Ordnance Department be done by the Engineers. Otherwise, the committee revealed, half of the Corps' 6,000 civilian engineers would face dismissal. The report continued: "We would further recommend that the Corps of Engineers be consulted in regard to their ability to undertake the preparation of additional plans and drawings . . . , rather than to attempt at this late date to organize a new and independent engineering force for the purpose as was done in the last war."[7] While the report was in preparation, Hogan and his colleagues solicited advice from the Engineers but had little contact with the Quartermaster Corps. The report produced no tangible results.[8] Even so, the committee's stand strengthened the Engineer position.

[5] (1) Presidential Message, 24 May 40. In 86 *Cong. Rec.* 6513. (2) *Annual Report of the Chief of Engineers, U.S. Army, 1940*, Part 1, vol. 1, pp. 20, 14. (3) Incl with Ltr, Schley to EHD, 5 Sep 53.

[6] (1) Answers to Questionnaire, Hogan to authors, 2 Aug 57. (2) Pagan Interv, 8 Mar 57. (3) Memo, Moore for Marshall, 9 Jul 40. G-4/31344-1.

[7] Rpt, Hogan Comm to ANMB, 10 Jun 40. ANMB 334, Comm Members and Min.

[8] Answers to Questionnaire, Hogan to authors, 2 Aug 57.

While the Hogan committee took the lead in advocating a change, General Schley limited his activities to missionary work. Visiting appointees to key posts in the new defense setup, he told them about his organization, its record and its capabilities. After one such interview, he reminded Knudsen: "I called on you a few days ago to give you a brief outline of the construction work which is normally done by the Corps of Engineers of the Army and to explain that the reduction in appropriations for that purpose in the current fiscal year makes it possible for us to take on some national defense construction not already undertaken by other agencies."[9] The delicacy of Schley's position was illustrated by a story he later told. Among the men to whom he talked was Harrison. When, a short time after their conversation, the two men met by accident, Harrison asked Schley what he was trying to do—pressure him, Harrison, into giving Quartermaster construction to the Engineers. Schley answered that since the Engineers would fall within Harrison's purview an explanation of their duties and potential had seemed in order.[10]

In his quest for additional projects, General Schley was sure to have strong support. The Engineers' strength on Capitol Hill was a well-known fact. The preference of the Chief of Staff and Assistant Secretary Johnson for the Engineers was plainly apparent. What some failed to appreciate was the number of Engineer officers who held high-level posts in the War Department and the number of friends the Corps had within the industry. Since his appointment as Chief in 1937, General Schley had done his best to convince top military leaders that Engineer officers were "naturals for G–4" and other positions of broad responsibility. On 30 June 1940 six Engineer officers, including General Moore, were serving with the General Staff and seven, among them Colonel Schulz, were on duty with the Assistant Secretary. The Inspector General, Maj. Gen. Virgil L. Peterson, was also a member of the Corps. However impartial they wished to be, these men still tended to think as Engineers. As for the industry, one important segment, the heavy construction contractors, generally favored the Engineers. "The Corps, for several years, had been progressively doing more of its construction work by contract and less by hired labor," Schley explained.[11] Moreover, dissatisfaction among contractors with Seaman's handling of the Panama and Alaska projects in 1939 and the coolness of many construction men toward "Puck" Marshall reacted in the Engineers' favor.

If the Engineers had important allies, they also had determined opponents. Hartman was not one to give up a single project without a fight. Nor did he lack support. Chairman Morris Sheppard of the Senate Military Affairs Committee was in accord with the Quartermaster position and so were a number of other legislators. Two sizable groups within the industry—the building construction contractors and the American Society of Civil Engineers—were generally pro-Quartermaster. Moreover, proponents of a separate corps were certain to resist a transfer of defense work to Schley's organization, for it would hurt their own chances of success.

[9] Ltr, Schley to Knudsen, 10 Jul 40. 334 (NDAC) 1940.

[10] Schley Interv, 26 Oct 55.

[11] Incl with Ltr, Schley to EHD, 5 Sep 53.

During June and July the Engineers made slight gains. First, the Corps received approximately $10 million for fortifications. This money, which covered projects in the United States, Panama, and the Insular Departments, was to go primarily for seacoast defenses.[12] Second, General DeWitt obtained permission to have Engineer troops build two landing fields in the Alaska panhandle. Earlier plans had contemplated construction of these airstrips by the Civil Aeronautics Authority.[13] Third, General Schley persuaded Assistant Secretary Johnson to let the Corps build a plant at Cincinnati to produce metal mirrors for antiaircraft searchlights—an Engineer responsibility. The President allotted $520,000 for the purpose from the appropriation for expediting production. At Hartman's insistence, the Quartermaster Corps maintained a measure of control. The Engineer officer in charge of the project was the CQM and reported to the Construction Division.[14] These additions to the Engineer program, however welcome, were too small to be consequential.

Writing to Secretary Stimson on 23 July, Maj. Walter E. Lorence of OCE indicated that districts and divisions were feeling the pinch. The Civil Service Commission had recently classified all federal agencies as defense or nondefense. Those in the first category enjoyed important advantages: they could refuse to let their employees transfer to other government departments and they could draft employees of nondefense agencies. The Corps of Engineers fell within the second, nondefense, category. Protesting that many power and navigation projects and all fortifications work could "be properly described only as defense," Lorence asked that the Engineers be reclassified. The Secretary's office refused on the grounds that "the Engineer Department as a whole cannot be termed a national defense agency, particularly with reference to its river and harbor work."[15] While Schley's organization seemed headed downhill, Hartman's was coming up. Declining an offer of technical assistance from Interior Secretary Ickes, Stimson noted on 2 August: "The Quartermaster General has greatly augmented the engineering personnel of his department and expects to handle satisfactorily with his own force the routine design work involved."[16]

Meanwhile, something was stirring in Congress. On 24 July, at hearings of the House Subcommittee on Military Appropriations, a significant exchange took place between Representative John Taber and General Gregory:

> Mr. Taber. Would you not be a good deal better off if you turned most of that construction of barracks and storehouses, and things of that sort, over to the Engineers?
>
> General Gregory. I do not think so; no.
>
> Mr. Taber. Give them that job.
>
> General Gregory. We have a construction division which we feel is fully adequate to meet the current construction problems. It has been operating for the last 20 years very satisfactorily.[17]

[12] OCE Annual Rpt, Mil, FY 1940, pp. 73–74.

[13] Karl C. Dod, *The Corps of Engineers: The War Against Japan*, UNITED STATES ARMY IN WORLD WAR II (Washington, D.C., 1966), p. 19.

[14] (1) Elaine A. Nelson, The Construction of the War Department Metal Mirror Plants (MS), pp. 5–6. EHD Files. (2) Memo, TQMG for ASW, 25 Jul 40. SW Secret Files, 991–1100.

[15] Ltr, Lorence to SW, 23 Jul 40, and 1st Ind, 7 Aug 40. 4330 (Nat Def) Part 2.

[16] Ltr, Stimson to Ickes, 2 Aug 40. G–4/31872.

[17] H Subcomm of the Comm on Appns, 76th Cong, 3d sess, *Hearings on Second Supplemental National Defense Appropriation Bill for 1941*, p. 148.

Another member of the subcommittee, Representative Clarence Cannon, questioned whether the Quartermaster Corps could do the job as efficiently as the Corps of Engineers.[18] Senator John E. Miller was also active in the Engineers' behalf. On 5 August he announced that he would offer an amendment to a rivers and harbors authorization bill pending on the Senate calendar. The amendment would empower the Secretary to transfer any part of defense construction to the Engineers.[19] Whether Miller had chosen the best bill for the purpose was questionable, the President's attitude toward new rivers and harbors legislation being what it was. But the idea of an amendment was promising.

When Senator Miller's amendment came to the War Department for comment, Secretary Stimson was out of town and General Marshall was acting in his stead. The Chief of Staff's reaction to the proposal was entirely favorable. On 17 August, he wrote the Senate Committee on Commerce:

> The U.S. Army Engineer Corps has an existing, widely extended field organization, fully equipped, and highly trained and experienced in all types of construction work, which due to limitations contained in the National Defense Act of 1920, cannot be fully and expeditiously utilized under the present Defense Program. This amendment, if enacted, will . . . make all of the established facilities of the Corps of Engineers immediately available for the expeditious and efficient prosecution of such work. Its passage will greatly facilitate the vigorous prosecution of the National Defense Program.
>
> The Department accordingly recommends favorable consideration of the amendment.[20]

Although the future of both branches was involved, the Engineers knew of Marshall's action; the Quartermaster Corps did not.[21]

Even before Marshall endorsed the amendment to the rivers and harbors bill, efforts were under way to attach the rider to another measure—the second supplemental defense appropriation for 1941. High on the President's list of "must" legislation, the second supplemental had far better prospects than the controversial, slow-moving rivers and harbors bill. On 15 August, the day the Senate concluded hearings on the appropriation measure, Assistant Secretary Patterson asked Senator Miller to sponsor the amendment.[22] Patterson later explained his reasons for supporting the rider:

> It was pointed out to me by General Schley . . . that he had large forces, integrated organizations on river and harbor work, in the Corps of Engineers, and the work was drying up, there was not any more work coming out, and was he to disband these forces that had worked well together, a group of, say, 30 men, each of whom had his task in a going concern, and just scatter them to the winds and lose the benefits of years of contact and organization that they had, when the construction program of the Army needed exactly that organization, when we had none in the Quartermaster Corps comparable to the Corps of Engineers for the program that was right in front of us.[23]

It was Senator McKellar of the Appropriations Committee, rather than Senator Miller, who put forward the pro-

[18] *Ibid.*, pp. 147–48.

[19] (1) 86 *Cong. Rec.* 9824. (2) *The Constructor*, August 1940, p. 11.

[20] Ltr, Marshall to Chm S Comm on Commerce, 17 Aug 40. Rcds of U.S. Senate, Rcd Gp 46, H R 9972.

[21] (1) Ltr, Schley to Sen Miller, 17 Aug 40. Rcds of U.S. Senate, Rcd Gp 46, H R 10263. (2) Statement of Gen Hartman, 5 Jul 55, p. 15.

[22] Ltr, Patterson to Sen Miller, 15 Aug 40. Rcds of U.S. Senate, Rcd Gp 46, H R 10263.

[23] Patterson's Testimony, 22 Sep 41. In S Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on S 1884, p. 29.

posal. On 19 August he notified the Senate that he would move to suspend the rules for the purpose of amending the appropriation bill as follows: "The Secretary of War may allocate to the Corps of Engineers any of the construction works required to carry out the national-defense program and may transfer to that agency the funds necessary for the execution of the works so allocated."[24] As one senator remarked, the proposed amendment was "slight in verbiage but rather important in consequence."[25]

After reading McKellar's proposal in the *Congressional Record*, Hartman went to Secretary Stimson, who was sympathetic but said his hands were tied. Stimson explained that in his absence Schley and Schulz had brought in a letter favoring the amendment and Patterson had signed it. With Hartman present, Stimson called the Assistant Secretary into his office and inquired why he had signed. Patterson replied that the two Engineer officers had "very forcibly presented the matter as one in the national defense," and that inasmuch as he had been in office only two weeks, he "necessarily had to take the recommendations of senior officers such as General Schley, the Chief of Engineers, and Colonel Schulz, one of his own assistants." Because Patterson had acted in good faith, Stimson was unwilling to ask that the amendment be stricken from the bill. But it was Hartman's understanding that any steps taken by the Quartermaster Corps to kill the provision would meet with the Secretary's approval.[26]

Hartman was at a disadvantage. For the first time, the AGC refused to take the Quartermaster's side against the Engineers. At the September meeting of his executive committee, Managing Director Harding explained:

> On the question of the amendment to the last appropriation bill, the heat was terrible here. But I consulted with the President, Mr. Zachry, and we felt that there was only one course for us to follow and that was to be neutral. A great many of our members are doing work for the Army and a great many are doing work for the Engineer Corps. In addition to that, it was a family fight and we felt very definitely that it should be handled inside the Army. . . . We knew that the Assistant Secretary of War, who is in charge of the construction program, and the Chief of Staff, General Marshall, were in sympathy with this legislation; that they had recommended to the Congress that this legislation be passed and, therefore, it would be very ungracious for us to tell them that they weren't running the Army right.

Harding had received assurances that the Engineers would do the work by contract rather than by day labor.[27] Unlike the general contractors, the specialty group opposed the amendment, but their protests came too late to affect the outcome.[28] With no time to rally effective support, Hartman resorted to a stratagem. "Steps were taken," he related, "to have the Senate change the wording of the bill in any manner possible so that it would be thrown into conference, at which time I hoped that we could present our side of the case and show the lack of need for such a law."[29]

On 29 August, as the second supplemental moved toward a vote in the upper house, Senator McKellar offered the

[24] 86 *Cong. Rec.* 10470.
[25] 86 *Cong. Rec.* 11633.
[26] Statement of Gen Hartman, 5 Jul 55, p. 14.
[27] Min of Mtg, Exec Comm of AGC, 16 Sep 40, pp. 5–6. AGC Files.
[28] Ltr, O. R. McGuire to Chm S Comm on Commerce, 5 Sep 40. Rcds of U.S. Senate, Rcd Gp 46, H R 9972.
[29] Statement of Gen Hartman, 5 Jul 55, p. 15.

amendment on behalf of the Appropriations Committee. Four words had been added to the text—the Engineers could be assigned construction work "in their usual line." Little was said on the Senate floor. The only comment came from Senator Arthur H. Vandenberg, who called attention to the long-standing controversy between the construction services. "This is the first time that the Quartermaster Corps has lost," he said, "and the first time the Corps of Engineers has won." A routine question by Senator Wallace H. White, Jr., a reply by Senator McKellar, and that was all there was to it. The Senate agreed to the amendment.[30]

The House and Senate conferees met to consider the bill early in September. Reports reaching Hartman indicated that all but one of the conferees had agreed to eliminate the rider and that the Chief of Staff had then been called to testify.[31] One of the conferees, Representative Clifton A. Woodrum of Virginia, summarized Marshall's testimony:

> General Marshall very emphatically endorsed this provision. He pointed out the fact that it in no way was an effort to tread upon the prerogatives of the Quartermaster General, that the Quartermaster General of the Army customarily was geared up to do a construction total of about $10,000,000 a year, that under the defense program that figure had been skyrocketed to something like half a billion dollars, and that he did not have the set-up to do this work, whereas they had in many places over the country district engineers of the Army all set up and ready to go, especially qualified to do this work, and they could go right into the program immediately.[32]

Although Marshall made a deep impression, the issue remained in doubt. Reported in disagreement by the conference committee, the amendment still had to clear the House of Representatives.[33]

The final hurdle was quickly crossed. When the Joint Conference Committee reported the bill to the House on 5 September, Representative Woodrum suggested two changes in the amendment—that the new authority be limited to 30 June 1942 and that the phrase "in their usual line" be eliminated. In answer to objections against the rider, Woodrum emphasized that General Marshall had expressed his complete approval of the amendment when he appeared before the conferees. There were no further questions. The House approved the bill as amended, with the changes Woodrum had proposed, on 6 September 1940; the Senate agreed to the House version the following day; and on 9 September the President signed the bill.[34]

A week before this bill became law, the Destroyer-Base Agreement was signed at Washington. In exchange for fifty overage warships, Great Britain granted the United States the right to establish bases in the Bahamas, Trinidad, Jamaica, Antigua, St. Lucia, and British Guiana and, as a "gift" to the American people, added leaseholds in Newfoundland and Bermuda. Anticipating approval of the McKellar amendment, General Marshall on 6 September assigned construction at these bases to the Corps of Engineers. By the 25th Schley's office had completed a rough estimate based on plans of the General Staff. The cost would be upwards of $200 million. An immediate allotment of $25 million from the President's emergency fund enabled the Engi-

[30] 86 *Cong. Rec.* 11200.
[31] Statement of Gen Hartman, 5 Jul 55, p. 15.
[32] 86 *Cong. Rec.* 11560.
[33] 86 *Cong. Rec.* 11554.
[34] (1) 86 *Cong. Rec.* 11560, 11631–11634. (2) 54 *Stat.* 875.

neers to make an early start. An order from Marshall that $175 million be made available before the end of the fiscal year for work in the British possessions indicated the urgency of the task.[35]

The Engineer program assumed new dimensions as the Corps received additional funds and fresh responsibilities. Under the supplemental defense appropriation acts of 9 September and 8 October 1940, the Engineers got $6.7 million for seacoast fortifications. The First Supplemental Civil Functions Appropriation Act for 1941, approved on 9 October 1940, carried some $13 million for navigation improvements, flood control work, and enlargement of the power plant at Bonneville Dam. This same act appropriated $40 million for airport construction by the Civil Aeronautics Authority. The Department of Commerce viewed this as the beginning of a large-scale effort which would cost $500 million and include 3,100 airfields. By agreement between Secretary Jesse H. Jones and Secretary Stimson, the Engineer Department would perform extensive survey and construction work for CAA. An act of 17 October 1940 further enlarged the Engineers' role in emergency construction by authorizing twenty-two new rivers and harbors projects in the interest of national defense. By early November the Corps was in line for yet another assignment—supervision of all WPA projects at military and civilian airfields.[36]

The Engineers had made impressive gains. They had a substantial program and more work was in prospect. Many of their new projects, civil as well as military, were vital to defense. The Civil Service Commission recognized the Corps as a defense agency and placed the Engineer Department and all of its employees in the protected category.[37] But General Schley could not rest easy. He still had to contend with the faction that favored a separate construction corps.

A Separate Corps?

By September 1940 Benedict Crowell was deep in plans for reorganizing the War Department. Working with Arthur E. Palmer, a young attorney from Stimson's law firm, he reviewed the existing setup in the light of his World War I experience. A strong assistant secretary, centralized control over all Army procurement, and close ties with industry were among his principal objectives. Describing Crowell's plan for an independent Construction Division, another of Stimson's assistants, John J. McCloy, said: "[He] felt that a separate agency should be set up . . . and that it should not be exclusively under the direction of the Quartermaster General. . . . He placed a great deal of stress on the use of officials from the construction industry and he did feel that civilian control of it was essential."[38] Crowell intended to re-establish the Construction Division of the Army and place it under Patterson.

While Crowell's construction plan was taking shape, a fundamental weakness in the Quartermaster organization was be-

[35] (1) Langer and Gleason, *Challenge to Isolation*, pp. 766–69. (2) David Latt, Engineers in the British-Owned Bases, 1940–1943 (MS), pp. 3–7. EHD Files.

[36] (1) 54 *Stat.* 872, 965, 1030. (2) Ltr, Asst Secy of Commerce to ASW, 23 Aug 40, and Incl. WPD 4239 to 18 Incl. (3) Ltr, Stimson to Jones, 21 Oct 40. 321.7. (4) 54 *Stat.* 895. (5) Memo, Sup Div G–4 for Reybold, 5 Nov 40. 600.1–425.

[37] CSC Circ Ltr 2896, Suppl 7, 20 Sep 40. 4330 Part 1, Ser 1–30.

[38] Ltr, McCloy to authors, 13 Aug 57.

coming apparent. As early as 19 September 1940 Maj. Sidney P. Simpson of Patterson's staff had concluded that shortages of personnel, particularly of officers, lay at the root of Hartman's difficulties. A study of the Construction Division had convinced Simpson that the organizational machinery was sound and that all would go well if only enough qualified men could be found to run it. But enough such men could not be found. Throughout the fall of 1940 Hartman had to struggle along with two to three hundred fewer officers than he needed.[39] Moreover, numbers told an incomplete story, for, as Hartman pointed out, the Division had "to take any officer even with remote construction experience in order to get the jobs . . . staffed."[40] The makeup of his civilian staff reflected this same expediency. The lack of qualified personnel was unquestionably Hartman's cruelest handicap.

Some of his critics failed to recognize this fact. Madigan and Harrison seemed to think that the crying need was for better management. They displayed growing impatience with Quartermaster systems of cost control, job planning, and progress reporting. When Hartman continually disregarded their advice, they came to view him as "a complete road block."[41] Hogan agreed with them. He attributed confusion in the program "to Hartman's ignorance of the principles of delegation of authority . . . , his lack of judgment and vacillation under pressure."[42] This attitude was contagious. Unsatisfactory progress and rising costs were generally ascribed to bungling by the Quartermaster Corps. Stimson and Patterson became more and more concerned. After Armistice Day events moved rapidly toward a showdown.

On 12 November, in a confidential memorandum to Patterson, Major Simpson recommended removing the Construction Division from the Quartermaster Corps and placing it directly under the Assistant Secretary. An investigation of the division's persistent shortage of officers had convinced Simpson that such a step was "basic to the effective carrying out of the construction program." Under the existing arrangement, Hartman was unable to select and assign his own personnel. Moreover, Gregory's insistence that "all papers to or from the Construction Division" be routed through his office was delaying orders for sorely needed officers. Before the personnel problem could be solved, Simpson believed the division would have to be freed from the "straight-jacket organizational set-up in the Quartermaster Corps." Citing the precedent of World War I, he argued the necessity of "relieving what is fundamentally a civilian undertaking from the dead hand of orthodox military organization." Having learned from Crowell that the Secretary's office was studying a plan for a separate corps, Simpson suggested that Patterson sit back and await developments. The Assistant Secretary passed the memo on to Madigan for comment.[43]

[39] (1) Memo, Simpson for Patterson, 19 Sep 40. QM 022 (Constr Div) Confidential. (2) QM 326.21 QMGO, Asgmt for Active Duty, 1940.

[40] Memo, Hartman for McCloy, 2 Dec 40. QM 210.312–1940.

[41] Madigan Interv, 18 Jun 56. See also Madigan Files, 101.1 (Canton Design and Constr) and 100.3 (FF Br Constr Div—Orgn).

[42] Answers to Questionnaire, Hogan to authors, 2 Aug 57.

[43] (1) Memo, Simpson for Patterson, 12 Nov 40, and Incl. (2) Memo, Patterson for Madigan, 12 Nov 40. Both in Madigan Files, 100.3 (FF Br Constr Div—Orgn).

News of Simpson's proposal traveled fast and had immediate repercussions. Madigan lost no time in discussing the memorandum with Harrison and Hogan. All three agreed that something drastic ought to be done, but they were not yet ready to go as far as Simpson. They consulted General Burns who put them in touch with General Moore. After talking at length with the Deputy Chief of Staff, the three industry men took the position that construction was an Army "show" and ought to stay within the Army. A civilian corps would be "too commercial." Nonetheless, if the Army fell down on the job, Crowell and Simpson were likely to have their way. Apprehensive, General Moore decided to take the initiative. On 13 November he and Reybold proposed that Marshall turn over airfield construction to the Engineers. Somewhat reluctantly, the Chief of Staff agreed.[44] He later testified, "I questioned seriously the transfer of the Air Corps construction to the Engineer Corps in the middle of the program." But, he continued, "I found myself compelled to accede to the recommendations of the principal staff officers concerned . . . because we had had to quickly reduce the load on the Quartermaster Corps."[45] Moore viewed this as the first step. He believed it would also be necessary to replace Hartman and "to effect a complete reorganization."[46]

Learning what was afoot, Gregory called a conference for Thursday, 14 November. Madigan, Harrison, Hogan, Reybold, Hartman, and Groves attended. "I gathered that they were preparing to remove Hartman and Gregory had demanded that he be faced with his critics," Hogan afterward related. "Madigan and I had a little skull practice and decided to pull no punches."[47] Talk at the meeting was blunt and acrimonious. Opening the discussion with a plea for better management, Harrison stressed the need for a system of cost control. Hartman replied that such a system was already in operation. Harrison contradicted him and warned that unless a change took place the Construction Division would be unable to give an accounting of its funds. Madigan. Dismissing this criticism, Hartman had already lost track of progress and expenditures, he demanded that contractors submit progress schedules and cost estimates periodically during the course of their work. Reybold backed up Madigan. Dismissing this criticism, Hartman pointed out that his organization was "very much undermanned." His statement got a cold reception.[48] The discussion went on for several hours but produced no agreement. Hogan observed that Gregory "looked increasingly disheartened."[49]

Meanwhile, General Moore was attempting to clear the way for transferring airfield construction to the Engineers. On the afternoon of the 14th he discussed the matter with Colonel Kennedy of the Air Corps Buildings and Grounds Division. Kennedy recommended against the transfer. Writing to Moore the fol-

[44] (1) Madigan Interv, 18 Jun 56. (2) Answers to Questionnaire, Hogan to authors, 2 Aug 57. (3) Moore's Comments on MS, 1955. (4) Memo, Reybold for Rcd, 14 Nov 40. G–4/31343.

[45] 30 Sep 41. In H Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on H R 5630, p. 14.

[46] Moore's Comments on MS, 1955.

[47] Answers to Questionnaire, Hogan to authors, 2 Aug 57.

[48] Memo, Madigan for Patterson, 19 Nov 40. Madigan Files, 100.3 (FF Br Constr Div—Orgn).

[49] Answers to Questionnaire, Hogan to authors, 2 Aug 57.

lowing day he explained his reasons:

> The construction under the Air Corps Expansion Program so far has gone forward without any delays that could have been avoided . . . .
>
> I am convinced that if, in the midst of this program, decision is made to take all of this construction work out from under The Quartermaster General and place it under the Corps of Engineers the amount of confusion that would accrue would result in chaos for weeks and fatal delay when these Air Corps new stations are so badly needed for early occupancy.

If a transfer took place, he wanted to confine it to projects not yet well underway. He also wanted assurance that jobs costing $1 million or more would be done by fixed-fee contract.[50] Kennedy's opposition was ineffective. On the 18th, after a second conference with Moore and Reybold, General Marshall ordered that construction at all Air Corps stations, except those in Panama, go over to the Engineers without delay. On 19 November Reybold issued the directive.[51]

That same day, Marshall held a conference in his office to discuss the Quartermaster construction effort. Among those present were Madigan, Harrison, Hogan, Moore, and Reybold. No Quartermaster officer attended. Madigan set the tone of the meeting. After expounding his ideas on estimates, schedules, and progress reports, he told the others, "Take it from one who came up from waterboy that you can't reorganize a job by keeping the same superintendent." Hogan, Moore, and Reybold joined in an indictment of Hartman. "Hartman does too much himself," Hogan said. "Hartman takes no suggestions," said Moore. "No planning in his office or in the field," Reybold declared. Harrison had some words of appreciation. "Hartman and his six top men are faced with the hardest job in the Army," he said. "They are getting a lot done and well done, but," he agreed, "there could be great improvement."[52] Marshall asked each man, in turn, whether Hartman ought to go. All replied yes. The Chief of Staff rose, shook hands all around, and thanked each man for coming. Whether he intended to follow their advice, he did not say.[53]

Within a short time after this conference, an effort was under way to sidetrack Hartman. Whether because, as some believed, Marshall was reluctant to act or because, as others reported, Gregory fought stubbornly for Hartman, the strategy had changed. A search was on for a man who could go in as Deputy Chief of Construction and assume authority. Groves was Gregory's choice for the deputy's job, and Hartman agreed to take him.[54] "It had been or was about to be announced that I was appointed as Deputy to Hartman," Groves reminisced. "When I first joined the Construction Division on November 14th, I was designated Chief of the Fixed Fee Branch. A short time later I took over all operations and had already assumed many of the prerogatives of Deputy Chief."[55] This arrangement did not long

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[50] Memo, Kennedy for Moore, 15 Nov 40. G-4/31343.

[51] D/S, G-4 to TAG, 19 Nov 40, and record thereon. G-4/31324.

[52] Notes of Conf in OCofS, 19 Nov 40. OCS, Notes on Confs, 26 Sep 40—.

[53] (1) *Ibid.* (2) Answers to Questionnaire, Hogan to authors, 2 Aug 57. (3) Memo, Madigan for Patterson, 19 Nov 40.

[54] (1) Groves Comments, V, 2–3. (2) Madigan Interv, 18 Jun 56; Burns Interv, 24 May 56; Groves Interv, 19 Jun 56.

[55] Groves Second Draft Comments, VII, 5.



COLONEL SOMERVELL

continue. Speaking for himself and Harrison, Madigan explained, "We were not having any part of that Engineer major."[56]

In Washington at the time, awaiting assignment to Camp Leonard Wood, was Lt. Col. Brehon B. Somervell, CE. A 1914 West Point graduate, Somervell had had a varied and somewhat unusual career. During World War I he served in France, first with the 15th Engineer Regiment and later with the 89th Division. After the Armistice he stayed on in Europe as G–4 of the Third Army. Returning to the United States in 1920 he took up the peacetime duties of an Engineer officer. His service during the next fifteen years included three tours in the Chief's office and assignments to the New York, Memphis, and Washington Districts. During this same period he completed courses at the Engineer School, the Command and General Staff School, and the Army War College. Twice he received leaves of absence for special missions abroad. In 1925 he aided Walker D. Hines in a study of navigation on the Danube for the League of Nations. Eight years later he again assisted Hines, this time in an economic survey of Turkey. In 1935 he became district engineer at Ocala, Florida. There, in the course of work on the Florida Ship Canal, he met Harry Hopkins, with whom he formed a close association. In 1936 Somervell became WPA administrator in New York City. In four years with the relief agency he gained a reputation as an able executive and adroit politician. As his tour in New York drew to a close in the fall of 1940, he began casting about for a new assignment. He approached General Marshall about a field command and he also talked to General Moore. The results were disappointing. General Schley selected him to be executive officer of the new Engineer Training Center at Camp Wood, a responsible position but hardly what Somervell had in mind. One day in November over luncheon, Madigan told him about the Construction Division job. Somervell said he would "love" it. Madigan, who was familiar with WPA operations in New York City, believed he had found the right man.[57]

Plans for a separate corps were still very much alive. By 22 November a proposal for an independent, civilian-run Construction Division had reached

[56] Madigan Interv, 18 Jun 56.

[57] (1) WD Press Release, 17 May 42, Lt. Gen. B. B. Somervell. EHD Files. (2) John D. Millett, *The Organization and Role of the Army Service Forces*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1954), pp. 3–5. (3) Answers to Questionnaire, Moore to authors, 3 Jan 56. (4) Madigan Interv, 18 Jun 56.

General Marshall. He took the matter up with General Moore.[58] Recalling this interview, Moore commented:

> General Marshall called me into his office and told me verbally that it had been suggested that all construction work be placed in the hands of civilians. I replied vigorously that, in the past, it had been the civilian branches of the Government that had called upon the Army to help them in construction matters and cited the help given by Corps of Engineers officers in the Panama Canal and, more recently, the large operations of the WPA and other relief organizations. I thought the Army could do a better job than a civilian organization.[59]

There were others to be persuaded besides the Chief of Staff. The White House favored Crowell's idea. Stimson believed that the construction "problem would only be solved by getting a man, be he a civilian or a soldier, who had the necessary drive to invigorate the program and bring it to fruition."[60] Madigan was in a position to influence the decision. According to his own account, he laid down the law to Moore. Either the military would do what Madigan thought necessary or he would come out "flat-footed" and state that the Army could not handle the job.[61]

On 28 November Somervell reported for temporary duty with General Peterson. His orders to Camp Wood were a dead letter and General Moore was attempting to arrange his transfer to the Construction Division. Gregory, Madigan recalled, was averse to taking him, considered him too aggressive; but others gave him enthusiastic backing. Hopkins had high praise for his work with WPA. Hogan, a personal friend, expressed confidence in his abilities. Harrison went along with Madigan and Hogan. Inquiries by members of Stimson's staff disclosed that the 48-year-old lieutenant colonel had a reputation as a driver and a good administrator. Operating out of Peterson's office, Somervell prepared for the Quartermaster assignment. He conferred with various persons familiar with Hartman's difficulties and lined up Engineer officers to serve with him in the Construction Division. Between 30 November and 4 December he visited Chicago, St. Louis, Charlestown, Indiana, and Louisville, Kentucky, on a whirlwind tour of inspection. He presented his findings in a 14-page report criticizing the Quartermaster effort.[62]

Meanwhile Gregory, smarting from slaps at the Quartermaster Corps, had taken the situation in hand. In a series of quick moves, he tried to quiet the commotion. On 25 November he gave his deputy a list of complaints against the Construction Division and told him to take corrective action. That same day the first of a series of orders canceling old instructions and establishing new procedures went to the field. Within a short time persons sympathetic to the separate corps idea were being ousted from their posts. Quartermaster Regulars who had had no connection with the Construction Division of the Army replaced Lamphere, White, and Bennett. Decentralization was

[58] (1) Pagan Interv, 8 Mar 57. (2) Memo, Marshall for Moore, 22 Nov 40. OCS 14554-819.

[59] Moore's Comments on MS, 1955.

[60] Ltr, McCloy to authors, 13 Aug 57.

[61] Madigan Interv, 18 Jun 56.

[62] (1) Memo, Pers Sec OCE for DCofEngrs, 29 Nov 40. 025.1 Part 2. (2) Ltr, Moore to EHD, 15 Jun 53. (3) Madigan Interv, 18 Jun 56. (4) Ltr, McCloy to authors, 13 Aug 57. (5) Answers to Questionnaire, Hogan to authors, 2 Aug 57. (6) Memo, JCL for Rcd, 6 Dec 40. OCS, Notes on Confs–25 Sep 40—. (7) Memo, Somervell for Gregory, 9 Dec 40. EHD Files.

the next step. Invoking the example of the Corps of Engineers, Gregory early in December ordered Hartman to set up regional offices similar to those that administered rivers and harbors projects. Convinced that centralized control of military construction was essential, Hartman refused. Gregory thereupon decided to relieve him. The decision, Gregory insisted, was his and his alone.[63]

Colonel Danielson was the logical man to succeed General Hartman. A Quartermaster officer since 1920, he was particularly well qualified to head the Construction Division. He was, by general agreement, one of the best engineers in the Army. With degrees from Iowa State College and MIT, he had a sound academic background. He was a recognized authority on utilities design and airport development; and he had served as chairman of the research committee of the American Society of Heating and Ventilating Engineers. He knew from experience the workings of the Quartermaster organization and understood the problems that it faced. His assignments had included tours as CQM, post QM, corps area utilities officer, and branch chief in the central office. During the 1920's he had played a leading role in modernizing Army posts. In 1934 he had directed the $50 million emergency relief construction program. As CQM for Panama since 1939 his record was outstanding. From friends who were in Gregory's office at the time, Danielson afterward learned that his name went on the bulletin board as Chief of Construction on Friday, 6 December. The following Monday the notice came down and Somervell's name went up. Reportedly, the White House had called the turn.[64]

On Wednesday, 11 December, the change in command took place. Recalling the event, General Hartman wrote: "General Gregory came into my office early in the afternoon of December 11th and I knew by the scared look on his face that he had bad news for me. He informed me that I was relieved from the Construction Division at once. I did not give him the courtesy of a reply. I immediately closed my desk and departed."[65] As Hartman left by one door, Somervell came in the other. That day Secretary Stimson wrote in his diary:

> Another crisis has come up in the Department. General Hartman, who has had charge of construction in the Quartermaster Corps, is being relieved and Lt. Col. Somervell is being placed in his place. It is a pathetic situation because Hartman has been a loyal and devoted man. He has conducted the difficult and delicate work of choosing these contractors in these bids on numerous projects without a taint of scandal of any sort thus far. But he apparently lacks the gift of organization and he has been running behind in the work. Accordingly, General Marshall came in this morning to tell me that it was his advice that this change should be made and I gave my approval to it as a matter of course, for I knew very well that Marshall has given careful and fair consideration of it and felt just as kindly towards Hartman as I did. But it makes another problem to be handled at the coming Press conference.[66]

At Stimson's weekly news conference

[63] (1) Memo, Gregory for Dep QMG, 25 Nov 40. QM 600.1 (Misc) 1940. (2) FF Ltr 25, 25 Nov 40, and various subsequent FF Ltrs. EHD Files. (3) Memo, Lt Col James W. Younger, QMC, for Hartman, 6 Dec 40. Opns Br Files, Orgn and Consolidation. (4) Groves Interv, 19 Jun 56. (5) Verbatim Rpt, Meeting with Gregory and Hastings.

[64] (1) Answers to Questionnaire, Danielson to authors, 14 May 59. (2) Kirkpatrick Interv, 4 Apr 51; Pagan Interv, 2 Jun 55.

[65] Statement of Gen Hartman, 5 Jul 55, p. 17.

[66] Stimson Diary, 11 Dec 40.

on 12 December, the "ticklish" question of Hartman's relief did not arise.[67] A War Department press release dated 13 December announced Somervell's appointment. The release disclosed that Hartman had entered Walter Reed Hospital "for observation and treatment following a long period of overwork" and stated "that the delays in certain of the construction projects . . . had no bearing on the assignment of Colonel Somervell; that these delays had been due to causes beyond the control of the Construction Division."[68] At his next press conference, Stimson introduced Somervell to the reporters and made a statement "designed to protect poor old Hartman, who has been as faithful as could be and has broken down under the task, from being unjustly criticized."[69] Press reaction was mixed. "All the dead generals were not sleeping under statues last week," began an item in *Time*, which lambasted Stimson and "the bumbling quartermasters."[70] Publishing an interview with William F. Carey of Harrison's staff, the New York *Times* presented a different picture. "The Lord Himself could not meet the construction timetables and cost estimates first set for the camps," it quoted Carey. "It was a literal impossibility to finish the work in the time originally set. I don't know who made out the original time and cost estimates, but whoever did was expecting the impossible."[71]

[67] Stimson Diary, 12 Dec 40.
[68] WD Press Release, 13 Dec 40. EHD Files.
[69] Stimson Diary, 19 Dec 40.
[70] *Time*, December 23, 1940, p. 16. Reprinted by permission from *TIME, The Weekly Newsmagazine*; Copyright Time Inc. 1940.
[71] New York *Times*, December 28, 1940, p. 6. © 1940 by The New York Times Company. Reprinted by permission.

Hartman's long career in construction was over. Admitted to Walter Reed on 11 December, he remained on sick leave until April 1941, when he took command of the Quartermaster Replacement Center at Fort Lee. He served at Lee until March 1942, when he suffered a near-fatal heart attack brought on, friends believed, by grief over his removal as Chief of Construction. On 30 April 1943 General Hartman retired on disability after 39 years' service. Five years before his death in 1962 he stated: "I have no apologies, and if I had it to do over I would do the same thing again."[72]

Reorganization and Restaffing

Two days before his appointment, Somervell outlined plans for overhauling the construction setup. Writing to Gregory on 9 December, he recommended drastic changes: reorganize the Construction Division, reduce the number of branches, and create several new sections; strengthen the field, establish regional offices, and decentralize authority "to the maximum extent possible"; and review the qualifications of construction personnel and replace incompetents with top-flight engineers and executives.[73] Left free to make these changes, Somervell promised to get results.

The new chief was in a far stronger position than Hartman had been. It was rumored at the time of his appointment that he had demanded and got a blank check from Gregory. McCloy in Stimson's office thought he had "full and independent powers."[74] Major Thomas

[72] Quoted by Mrs. Pagan in Interv with authors, 8 Mar 57.
[73] Memo, Somervell for Gregory, 9 Dec 40. EHD Files.
[74] Ltr, McCloy to authors, 13 Aug 57.

in the field sensed that Somervell, "a much bigger fish" than Hartman, had taken over the construction duties of The Quartermaster General.[75] Questioned about this later, General Gregory said:

> My policy has always been if anybody is placed in charge of a job, let him do it. I don't try to run it for them. So if he was put in charge of Construction Division, he was in charge of Construction Division, although I expected if anything went wrong and I said to correct it, I wanted it corrected. As far as his demanding anything like that [a blank check], I don't think that is true.

Somervell hardly needed a carte blanche agreement, such was the high-level support he could count on. He had, as Gregory put it, "a pipeline to General Marshall" and could "go around Moore and Reybold and get what he wanted."[76] He enjoyed Stimson's admiration and respect. Most important, he had the confidence of Hopkins and the President. The door to the White House was always open to him and those with whom he dealt were not likely to forget it.[77]

Somervell knew what he wanted in the way of an organization. He favored a type of setup known as line and staff and characterized by a high degree of decentralization, a minimum number of bosses, and a sharp distinction between those who gave orders and those who advised. Applied to the Quartermaster structure, line and staff principles suggested three levels of authority—Construction Division, regional offices, and project offices. The Chief of Construction would issue orders to his regional representatives, who would, in turn, direct the Constructing Quartermasters. At each level of authority, the responsible officer would have his own advisers. Policy matters would be decided in Washington; local problems would be settled on the spot. Up-to-date management methods and good public relations completed Somervell's organizational formula.[78]

On 16 December 1940, his fifth day in office, Somervell reorganized the Construction Division. (*Chart 6*) He reduced Hartman's eleven branches to five—Administrative, Accounts, Engineering, Operations, and Real Estate. Administrative absorbed personnel functions which had been in the Executive Office. Accounts took in the former Funds and Estimates and Accounting and Auditing Branches. Engineering annexed the Liaison and Legal Branches and contracting groups from other sections of the office. Operations incorporated the former Fixed Fee, Lump Sum, Procurement and Expediting, and Repairs and Utilities Branches. Of all Hartman's branches, only Real Estate remained unchanged. Somervell added two new sections to the Executive Office; the first, Control, was to be a management unit, preparing statistics and reports and coordinating the work of the various branches; the second, Public Relations, was to place the construction story before the public.[79] Details of the new organization were left for later. Further changes would take place after the branch chiefs had conferred. With the program at a

[75] Thomas Interv, 27 Dec 55.

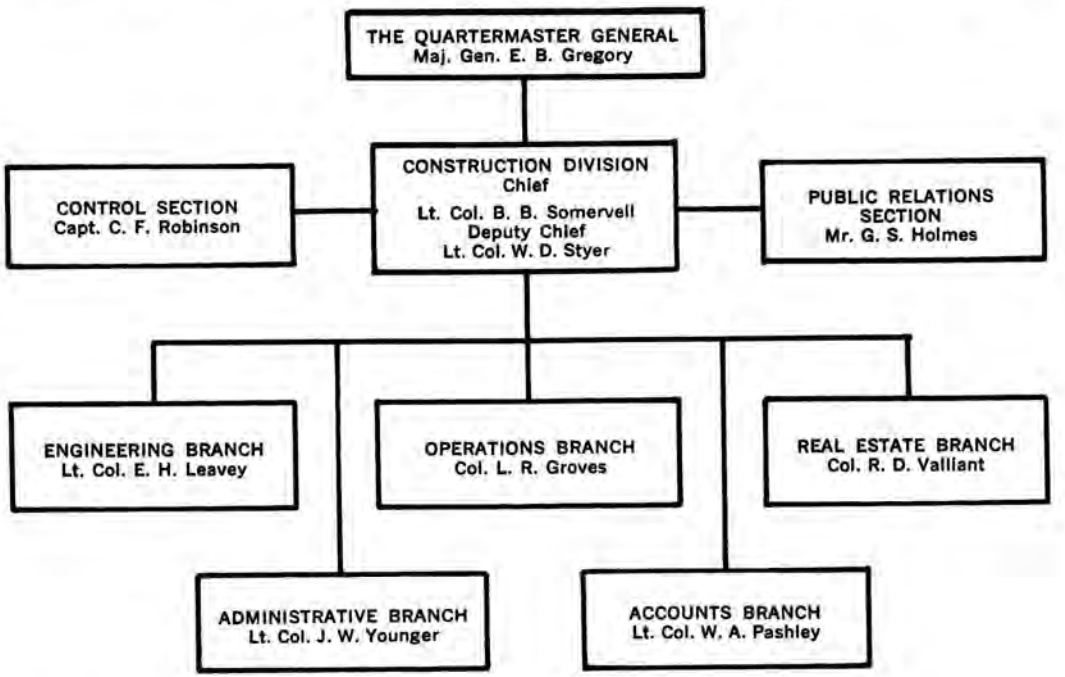
[76] Verbatim Rpt, Meeting with Gregory and Hastings.

[77] (1) Stimson Diary, 19 Dec 40, 2 Jan 41. (2) Intervs with Pirnie and Voorhees, 14 Jan 58; Gen Groves, 19 Jun 56; Brig. Gen. Clarence Renshaw, 13 Feb 59.

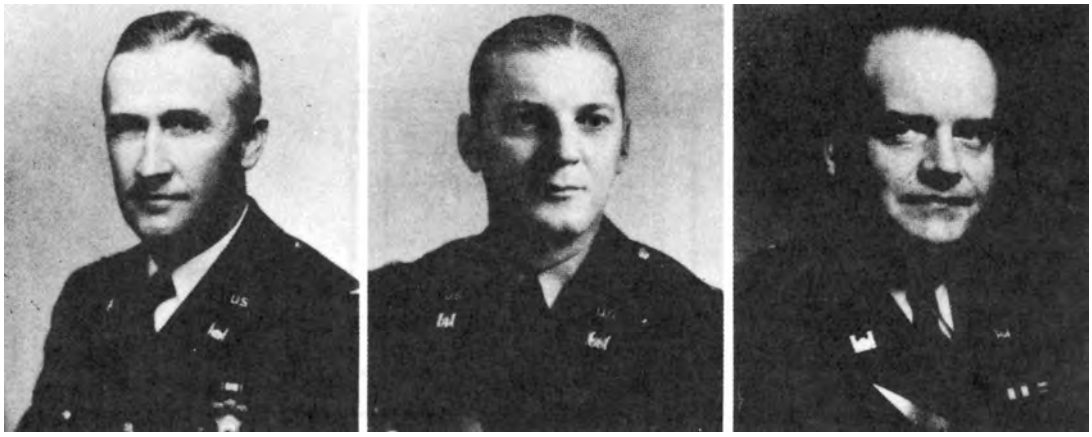
[78] (1) John D. Millett, *The Works Progress Administration in New York City* (Chicago: Public Administration Service, 1938), p. 67ff. (2) Incl, n.d., with Constr Div Ltr 361, 22 Jul 41. EHD Files.

[79] OQMG Office Order 137, 14 Dec 40. Opns Br Files, Orgn and Consolidation.

CHART 6—ORGANIZATION OF CONSTRUCTION DIVISION, OQMG, 16 DECEMBER 1940



Source: Incl with OQMG, Office Order 137, 14 Dec 40. Opns Br Files, Orgn and Consolidation.



COLONEL LEAVEY MAJOR ROBINSON COLONEL STYER

critical stage, Somervell believed "the reorganization should be one of evolution rather than revolution." From his office came the reminder: "The Construction Division is a going concern in the midst of a huge program. Our efforts should strive to help this living organization run more efficiently, more smoothly with a bit more speed."[80]

Of the old branch chiefs, only two retained their positions. Groves headed Operations and Valliant continued as chief of Real Estate. Other top posts went to newcomers. Lt. Col. James W. Younger, QMC, recently of the Assistant Secretary's office, took over the Administrative Branch. Lt. Col. Walter A. Pashley, QMC, holder of a Master's degree in Business Administration from Harvard University, became head of the Accounts Branch. Engineering went to Lt. Col. Edmond H. Leavey, CE, former deputy administrator of the New York City WPA, Control, to Capt. Clinton F. Robinson, CE, another alumnus of the New York City relief agency. The public relations assignment fell to George S. Holmes, veteran newspaperman and former Washington correspondent for the Scripps-Howard chain. As his deputy and executive officer, Somervell chose an old friend and fellow Engineer officer, Lt. Col. Wilhelm D. Styer. Most of these men were relatively young and promising. Except for Holmes and Valliant, none had reached his forty-eighth birthday. Younger later rose to be a brigadier general; Leavey and Robinson, to be major generals; Styer and Groves, to be lieutenant generals. Significantly, Somervell's staff included four Engineer officers.

This group began almost at once to transform the Construction Division. Branch chiefs soon were busy with plans for internal reorganization and before long were shifting units from one office to another, seeking additional space, and studying personnel requirements. On 20 December Somervell inaugurated a series of weekly staff conferences. A short time later Holmes issued his first press release.

[80] Memo, Office Chief Constr Div OQMG for Chief Admin Br, 18 Dec 40. Opns Br Files, Office Memos, 12/19/40–4/30/41.

By the end of the month Robinson was ready to begin publishing a weekly progress report.[81] Meanwhile, the new Chief of Construction pushed on toward his next objective, establishment of regional offices.

Within a week of Somervell's coming, rumors of impending change had begun to circulate. The press carried reports that building work would soon go to the corps areas. Old construction hands came forward with advice and encouragement. On 17 December Somervell acknowledged that he wished to make a change but said that details were still uncertain. Behind the scenes he worked to clear the way for territorial zones. He instructed Styer to draft an order setting forth the authority and responsibilities of the zones. He told Younger to decide whether the new offices should be established by law, Army Regulation, or official instructions. He asked Groves to recommend men who could serve as Zone Constructing Quartermasters.[82] By Christmas, all was in readiness.

A War Department Circular of 30 December 1940 established nine territorial construction zones having the same boundaries and headquarters as the nine corps areas. (*Map 2*) Heading each zone would be a Zone Constructing Quartermaster (ZCQM), responsible to The Quartermaster General. The zone offices would be miniature Construction Divisions, doing much of the work previously done in Washington. The ZCQM would supervise and control all CQM's within his territory; make frequent inspections of projects; award advertised contracts for $500,000 or less without consulting Washington; represent The Quartermaster General in dealing with respective corps area commanders; and, in fact, relieve the chief of the Construction Division of "any problems which are susceptible of proper solution locally."[83] Somervell called the zones the "backbone" of his organization. "The Zone Quartermasters must function," he told his staff. "If they don't, we won't."[84] Nevertheless, Somervell, like Hartman, recognized the need for strong centralized control over design, contract negotiations, and other advisory and directive functions. Such functions remained in his own office.

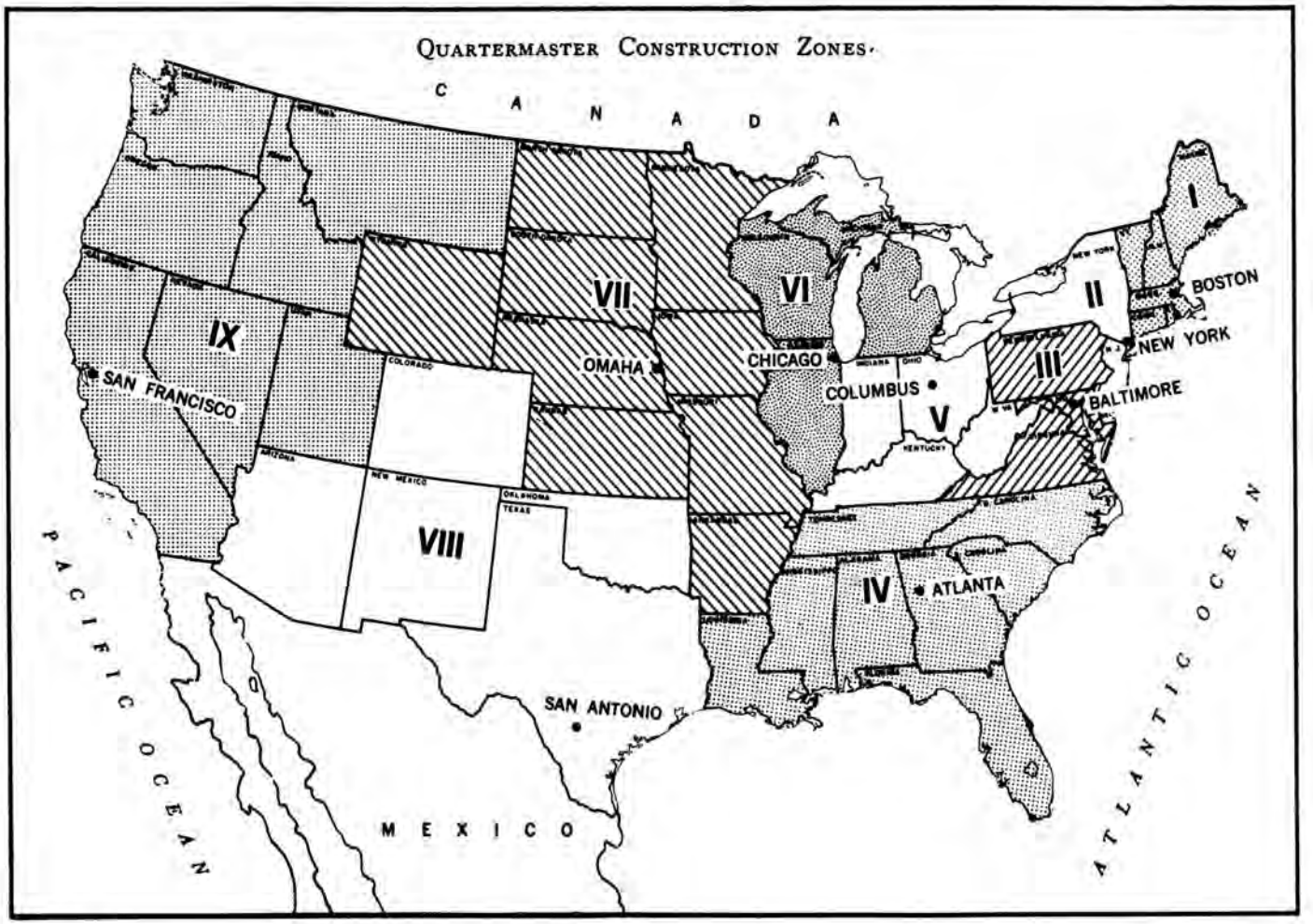
The nine newly appointed zone constructing quartermasters who reported to General Gregory early in January had been singled out by Groves as the best men available. Three came from CQM and Vicinity offices, the archetypes, if such there were, of the zones. Five came from important projects, where they had made excellent records as CQM's. All were Quartermaster Regulars and career construction officers. When the group had assembled, Gregory announced their assignments. Maj. Ralph G. Richards would head the First Zone; Lt. Col. Murdock A. McFadden, the Second; Maj. Joseph H. Burgheim, the Third; Col. Henry L. Green, the Fourth; Maj. Benjamin F. Vandervoort, the Fifth; and Capt. Everett C. Hayden, the Sixth. Maj. Morton E. Townes, Lt. Col. Edwin

[81] (1) Opns Br Files, Office Memos, Dec 40–Apr 41. Opns Br Files, Pers, Dec 40–Apr 41. (2) Min, Constr Div Staff Mtg, 20 Dec 40. EHD Files. (3) Memo, Holmes for PubRelO OQMG, 31 Dec 40. (4) Constr Div OQMG, Constr Progress Charts 1, 2 Jan 41.

[82] (1) Ltr, Somervell to CG Seventh Corps Area, 17 Dec 40, and related correspondence in QM 323.362. (2) Opns Br Files, Territorial Zones; and Pers, Dec 40–Apr 41.

[83] WD Circular 158, Sec 1.

[84] Notes, Conf on Orgn of Constr Div, attended by members of Constr Div, 22 Feb 41. EHD Files.


QUARTERMASTER CONSTRUCTION ZONES
CANADA
I
II
III
IV
V
VI
VII
VIII
IX
BOSTON
NEW YORK
BALTIMORE
CHICAGO
COLUMBUS
OMAHA
ATLANTA
SAN FRANCISCO
SAN ANTONIO
MEXICO
PACIFIC OCEAN
ATLANTIC OCEAN

MAP 2

V. Dunstan, and Lt. Col. Edward M. George were named to Zones Seven, Eight, and Nine, respectively. After three days of conferences, the Zone Constructing Quartermasters left to take up their duties in the field.[85]

Aware that no organization, however streamlined, was better than the men who composed it, Somervell gave considerable thought to personnel. He set exacting standards. His subordinate officers would have to be aggressive leaders, capable of hard work and sound judgment; his civilian advisers, eminent professionals, top men in their fields. His staff would include "operators" with important industrial connections.[86] Somervell put a premium on youth and drive. Given "an enthusiastic younger man" and "an older, more experienced person who has lost some of his steam," he generally preferred the former.[87] Go-getters, crack executives, and prominent consultants—these were the men who would henceforth run the program. Anyone who failed to measure up would have to go. Once convinced that a man was unsuited for his job, Somervell intended to act fast. "I will not talk . . . ," he told Reybold. "I will just move."[88]

A personnel shakeup accompanied the reorganization. Key members of Hartman's team received less important posts. Birdseye became Styer's assistant; Nurse, Leavey's executive. Men like Bayer and Leisenring, who had been prominent in the division's affairs, found themselves in the background. Others resigned or transferred out. Koke left in mid-December, following a disagreement with Somervell over auditing procedures.[89] Violante was relieved at his own request early in January, after informing Somervell that he "was not in tune with his administration."[90] Some twenty Constructing Quartermasters were ousted from their projects. Scores of lesser figures were struck down by what some called the "Somervell blitz." Yet the number affected was comparatively small; a majority of Hartman's people continued in their jobs. "That we have not had more poor ones, I think, is a question of luck, to a considerable extent," Somervell commented, "and also the good judgment of the people who picked them out."[91]

The need for more officers sparked a recruiting drive. The search led naturally to the Corps of Engineers. Two days after Christmas, Styer asked the Chief's office for the loan of several Regulars, but the Engineers, also short of officers, refused. "This source of supply," Styer concluded, "cannot be considered at the present time."[92] Somervell was not so easily discouraged. At his prompting, Gregory on 30 December appealed to Schley for three officers to fill key positions in the Construction Division. Gregory's letter, reinforced by an appeal from Somervell to Marshall, turned the trick. Early in January two Engineers, Maj. Hugh J. Casey and Capt. Edmund K. Daley, joined Colonel Leavey, and a third, Capt. Garrison H. Davidson, joined Colonel

[85] WD Press Release, 6 Jan 41, Nine ZCQM's Appointed. EHD Files.

[86] Memo, Somervell to Br Chiefs, 21 Jan 41. Opns Br Files, Gen—16 Dec 40–2 Jun 41.

[87] Memo, Somervell for Control Sec, 2 Apr 41. Opns Br Files, Management Engrg Unit.

[88] Tel Conv, Somervell and Reybold, 18 Dec 40. Opns Br Files, Cp Wallace.

[89] Incl with Ltr, Koke to authors, 25 May 59.

[90] Answers to Questionnaire, Violante to authors, 25 Sep 57.

[91] Transcript, Conf on Constr Div, conducted by Somervell, 29 Jan 41, p. 74. EHD Files.

[92] Memo, Styer for Younger, 28 Dec 40. Opns Br Files, Pers, Dec 40–Apr 41.

Groves. Schley made the loan on one condition—Gregory had to agree to release the three officers in June.[93]

The hunt fanned out in many directions. Gregory asked The Surgeon General and the Chief of Ordnance to lend officers who could help design hospitals and industrial plants. Somervell requested twenty West Point graduates of the class of 1941. Styer meanwhile tried to borrow officers from other divisions in Gregory's office. A search of Retired and Reserve lists yielded many good possibilities. Members of the Construction Division were constantly on the lookout for prospects. A chance meeting with an old acquaintance or a letter from a fellow officer was often enough to start negotiations. While some of these schemes came to naught, others bore fruit. The list of officers on construction duty grew steadily longer. Many of the men Somervell brought in did excellent work; most, though by no means all, proved competent.[94]

Somervell set out to acquire a staff of outstanding civilians and in this he succeeded. The list of prominent men who came to work for the Construction Division read like a roster of "who's who" in engineering and allied professions. Alonzo J. Hammond, president of the American Engineering Council, joined the Construction Advisory Committee. Henry A. Stix, vice president and comptroller of the Associated Gas and Electric Company, agreed to manage the division's finances. Among those who accepted full-time employment with the Engineering Branch were George E. Bergstrom, president of the American Institute of Architects; Frederick H. Fowler, president of the American Society of Civil Engineers; Warren H. McBryde, past president of the American Society of Mechanical Engineers; Albert D. Taylor, president of the American Society of Landscape Architects; and Leonard C. Urquhart, professor of structural engineering at Cornell. Discussing these appointments, Groves wrote:

> The reason for selecting these prominent men was not so much for the expected accomplishments, but rather to have a group in whom the professional men and professional societies, as well as the public, would have full confidence. Somervell hoped, and his hopes were fulfilled, that this would improve the public attitude toward the Construction Division.[95]

Besides the distinguished men who became regular employees, there were some who agreed to act as consultants. Rudolph W. Van Norden and Malcolm Pirnie, both well-known engineers, put their knowledge and experience at Somervell's disposal. Richmond H. Shreve, whose firm, Shreve, Lamb & Harmon, had designed the Empire State and other large buildings, advised on architectural matters. Among others who served on a part-time basis were Earnest Boyce, professor of sanitary engineering at the University of Kansas; John G. Eadie, member of Eadie, Freund and Campbell, consulting engineers of New York City; George B. Hills, an authority on the design of docks and terminals; Alfred L. Jaros, an expert on installation of mechanical equipment; and Charles R. Velzy, works superintendent of the

[93] (1) Ltr, Gregory to Schley, 30 Dec 40. Opns Br Files, Pers, Dec 40–Apr 41. (2) Schley Interv, 26 Oct 55; Reybold Interv, 12 Mar 59. (3) Verbatim Rpt, Meeting with Gregory and Hastings. (4) Ltr, OCE to TAG, 2 Jan 41. Opns Br Files, Misc Papers.

[94] Opns Br Files, Pers, Dec 40–Apr 41, and May 41–Jan 42.

[95] Groves Comments, VI, 2.

Buffalo Sewer Authority. Engineers, architects, professors, and attorneys received anywhere from $17 to $100 per day plus expenses as consultants. By mid-1941 about two dozen were on the rolls.[96]

Hardly less notable than Somervell's own advisers were those of the Zone Constructing Quartermasters. Early in February each of the regional offices had an engineer, an architect, and a construction man—every one of them a leader in his field. Some, such as C. Herrick Hammond, past president of the American Institute of Architects, and Edward T. Foley, a director of the internationally known firm of Foley Brothers, Inc., had reached the pinnacle of their professions. Of the twenty-seven new officials, two came out of retirement; the rest left high-salaried positions, flourishing practices, and successful businesses to take jobs with the Quartermaster Corps. Their appointments climaxed a month-long drive by the ANMB Advisory Committee, the American Society of Civil Engineers, and the Associated General Contractors to sign up men for the zone offices.[97]

In his first months as Chief of Construction Somervell had made substantial progress toward a stronger organization. Nevertheless he still had some distance to go before the reorganized central office and the newly established zones were fully staffed and running smoothly.

Transfer of Air Corps Construction

The transfer of Air Corps construction in November 1940 lifted a sizable burden from the shoulders of The Quartermaster General. By 30 March 1941, eighty-one Air Corps projects with a total estimated cost of $200 million had gone over to the Corps of Engineers. In January, at General DeWitt's urging, the Engineers assumed responsibility for all construction in Alaska, ground as well as air. Except for real estate and maintenance activities, the Engineers took over all work in connection with their new projects.[98] While longtime Quartermaster construction officers deplored the loss of the airfields, Groves thought the change was advantageous. Some years later he recalled:

> I did not consider it unfortunate for the Quartermaster Corps at the time and I don't believe that General Gregory did either. Actually, I believed it was beneficial, as it reduced . . . [the Quartermaster Corps'] overwhelming responsibilities. It also eliminated the difficulties encountered in dealing with the Buildings and Grounds Division of the Air Corps. This division always wished to interfere excessively in the details of construction.[99]

With the shift in responsibility, direction of the Air Corps program devolved on Brig. Gen. Thomas M. Robins, Assistant Chief of Engineers. A man of mature ability and quiet manner, Robins had behind him thirty-six years as an Engineer officer. Since 1939 he had headed the Civil Works Division, OCE, which oversaw all Engineer construction except fortifications. In the fall of 1940 Robins' organization consisted of four principal sections: Engineering, under William H. McAlpine; Finance and Ac-

[96] Incl, 16 Jun 41, with Memo, Styer for Somervell, 17 Jun 41. Opns Br Files, Senate—Hearings, Complaints, Requests.

[97] (1) Incl with Routing Slip, Holmes to Styer, 6 Feb 41. (2) Memos, Styer for Somervell, 7 Jan 41. Both in Opns Br Files, Territorial Zones.

[98] (1) Ltr, DeWitt to Moore, 16 Dec 40. (2) WD Ltr AG 600.12 (12-23-40) M-D, 7 Jan 41, sub: Constr Proj at Anchorage, Alaska. Both in AG 600.12 (11-19-40) Airfield Constr. (3) Millard W. Hansen, The Transfer of Air Corps Construction to the Corps of Engineers (MS), pp. 15 and 33. EHD Files.

[99] Groves Comments, V, 3.



GENERAL ROBINS

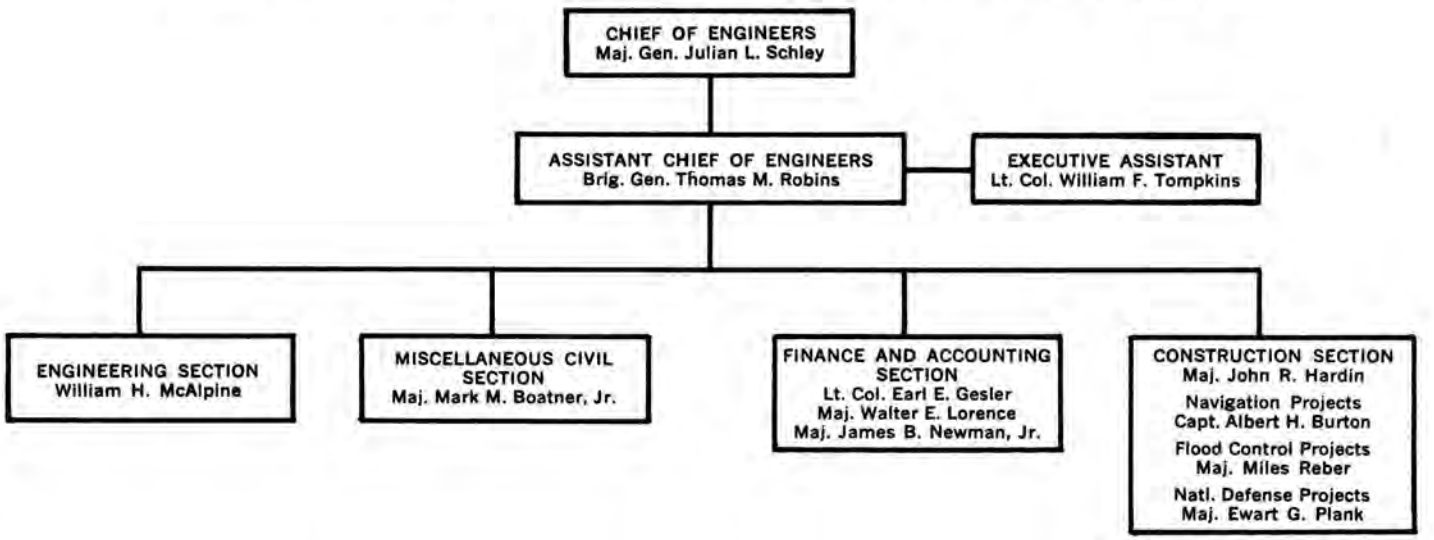
counting, under Lt. Col. Earl E. Gesler; Miscellaneous Civil, under Maj. Mark M. Boatner, Jr.; and Construction, under Maj. John R. Hardin. Lt. Col. William F. Tompkins was Robins' executive assistant. (*Chart 7*) A graduate of MIT, "Mr. Mac" McAlpine had been with the Engineers since 1902. Robins' officers, like their chief, were all West Point graduates who had spent their entire careers in the Corps, and most held additional degrees from top civilian engineering schools. Upon the assignment of emergency construction to his office, Robins made certain changes. He dropped the Civil Works designation. He set up a National Defense Projects Branch in the Construction Section and named Maj. Ewart G. Plank to head it. He appointed Maj. Henry F. Hannis liaison officer with the Air Corps. Both Plank and Hannis were West Pointers and both were graduates of Rensselaer Poly. In keeping with the Engineers' policy of decentralization, Robins and his assistants concerned themselves largely with matters of policy and administration, leaving the main work of supervising and executing construction to the districts and divisions.

In a letter to the Chief of the Air Corps on 4 December 1940, Colonel Tompkins described the Engineer Department and the way it operated. Covering the entire continental United States and the insular possessions, the department consisted of twelve divisions and fifty districts. The divisions conformed geographically to major river basins; the districts to smaller natural watersheds. In contrast with the Quartermaster field, Engineer field officers had considerable authority. District and division engineers issued specifications for jobs costing up to $10,000 and $50,000, respectively. Districts advertised contracts amounting up to $50,000; divisions, contracts in any amount. "These Districts and Divisions," Tompkins wrote, "function as closely knit but self-contained units, all responsible successively to a single administrative authority, namely the Chief of Engineers." Terming decentralization "a great feature in the strength of our organization," Tompkins looked forward to effective co-operation between Engineer field officers and Air Corps station and area commanders.[100]

During the last week in November Tompkins met with Nurse to block out procedures for expediting the transfer. The two men established a system of priorities. Projects not yet started they labeled Priority One—to be transferred almost immediately. Projects involving

[100] Ltr, Tompkins to Brett, 4 Dec 40. 686 (Airfields) Part 1.

CHART 7—ORGANIZATION OF OFFICE OF ASSISTANT CHIEF OF ENGINEERS, DECEMBER 1940



Source: OCE Orgn Charts, 1939–41. EHD Files.

permanent structures went into Priority Two—to be transferred within two weeks. Projects involving temporary construction already under contract but not well advanced received Priority Three. Projects involving temporary construction and those nearing completion were in Priority Four—last and least likely to be transferred. A partial listing made on 2 December showed 14 jobs in the first priority, 35 in the second, 8 in the third, and 11 in the fourth. Tompkins set a target date of 1 January 1941 for completing the operation. Nurse agreed to try to meet this deadline.[101] On 30 November he instructed the CQM's concerned to work out details of the transfer with local Engineer districts. Urging full co-operation, Nurse directed:

> You will extend to the officer representing the Corps of Engineers every courtesy and will acquaint him fully with the details of the project concerned and give him every aid in establishing himself and acquiring responsibility for his new duties. Until such time as the transfer is effected you will vigorously prosecute all work under your jurisdiction and there will be no slowing or slacking up of the work.[102]

District engineers began almost at once to prepare for the changeover, surveying projects and setting dates for transferring them.[103]

A difficult problem remained. By late 1940 General Schley was critically short of officers. Increases in Engineer troops, burgeoning demands for Engineers on general staffs and in training centers, and details of Engineers to other activities had strained the Corps' commissioned strength to the limit. In early December only 61 officers were on river and harbor duty, though a minimum of 124 was needed. Schley would need an additional 120 for the Air Corps projects, and these he hoped to get through the transfer. Although Gregory readily agreed to reassign civilian employees along with the projects they were working on, he was reluctant to release sorely needed officers. When Schley, in an initial request, asked for twelve Reservists—five Engineers, two Quartermasters, and five from other branches, Gregory turned over the Engineer Reservists but refused to give up the rest. It became his policy not to transfer officers. There seemed to be but one course Schley could follow. On 23 December he directed the division engineers to look for qualified Reservists, able and willing to serve with the Corps. By summer, 1941, more than 150 Reserve officers were on active duty with the Engineer construction program.[104]

Beginning, on 27 November 1940, with the air base at Manchester, New Hampshire, Air Corps projects passed rapidly to Engineer control. By the end of the year, 53 had changed hands. Twenty more made the transition in January, one in February, and 7 in March. Along with these projects, Gregory turned over to the Engineers some 200 construction contracts and approximately $80 million. Roughly 20 jobs, some primarily housing

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[101] (1) *Ibid.* (2) Memo, Supply Div G–4 for Reybold, 27 Nov 40. G–4/32249. (3) Memo, Nurse for Tompkins, 2 Dec 40, and Incl. 686 (Airfields) Part 1.

[102] Ltr, Nurse to CQM's, 30 Nov 40. QM 600.1 (Bowman Fld).

[103] (1) Ltr, Dist Engr Los Angeles to OCE, 6 Dec 40. (2) 1st Ind, 7 Dec 40, on Ltr, North Atlantic Div to Dist Engr, Providence, R.I., 3 Dec 40. (3) OCE Memo (Finance 86) (Fld Pers 26), 9 Dec 40. All in 686 (Airfields) Part 1.

[104] (1) Incl with Ltr, Schley to EHD, 5 Sep 53. (2) Memo, G–1 for OCE, 7 Dec 40. 210.3–1534. (3) Hansen, Transfer of AC Constr to CE, pp. 28, 31–32. (4) Annual Report Covering Military Activities of the Corps of Engineers for the Fiscal Year Ending June 30, 1941, p. 24.

projects and most near completion, continued under the Quartermaster Corps. By 1 April 1941 the transfer was over and done with.[105]

During and after the changeover, the Corps of Engineers and the Quartermaster Corps maintained close liaison. Somervell placed the facilities of his office at General Robins' disposal. Sheafs of Quartermaster circulars, manuals, reports, and standard drawings and specifications went to OCE for distribution to the field. Colonel Leavey's staff continued work on plans and layouts for Air Corps stations until May 1941, when the Engineers were able to dispense with this help. The Construction Advisory Committee opened its files to the Engineers and, upon request, recommended contractors for Air Corps projects. To simplify real estate transactions, General Gregory in the spring of 1941 delegated his responsibility for negotiating leases and acquiring land at air bases to General Schley. Successful co-operation between the two Corps enabled construction to go forward without disruption or delay.[106] This co-operation was due largely to the example set by Schley and Gregory. As Groves observed: "It was not so hard for Schley to be cooperative, as he was on the receiving end. Many men in Gregory's position would have been inclined to wash their hands of it all."[107]

During the winter of 1940–41 the Air Corps program expanded, as directives came out for sixteen big new projects and for dozens of additions to going ones.

TABLE 11—COST OF AIR CORPS PROJECTS

Projects by Type	Estimated Cost
Total	$286,674,000
Tactical stations	$155,913,000
Pilot schools	26,612,000
Technical schools	28,577,000
Air Corps depots	31,572,000
Experimental depots	6,800,000
Aircraft assembly plants	37,200,000

Source: Ltr, OCE to BOB, 28 Mar 41. 686 (Airfields) Part 9.

Largest of the new projects were four aircraft assembly plants authorized by the President in December and January. Designed to produce light and heavy bombers, these plants were to be at Fort Crook, Nebraska; Kansas City, Kansas; Tulsa, Oklahoma; and Fort Worth, Texas. Next in size were eight pilot training schools to be in the South and Southwest. Three stations for General Headquarters, Air Force, and one for observation units completed the list.[108] By 1 April Air Corps projects under Engineer direction had a total estimated cost of $286,674,000.[109] (*Table 11*) Together with the Atlantic bases, these Air Corps projects represented almost one-third of the Army's construction program—from a monetary standpoint. But, as Groves emphasized, owing to the simpler nature of airfield work, the Engineer program presented nothing "like a third of the difficulties."[110]

[105] (1) Constr PR's, 30 Aug 41, p. 13; 2 Apr 41, p. 44. (2) Data compiled by Control Sec Constr Div OQMG, 30 Sep 41, Status of AC Projects at Time of Transfer to the CE. EHD Files.

[106] Hansen, Transfer of AC Constr to CE, pp. 32–37.

[107] Groves Second Draft Comments, VII, 6.

[108] (1) Elaine A. Nelson, The Construction of Aircraft Assembly Plants, World War II (MS), 1944, pp. 1–2. (2) OCE PR's, 28 Feb, 15 Nov 41, sub: Constr at AC Stations. EHD Files.

[109] Ltr, OCE to BOB, 28 Mar 41. 686 (Airfields) Part 9.

[110] Groves Comments, IX, 1.

On 1 April 1941 General Marshall reported to Stimson that the transfer had gone "smoothly." "The construction projects which have been allocated to the Corps of Engineers," he went on to say, "are being actively and efficiently prosecuted and are generally meeting the requirement dates. . . . The spread of the work between the two organizations is resulting in closer supervision in Washington and more expert direction on the job by both agencies."[111] But while Marshall considered the arrangement practical, he could not regard it as final. Unless Congress acted beforehand, airfield construction would revert to the Quartermaster Corps on 1 July 1942.

[111] Memo, Marshall for Stimson, 1 Apr 41, G-4/31324.

CHAPTER VIII

Completing the Camps

When Somervell succeeded Hartman in December 1940, he faced a stiff ordeal. Eight National Guard divisions and some eighty miscellaneous units were due for induction during January and February 1941. Five general hospitals were to open on 1 March. Twenty-one replacement training centers were to begin operation around 15 March. In all, more than sixty projects were due for completion before April 1941.[1] This construction had to be accomplished on limited budgets, in the face of continuing shortages and changing requirements, and at a season of the year when outdoor building work throughout most of the country was normally suspended. War was moving closer. The situation did not permit further delay in getting troops into training.

The Deficit Problem

During December the question arose in the War Department whether economy or speed should govern construction. The growing construction deficit—$100 million on 2 December, $140 million five days later—was a source of official embarrassment. Huge amounts were owing to contractors and materialmen. Money to keep the program going would be hard to find. Large additional appropriations would be necessary, how large no one knew. Nor could anyone be certain how Congress and the public would react. Marshall, Stimson, and Roosevelt were frankly concerned. The situation gave rise to various proposals for saving money, including some for slowing construction.

On 7 December, General Reybold suggested a common-sense approach to the problem of the deficit. Referring to the high cost of labor and materials and the inaccuracy of original estimates, he wrote to the Chief of Staff:

> The requirements for housing and caring for our large Army are considered generally modest . . . . It is not believed that these requirements may be decreased in order to reduce the deficit, nor will the world situation permit a slowing of the program to reduce cost or a delay to obtain more funds. It is believed that the program based on authorized requirements must proceed to a rapid conclusion irrespective of the deficit caused thereby. G–4 does believe, however, that every effort should be made, short of reduction of requirements and delay in the program, to prevent this deficiency from becoming of undefendable size.

Reybold went on to outline a course of action. First, he would ask the President for permission to incur a deficit of $150 million; second, he would ask General Gregory to prevent the overrun from becoming any larger; and third, he would ask the using services to save construction funds by requesting only bare necessities,

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[1] (1) Memo, Groves for Styer, 23 Dec 40. QM 600.94 (1935—). (2) 1st Ind, 20 Dec 40, on WD Ltr AG 600.12 (12–11–40) M–D–M to TQMG, 13 Dec 40, sub: List Showing Location and Strength of Reception Centers. AG 652 Rec C No. 2. (3) Incls with Memo, Styer for Somervell, 31 Dec 40. Opns Br Files, Induction Dates.

by using WPA, and by reviving "the American Army principle of extemporizing facilities in the field." General Marshall agreed to try the plan.[2]

Two days before he presented this proposal, Reybold agreed to a new schedule for housing the National Guard. Since late November he had been debating camp completion dates with Col. Harry L. Twaddle, the new Assistant Chief of Staff, G–3. By 1 December, the two men had agreed on induction dates for all Guard units except those slated for Indiantown Gap, Forrest, and Wood. In Reybold's opinion the first of these three camps could not be finished until February, the others not until April. Twaddle insisted that all be ready in January. The two men settled their differences on 5 December. Next day they issued a new timetable: Camp Robinson in December; Camps Edwards, Claiborne, Shelby, and San Luis Obispo in January; and Camps Forrest, Meade, Blanding, and Indiantown Gap in February. With the exception of Camp Leonard Wood, now listed for 1 April, the remaining projects in the original Guard program would be ready by the end of January.[3] Committed to the new schedule, Reybold wrote to Gregory, "It is vitally important that the accommodations be completed on the dates specified."[4]

The postponement of induction dates led Inspector General Peterson to demand stricter economy. Unnecessary haste, he maintained, was costing the Army millions. Reports from his inspectors indicated that attempts to rush completion had inspired reckless spending. Overtime, duplicate purchases, and "other costly procedures" were prevalent. Peterson proposed to put a stop to all this. Soon after learning of the new induction schedule, he wrote General Marshall, "This postponement . . . materially increases the time available for completion of the various construction projects . . . and, in my opinion, should permit their completion in an orderly and economical manner." He went on to suggest that General Gregory be ordered to "eliminate all unnecessary expenditures."[5]

Peterson became the proponent of a new scheme for saving money. Twaddle had recently recommended that Guard units inducted after mid-February remain at peace strength until June. Selectees earmarked for these units would not go directly to the Guard camps as originally intended, but instead would receive thirteen weeks of basic training at replacement training centers before joining the Guardsmen. This plan, if approved by the Chief of Staff, would affect three divisions and a number of separate regiments slated for Blanding, Dix, Indiantown Gap, Forrest, and Wood. While Marshall deliberated, Peterson discovered that these projects were working overtime in an effort to complete by March accommodations which, under Twaddle's plan, would not be fully occupied until June. The replacement training centers were also going full speed. The Inspector General warned Marshall that using expensive methods to complete buildings

[2] Memo, Reybold for Marshall, 7 Dec 40, and concurrence thereon. G–4/32243.

[3] (1) G–4/31948. (2) WD Ltr AG 325 (12–5–40) M–C–M to All Army and Corps Area Commanders, 6 Dec 40, sub: Induction Dates for NG Units, and Incl. 325.37 Part 1.

[4] Memo, Reybold for Gregory, 6 Dec 40. G–4/31948.

[5] Memo, Peterson for Marshall, 13 Dec 40. G–4/31948.

which would stand vacant for several months could "only result in just and unfavorable criticism of the War Department." Anticipating Marshall's approval of Twaddle's proposal, Peterson recommended that The Quartermaster General wait until spring to house selectees at Guard camps.[6]

G–4 considered Peterson's plan ill-advised. Acting in Reybold's absence, Colonel Chamberlin commented on the scheme. To postpone construction for selectees, Chamberlin maintained, the Army would have to follow one of two courses. First, it could ask each contractor to complete a section of his camp large enough to house the peace-strength units. Guardsmen would take over the finished sections, with pairs of half-strength units occupying quarters intended eventually for single units at full strength. Then the contractor would complete the camp. When selectees arrived, each unit would jump to full strength and move to its permanent area. Second, the Army could ask a contractor to build throughout an entire camp, leaving out every other barracks, omitting parts of the hospital, and in general completing enough of the camp to enable peace-strength units to move into their permanent areas. Later on, the contractor could retrace his steps, putting in the buildings he had skipped before. Chamberlin opposed both courses. He said of the first: "This method would entirely defeat the principle of mobilization. Each unit when it comes in should be put in its own area so that it can organize that area . . . to receive the additional men in orderly fashion"; and of the second: "Since the area would have to be gone back over again . . . it would probably cost more than the payment of overtime to complete the entire facility at one time."[7]

Colonel Groves, who carried major responsibility for the camp projects, was also against Peterson's proposal. He had already adopted some of the suggested methods to save time but doubted they could save money. Groves shared with civilian engineers the opinion "that it costs more money to bring troops into your camp before the camp is completed."[8] Moreover, he contended, since premium pay was necessary to hold labor at defense jobs, any attempt to reduce costs by cutting overtime would deprive the projects of essential workers and thus delay construction for peace-strength units as well as for selectees.[9] General Moore soon joined Groves in opposing the Inspector's plan.

On 19 December, in a memorandum for Marshall, Moore attacked Peterson's position, warning that the Army must focus on its objective—"the mobilization and training of our troops in the least practicable time." Noting that Congress had appropriated almost one billion dollars for expediting production of munitions and airplanes, he stated:

> Under such circumstances I think we are justified in incurring additional expense in "expediting production" of shelter for troops in spite of "hell and high water" (particularly the latter), so that we may have a trained force ready at the earliest practicable date. . . .
>
> Although we may be subject to some

[6] Memo, Peterson for Marshall, 17 Dec 40. Opns Br Files, Insp Rpts.

[7] Memo, Chamberlin for Moore, 18 Dec 40. G–4/31981 Sec 1.

[8] Testimony of W. C. Roberts, Proj Engr at Ft Meade, Md, 29 Apr 41. In Truman Comm *Hearings*, Part 2, p. 465.

[9] Memo, Chamberlin for Moore, 18 Dec 40.

economy minded criticism for pushing construction at additional expense under adverse winter conditions, we would be subject to more justified criticism if we permit "logistical" financial considerations to govern under the present situation.

Besides, he said, carrying out Peterson's plan would be difficult if not impossible. Agreeing with his deputy, Marshall penciled "O.K., GCM" on Moore's memorandum.[10]

Although Peterson's scheme fell through, it did serve to underline the necessity for thrift. On 20 December Somervell asked camp CQM's to justify their use of crash methods.[11] A short time later he felt called upon to defend continued use of overtime at Indiantown Gap. "It will not be possible," he told Reybold, "to stop working overtime at present without seriously jeopardizing the work."[12] Hard pressed for funds, Somervell endorsed every means of reducing expenditures short of slowing inductions. He encouraged contractors to cut payrolls and to hold construction to essentials. He cut out unnecessary overtime. He substituted gravel roads for concrete and asphalt. He eliminated tie rods, exterior paint, floor seals, and skirting from building plans. He postponed landscaping and fine grading. He denied requests for additional buildings.[13] In January he warned his branch chiefs: "Nothing aside from crookedness will subject this office to criticism as will exorbitant costs. Dementia dollaritis must be stamped out."[14] As long as the big construction deficit remained, this attitude would prevail.

Additional Funds

Wiping out the deficit was high on Somervell's agenda. When he took over the Construction Division, the known deficit stood at about $150 million. This figure he suspected was too low. "I do not believe they can finish the camps for that," he told Reybold. "I am just a little worried about it . . . . I do not want to embarrass you and the Secretary by running up and saying we need more million dollars."[15] On 13 December he told architect-engineers to re-estimate, this time correctly, the final costs of their projects. The result was startling. The new estimates indicated that approximately $337 million would be necessary to complete the program. Somervell added $25 million for contingencies, putting the total deficit at $362 million.[16] Having decided how much to ask, he prepared to make a strong bid for early passage of a deficiency appropriation.

On 3 January he presented the bill to the Chief of Staff. Marshall was perturbed. The Secretary, he explained, had understood that the deficit would be $150 million. "If he had that impression," said Somervell, "he was wrong. We can't build for any less than this sum. These estimates cannot be pared." Marshall interjected, "I understand that. What I want to do is to get the matter straight before the Budget." Stimson had already

[10] Memo, Moore for Marshall, 19 Dec 40, and notation thereon. AG 600.12 (1–23–36) Ser 1E.

[11] Memo, Somervell for Marshall, 20 Dec 40. Opns Br Files, Insp Rpts.

[12] Memo, Somervell for Reybold, 30 Dec 40. Opns Br Files, Indiantown Gap.

[13] Opns Br Files, Economy.

[14] Memo, Somervell for Br Chiefs Constr Div, 21 Jan 41. Opns Br Files, Gen—16 Dec 40–2 Jun 41.

[15] Tel Conv, Somervell and Reybold, 18 Dec 40. Opns Br Files, Cp Wallace.

[16] (1) TWX, Gregory to CQM's, 13 Dec 40. Opns Br Files, Future Policies—Cp Constr. (2) Ltr, Groves to CQM's, 13 Dec 40. Opns Br Files, Estimates. (3) Incl (31 Dec 40), with Memo, Harrison for Knudsen, 3 Jan 41. Madigan Files, 101.4 Estimates—Costs.

requested the smaller sum. Should he ask for the balance now or later? After some discussion Marshall and Somervell decided to tell the "whole story." They would put in for $362,000,000. "However," the Chief of Staff remarked, "I am also concerned with the diplomatic way to handle this matter."[17]

The administration would have to be ready with an explanation. That much was generally agreed. But opinions differed as to what the explanation ought to be. Hartman had wished to stress the reduction of his original estimate by General Moore, the lack of advance information about camp sites, and union demands for higher wages. Stimson wished to emphasize advancing materials and labor costs and the adversities of winter weather. Reybold attributed most of the increase to haste.[18] Somervell listed hastily prepared layouts, changes in plans, rising prices and wages, unskilled workmen, overtime, speed, and bad weather. "Then," he added, "some of the estimates were just plain dumb."[19] In the midst of all this conjecture, the President asked for an "honest-to-God" statement of the reasons for the overrun.[20]

A word from Roosevelt and the Construction Division set to work. Picking up the telephone, Groves summoned to Washington contractors whose projects showed a deficit. Costs, he declared, had gone "sky high."[21] The size of the overrun seemed "inexcusable."[22] "But," he told one man, "we have to explain it and so does the President . . . . That's why we are so anxious to have this meeting and get our explanation as to just what can be said other than 'we are sorry to have spent more money than we have.' "[23] The conference took place on 29 December. A short time later the President had his answer. The "honest" statement gave three major causes for the overrun. It attributed 25 to 35 percent to increased costs of labor and materials, 50 or 60 percent to additional requirements, and 15 to 25 percent to changes in plans and underestimation of costs. These percentages were approximate. Precise figures were not yet available and, indeed, might never be.[24]

A somewhat different appraisal came from Slaughter, Saville & Blackburn, Inc., of Richmond, an engineering firm hired by Somervell to make an independent study. On 30 December General Gregory wired Constructing Quartermasters, asking them to forward plans, layouts, and cost data to the Virginia firm.[25] Forty-four fixed-fee and fifty-eight lump sum projects sent replies. This information formed the basis of a 66-page report submitted to Somervell on 13 January. After comparing the original estimate with the actual costs of labor, materials, buildings, and utilities, and after analyzing an imposing array of figures, Slaughter, Saville & Blackburn concluded that "the reasons for the deficiency are speed of action in preparation

[17] Min, Conf in OCofS, 3 Jan 41, attended by Marshall, Somervell, Reybold, and Col Haislip. G–4/32243.

[18] (1) 1st Ind, 2 Dec 40, on Ltr, TAGO to TQMG, 16 Nov 40. (2) Ltr, Stimson to Roosevelt, 13 Dec 40. Both in QM 600.1 (Funds) IX. (3) WD Ltr AG 600.12 (2–7–40) M–D–M, 16 Dec 40. 600.1 Part 8.

[19] Min of Conf in OCofS, 3 Jan 41.

[20] Memo, DCofS (Maj Gen William Bryden) for TQMG, 26 Dec 40. G–4/32243.

[21] Tel Conv, Groves and Mr. Meade, Ft Warren, Wyo., 28 Dec 40. Opns Br Files, Ft Warren Corresp.

[22] Tel Conv, Groves and L. E. Dixon, Los Angeles, Calif., 27 Dec 40. Opns Br Files, San Luis Obispo.

[23] Tel Conv, Groves and Kier, Los Angeles, Calif., 27 Dec 40. Opns Br Files, San Diego Corresp.

[24] Memo, Reybold for Marshall, 15 Jan 41, and Incl, n.d. G–4/32243.

[25] TWX, Gregory to CQM's, 30 Dec 40. 652 (Cp Croft) I.

of the original estimates before sites were selected and the speed of construction required of the field forces." Costs of utilities and labor bulked large, but neither rises in prices nor changes in plans could account for a substantial portion of the deficit.[26] These findings did not go unchallenged. On discovering that many of the figures given the Richmond firm were "well-nigh valueless,"[27] Groves concluded that "the Slaughter, Saville & Blackburn report is based on uncertain data and hypotheses and that the figures it gives cannot be relied upon for comparative purposes—nor indeed for any other useful purposes."[28] Groves' criticism notwithstanding, Somervell believed the report told "the general story" and drew heavily upon it in defending the deficit.[29]

The day Slaughter, Saville & Blackburn submitted their report, Somervell appeared before the Budget to ask for approximately $535 million in construction money. Over and above the $362 million, he wanted $32.6 million for maintenance and repairs and something in the neighborhood of $140 million for land and for such additional items as chapels, ice plants, recreational facilities, repair shops, and access roads. Asked to guarantee that these funds would be sufficient, he refused. The Budget Director thereupon struck out the allowance for contingencies and cut the maintenance item by almost forty percent, and he reduced the deficiency fund to $338,880,000 and the fund for maintenance to $19,835,000. The request to Congress would be some $36 million less than Somervell felt he required.[30]

The Budget Director promised the money for 1 March. The question was whether the Construction Division could keep going until then. Ten days before the Budget hearing, at his conference with General Marshall, Somervell had estimated that funds on hand would last until the end of January. He now promised to hold out one month longer. While Somervell was making this commitment, Groves, who was also present, grew "very uncomfortable."[31] He later told a member of the Budget staff: "I was signalling frantically. If you'd watched me up there, you'd have seen me shaking my head most vigorously when General Somervell was agreeing to March 1." It appeared to Groves that appropriations for construction would again be too little and too late.[32]

By early February the known deficit for troop projects had climbed beyond the $360 million mark. Architect-engineers were admitting that their previous calculations had been optimistic. Blanding, Forrest, and Shelby showed a combined increase of $19 million over December estimates. As other projects swelled the total, Groves complained,

[26] Slaughter, Saville & Blackburn Rpt.

[27] Memo, Hadden for Groves, 30 Jan 41. Opns Br Files, Cp Robinson.

[28] Memo, Groves for Somervell, 31 Jan 41. Opns Br Files, Cp Robinson.

[29] Somervell's Testimony, 12 Feb 41. In H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on Fourth Supplemental National Defense Appropriation Bill for 1941*, p. 21.

[30] (1) Tel Conv, Col Kobb and Col Groves, 14 Jan 41. Opns Br Files, Cp Robinson. (2) Opns Br Files, Budget. (3) Memo, NDAC, J. V. Dunn for Harrison, 15 Jan 41, and Incl, 13 Jan 41. WPB–PD File, 411.33 Const Proj—Mil, Jun 40–41. (4) H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the Fourth Supplemental National Defense Appropriation Bill for 1941*, p. 2.

[31] Tel Conv, Groves and Col Waite, BOB, 20 Feb 41. Opns Br Files, Budget.

[32] Tel Conv, Groves and Col Clarke, BOB, 4 Apr 41. Opns Br Files, Budget.

"These engineers are fine engineers, I must say. The thing that makes me so mad is that . . . the estimate of December 15 was just a joke, apparently, to them."[33] While he shared Groves' dissatisfaction, Somervell hoped to turn the new estimates to advantage. On 11 February, the day before Congress began hearings on the fourth supplemental appropriation bill, he asked for restoration of the contingency fund, arguing that the money was needed at once.[34] His eleventh-hour appeal failed. The War Department would defend a deficit of $338,880,000.

Hearings before the Subcommittee on Deficiencies of the House Appropriations Committee began on the morning of 12 February, with a company of distinguished officers on hand, among them Marshall and Gregory. The spotlight centered, however, on the chief of the Construction Division. Somervell, who had but two weeks before exchanged the oak leaves of a lieutenant colonel for a brigadier general's stars, was the principal witness. He presented the case expertly. His detailed explanation of the overrun seemed frank and reasonable. His replies to leading questions were at once adroit and witty. The subcommittee agreed to the request turned in by the Bureau of the Budget. But, although Somervell twice introduced the subject, he could not persuade the group to add $25 million for contingencies.[35] The committee bill, which the House passed on 27 February, was something of a disappointment.

Not until 3 March did the bill come before the Senate Subcommittee. This time Somervell had little opportunity to express his views. Having read the lengthy testimony taken by the House group, the Senators did not wish to have the deficit explained again. They were less concerned with the reasons for the overrun than with the failure to foresee it. "I am not complaining so much about the expenditure of funds," one committee member said, "and I do not think that Congress is. We have all become calloused to that, . . . but it is rather amazing that the original estimates could have varied as much as the amount that was really necessary to complete the jobs."[36] "In our usual search for economy," General Moore testified, "the original estimates were made dangerously low . . . . There was some argument about it, but I kept it low with the hope that . . . the quartermaster and people in the field would be able to observe economies, but my hopes were dashed to the ground."[37] Somervell, who knew the latest estimate was likewise founded on false hopes, had no chance to say so. Most of the Senators' queries were directed to General Moore. Somervell found himself confined largely to routine subjects. On 6 March the Committee on Appropriations reported the Army sections of the bill favorably and without change. The measure passed the Senate on 10 March and on the 17th the President signed it.[38]

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[33] Tel Conv, Groves and Harrison, 11 Feb 41. Opns Br Files, Budget.

[34] Memo, OQMG for Moore, 11 Feb 41. 600.1 Part 8.

[35] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the Fourth Supplemental National Defense Appropriation Bill for 1941*, pp. 1–126, *passim*.

[36] S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 3617, p. 10.

[37] *Ibid.*, p. 5.

[38] (1) *Ibid.*, pp. 1–30, *passim*. (2) 87 *Cong. Rec.* 2128. (3) 55 *Stat.* 34.

The appropriation eased but did not end the Construction Division's financial troubles. Final solution of the budgetary problem came only after completion of the projects.

Winter Construction

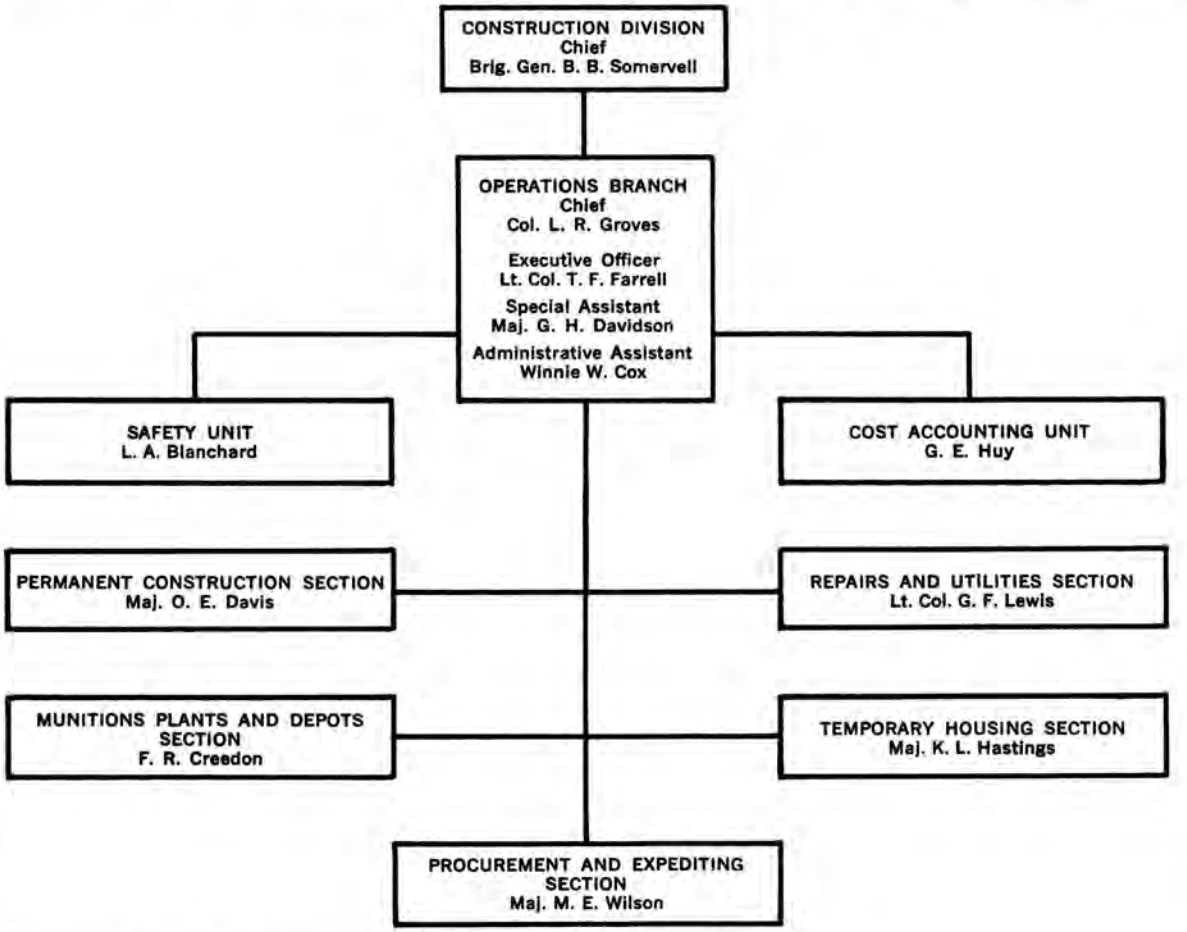
To those engaged in camp construction—contractors, engineers, and workmen—the winter of 1940–41 was a time of unusual challenges and strenuous effort. It was a time of mud, high winds, frozen ground, and stalled equipment; of urgent demands, unremitting pressure, long hours of work, and increased personal hazards. It was also a period of changing schedules, critical shortages, and maddening delays. Few construction men had experienced anything like it before. One engineer declared, "There is no work in the world as hard as building a cantonment under the conditions imposed."[39] But if the difficulties were great, great too was the accomplishment. During the winter months, the camp projects were virtually completed.

At the center of the effort to complete the camps was the Operations Branch. (*Chart 8*) The December reorganization had augmented both its duties and its staff. Among the persons assigned to Colonel Groves at that time were Violante's top assistants, including Winnie W. Cox, an able administrator who had been with the division since World War I, Maj. Orville E. Davis, Capt. William A. Davis, Capt. Donald Antes, Creedon, and Kirkpatrick. While Groves relied heavily upon such stalwarts as these, he strengthened his organization by bringing in more officers. Recalled to duty as a lieutenant colonel, former CE Regular Thomas F. Farrell gave up his post as chief engineer of the New York Department of Public Works to become Groves' executive. Lt. Col. Garrison H. Davidson, CE, became Groves' special assistant. George F. Lewis, formerly an Engineer lieutenant colonel, took charge of Repairs and Utilities. Four of the Quartermaster's West Point careerists also joined Groves' team; Maj. Kester L. Hastings, Capt. Clarence Renshaw, Capt. Howard H. Reed, and Capt. Carl M. Sciple. With these four, plus Lewis, Davidson, Kirkpatrick, W. A. Davis, and Groves himself, the branch now had nine Academy graduates. To fill longstanding needs, Groves created two new sections. The first, headed by Lloyd A. Blanchard, inaugurated a program of accident prevention; the second, under George E. Huy, maintained a uniform system of cost accounting. The improved organization enabled Groves to give the program better direction and to help the field surmount numerous obstacles.

The winter of 1940–41 was unusually severe. Contrary to the hopes of construction men it began early. While September and October had been abnormally dry in most parts of the country, November rainfall was above average in thirty-two states. Bad weather set in around Thanksgiving. Cloudbursts hit camps in Texas and Arkansas late in November. During the next month steady rains settled over the states along the lower Mississippi and the Gulf of Mexico. Meanwhile, in New England frosts were occurring nightly. Soon the ground began to freeze, and by Christmas northern camps were blanketed with snow. Across the continent, California was experienc-

[39] Roberts' Testimony, 29 Apr 41. In Truman Comm *Hearings*, Part 2, p. 457.

CHART 8—ORGANIZATION OF OPERATIONS BRANCH, CONSTRUCTION DIVISION, OQMG, JANUARY TO MARCH 1941



Source: OQMG, Constr Div, Orgn Charts, 1941. EHD Files.

ing the wettest December in living memory. The new year brought no improvement. During January and February storms swept the West, South, and Midwest. In the North freezing temperatures prevailed and blizzards raged. Old-timers avowed that this was the worst winter in many years. Official statistics confirmed their view. Baton Rouge recorded "its worst rainy season in ten years;"[40] Los Angeles, its "heaviest and most continuous rainfall . . . in forty-three years;"[41] Topeka, the wettest winter "in the history of the Weather Bureau."[42]

This weather was extremely unfavorable to construction. In the South, where a majority of the camps were located, rains turned unfinished projects into seas of mud. Serious floods occurred at Wallace, Hulen, and Shelby.[43] This story was repeated in the West and Midwest. At one point high waters threatened key projects in California and Missouri. On 27 December the contractor at San Luis Obispo telephoned Groves: "We are completely flooded out here. . . . We have had a whole season's rainfall in about ten days. . . . It is still raining."[44] That same day one of Groves' inspectors reported that prolonged rains at Camp Leonard Wood had made field work "hazardous and in some cases impossible."[45] Nowhere were conditions worse than in the North and East. There workmen battled snow, sleet, high winds, and subnormal temperatures. By the first of January the ground at Pine Camp, New York, had frozen to a depth of twenty-six inches. At Devens frost penetrated to a depth of four feet. At Meade intermittent freezes and thaws harassed construction crews.[46] Few projects escaped the crippling effects of inclement weather.

The onset of winter found many jobs in the midst of paving and grading. Unfinished roads washed out at a number of locations. Traffic in wet weather ruined $200,000 worth of subgrade at Camp Bowie. Similar losses occurred at Robinson, Claiborne, Livingston, and Wood.[47] Roadbuilding was everywhere a tough and expensive job. Prolonged rains forced contractors to plow out mud with heavy equipment and to lay down huge quantities of rock and gravel. Where thermometers dropped below freezing, builders had to use heated concrete and early-strength cement and to protect freshly poured concrete for at least seventy-two hours with straw, tarpaulins, and salamanders.

Winter was a period of low production. Bad weather cut deeply into construction

[40] Compl Rpt, Cp Livingston, II, 155. Copy in EHD Files.

[41] Telg, Morrison-Knudsen Co., Inc., Paso Robles, Calif., to Somervell, 16 Jan 41. 600.914 (Cp Roberts) I.

[42] Ltr, Long-Manhattan-Watson, Ft Riley, Kans., to H Comm on Mil Affs, 31 May 41. Opns Br Files, Loose Papers.

[43] (1) Memos, Peterson for Marshall, 5, 17 Dec 40. Opns Br Files, Rpts of Insp. (2) Tel Conv, Reybold and CG Eighth Corps Area, 2 Dec 40. G-4/31981. (3) Tel Conv, Frink with Groves and Somervell, 16 Dec 40. Opns Br Files, Cp Shelby.

[44] Tel Conv, Groves and Dixon, Los Angeles, Calif., 27 Dec 40. Opns Br Files, San Luis Obispo.

[45] Memo, Capt G. A. Rafferty for Groves, 27 Dec 40. QM 333.1 (Ft L. Wood) 1941.

[46] (1) Ltr, W. S. Lozier, Inc., to CQM Pine Cp, 5 Jan 41. 652 (Pine Cp) Part 1. (2) H Comm on Mil Affs, Spec Subcomm 2, Draft of Interim Rpt, Aug 41, p. 10. EHD Files. (3) Ltr, Consolidated Engrg Co., Inc., to H Comm on Mil Affs, 29 May 41. Opns Br Files, Ft Meade.

[47] (1) Memo, Peterson for Marshall, 17 Dec 40. Opns Br Files, Rpts of Insp. (2) Memo, FF Br Sec C for Groves, 26 Nov 40. 652 (Cp Robinson) Part 1. (3) Memo, Peterson for Marshall, 9 Dec 40. EHD Files. (4) Memo, Reybold for Marshall, 13 Dec 40. G-4/31735. (5) Ltr, IGD to TIG, 6 Feb 41. QM 333.1 (Ft L. Wood) 1941.



SCENE AT CAMP SAN LUIS OBISPO AFTER HEAVY DOWNPOUR, *February 1941.*

time. Meade lost 30 out of a total of 116 possible working days; Bowie, 38 out of a total of 150. At the Presidio of Monterey, operations were suspended on 16 days within a 2-month span. During a single week in December, Camp Leonard Wood missed 4½ days.[48] Occasionally, goldbricking prolonged layoffs. Writing from Camp Davis, Major Davidson complained, "Local labor is so spoiled by their unaccustomed income that they not only lose the rainy days but also the following day when they steer clear of the job until the ground dries out."[49] Somervell gave another view of labor's performance during this period:

> I went to Devens, Edwards, Pine Camp, Madison Barracks, and Fort Ontario, and the blizzard followed me all around, so that I had a good opportunity to see what was going on. It was below zero at Pine Camp and at Devens, and the men were out there trying to do their work, and they were doing it, but obviously at a very much reduced efficiency.
>
> I visited Fort Meade . . . , during a moderate drizzle, where the mud was up to your knees, and where the workmen were

[48] (1) Opns Br Files, Ft Meade. (2) Compl Rpt, Cp Bowie, p. 35. (3) Memo, Hastings for Robinson, 15 Apr 41. Opns Br Files, Proj Behind Schedule. (4) Testimony of E. W. Dunn, 8 May 41. In Truman Comm *Hearings*, Part 2, p. 662.

[49] Memo, Davidson for Groves, 18 Feb 41. QM 333.1 (Cp Davis) Jul–Dec 41.



POURING CONCRETE IN SUBZERO WEATHER, PINE CAMP, NEW YORK

trying to dig trenches, lay pipe, and things of that kind, which they were doing at, I should say, about 25 percent efficiency.[50]

Increased cost was a corollary of lowered efficiency. To make up for lost time, projects worked long hours and double shifts. The contractor at San Luis Obispo operated 10 hours, 5 days a week, and 8 hours on Saturdays during the winter months, thereby adding $600,000 to the cost of his camp. Overtime and multiple shifts increased the payroll at Camp Leonard Wood by $1,839,690 between December and April. Coupled with the expense of sheltering men and equipment from the elements, removing snow and mud, employing special techniques for cold weather construction, and replacing facilities damaged by storms, bills for overtime and shift work brought the cost of winter operations to a sizable total. Bad weather increased project costs an average of 10 percent. Of thirty-four contractors questioned by a congressional committee, all but one reported that costs had risen sharply as a result of winter conditions.[51]

[50] Somervell's Testimony, 12 Feb 41. In H Comm on Appns, *Hearings on Fourth Supplemental National Defense Appropriation Bill for 1941*, pp. 21–22.

[51] (1) Ltr, CQM Cp San Luis Obispo to TQMG, 19 Feb 41. 600.94 (Cp San Luis Obispo). (2) Incl with Ltr, Alvord, Burdick & Howson to CQM Ft L. Wood, 10 Apr 41. 600.94 (Ft L. Wood). (3) Memo, Boeckh for Casey, 19 Jul 41. QM 652 (Canton Constr) 1941. (4) H Comm on Mil Affs, Sp Subcomm 2, Draft of Interim Rpt, Aug 41, p. 10. EHD Files.

As costs rose, contractors came under increasing financial strain. More money was being paid out and less was coming in. Slow to begin with, reimbursements lagged further and further behind as appropriated funds dwindled. By February 1941 contractors had more than $325 million tied up in Quartermaster projects. Groves tried by various means to ease their distress. He became adept at "trading dollars," transferring money from projects which had funds to projects which were short. He put more pressure on the field auditors, urging them to speed up reimbursements and place available funds in contractors' hands as soon as possible. Lastly, he arranged for contractors to tap additional sources of capital. Under the Act of October 9, 1940, claims against the United States could be assigned to private financial institutions. By invoking this law, Groves helped a number of contractors to borrow. Among the first concerns to do so was Starrett Brothers and Eken, which obtained a loan of $915,000 by assigning the Blanding contract to the Manufacturers Trust Company of New York in late December. Other firms followed suit.[52] The situation could not go on indefinitely. By early March Groves and the contractors had reached the end of their financial tether. On the 4th Reybold notified Gregory that he could go ahead with construction "even though funds may not be on hand."[53] Deficit spending could continue until money from the new supplemental appropriation became available late in March.

Shortages of materials and installed equipment drew more complaints from contractors than weather and money. During the third week in January shortages were listed as delaying factors by 45 percent of the projects; the weather, by 28 percent; and lack of funds, by only 2 percent. Progress reports submitted on 7 February showed 42 percent held up for lack of supplies and equipment as against 22 percent for weather and less than 4 percent for funds. Both contractors and CQM's consistently named scarcity of critical items as the leading cause of delay.[54] Somervell was skeptical of these reports. "I am wondering," he confided to Groves, "how much of this alleged shortage is real and how much of it is an alibi of the contractors for not getting on with the work."[55] No doubt there was some exaggeration. Nonetheless, some shortages were truly desperate. On 7 March the contractor at Camp Wallace appealed to his CQM:

> We are now short of lumber with which to complete the project. We, today, will have to lay off two hundred carpenters. This lumber was purchased by the War Department . . . and has been dribbling in promiscuously without any regard to our requirements. Today, we have structures standing with [out] roof sheathing, others without siding, and [on] others we have nothing but the foundation sills, and on still others we have the foundation sills and first

[52] Data prepared by Constr Div, c. Apr 41, sub: Delays in Payments and Reimbursements. Opns Br Files, Questions and Answers by CAC, etc. (2) Tel Conv, Groves and Col Waite, BOB, 18 Mar 41. Opns Br Files, Budget. (3) Groves Comments, V,5. (4) 54 *Stat.* 1029. (5) Agreement of Starrett Brothers and Eken and Manufacturers Trust Co., 30 Dec 40, and related docs. In Compl Rpt, Cp Blanding. (6) Ltr, OQMG to CQM Ft Riley, 3 Feb 41. 652 (Cp Riley) II.

[53] Reybold's penciled note on Memo, Chamberlin for Reybold, 4 Mar 41. G–4/30552–4 Sec 2.

[54] (1) Memos, Robinson for Somervell, 5, 18 Feb 41. Opns Br Files, Proj Behind Schedule. (2) Opns Br Files, Delays.

[55] Memo, Somervell for Groves, 29 Jan 41. Opns Br Files, Proj Behind Schedule.

floor joists. We have to rob materials from one building to do something with another, and it makes the progress very slow and costly.[56]

Items reportedly in short supply fell into three classes: those purchased by Major Wilson's Procurement and Expediting Section, those purchased by The Surgeon General, and those purchased locally by contractors. Included in the first category were lumber, millwork, boilers, furnaces, and equipment for kitchens and laundries. Hospital equipment was in the second category; sheet metal, structural steel, plumbing and electrical supplies, and hardware were in the third. An investigation ordered by Groves in February indicated which items were critically short and some of the reasons why. "With regard to lumber and millwork," the investigator stated, "the shortages are not critical at the present time, unless the contractor has delayed placing his orders through the Procurement and Expediting Branch until he has run out of these materials." The same was true of furnaces and boilers. The scarcity of kitchen equipment was nothing more than a lack of luxury items, such as puree mixers and potato peelers; all stations had received essential items, such as refrigerators and stoves. The demand for laundry equipment had exceeded production, but deliveries were gradually coming through. The supply of hospital equipment was gravely inadequate. The Surgeon General had promised to report on the situation but so far had not done so. Among items procured by contractors, serious shortages existed in structural steel, plumbing supplies, and electrical equipment. The report did not comment on reasons for these troubles.[57]

Contractors were feeling the effects of the priorities system. Established during the summer of 1940, this system was administered by NDAC until January 1941, when the newly established OPM took it over. The two agencies' procedures were essentially the same. Both established a Critical List of materials. ANMB issued priority ratings applicable to items on these lists. Preference ratings, issued by purchasing officers whose projects had priorities, governed the sequence in which suppliers filled orders. Although ANMB had considerable freedom of action, NDAC and OPM had final say on major questions of policy. From the beginning, military construction jobs rated low priorities, so low, in fact, as to be practically meaningless. Because some key construction commodities, such as lumber, were not on the Critical List, and because shortages of listed items, such as steel, did not become acute until late 1940, camp contractors for a time were able to get along without priority assistance. But by early 1941 they were calling for help. Efforts during February to obtain higher priorities for camps met with little success. The best OPM would do was to grant an A–1–j priority, the same rating assigned to naval vessels scheduled for completion in several years.[58] Recalling OPM's action, Groves denounced "the viciousness of the priority system, particularly with respect to the tremendous

[56] Ltr, Nathan Wohlfeld, Galveston, Tex., to CQM Cp Wallace, 7 Mar 41. 600.914 (Cp Wallace).

[57] Memo, Opns Br Tempo Housing Sec for Hastings, 24 Feb 41. Opns Br Files, Proj Behind Schedule.

[58] (1) Smith, *The Army and Economic Mobilization*, pp. 507ff. (2) CPA, *Industrial Mobilization for War*, pp. 68, 91–92, 96. (3) Memo, Hastings for Wilson, 14 Feb 41. 411.5 I. (4) Ltr, OPM to ANMB, 21 Feb 41. 400.31 (Philippine Dept).

disadvantages under which military construction had to operate."[59] To improve the situation would require a long, hard fight.

Major Wilson in P&E gave the projects what help he could. He kept delivery schedules for centrally procured items under constant review and channeled shipments to neediest sites. In January he created an expediting unit to investigate each shortage reported from the field and to try to find a cure. In February he established closer ties with the projects by placing a supply officer in each of the nine zones. Throughout the early months of 1941 he exerted steady pressure upon vendors to speed deliveries. Wilson achieved a better distribution of building supplies, but there was little or nothing he could do toward solving basic problems of production and priorities. As long as demand exceeded output and Quartermaster projects had no prior claim upon supplies, some contractors had to wait.[60] Not until the program neared completion did the percentage of projects delayed for want of materials and equipment show a marked decline. On 4 April Groves reported, "All requirements for critical items have been met by actual delivery, but minor articles cannot be delivered from the factories on time."[61] As late as 2 May orders for kitchen, heating, and hospital equipment and for structural steel and plumbing fixtures were still outstanding.[62]

Shortages of skilled labor also ranked high among delaying factors. Thirteen percent of the projects needed additional craftsmen on 25 January. The figure stood at 11 percent on 7 February and at 10 percent two weeks later.[63] Among the trades most often listed as critical were plumbers, steamfitters, electricians, rod setters, and sheet metal workers. Although the Construction Division occasionally tried to alleviate these shortages by raising wage rates or authorizing overtime, it did so only in extreme cases. For the most part it left the problem to contractors and the unions. While reminding contractors "that full responsibility for the employment and management of labor"[64] rested with them, the division notified the unions that they "must accept some responsibility for endeavoring to man these jobs."[65]

Although they willingly took up the challenge, the unions were unable to satisfy demands for skilled workmen. Appraising their effort, one contractor said: "We have been trying to get additional men through the local unions. We get a few each day, but almost the same number leave the job."[66] Another reported that requests for 325 plumbers and steamfitters had brought only 172 workmen to his project. A third protested that the union had certified 19 men as rod setters, although only 4 had any

[59] Groves Comments, V, 6.

[60] (1) Memos, Wilson for Groves, 27 Feb, 1 Mar 41. Opns Br Files, Proj Behind Schedule. (2) Memo, Somervell for Nelson, 14 Jan 41. 411.1 II. (3) Ltr, Constr Div to ZCQM 6, 26 Mar 41. QM 337 (ZCQM 6) 1941. (4) Groves Comments, V, 5–6.

[61] Min, Constr Div Staff Mtg, 4 Apr 41. EHD Files.

[62] Min, Constr Div Staff Mtg, 2 May 41. EHD Files.

[63] (1) Memo, Robinson for Somervell, 5 Feb 41. Opns Br Files, Proj Behind Schedule. (2) Memos, Robinson for Somervell, 18 Feb, 5 Mar 41. Opns Br Files, Delays.

[64] Memo, Labor Rel Sec for Chief Admin Br Constr Div, 13 Mar 41. OCE Rec Retirement, Labor Rel.

[65] Tel Conv, Mitchell, Labor Rel Sec, and Lt Fuller, Atlanta, Ga., 13 Mar 41. OCE Legal Div Labor Rel Br Files, Lawson Gen Hospital.

[66] Ltr, Nathan Wohlfeld, Galveston, Tex., to CQM Cp Wallace, 7 Mar 41. 600.914 (Cp Wallace).

experience in that trade.[67] Project after project echoed these complaints. Against the nationwide shortage the combined efforts of contractors and unions were of little avail. The program suffered throughout from a scarcity of skilled mechanics.

Strikes also had adverse effects. Between 17 March and 30 June 1941, the earliest period for which full information was available, twenty-two strikes occurred at troop projects. Twelve of these walkouts involved jurisdictional disputes and protests of various sorts; they accounted for a total of 366 man-days lost. The other ten, all involving wage disputes, accounted for a total of 9,230 man-days lost. Man-days lost because of strikes were only a tiny fraction of total man-days at the projects.[68] Nevertheless, effects of work stoppages could not be measured solely by time lost. The report on a 2-day strike at Camp Davis early in March was revealing:

> Job operations were proceeding at full speed before the strike, and a high point of efficiency of operations had been reached. The strike killed the momentum of operations, and efficiency had to be developed again through weeks of hard effort. The loss has been figured by comparison of percentages of progress during month of February with percentages of progress through month of March. That comparison shows that 7 percent of progress was lost during March.[69]

Production suffered less from strikes than from union restrictions on output and resistance to timesaving methods and machines. Union rules designed to spread work and maintain traditional methods were in force at many projects. Bricklayers continued their normal practices of using only one hand and of beginning a new course only when the preceding course was complete. Plumbers refused to install made-to-order pipe, insisting that they do cutting and threading by hand at the site. Painters opposed use of spray guns; cement workers, use of finishing machines. Several crafts demanded that skilled men perform unskilled tasks. Although the Construction Division occasionally succeeded in having working rules suspended, restrictive practices continued to prevail.[70]

Belated and oft-changed plans presented an added handicap to constructors. According to the Fuller Company, tardy deliveries of specifications and layouts hindered the project at Fort Monmouth, New Jersey, from start to finish. Long-Manhattan-Watson gave "inadequate or delayed plans" as one reason for high costs and slow progress at Riley. Almost three months after work began at Devens, Coleman Brothers Corporation and John Bowen Company were still awaiting designs for several buildings.[71] Plans con-

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[67] (1) Ltr, CQM Ft Meade to Groves, 21 Feb 41. OCE Legal Div Labor Rel Br Files, Ft Geo. G. Meade. (2) Ltr, OZCQM 7 to OQMG, 19 Mar 41. OCE Legal Div Labor Rel Br Files, Ft L. Wood.

[68] (1) OCE Legal Div Labor Rel Files, Work Stoppage Rpts, March 1941–45. (2) Brig. Gen. Brehon B. Somervell, "The Temporary Emergency Construction Program," *The Constructor*, July 1941, p. 108.

[69] Rpt, Constr Div, OQMG, 1941, sub: Analysis of Costs, Cp Davis. Opns Br Files, Cost Analysis of Bldgs.

[70] (1) Memo, Hastings for Groves, 24 Mar 41. QM 333.1 Mar–Apr 1941. (2) Memo, Labor Rel Sec Admin Br for Groves, 19 Apr 41. QM 600.1 (Labor) (Gen). (3) 600.1 (Labor) for: Ft Custer, Ft Devens, Cp Forrest, Indiantown Gap, Ft Monmouth, Ft. Riley, Cp Roberts, Stark Gen Hosp, and Ft L. Wood. (4) Labor Rel Br Files for: Cp Barkeley, Ft Belvoir, and Cp Edwards.

[71] (1) Ltr, George A. Fuller Co. to H Comm on Mil Affs, 16 Jun 41. (2) Ltr, Long-Manhattan-Watson to H Comm on Mil Affs, 31 May 41. Both in Opns Br Files, Loose Papers. (3) Ltr, Coleman Bros. and Bowen Co. to Somervell, 8 Jan 41. 600.914 (Ft Devens) Part 1.

tractors had received were under constant revision. So great was the confusion at Camp Leonard Wood, where plans were changing "all the time," that the exasperated architect-engineer predicted completion of the project "within about five years."[72] So frequent were changes in the layout at San Luis Obispo that the contractor "actually considered constructing the buildings on skids so that their location could be changed without delaying the work."[73] The difficulties increased in the weeks that followed. Interference by troop commanders grew as the time neared for occupying camps. Demands for cheaper designs intensified as the deficit rose. The Engineering Branch, unable to cope with a mounting backlog of requests for new plans, fell further behind in its work.[74]

Most disconcerting to contractors was military control of building schedules. By January the old scheme of final completion dates had all but disappeared. In its place was a system of "priority schedules" calling for completion in successive stages. The contractor who had originally agreed to turn over a finished camp on a given date now had to turn over housing for a few units at a time. At Camp Roberts, for example, instructions to be ready for 178 men on 1 January, 2,882 on 15 February, 7,893 on 15 March, and 5,179 on 15 June superseded the completion date of 15 March.[75] Priorities reflected induction dates. When a commander determined the size, composition, and arrival dates of various units and designated the buildings each unit would occupy, he imposed a construction schedule on the contractor. Each time the commander changed his plans, he compelled the contractor to do likewise. Builders disliked this system because it denied them "the leeway that a contractor should have in order to prosecute and expedite a job placed under his care."[76] Contractors were not the only critics. "One item that has cost millions of dollars," Captain Renshaw told Groves, "has been the shifting of construction forces from area to area to meet the changing requirements of Commanding Officers." Citing the case of a contractor ordered to rip equipment out of one group of barracks and install it in another group at the opposite end of the camp, Renshaw commented, "The change in flow of materials . . . created a confusion just as great as if the Ford Manufacturing Company tried to finish the last car on the production line first."[77]

Illustrative of the workings of the priorities system were events at Camp Meade, Maryland. Late in September, when Hartman awarded Consolidated Engineering of Baltimore a fixed-fee contract for a cantonment for the 29th Division, he assigned the project a completion date of 6 January 1941. Work began on 9 October. Adhering to orthodox methods, Consolidated divided the job into seven areas; appointed superintendents, foremen, and pushers for each area; and scheduled the work so that

[72] Tel Conv, Maj Reed and Maj Townes, 27 Jan 41. 632 (Ft L. Wood).

[73] Compl Rpt, Cp San Luis Obispo, 26 Mar 42, p. 8.

[74] Min, Constr Div Staff Mtg, 28 Feb 41. Opns Br Files, Staff Mtgs–1941.

[75] Tel Conv, Groves and Capt J. T. Smoody, CQM Nacimiento, Calif., 17 Dec 40. Opns Br Files, Cp Roberts.

[76] Ltr, Nathan Wohlfeld, Galveston, Tex., to CQM Cp Wallace, 7 Mar 41. 600.914 (Cp Wallace).

[77] Memo, Renshaw for Groves, 8 Mar 41. Opns Br Files, Economy.

crews of excavators, foundation workers, carpenters, and so forth, would follow one another "in proper sequence and in proper rotation" from area to area. Since all of the seven areas would reach completion within a short time of one another, this arrangement was consistent with the principle of final completion dates. The contractor ran the job along these lines for three weeks. Then, relaying orders from the General Staff, Hartman on 31 October asked Consolidated to finish buildings for two battalions of tank and antitank troops by 11 November. In an effort to meet this date, the contractor pulled men off jobs in other parts of the camp and worked twenty-four hours a day, seven days a week. No sooner were these buildings completed than Hartman forwarded a second rush order, this one for facilities for the 30th Ordnance Company. These directives were the first of twenty-five or thirty priority orders—some originating with the General Staff, some with the corps area commander, and some with the commanding general of the 29th Division—which disrupted Consolidated's plans.[78]

Noteworthy among the Meade priorities was one established late in November by the General Staff. Issued shortly after the new corps area commander, Maj. Gen. Walter S. Grant, had predicted that the camp would not reach completion before March, this order stipulated that housing for 12,000 men, the peace strength of the 29th Division, would have to be ready by 8 January. When he got this order, the contractor hurriedly reorganized the job, concentrating his forces in half the building areas and discontinuing work in the other half.[79] This approach, though sound from the constructor's point of view, was militarily undesirable. Around 15 December, Maj. Gen. Milton A. Reckord, the commander of the 29th, asked that construction "be so arranged that each regiment could go into its own area when it arrived from home station."[80] General Grant made a similar request.[81] Agreeing that the commanders were "entirely justified for use considerations," Groves issued the necessary instructions. The contractor reorganized the job again. Part of the construction force moved back to locations deserted a few weeks earlier, abandoning partially finished buildings and starting new ones. Work now focused on half the buildings in all the areas rather than on all the buildings in half the areas. With these changes, hopes of meeting the 8 January date collapsed. A few days after Christmas, Groves pushed the deadline back to 3 February.[82]

Throughout January the contractor worked furiously. The project again adopted a 7-day week. No effort was spared. On the 23d, the project received a severe blow—the project engineer, the spark plug of the job, died in an automobile accident. By the first of February

[78] (1) WDGS, Constr Hist at Major Stations, U.S. Army, 1940–41, pp. 16–17. G–4/32439. (2) Memo, Peterson for Marshall, 16 Nov 40. G–4/30062–47. (3) Testimony of John A. Stalfort, President, Consolidated Engrg Co., 29 Apr 41. In Truman Comm *Hearings*, Part 2, pp. 495–96.

[79] Testimony of John A. Stalfort, Maj Gen Milton A. Reckord, Col Henry L. Flynn, Third Corps Area, and W. C. Roberts, Proj Engr, Ft Meade, Md., 29 and 30 Apr and 5 May 1941. In Truman Comm *Hearings*, Part 2, pp. 466, 496, 542, 564, 574.

[80] Gen Reckord's Testimony, 5 May 41. In Truman Comm *Hearings*, Part 2, p. 574.

[81] Ltr, CQM Ft Meade to OQMG, 30 Dec 40. 600.1 (Ft Meade) (Labor) I.

[82] (1) Groves Comments, V, 8. (2) Testimony of W. C. Roberts, John A. Stalfort, and Gen Grant, 29 Apr, 5 May 41. In Truman Comm *Hearings*, Part 2, pp. 467, 496–97, 578.

considerable work remained on the artillery area and the station hospital. Inducted on 3 February the men of the 29th Division remained at home stations for fifteen days, instead of the usual ten. Not until there was steam in the hospital boiler did General Reckord order his men into camp. Meade was completed some months later at a cost of more than $21 million. Among factors affecting its cost and progress were the site, the layout, bad weather, labor troubles, and the loss of the project engineer. Nevertheless, both the architect-engineer and the Constructing Quartermaster placed particular emphasis on priority scheduling.[83] Reviewing his experience at the project, W. C. Roberts of the Greiner Company offered the Army this advice:

> In order to hold a contractor for the economy in that particular respect [building construction], he should be allowed to build his cantonment without interruption during the construction period. In other words, he should be held responsible for finishing all of his buildings in the whole camp by just one date, and he shouldn't, to obtain that ultimate economy, be held responsible for finishing various portions of the regimental areas prior to the general completion of the whole camp.[84]

In view of the military situation, such a procedure would, of course, have been impossible.

Despite heroic efforts by contractors, the program made faltering progress. Again and again Somervell had to play for time. The Surgeon General eased the pinch by extending hospital deadlines and G–3 relaxed the schedules for occupying replacement centers. But the Guard camps posed a tougher problem. Late in 1940 the General Staff had agreed to call no Guard units until Colonel Groves had set dates for housing them. But calls to the Guard had to go out forty days in advance. With the uncertainty of winter operations, no one could possibly predict so far ahead how much construction would be in place on a given date. Groves wrung a small concession from G–3, a promise to hold newly inducted Guardsmen at home stations for fourteen days instead of the usual ten. But two weeks' grace on construction deadlines was seldom enough. Time after time the General Staff had to cancel orders calling units to active duty. Each cancellation further disrupted mobilization and inconvenienced Guardsmen waiting to begin their training.[85]

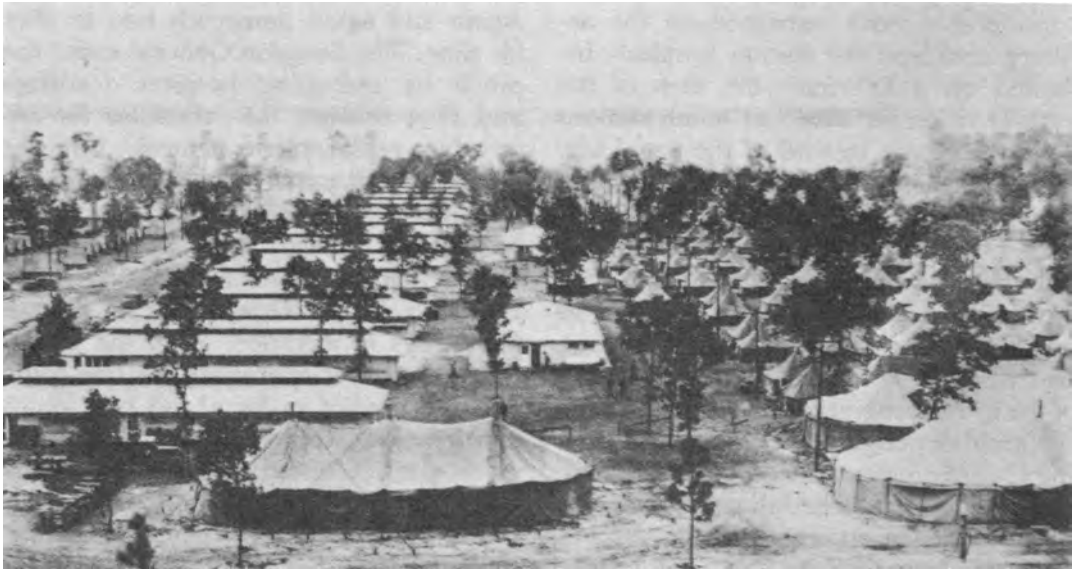
The plight of the Guardsmen attracted wide notice. These men had arranged their affairs with the original dates in mind. Some had resigned from their jobs. Others had trained substitutes to do their work. Lawyers and physicians had turned their practices over to civilian colleagues. Households had been broken up, homes sublet, and dependents provided for. Postponements worked appreciable hardship on the men and their families. Guard

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[83] (1) Ltr, Consolidated Engrg Co., Inc., to H Comm on Mil Affairs, Sp Comm 2, 29 May 41. Opns Br Files, Ft Meade. (2) Testimony of W. C. Roberts, Col H. L. Flynn, Gen Reckord, and Maj Noxon, 29 Apr, 5 May 1941. In Truman Comm *Hearings*, Part 2, pp. 456, 566–67, 575, 530. (3) Reckord Interv, 25 Nov 58. (4) Truman Comm Rpt 480, Part 2, p. 42, app. X.

[84] Roberts' Testimony, 29 Apr 41. In Truman Comm *Hearings*, Part 2, p. 465.

[85] (1) Memo, Hastings for Groves, 26 Feb 41. Opns Br Files,Grnd Tp Sec. (2) Data prepared in Constr Div OQMG, 1 Mar 41, Projs to Be Watched. Opns Br Files, Data for Hearings on Deficiency Bill, 1941. (3) Memo, SGO for G–4, 14 Feb 41. G–4/29135–9. (4) DS, G–4 to TAG, 29 Jan 41. G–4/31981 Sec 11. (5) G–4/31948. (6) WD Ltr AG 680.1 (1–21–41) M–C to CG Sixth Corps Area, 25 Jan 41. 325.37 Part 1.



CAMP BLANDING, FLORIDA, LATE NOVEMBER 1940

officers, public officials, and others protested the delay. Some advocated calling the men immediately and quartering them in public buildings until camps were ready.[86] In the face of mounting pressure for early inductions Assistant Secretary Patterson stated, "I have resolved that, unless the international situation becomes acutely critical, I shall postpone induction of National Guard units until the War Department is prepared to safeguard the health and well-being of the members of such units through the provision of adequate shelter and sanitary facilities."[87] Despite Patterson's determined stand, agitation served to hasten the calling of the Guard.

A number of camps were occupied prematurely. Units went to unfinished projects, where discomfort awaited them. At Shelby troops quartered in undrained areas had to wade through water to get to their tents. At Barkeley there were not enough latrines. At Blanding the men of the 31st Division underwent a painful ordeal.[88] Representative Joe Starnes, an officer of this division, gave a firsthand account of conditions at the Florida camp: "A regiment of 1,815 men was moved in with not a single kitchen, latrine, or bathhouse available. This occurred in December in a pouring rain and conditions were such that it was impossible to use the straddle latrine. Only the grace of Almighty God prevented an epidemic."[89]

[86] (1) Telg, Sen Ernest W. Gibson (Vt.) to Stimson, 7 Dec 40. G-4/31948. (2) Tel Conv, CG Ninth Corps Area and Reybold, 8 Jan 41. G-4/31948.

[87] Ltr, Patterson to Governor Culbert L. Olson, Sacramento, Calif., (9 Jan 41). G-4/31735 Sec 3.

[88] (1) Tel Conv, Frink, Groves, and Somervell, 16 Dec 40. Opns Br Files, Cp Shelby. (2) Min, Constr Div Staff Mtg, 21 Feb 41. EHD Files. (3) Ltr, Rep Joe Starnes to Frink, 7 Jan 41. 632 (LaGarde Gen Hosp) I.

[89] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on Military Establishment Appropriation Bill for 1942*, Apr–May 41, p. 118.

Elsewhere epidemics did occur. Flu struck Fort Lewis early in December. From there it traveled down the Pacific Coast, across the Southern States, and up the east coast to New England. At many camps there were also outbreaks of measles. At one point San Luis Obispo reported 970 sick out of a total population of 11,500. At Lewis the sick rate for a time was more than 11 percent. Fortunately, the Army was prepared, having learned that flu epidemics go hand in hand with troop mobilizations and that newly inducted men who have not acquired immunity almost always come down with measles. Hospital beds were waiting for most of the sick. At camps where the number of cases exceeded expectations, barracks had to serve as wards.[90]

The presence of troops hindered construction. Military traffic clogged roads to building sites, blocking the flow of supplies. Commanders drew labor from important jobs to make quarters more comfortable. Soldiers pilfered construction materials and wrecked expensive equipment. Workmen, arriving in the morning to find that their supplies had vanished during the night, waited in enforced idleness until replacements came in over congested roads. Under such circumstances disputes were bound to occur. The Constructing Quartermaster at Bowie had a hard time stopping troops from carrying off black top to pave their company areas. Men of the 37th Division became unruly when the CQM at Shelby tried to stop them from stealing five truckloads of materials. When soldiers altered unfinished buildings, this same CQM quarreled so bitterly with the division commander that Groves sent Captain Sciple to restore peace. Fresh arrivals usually brought fresh troubles. Colonel Styer tried to forestall shipment of troops to half-completed camps—but without much success.[91]

Once begun, movement of troops to construction projects continued. Between 23 December and 5 March nine National Guard divisions entered federal service. The strength of the Army increased by about 100,000 during January, by about 150,000 during February, and by nearly 200,000 during March. By 1 April it had passed the 1-million mark.[92] Meanwhile, construction went forward. In the midst of huge concentrations of troops builders pushed toward completion.

The coming of spring enabled contractors to make a better showing. The number of projects on or ahead of schedule rose steadily. A few camps continued to lag but nevertheless met their troop arrival dates.[93] On 15 April 1941 Secretary Stimson declared: "The status of our construction is in such an advanced

[90] (1) Notes of Conf, ODCofS, 10 Dec 40. OCS, Notes on Confs, Sep 26, 1940—. (2) Ltr, Dunn and Hodgson to CQM Ft McClellan, 1 Feb 41. 652 (Ft McClellan) II. (3) Memo, Peterson for Marshall, 30 Apr 41. QM 333.1 (San Luis Obispo) 1941. (4) Notes, Conf of ZCQM's, OQMG, 7–10 Apr 41, pp. 81–82. EHD Files.

[91] (1) Memo, Peterson for Marshall, 10 Dec 40. Opns Br Files, Rpts of Insp. (2) TWX, CG Eighth Corps Area to TAG, 13 Dec 40. 652 (Cp Hulen) III. (3) Ltr, CQM Ft McClellan to TQMG, 2 Feb 41. 652 (Ft McClellan) II. (4) Insp Rpt, Kirkpatrick for Gregory, 4 Apr 41. QM 333.1 (Cp Bowie) 1940. (5) Tel Conv, Capt Shepherd and Col Green, 17 Jan 41. (6) Memo, Sciple for Groves, 19 Jan 41. Last two in Opns Br Files, Cp Shelby. (7) Memo, Styer for Moore, 24 Jan 41. Opns Br Files, Ft L. Wood.

[92] *Report of the Secretary of War . . . 1941*, app., Chart 9, and app. B, Chart C.

[93] (1) Rpt, Activities of Constr Div, Jul 40–Jul 41, p. 6. (2) Memo, Hastings for Robinson, 15 Apr 41. Opns Br Files, Proj Behind Schedule. (3) Min, Constr Div Staff Mtgs, 21 Mar, 2 May 41. EHD Files.



MEN OF THE 29TH DIVISION AT CAMP MEADE, MARYLAND, *May 1941.*

condition that we can confidently assure the country that all of the remaining men in our proposed military program will find their quarters awaiting them ready and completed for their occupancy." On the 22d General Marshall stated, "We have gotten over the hump."[94] Two days later Somervell announced, "The new Army is housed."[95] Remaining work went smoothly. Contractors made a fine record at replacement training centers, finishing all but one by mid-May. Of the 760 buildings that comprised the nine general hospitals, 665 were ready for occupancy in June. By the end of the fiscal year the program had met its goals.[96]

The time and cost estimates made by the General Staff in the summer of 1940 had proved to be grossly erroneous. Inability of construction forces to meet impossible deadlines had made necessary substantial changes in plans for expanding the Army. Induction of Guardsmen and selectees for the Protective Mobilization Force was not complete until two to three months after the time originally set. (*Charts 9 and 10*) The program had cost about double the figure initially given to Congress. Referring to the original camp completion dates, General Hastings later said:

> In the general concept of the time required to prepare, I don't think General Staff, or Congress, or the President himself realized the amount of time it takes to do things—to create the supplies, to build your facilities. They thought . . . , "A million men will spring into arms overnight." Months go into years to do these things. They always have and they always will.[97]

Commenting on the time and money that went into construction, General Cham-

[94] Truman Comm *Hearings*, Part 1, pp. 7, 169.

[95] WD Press Release, 24 Apr 41, sub: The Army Is Housed. Opns Br Files, Cp Blanding Investigation and Misc.

[96] (1) Min, Constr Div Staff Mtg, 23 May 41. EHD Files. (2) Patterson's Testimony, 15 Jul 41. In Truman Comm *Hearings*, Part 6, p. 1530.

[97] Verbatim Rpt, Meeting with Gregory and Hastings.



BARNES GENERAL HOSPITAL, VANCOUVER, WASHINGTON

berlin stated:

> Actually a phenomenal standard was set, one in which all Americans can glory. As far as wasting a few dollars was concerned, the construction effort cannot hold a candle to lease-lend, the Marshall Plan, or the Military Assistance Program. Had it not been for the courageous performance of those in charge of the War Department in the emergency, we might well have been defeated, and how then would the expenditure of a few millions have loomed in the long-range picture.[98]

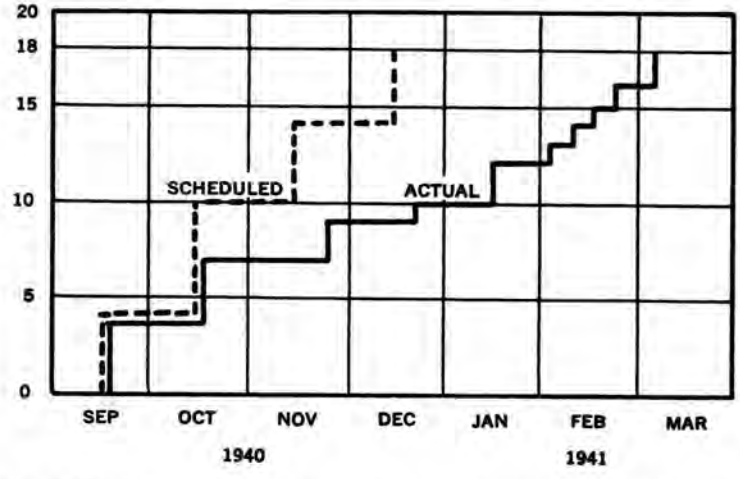
At the conclusion of the program, the Quartermaster Corps received congratulations. "Taken as a whole," Patterson said, "the job was well and speedily accomplished."[99] Secretary Stimson stated, "I think I am speaking in measured language when I say that in no country in the world, including our own, has its military forces ever before been provided for in so brief a time and upon so adequate a scale."[100] Speaking before the House of Representatives, Congressman John W. McCormack declared, "The record of accomplishment during the six months that the present construction program has been in force is astounding in comparison with that of the 18 months of the World War period which has always been pointed to as

[98] Ltr, Gen Chamberlin to EHD, 29 Dec 55. EHD Files.

[99] 15 Jul 41. In Truman Comm *Hearings*, Part 6, p. 1531.

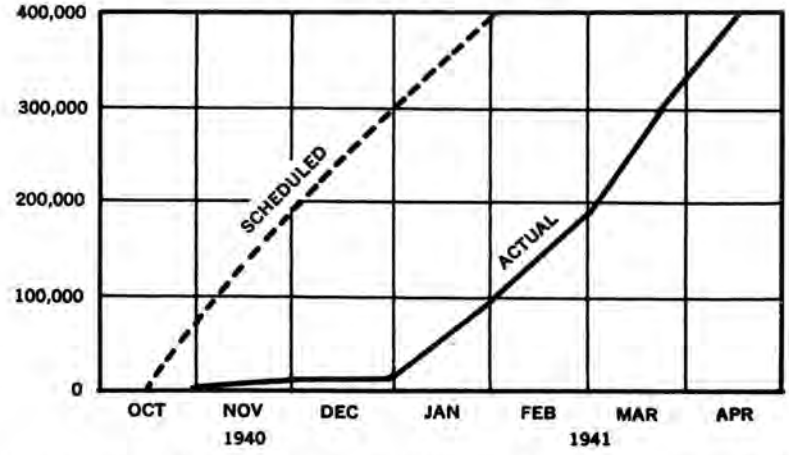
[100] 15 Apr 41. In Truman Comm *Hearings*, Part 1, p. 7.

Chart 9—Rate of National Guard Inductions
Scheduled and Actual



Source: (1) Incl w/WD Ltr AG 325 (7-22-40) M-C-M, 30 Jul 40, sub: Induction of certain NG Units into the Federal Service. G-4/31948.R. (2) Memo, G-3 WD for C/S, 14 Aug 40, sub: Determination of addn costs for F.Y. 1941 . . . . G-4/31453-18. (3) Incls w/Ltr BOWD to Chiefs of Estimating Agencies, 26 Aug 40, sub: Determination of addn costs for F.Y. 1941 . . . . Nat Arch AG 111 9-24-38 (1) Sec. 3. (4) *The Army Almanac*, 1950, pp. 528-44.

Chart 10—Rate of Selective Service Inductions
Scheduled and Actual



Source: (1) Memo, G-3 for CofS, 14 Aug 40, sub: Determination of addn costs for F.Y. 1941 . . . . G-4/31453-18. (2) ASF, Mil Pers Div, *The Procurement of Military Personnel, 1 Sep 1939 to 1 Sep 1945*, Vol. II, p. 415.

bordering on the miraculous."[101] Praise was by no means universal. Nevertheless, the Construction Division could take pride in its achievement.

Closing Out Contracts

As troops began moving into camp, Somervell decided to get fixed-fee contractors off the jobs as soon as possible. To be sure, much work remained. Construction of chapels, theaters, field houses, and two or three other "extras" awaited funds. At many projects, painting, screening, paving, and cleanup operations awaited warm weather. At several camps, large-scale undertakings were in the planning phase. There were strong arguments in favor of letting contractors finish the camps—their familiarity with the sites, their proved capability, and their seasoned organizations—but economy indicated another course. Overhead on fixed-fee work was averaging about 5.6 percent as compared with 4.4 percent on lump sum and purchase and hire.[102] Part of this difference was no doubt due to the higher cost of administering fixed-fee contracts; part, to the higher price of first-rate management. Not only was overhead higher on fixed-fee jobs, but, many believed, construction itself cost more. With speed no longer a pressing concern, emergency contracts seemed unnecessary. On 1 March 1941 Somervell sent orders to the field: "It is essential that construction projects which are nearing completion be *promptly terminated at the earliest practicable date.*" Minor construction needed to complete the camps would be done by lump sum contract or by purchase and hire.[103]

As big construction jobs generally do, the fixed-fee projects tended to drag on. At camps nearing completion, Somervell noted an inclination on the part of CQM's, contractors, and architect-engineers "to continue their organizations at greater strength than necessary in anticipation of the assignment of additional work."[104] "You could almost say it is a universal tendency," Groves observed. "I think it is a human trait."[105] Styer foresaw difficulty in terminating contracts "as long as there is any prospect of additional work because the architect-engineer, the contractor, and the CQM will all want to hold their organizations together."[106] With the aim of shutting off fixed-fee operations as soon as the main job was over, Somervell notified the field: "Neither rumors, requests by troop commanders for additional work, nor knowledge of future work still under consideration by the Washington office are any justification for delaying the prompt termination of existing contracts."[107] Going a step further, he adopted a system of cutoff dates. When authorized work was substantially complete, or when contractors reached convenient stopping points, CQM's would issue letters of acceptance or stop orders to the contractors, giving them so much time to wind up operations.[108] On learn-

[101] 87 *Cong. Rec.* 2899.

[102] Memo, Cost Unit Opns Br for Groves, 1 Feb 41, and Incl. Opns Br Files, Constr Costs and Authorizations.

[103] OQMG Constr Div Ltr 123, 1 Mar 41. EHD Files.

[104] *Ibid.*

[105] Min, Conf of ZCQM's, 7–10 Apr 41, p. 90. EHD Files.

[106] Memo, Styer for Rcd, 18 Feb 41. Opns Br Files, Insp Rpts.

[107] OQMG Constr Div Ltr 123.

[108] OQMG Constr Div Ltr 182, 29 Mar 41. EHD Files.

ing that Somervell intended "to really have a cutoff date at each one of these jobs," Harrison telephoned Groves: "That is the only way to handle it." Groves agreed. "I learned that years ago," he said, "after going to Boulder Dam and seeing that after three years the payroll was still 1500 men."[109]

Closing out fixed-fee jobs went more slowly than Somervell had hoped. At 45 camp and general hospital projects nearing completion in March 1941, there were 85 fixed-fee architect-engineer and construction contracts. By 15 April all but seven of these contracts were still on the books.[110] Efforts to expedite the setting of cutoff dates intensified. In mid-April Somervell notified the zones: "I, of course, do not want the jobs closed out prematurely, but I do want them stopped as soon as you have reached a logical stopping place."[111] Early in May, when the number of closed-out contracts totaled twenty, he asked Groves to bear down on the field.[112] Groves put more pressure on the CQM's and told contractors frankly, "We just have to get you boys off our payrolls."[113] Knowing that many of the firms would soon be taking on new projects, he encouraged them to hold their organizations together, but not at the government's expense. He suggested instead a few weeks' vacation. The closing out operation gathered speed. Eighteen contracts ended in May; twenty-four, in June; and eleven, in July. By late August fixed-fee contracts were still in force at only four projects. At Aberdeen, Polk, and Knox, the Army extended the original contracts to cover major additions. At San Luis Obispo the contractor stayed on to build a $3-million water supply system—a dam across the Salinas River, a pumping station, a mile-long tunnel, and a 12-mile pipeline to bring water through the mountains.[114]

To shut down projects and terminate contracts was no simple undertaking. There were many details involved: transferring police forces, fire departments, and maintenance crews to post jurisdiction; disposing of surplus materials, salvaging scrap, and clearing away debris; recapturing or releasing rented equipment; completing paperwork, bringing audits up to date, and clearing records of pending items such as unclaimed wages and unpaid bills; and lastly, reaching final settlements with contractors. While some of these were routine tasks, others proved troublesome. Recurring false reports of buried nails and burned lumber needed refutation. Contractors' complaints that delays in the government's audit were preventing them from closing their books needed looking into.[115] Major problems arose in con-

[109] Tel Conv, Harrison and Groves, 5 Mar 41. Opns Br Files, Equip 1.

[110] Rpt, Hastings for Leavey, 23 Jun 41. OCE Legal Div Files, Contract Progress.

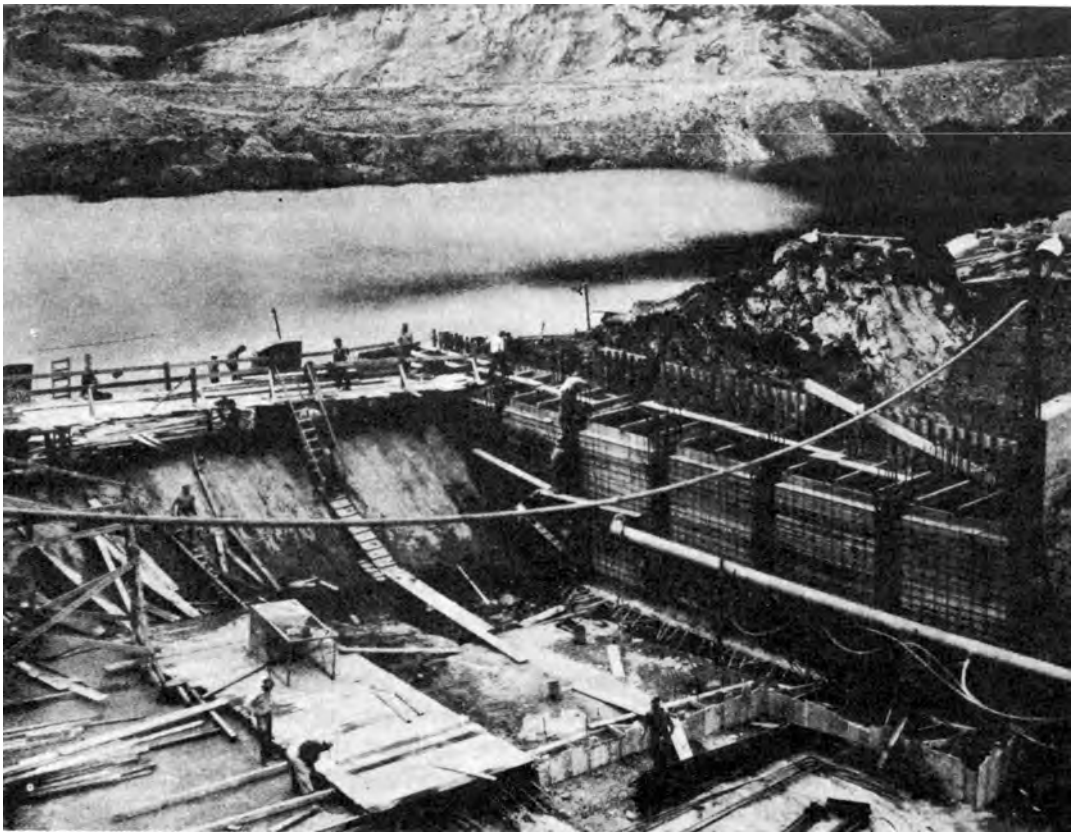
[111] Ltr, Somervell to ZCQM's, 15 Apr 41. 600.1 (ZCQM 1) (Labor).

[112] Min, Constr Div Staff Mtg, 9 May 41. EHD Files.

[113] Tel Conv, Groves and Wyatt C. Hedrick, Fort Worth, Tex., 7 Jun 41. Opns Br Files, A–E's.

[114] (1) Min, Conf of ZCQM's, 7–10 Apr 41, p. 91. EHD Files. (2) Rpt, Hastings for Leavey, 19 Aug 41. OCE Legal Div Files, Contract Progress. (3) OCE Legal Div Files, Aberdeen Pr Grnd. (4) QM 652 for: Cp Polk and Ft Knox. (5) Compl Rpt, Cp San Luis Obispo–Salinas River Proj, p. 14B.

[115] (1) Opns Br Files, Questions and Answers, Truman Comm. (2) Memo, Unit B Temp Housing Sec Opns Br for Hastings, 31 Mar 41. Opns Br Files, Delays. (3) Ltr, T. A. Loving and Co. to CQM Ft Bragg, 10 Jul 41. 652 (Ft Bragg) VI. (4) Min of Conf, OZCQM 7, 16 Sep 41. 652 (Ft L. Wood) Part 2.



SPILLWAY UNDER CONSTRUCTION AT DAM SITE, CAMP SAN LUIS OBISPO
March 1941.

nection with recapturing equipment and settling contractors' claims.

Under its agreements with fixed-fee contractors and third-party renters, the government could recapture leased equipment when projects reached completion. As the program neared its end, the question arose—how much equipment to capture. The nationwide shortage was still critical, and the recently approved lend-lease program promised to make it even worse. The Army needed large fleets of equipment to maintain newly built installations and to equip Engineer construction units. WPA and CCC, both heavily engaged in defense work, were short of trucks and machinery. Here was an opportunity not only to get the needed items but to get them cheap. After consulting the Engineers, WPA, and CCC, Somervell outlined a recapture policy. Generally, he would take only late models which were in good repair and in which the government's equity was 60 percent or more. He would capture no item until one of the interested agencies had spoken for it. The zones would co-ordinate the effort, serving as clearinghouses for re-

quests and lists of items available, refereeing disputes among government agencies, and overseeing transfer of titles and funds.[116]

Unlooked-for complications soon developed. Many pieces of equipment desired by the government were heavily mortgaged and, thus, subject to prior liens. Some rental agreements contained loopholes which enabled the equipment to escape. Some valuations were so inflated that recapture was out of the question. These were relatively simple matters. The big headache was with the owners. When they learned that their equipment would be captured, many complained. Some pleaded hardship, maintaining that the loss of their equipment would force them out of business. Others, outraged and indignant, quoted promises they had received from Quartermaster officers that the recapture clause would be inoperative. Congressmen and AGC officials backed the owners' protests. Nevertheless, Somervell refused to yield, taking the position that a contract was a contract and the owners ought to have known that when they signed.[117]

Recapture went forward. By 1 June 1941, the Army had taken over 44,554 items of equipment valued at $12,890,097. By the spring of 1942 the total value of captured items had climbed to $30 million; by fall, to $70 million. The Army put this equipment to good use in construction and training and eventually shipped the bulk of it overseas for use by troops in theaters of operations.[118] "This actually saved the Army a tremendous amount of money," said Groves, "and enabled it to have equipment which it otherwise could not have obtained even by throwing a tremendous additional burden on the manufacturers of construction equipment."[119]

Even more challenging than the problems of recapture were those of final settlement with fixed-fee contractors. As the program neared an end, claims piled up rapidly. Contractors found many reasons for asking higher fees. Their projects had cost far more than the estimates on which their fees were based. They had done much work not covered by the original contracts and had remained on the jobs long past the original completion dates. Many had paid out sums for travel, entertainment, advertising, telephone calls and telegrams, and legal and banking services, expecting reimbursement, only to have their vouchers disapproved. By February 1941, requests for additional payments were flooding the Legal Section of the Engineering Branch. In handling this spate of claims, Major Jones, chief of Legal, relied heavily on the Contract Board. Established during the reorganization of December 1940 and having as its principal function the negotiation of contracts, the board consisted of Loving, who was chairman, Tatlow, and Maj. Clyde M. Hadley of the Judge Advocate General's Department. Because Loving and Tatlow had negotiated most of the contracts, they

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[116] (1) Memo, Farrell for Groves, 28 Mar 41. Opns Br Files, Rental Equip. (2) Memo, Opns and Trg Sec OCE for Supply Sec, 26 Apr 41. 413.8 Part 9. (3) OQMG Constr Div Ltrs 154, 12 Mar; 248, 12 May; and 318, 20 Jun 41. EHD Files.

[117] Opns Br Files Rental, Equip; and Equip 1.

[118] (1) Memo, Somervell for Patterson, 21 Jun 41. (2) Memo, Robins for SOS, 31 Mar 42. Both in 481 Part 1. (3) 1st Ind, 15 Sep 42, on Memo, SOS for CofEngrs, 11 Aug 42. 413.8 Part 13.

[119] Groves Comments, IV, 7.

were in a particularly good position to advise on matters of interpretation and intent.[120]

Disputes were many and involved. The government had agreed to pay all costs of construction except interest and home office overhead and to adjust fees whenever there were "material changes" in the amount or character of work described in the contract or in the time required for performance. Which expenditures were chargeable to home office overhead? Which to the cost of the projects? Were some improper and therefore nonreimbursable? What constituted a material change? Did painting all the buildings entitle a contractor to a larger fee? Did putting up a few additional structures? Could a contractor who had accepted the Army's original estimate of $110,000 for "all necessary utilities" at a camp point to the actual cost of $1.8 million as evidence of material change? These questions and others like them had to be resolved to the satisfaction of both parties if lawsuits were to be avoided.

In reaching settlements with the contractors, Jones had first reference to the contract documents and to the laws governing emergency agreements. When the contracts were vague or the law silent, he consulted the Contract Board and reviewed the record of negotiations. He referred particularly complex questions to the Comptroller and Judge Advocate Generals for decision. Because the contracts provided reimbursement for certain unspecified items, he paid practically all disputed vouchers. Only damages resulting from a contractor's negligence and such obviously improper items as entertainment met with disapproval. Because Congress had outlawed percentage contracts, Jones turned down claimants who argued that costs had exceeded original estimates, denying additional fees even to contractors who had constructed utilities costing many times the figure mentioned during negotiations.[121] In adjusting fees to cover material changes in the scope of the work and the duration of the contract, he generally proceeded as if the agreement "as originally negotiated . . . had included the subject change."[122]

As the volume of claims increased, Jones urged establishment of a fact-finding board to assist in settlement of disputes. On 29 July Somervell informed the Under Secretary that the Construction Division wished to organize such a group but pointed out that the plan depended upon Patterson's willingness to set up a board of appeal. Patterson waited four months before taking the necessary action. Jones meanwhile was receiving about eighty claims each week. Finally on 7 November 1941 the Under Secretary established the War Department Board of Contract Appeals and Adjustments. Three weeks later Gregory formed the Contract Settlement Board, OQMG. Henceforth claims went to one

[120] (1) Memo, Jones for Leavey, 6 Feb 41. OCE Legal Div, Changes in Provisions and Policies—CPFF Contracts. (2) Memo, Birdseye for Patterson, 19 Feb 41. QM 600.1 (Contracts—Misc) IV. (3) Memo, Contract Bd for Jones, 26 Feb 41. Same File as (1). (4) Memo, Somervell for Patterson, 11 Apr 41. QM 600.1 (CPFF) II.

[121] (1) Memo, Somervell for Patterson, 18 Mar 41. QM 600.1 (CPFF) II. (2) OCE Legal Div Files, Instr Relating to FF Contracts, Book I. (3) Memo, Leavey for Somervell, 18 Jul 41. OCE Legal Div Files, Opinions—Misc.

[122] Ltr, Nurse to CQM Cp Callan, 14 Jan 41. 652 (Cp Callan) I. See also, Memo, Leavey for Somervell, 7 Mar 41. OCE Legal Div Files, Change Orders.

or the other of these boards. The Contract Settlement Board had jurisdiction over cases involving $50,000 or less; its counterpart in Patterson's office handled larger claims and heard appeals from decisions of the Quartermaster group. That most contractors considered the boards' decisions fair was evidenced by the fact that few went to court to obtain additional concessions.[123]

Months and sometimes years went by before final settlements were reached with camp contractors. Meanwhile, the camps were fully operational as Army training centers.

Maintenance and Operation

With their roads, streets, and rail terminals, their water, sewage, and electric systems, and their hospitals, laundries, bakeries, cold storage buildings, warehouses, fire stations, post offices, telephone exchanges, clubs, and theaters, the 46 new camps and cantonments resembled modern cities. There were, in all, 700 miles of gaslines, 804 miles of railroad tracks and sidings, 1,500 miles of sewers, 1,557 miles of roads, 2,000 miles of water conduits, and 3,500 miles of electric cables to keep up at these posts. There were nearly 46,000 furnaces, boilers, and heaters to fire. There were sewage disposal plants with a combined daily capacity of 86,729,866 gallons to operate; dams with a total capacity of 4,000 acre-feet to tend; and water tanks and reservoirs with a total capacity of 118,570,600 gallons to maintain. In addition there were matters of fire prevention, pest control, sanitation, and housekeeping. Vast though the undertaking was, it received little attention during 1940. Occupied fully with getting the camps built, Hartman could do little in the way of planning how to run them later on.[124]

In December 1940, finding the Repairs and Utilities Section almost totally unprepared to operate soon-to-be-completed camps, Somervell swung into action. Money was the first consideration. Totaling approximately $60 million, the sums so far appropriated were inadequate for the purpose. On 20 December Somervell asked Groves to prepare new estimates; by mid-January the battle for funds was under way. The second need was for equipment. Plans took shape for transferring recaptured equipment to maintenance crews. The third requirement, competent administrators, would be most difficult to fill. Experienced officers could not be spared for maintenance assignments at all the big new posts.[125]

Early in January Somervell hit upon the idea of calling in city managers. On the 8th he wrote to Groves: "I talked this thing over last night with Mr. Loving and he seemed to think there are many such people we can get . . . , people who are tops in their professions."[126] A

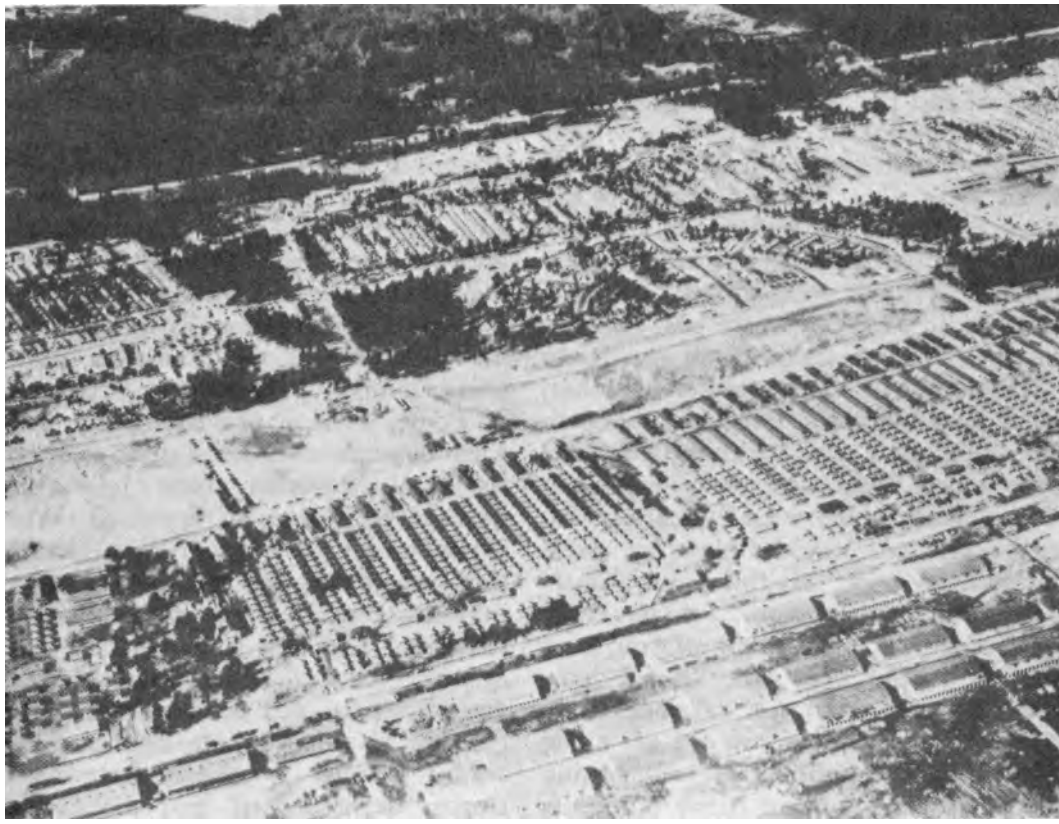
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[123] (1) Memo, Somervell for Patterson, 29 Jun 41. QM 334 (Contract Settlement Bd) 1942. (2) Memo, Styer for Leavey, 26 Sep 41. OCE Legal Div Files, Interpretations of CPFF Contract. (3) OUSW Purchases and Contracts Gen Directive 72, 7 Nov 41. (4) OQMG Office Order 273, 28 Nov 41. Last two in OCE Legal Div Library, Directives 1940–41. (5) Memo, SW, USW, and ASW for CofEngrs, 6 Jan 42. 3820 (Nat Def) Part 12. (6) OCE Memo 38, 9 Jan 42. EHD Files.

[124] (1) Rpt, Activities of Constr Div, Jul 40–Jul 41, pp. 21–24. (2) OCE Office Dir Mil Constr R&U Div, History of Repairs and Utilities, 1939–1945, p. 10. Cited hereinafter as Hist of R&U, 1939–1945.

[125] (1) Min, Constr Div Staff Mtg, 20 Dec 40. EHD Files. (2) See p. 278, above.

[126] Memo, Somervell for Groves, 8 Jan 41. Opns Br Files, Camps and Cantons (M&O).



AERIAL VIEW OF CAMP JACKSON, SOUTH CAROLINA

short time later he got in touch with Col. Clarence O. Sherrill, who had resigned from the Corps of Engineers in 1926 to become city manager of Cincinnati, a post he still held. Sherrill agreed to round up experienced city managers and city engineers who would be willing to serve as majors and lieutenant colonels in the Quartermaster Corps. These men would become utilities officers on the staffs of corps area and post quartermasters. Sherrill made rapid progress. "We have got a surprising number of acceptances," he told Groves on 28 January. "We will be ready in a few days."[127] With this assurance Somervell prepared to tell the corps areas that city managers were on the way.

The news broke on the 29th, when Groves announced to a meeting of corps area quartermasters: "These camps are big cities, and . . . we should have commissioned City Managers and City Engineers, who have managerial capacity." Fifty such officers would soon be available, and, said Groves: "We realize that when we send them out, that under present regulations, Post Com-

[127] Tel Conv, Groves and Sherrill, 28 Jan 41. Opns Br Files, Camps and Cantons (M&O).

manders or Post Quartermasters decide which Officer will be the Utility Officer, but we expect that when an experienced man of this character is sent there that he will be used for that purpose." This announcement brought a flurry of excitement. Brig. Gen. James L. Frink of the Fourth Corps Area was on his feet immediately. "Regardless of rank?" he exclaimed. Groves replied that the new men would be junior to the post quartermasters. In a moment Frink was back: "It should be thoroughly understood that, when these boys come down in the Fourth Corps Area, I am the boss." Several other corps area quartermasters questioned whether men used to dealing with city politicians would "play the game the military way." At this point Somervell joined the discussion. "I do not know how much experience any of you have had in politics," he said, "but I have been exposed to it for a considerable period of time, and if you can get along with a bunch of politicians—well, getting along with a bunch of Army officers is just 'duck soup'." After giving the assembled officers a few facts of political life, he went on to remonstrate: "Now, I gathered from what General Frink said that we were trying to ram something down your throats. Quite the contrary. What we are trying to do is to get the best people we can find in these United States to do that job for you." At the end, the corps area men seemed mollified.[128] The following day Groves wrote Sherrill that the corps area people were "unanimous in their approval and appreciation of the plan."[129]

Meanwhile, on 23 January, the new head of Repairs and Utilities, George F. Lewis, had arrived on the scene. Son of the inventor of the Lewis machinegun, he was a 1914 West Point graduate, a classmate of Somervell. Commissioned in the Corps of Engineers, he had served with the Punitive Expedition into Mexico and with the First Division in France. Resigning from the Army in 1919, he afterward held positions as vice president and treasurer of the Anderson Rolled Gear Company; president and treasurer of Foote, Pierson and Company, Inc.; town commissioner and public safety director of Montclair, New Jersey; and managing engineer of the J. G. White Engineering Corporation. With his military background and his wide experience in management, engineering, and construction, Lewis was particularly well qualified for the job of reorganizing the Army's repairs and utilities work.

While awaiting appointment as a lieutenant colonel in the Quartermaster Corps, Lewis looked into the existing setup. He found that repairs and utilities was commonly regarded as one of the worst headaches in the Army. Although The Quartermaster General was legally responsible for all post maintenance, successive Chiefs of Staff had insisted that commanders on the ground have complete control. As a result authority vested in the corps areas, and post quartermasters took their orders from station commanders. Diverting maintenance funds to pet projects of local military authorities was an almost universal practice. Because few enlisted specialists were available and funds were seldom sufficient for hiring civilians, post quartermasters had to draw men from the line. Gunners helped run sewage plants, in-

[128] Min, Conf of Corps Area QM's, 27–29 Jan 41, pp. 88–92. EHD Files.

[129] Ltr, Groves to Sherrill, 30 Jan 41. Opns Br Files, Camps and Cantons (M&O).

fantrymen fired furnaces, and tankers patched roofs and improved roads. Lewis noted other weaknesses. Budgetary controls were lax and spending was unscientific. There were no uniform procedures of cost accounting, stock control, or work load measurement; no regular inspections and reports; and no systematic studies of personnel utilization. Technical manuals and bulletins were few and out of date. Complicating the maintenance task were the temporary character of the new camps and the speed of construction. Already, some roofs were leaking and some floors were beginning to warp.[130]

One of Lewis' first assignments was to work with Groves on the city manager proposition. Unlooked-for complications endangered the plan. Word that city officials would receive direct commissions prompted inquiries from congressmen. Candidates appeared whose chief recommendation was political backing. Groves made it clear that there would be no patronage appointments. He told one congressman that the choice of city managers was up to Sherrill. He informed another that no commissions were available.[131] Finally, he adopted a standard reply: "We're anxious to get men who are city manager experienced, and these men aren't, that's all."[132] A more serious difficulty arose when Sherrill submitted his recommendations. Somervell had asked for men who had successfully managed cities of at least forty or fifty thousand. Sherrill's list named many who did not fill the bill. One man, recommended for the rank of lieutenant colonel, had managed a town of 4,700 since 1921; another candidate for a lieutenant colonelcy had once run a town of 10,000 but had been out of work since 1934. Somervell let Sherrill know that he was "quite surprised to learn that so many of the individuals recommended were not in fact eminently successful in private life."[133] Only fifteen of the fifty men Sherrill had named seemed qualified for commissions. Lewis regarded Sherrill's effort as a failure.[134] "We were," said Groves, "possibly a bit misled by Colonel Sherrill's initial optimism."[135]

While reviewing applications forwarded by Sherrill, Lewis combed the Army Reserve lists. For days he worked in the Military Personnel Branch of Gregory's office, studying the files. His efforts were rewarding, for he turned up thirty-three likely prospects, among them the city manager of Dallas, Texas, the city engineers of Elyria, Ohio, and Mamaroneck, New York, and the chief public works engineer of St. Paul, Minnesota. There were also engineers and officials of telephone and electric companies. Called to active duty early in March, these Reservists went to the new camps and cantonments and to Repairs and Utilities Branches in the zones.[136] Pleased with their performance, Lewis later

[130] (1) Extracts from Col Lewis' Diary, 1941. OCE R&U Div Files, Org—Utilities Sec. (2) Hist of R&U, 1939–45, *passim*.

[131] (1) Ltr, Groves to Rep Doughton, 4 Feb 41. Opns Br Files, Camps and Cantons. (2) Tel Conv, Groves and Rep McCormack's Secy, 7 Mar 41. Opns Br Files, Camps and Cantons (M&O). (3) Memo, Farrell for Groves, 26 Mar 41. Opns Br Files, Maj Shepherd.

[132] Tel Conv, Groves and Mr. Gale, WD, 13 May 41. Opns Br Files, Camps and Cantons.

[133] Ltr, Somervell to Sherrill, 27 Mar 41. Opns Br Files, Corresp (Gen).

[134] (1) Memo, Groves for Somervell, 5 Mar 41. Opns Br Files, Personnel. (2) Ltr, Lewis to OCMH, 8 Mar 55.

[135] Groves Comments, VI, 8.

[136] Memo, Groves for Somervell, 5 Mar 41. Opns Br Files, Personnel.

wrote: "Our Army was dependent on our reserve and National Guard forces for trained and skilled personnel and they should be given credit for the fine material they supplied."[137]

After receiving his commission on 11 February, Lewis concentrated on plans for reorganizing the Army's maintenance system. For the next few weeks his calendar was crowded with appointments. He called on William H. Harrison in the new Office of Production Management and on Comdr. Thomas S. Combs in the Bureau of Yards and Docks. He consulted two vice presidents of the Western Union Telegraph Company and the works manager of Standard Oil of New Jersey. He talked matters over with members of G–4, the Bureau of the Budget, and OQMG. After studying other maintenance setups, in both industry and government, Lewis took a closer look at his own. By early March he was ready to offer Somervell some concrete suggestions.[138]

Lewis proposed to bring all repairs and utilities under Construction Division control. Post utilities officers would be appointed and relieved, not by the corps area commanders, but by The Quartermaster General. The supervisory functions exercised by the corps area quartermasters would be transferred to the zones. Estimates would be prepared by post utilities officers and zone Constructing Quartermasters. Corps area and station commanders could concur or comment on these estimates but could not disapprove them. The bulk of the funds appropriated for maintenance would be allotted by The Quartermaster General directly to the post utilities officers. The meaning of Lewis' proposal was clear—local commanders would lose their power.[139] If the plan was logical, it was also revolutionary.

Opposition was not long in forming. Among the first to resist was Gregory's deputy, Brig. Gen. Frank F. Scowden. Believing maintenance should remain under post quartermasters, Scowden pigeonholed the plan.[140] When Groves at length went over Scowden's head, he found Gregory "fully in sympathy" with Lewis' proposal. Gregory agreed to recommend the change, but he reminded Somervell that corps area commanders had always shown "great interest in the expenditure of repair and maintenance funds." Perhaps, he said optimistically, the commanders now had "so many other problems that they may be glad to get rid of this one."[141] Gregory's hopes were short lived. Word of the plan reached the corps areas before it reached the General Staff. On 1 May the commanding general of the Fourth Corps Area asked General Marshall for a hearing.[142] In reply Marshall pointed out that Gregory had as yet made no proposal but promised that "all factors will be considered before any change is made."[143] The Construction Division had a fight on its hands.

On 9 May Gregory formally presented

[137] Ltr, Lewis to OCMH, 8 Mar 55.

[138] Extracts from Col Lewis' Diary, 1941.

[139] (1) *Ibid.* (2) Ltr, Gregory to TAG, 9 May 41, and Incl, Draft of Proposed Revision of AR 30–1760. G–4/33028.

[140] Extracts from Col Lewis' Diary, 1941.

[141] Memo, Gregory for Somervell, 16 Apr 41. QM 600.3 (Misc) 1935.

[142] Memo, Reybold for Marshall, 8 May 41. G–4/32445–1.

[143] Ltr, Marshall to CG Fourth Corps Area, 15 May 41. G–4/32445–1.

his recommendations to the General Staff. He cast his plea for their acceptance in compelling terms. "There is little doubt," he wrote, "but that the efficient and economical operation and maintenance of posts and stations in the expanded Army will be seriously impaired if these recommended changes are not made promptly."[144] Gregory's letter went to G–4, where the task of reviewing it fell to Colonel Chamberlin, who was acting in General Reybold's absence. Chamberlin's reaction was unfavorable. He saw the advantages of letting The Quartermaster General furnish expert personnel but balked at curbing the powers of local commanders. As he saw it, the question was whether command or staff ought to exercise authority. The answer was implicit in his recommendations. The Quartermaster General should redraw his proposal. Local commanders should retain their authority. Corps area commanders should be consulted before any change was made. General Marshall concurred.[145] Somervell had lost the first round.

The Quartermaster forces were not ready to admit defeat. Late in May Groves and Lewis undertook missionary work among members of the General Staff. On 12 June Somervell and General Moore framed a compromise plan.[146] Under it, The Quartermaster General would assign utilities officers to the posts; the zones would take over the maintenance duties of the corps areas. At the same time, local military authorities would retain a measure of control, for utilities officers would report to station commanders and zone Constructing Quartermasters would be responsible for repairs and utilities to corps area commanders. General Marshall accepted the compromise and ordered a new regulation printed. With its publication on 23 June, Lewis assumed full control of the technical end of repairs and utilities. Commanders still had final say as to what jobs to do and when, but the Construction Division decided how.[147]

The new arrangement enabled Lewis to replace the old housekeeping service with a vigorous and effective management organization. Specialization, modernization, and standardization were keynotes of his policy. Engineers, scientists, and trained mechanics took over operation of the Army's physical plant. Lewis' own staff included such experts as Jean L. Vincenz, commissioner of Public Works and City Engineer of Fresno, California, and Louis C. McCabe of the Illinois Geological Survey, an authority on solid fuels. Through an intensive recruiting drive, he obtained qualified men for key field positions from utility companies, municipalities, and universities. A countrywide training program offered instruction in fire fighting, plumbing, sewage plant operation, and many other specialties. Introduction of up-to-date management techniques—quarterly budgets, cost accounting, work order systems, and the like—eliminated guesswork and placed the maintenance operation on a business basis. Monthly reports and fre-

[144] Ltr, Gregory to TAG, 9 May 41. G–4/33028.

[145] (1) Memo, Chamberlin for Moore, 22 May 41. (2) Memo, Chamberlin for Marshall, 29 May 41. Both in G–4/33028. (3) 1st Ind AG 600.1 (5–9–41) PC, 7 Jun 41, on Ltr, Gregory to TAG, 9 May 41. QM 600.3 (Misc) 1935.

[146] Extracts from Col Lewis' Diary, 1941.

[147] WD Circ 121, Sec 1, 23 Jun 41.

quent inspections were helpful in determining norms and computing requirements. Books, manuals, and information bulletins established standard procedures and kept everyone abreast of developments. By late summer Repairs and Utilities was a progressive, smooth-running organization and a source of pride to Somervell and his officers.[148]

To build the camps and provide for maintaining them properly had taken about one year.

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[148] Hist of R&U, 1939–45, *passim*.

CHAPTER IX

Creating a Munitions Industry

Perhaps the most vital part of the vast national defense effort in which the United States is engaged is the supplying of weapons and ammunitions to its armed forces. This is so because these items, not being among the commercial products of industry, require a relatively long time to produce in the quantities essential to a major defense effort. At present men can be trained more rapidly than munitions can be provided.

Thus William H. Harrison reminded the National Defense Advisory Commission of the disparity between manpower and munitions in November 1940.[1] As shelter became available and the strength of the Army increased, the disparity grew. Men inadequately armed were a weak defense. Not until new government-owned munitions plants were in production could mobilization be effective. Anxiety over camps and cantonments for a time pushed munitions projects from the forefront of attention, but this seeming indifference to industrial preparedness did not long continue. As American involvement in global war became an unmistakable probability, arsenals, plants, and depots became objects of deep concern.

Before the first "goldfish bowl" drawing for the draft on 16 October 1940, Congress had voted nearly $750 million for "expediting production." Not all of this money was for plants to manufacture explosives, ammunition, tanks, and guns. Indeed, well over a third was for aircraft factories. Because the sums for expediting production of critical items of equipment for the ground forces appeared inadequate, the War Department drew on moneys appropriated for other purposes. The largest supplement came from Ordnance procurement funds. By late October, the Army had allotted roughly $700 million for constructing and equipping new facilities to make and store munitions.[2]

Although broad aims had been agreed upon in June 1940, defining the munitions program in terms of plants, their number, type, and size, consumed many months. Resolving military plans into "specific items of munitions," hard enough at any time, was particularly so in 1940. The fact that the 30 June munitions program was based on a figure of two million men, instead of four million as in the Protective Mobilization Plan, forced major readjustments in plans of the using services.[3] Frequent changes in the Army's organization, mobilization rate, and operational plans made necessary further adjustments. Job directives appeared intermittently during the latter half of 1940,

[1] Rpt, Constr Sec NDAC, 1 Nov 40, sub: Mun Plant Constr—U.S. Army. Madigan Files, 101.7 Mun Plant Constr.

[2] (1) *Ibid.* (2) Rpt, OUSW, 24 Jan 41, sub: Summary of Constr Program for Manufacturing Facils. USW Plng Div, 600.1—134 Constr (1 Jun 40–25 Mar 41).

[3] Memo, OCofOrd for OUSW, 26 May 41. USW Files, Legis—H and S Investigating Comm 1.

but not until February 1941 did the first munitions plant program take final form. By that time the Army had under way 34 manufacturing facilities, 29 for the Ordnance Department and the remainder for the Chemical Warfare Service. Included were 5 shell loading plants, 3 small arms ammunition plants, 3 explosives plants, and 2 anhydrous ammonia plants, as well as facilities for turning out tanks, shells, armor plate, toluol, charcoal-whetlerite, and M1 rifles and factories for making and bagging smokeless powder. Generally known as the "first wave plants," these facilities were to have stand-by status after the emergency. Together with proving grounds and depots to test and store end-products, they constituted a minimum requirement for defense.[4]

Status of the Program—December 1940

When Somervell succeeded Hartman on 11 December 1940, one munitions project, a bomb loading plant at the Savanna Ordnance Depot, was complete and construction was under way at 16 others—new manufacturing facilities and expansions of old-line arsenals. Detailed surveys were going forward at sites for 3 ammunition storage depots. Contracts had recently been let for 2 more plants and a proving ground and contractors nominated for 4 additional plants. Despite its somewhat mixed record in other areas, the division's conduct of industrial work was generally rated good. Hartman had taken an average of twenty-three days to translate directives into contracts and an average of eighteen days to get construction started after contracts were signed. Considering all he had to contend with—the frequent changes in capacity, design, and location of plants, the complexity of negotiations, and the magnitude of the jobs—this was a creditable achievement. Projects, once begun, made fairly steady progress. Most were due for completion in the summer or fall of 1941, which left a reasonably comfortable margin of time.[5] On 29 November Harrison reported to Knudsen: "The longer term projects (munitions, Quartermaster depots, etc.) generally are in good shape."[6]

Although munitions projects did not present him with a crisis in the sense that camps and cantonments did, the status of the industrial program caused the new Chief of Construction some misgivings. To be sure, going projects appeared to be more or less on schedule and several jobs were well ahead. Nevertheless, there were signs of trouble. Contracts were pending for 13 directed projects: 4 ammunition storage depots, 3 Chemical Warfare plants, 2 shell loading plants, 2 bag loading plants, 1 small arms ammunition factory, and 1 explosives works. Orders for 9 of these jobs dated from November, two from October, and two from September. Seven more directives were in the offing, but no one could tell how soon they would appear. At plant as well as at camp projects, overruns were becoming common. Moreover, two important questions remained unanswered: precisely how much production capacity would be needed, and when. While directing most of his ef-

[4] (1) Harry C. Thomson and Lida Mayo, *The Ordnance Department: Procurement and Supply*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1960), pp. 45–59. (2) Ltr, OCofOrd to USW, 9 Jun 41. Ord 675/9233-Misc.

[5] (1) Constr Div Progress Charts and Rpts. EHD Files. (2) Rpt, Activities of Constr Div, Jul 40–Jul 41, pp. 196–238.

[6] Memo, Harrison for Knudsen, 29 Nov 40. WPB–PD File, 411.33 Constr Projs—Mil, Jun 40–41.

forts to more immediate problems, Somervell gave the munitions program considerable thought and study.

He quickly identified the source of some of the trouble. In his initial report to General Gregory on 9 December, he noted that "the number of agencies involved" in the munitions program had "introduced complications." Too many discordant voices were calling the tune. As a result, confusion attended site selection, planning, design, and supervision. While agreeing that the using services "must, of course, be consulted," Somervell wished to streamline procedures and expedite decisions; and he felt the Construction Division ought to have a larger role.[7] As he probed more deeply into the workings of the program, he found little reason for altering these views.

Disputes over plant locations were delaying the start of several Ordnance projects. One such dispute involved the second anhydrous ammonia plant. In October Ordnance and its operator, the Allied Chemical and Dye Corporation, had proposed a site near South Point, Ohio. But Commissioners Davis and Hillman of NDAC held out for another location, near the depressed community of Carbondale, Illinois. When Somervell joined Gregory in December, the issue was deadlocked. Similar disagreements were blocking construction of the New River and Hoosier bag loading plants and the Plum Brook explosives works.[8] The delays seemed likely to continue. At a meeting of the Advisory Commission early in December, Davis said, "It was possible undue emphasis was given in making these recommendations to the wishes of industrial management compared with other factors which appear important to the Commission."[9] Ordnance took a different view. "The Country was faced with war," General Campbell afterward explained. "Ordnance was responsible for getting munitions in the hands of troops in sufficient quantity and *on time*. No one else was."[10] Not a party to decisions affecting plant locations, the Construction Division could only wait until Ordnance and NDAC composed their differences.

Further examples of snags which delayed commencement of construction were offered by the small arms ammunition plants—the most notable laggards among Ordnance projects. The decision to build three such plants came early in October 1940. Hartman succeeded in awarding the construction contract for one of them, the Lake City Ordnance Plant at Kansas City, Missouri, late in November; construction began two days after Somervell took over. Earlier, though, the directive for this contract had waited for more than five weeks, while Ordnance reviewed planned capacity and site boundaries.[11] The division was involved to a degree in delays at the second project, the St. Louis Ordnance Plant. Negotiations with the two firms selected to act as joint venturers, the Fruin-Colnon Contracting Company and the Massman

[7] Memo, Somervell for Gregory, 9 Dec 40. EHD Files.

[8] (1) Memo, OCofOrd Industrial Svc Facil for Rutherford, 22 Oct 40. Ord 675/1202 (Ohio River OW—Misc). (2) Memo, OCofOrd Industrial Svc Facil for Rutherford, 22 Nov 40. Ord 675/1636 (Misc). (3) *Minutes of the NDAC*, pp. 120–30.

[9] *Minutes of the NDAC*, p. 120.

[10] Comments of Gen Campbell on Constr MS, VIII, 52.

[11] (1) Memo, Reybold for Patterson, 3 Oct 40. G–4/38773. (2) Memo, OCofOrd Industrial Svc Facil for Rutherford, 20 Sep 40. (3) Memo, OASW, Plng Br for CofOrd, 26 Oct 40. Both in Ord 675/643 (Misc). (4) Memo, OCofOrd Industrial Svc Facil for Hartman, 19 Oct 40. 635 (Lake City OP) I.

Construction Company, were complete by 11 December. Somervell started to submit the contract to NDAC the next day but ran into a storm of political protest. He stuck to his guns and finally, on 30 December, secured Knudsen's permission to put through the deal with Fruin-Colnon and Massman.[12] A site for the third small arms ammunition plant was not finally chosen until mid-December. Ordnance had originally considered building this plant near Atlanta or in the Tennessee Valley, but by late November had decided in favor of Denver. The President approved the Denver site on 18 December and Ordnance promptly issued the directive. But even then, uncertainty as to the scope of the project threatened to hold up negotiations for some time.[13]

Visiting the plant sites, Somervell noted a source of potential, if not actual, delay—blurred lines of authority. Early in the program Hartman had had to yield in matters concerning supervision of construction. Short of experienced Quartermaster officers, he had let Ordnance take charge of building operations at a number of key jobs. At four of the first major projects, Indiana, Radford, Elwood, and Baytown, the commanding officer, a representative of the Ordnance Department, also served as Constructing Quartermaster. At Kankakee, the first TNT plant, and at Ravenna, one of the early shell loaders, the Constructing Quartermasters were Ordnance officers junior to the commanding officers. At eleven other projects, the CQM's were Hartman's men—long-time Regulars like Colonel McFadden at Springfield Armory; West Point careerists like Capt. Joseph E. Gill at the Savanna Ordnance Depot; and outstanding Reservists like Maj. Harry R. Kadlec at the Detroit Tank Arsenal. These men were capable administrators, but competence was not always the deciding factor in determining who would boss construction. At most projects Ordnance representatives outranked Hartman's officers.[14]

Neither practice nor results were uniform. In October the Hercules Powder Company had complained that the Ordnance officer at Radford "did not have sufficient authority or experience to make decisions on minor matters without referring to Washington or Wilmington."[15] After touring the projects, Somervell reported that the officer at Elwood "has apparently attempted to 'command' the Architects and Engineers who know more about construction than he will ever know." By contrast, he found the Indiana job "operating in a highly satisfactory way." But even where work was proceeding smoothly, the situation was far from ideal. The Reserve major sent by Hartman to Picatinny Arsenal could hardly be expected to question the wisdom of the commanding officer, a brigadier general whose service in the

[12] (1) Memo, Loving for Hartman, 11 Dec 40. EHD Files. (2) Memo, Gregory for Somervell, 13 Dec 40. 635 (St. Louis OP) I. (3) Memo, Constr Adv Comm for Somervell, 19 Dec 40. (4) Memo, Somervell for Knudsen, 28 Dec 40, and approval thereon. Last three in 635 (St. Louis OP) I.

[13] (1) Memo, OCofOrd Industrial Svc Facil for Hartman, 19 Oct 40. QM 095 (Remington Arms Co.). (2) Memo, OCofOrd Industrial Svc Facil for Rutherford, 25 Nov 40. Ord 675/1647 (Denver OP—Misc). (3) Memo, OCofOrd Industrial Svc Facil for Somervell, 18 Dec 40. 635 (Denver OP) I. (4) Memo, OCofOrd Industrial Svc Facil for Somervell, 21 Jan 41. Ord 675/2911 (Misc).

[14] Data compiled from EHD Files, Industrial-Projs.

[15] Memo, OASW, E. B. Isaak, for Madigan, 22 Oct 40. Madigan Files, Radford, Va., Smokeless Powder Plant.

Regular Army dated back to 1901. Ordnance officers on duty as Constructing Quartermasters, however well-intentioned, found it difficult to serve two masters. When these men had to choose between enforcing Construction Division policy and preserving what the Ordnance Department regarded as its prerogatives, their older loyalty often proved the stronger.[16]

Costs presented another dreary picture. At project after project, original estimates were turning out to be low. When Hercules signed the prime contract on 16 August 1940, the estimated cost of building the Radford plant and of operating it for one year was $25 million. Less than three months later the figure had risen to $40 million. A partial explanation lay in an additional line. Similarly, at the Indiana plant the number of lines doubled within three and tripled within five months of the signing of the contract.[17] By December General Campbell saw that many of the original estimates, made when "limited information was available," would "prove to have been greatly below" actual costs.[18]

Despite their various ailments, munitions projects received only incidental therapy in the weeks following Somervell's appointment. Reorganization of the division wrought but one significant change in the groups concerned with industrial construction—the placing of all field operations under



FRANK R. CREEDON

Frank R. Creedon and his principal assistants, William E. O'Brien, William K. Maher, Otto F. Sieder, and George F. Widmyer. Minutes of Somervell's staff conferences made but passing mention of the Ordnance and Chemical Warfare programs. Relations with Ordnance took on an easy-going air, which seemed to belie the differences between the two services, but which really proceeded from the fact that Somervell was preoccupied with other issues. But problems overshadowed were not solved any more than decisions deferred were permanently avoided.

Dollars Versus Days

While the spotlight focused on camps and cantonments, Campbell and Groves were uneasy about the progress of industrial preparedness. As the heads of the Ordnance Department's Industrial Service, Facilities, and the Construction

[16] Memo, Somervell for Gregory, 9 Dec 40.

[17] (1) Memo, OCofOrd Industrial Svc Facil for Knudsen, 1 Aug 40. Ord 675/119 (Radford—Misc). (2) Compl Rpt, Radford OW, 1940–43, Introd. (3) Memo, OCofOrd for ASW, 2 Nov 40. Ord 675/1335 (Radford—Misc). (4) Compl Rpt, Indiana OW, 6 Nov 42, pp. 2–3.

[18] Memo, Campbell for Groves, 13 Dec 40. QM 635 (Shops, Ord Repairs) 1940.

Division's Operations Branch, they bore a heavy responsibility for the munitions plant program, a responsibility they keenly felt. Telephoning Groves on 10 December 1940, General Campbell said: "Two guys are going to hold the bag, Campbell and Groves. You won't have the plants ready. I can't make TNT until the Quartermaster gives me the plant." Groves mentioned one solution, to put the projects on a three-shift basis. "It is going to cost money," he told Campbell, "and if anybody doesn't like it after we have started, we say, 'What are you going to do about it?' "[19] The problem, both men recognized, was not that simple. Funds were short and goals uncertain. Unless money was available and its spending could be justified, wholesale use of crash methods was out of the question.

On 13 December Campbell asked Groves to find out how much the munitions projects were actually going to cost. By making financial arrangements "without delay to take care of any shortages," Ordnance hoped to avoid "showing large deficits upon completion of plants." Complying with Campbell's request, Groves directed Constructing Quartermasters at all Ordnance projects to submit revised estimates of cost. The results were soon apparent. Ordnance projects would show deficits totaling about $100 million.[20]

Meanwhile, Groves and Somervell had appealed to Ordnance for firm completion dates. The deadlines originally announced were seldom final or exact. Some were set forth in general terms. The expectation was that the Iowa and Kingsbury shell loading plants would take about ten months to build; the Lake City small arms ammunition plant, about one year. Other completion dates, giving month and day, changed again and again, sometimes drastically.[21] Not knowing how fast to proceed or how heavily to spend, Somervell in mid-December appealed to the Chief of Ordnance for "honest-to-God" completion dates. General Wesson turned the request over to Col. Francis H. Miles, Jr., of the Ammunition Division, giving him ten days to prepare an answer. Miles' was no easy assignment, since completion hinged on deliveries of processing machinery. As Campbell put it, "No use having the buildings when we have no equipment."[22] It was still too early to know when deliveries might come through, so in the end, Wesson had to put Somervell off. On 23 December, he set dates for partial completion of three plants. One line at Radford was to be ready on 15 March; two lines at Indiana, on 1 April; and three lines at Kankakee, on 1 July. Wesson promised to have dates for all the plants on 1 March. Until then, he asked Somervell to continue building on a single-shift no overtime basis at all projects except Indiana, Radford, and Kankakee.[23]

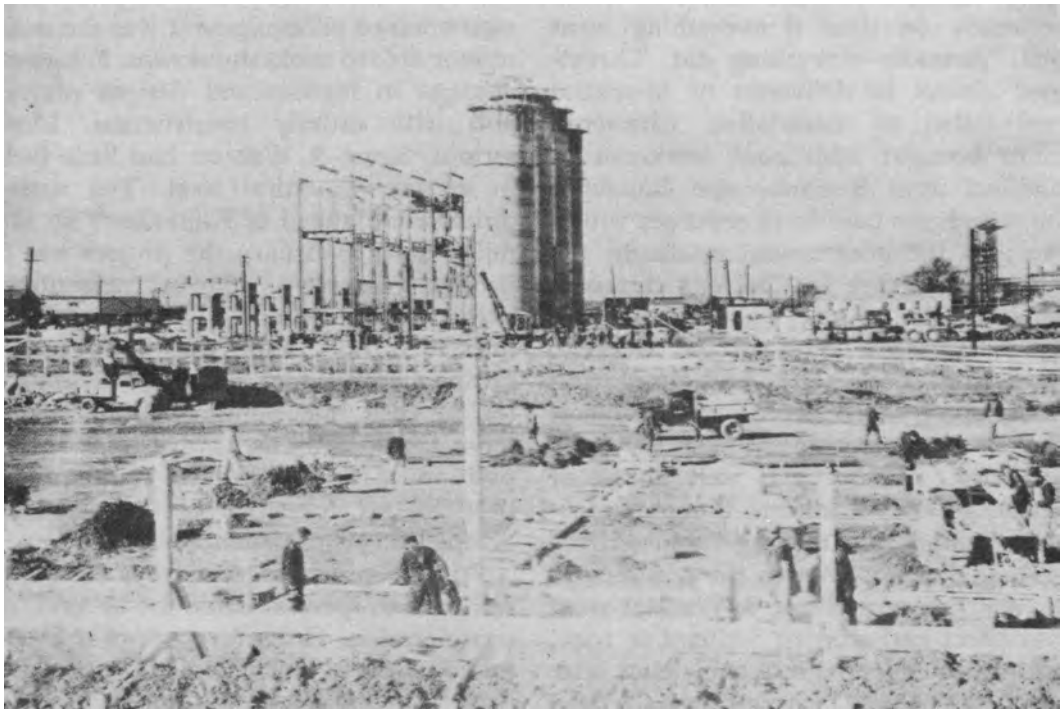
[19] Tel Conv, Campbell and Groves, 10 Dec 40. Opns Br Files, Ord.

[20] (1) Memo, Campbell for Groves, 13 Dec 40. (2) Memo, Groves for Campbell, 17 Dec 40. Both in QM 635 (Shops, Ord Repair) 1940. (3) OUSW, Summary of Constr Program for Manufacturing Facils (Rev 24 Jan 41). USW Files, Prodn Div 600.1–134 Constr (1 Jun 40–23 Mar 41). (4) Min, Mtg in Harris' Office, 5 Feb 41.

[21] Table compiled in EHD from Constr Progr Rpts and corresp files, Completion Dates and Progress—Ord Plants. EHD Files. Cited hereinafter as Table, EHD, Compl Dates and Progr—Ord Plants.

[22] Tel Conv, Groves and Campbell, 17 Dec 40. Opns Br Files, Ord.

[23] (1) Memo, Somervell for Styer, 26 Dec 40. Opns Br Files, Ord Projs. (2) Memo, Somervell for Patterson, 29 Apr 41. QM 635 (Ammo Plants) 1941.



CONSTRUCTION UNDER WAY AT INDIANA ORDNANCE WORKS, *1940.*

Wesson's choice of these three plants reflected the critical shortage of smokeless powder. The output of the single line at Radford would enable Frankford Arsenal, the Army's sole small arms ammunition factory, to increase production markedly. The two lines at Indiana would turn out twice as much cannon and small arms powder as the whole country had manufactured in 1940. But production of smokeless powder depended on the supply of DNT, one of its components. When it became apparent that commercial sources would not yield enough of this explosive to permit the lines at Radford and Indiana to operate at capacity, Ordnance focused its attention on Kankakee.[24] Campbell asked Groves to urge the contractor, Stone & Webster, to bend every effort toward completing one DNT line "at the earliest possible moment."[25] That the first rush order covered only three plants in no way reduced its importance.

Indiana and Radford presented little difficulty. Begun in September 1940, both were healthy projects and gave promise of meeting their deadlines. Creedon took nothing for granted, how-

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[24] (1) Memo, Campbell for Somervell, 28 Dec 40. 635 (Radford OW) I. (2) Compl Rpt, Indiana OW, 6 Nov 42, p. 5. EHD Files.

[25] Memo, Campbell for Groves, 20 Dec 40. Ord 675/2218 (Misc).

ever, stating only that the jobs would be ready on time if everything went well. Virtually everything did. Threatened delays in deliveries of structural steel failed to materialize. Chartered trains brought additional workmen to Radford from Roanoke and Bluefield; the passengers paid forty cents per round trip and the government made up the difference in fare for the long distances involved. At Indiana, trailer camps provided attractive housing for workers. Operating three shifts and employing 20,000-man work forces, the projects moved along at a lively pace. By early February, Indiana was well ahead of schedule, and Radford, though somewhat behind, was making rapid gains.[26]

Kankakee was another story. Although the contract with Stone & Webster went into effect early, on 12 September 1940, the project experienced one delay after another. The land, acquired by a Chicago broker, did not become available until 21 November. Two days later a supplemental agreement doubled TNT capacity, tripled DNT, and added twelve tetryl lines. Not until December were designs far enough along for Stone & Webster to order materials. Building progress was slow. Recruitment proved difficult; the nearby Elwood plant had already exhausted the supply of skilled labor in the area, and workmen had to come from Chicago and other more distant points. Freezing temperatures hindered the work of building roads, digging foundations, and pouring concrete; only by using portable shelters and coke-fired salamanders and by performing extensive maintenance on equipment was the contractor able to avoid shutdowns. Frequent changes in layouts and designs played hob with orderly construction. Most serious, Stone & Webster had little luck in getting structural steel. Too many orders were ahead of Kankakee's at the mills. On 1 February the project was 6 percent complete, fifteen percentage points behind schedule. Finishing three lines by 1 July would take some doing. Ordnance therefore asked the contractor to rush one building which could serve temporarily as a DNT plant. Imposition of this additional requirement brought no lessening of pressure for completion of permanent lines.[27]

For the program generally, economy rather than speed became the overriding consideration. Groves' report of a $100-million deficit touched off an economy drive. On 8 January Campbell forbade the building of more brick dwellings at plants. Residents would enjoy "commodious and comfortable" frame houses but would have to do without tile bathrooms, slate roofs, and air-conditioning systems.[28] The savings involved were negligible, for the houses originally constructed were not luxurious by ordinary civilian standards.[29] Going a step further, Campbell on 16 January modified designs for administration buildings. "It is more desirable to effect economies," he wrote to Somervell, "than to have elaborate buildings." Two-story brick structures would give way to one-story frame

[26] (1) Compl Rpt, Indiana OW, 6 Nov 42, pp. 69–70, 74–81. (2) Compl Rpt, Radford OW, 1940–43, pp. 26–28. (3) Memo, Somervell for Campbell, 4 Jan 41. Opns Br Files, Radford OW. (4) Constr Div Progress Charts, 5 Feb 41, pp. 46–47.

[27] (1) Compl Rpt, Kankakee OW, 11 Aug 44, *passim*. EHD Files. (2) Constr Div Progress Charts, 5 Feb 41, p. 46.

[28] Memo, Somervell for general distribution, 8 Jan 41. QM 600.1 (Ord) 1941.

[29] Groves Comments, VIII, 5.

buildings.[30] Campbell must have felt that he was straining at gnats, for he sent Somervell a second memo the same day, urging "such steps to reduce the cost of construction [as] can be done without lessening the efficiency of the operation or safety of the plants." Since some of the projects were so far along that changes might cause delays, Campbell asked Somervell to rely on his own judgment in deciding where to cut.[31]

Wasting little time on formalities, Somervell sent Campbell the terse reply, "Your desires in this matter will be carried out."[32] Meanwhile, he summoned Colonel Leavey.[33] Within a day or so the two Engineers had mapped a campaign. Somervell sent a scorching memorandum to the field. There had, he said, been "a leaning toward grandeur." Stressing the need for simplicity, efficiency, and economy, he wrote:

> There is no excuse for masonry structures, monumental or otherwise, where a light frame structure will serve the purpose. There is no excuse for the use of expensive materials where less costly ones will serve the purpose for the period of time for which the construction is being provided. There is no excuse for a heavy duty road where a lighter type will . . . provide for anticipated traffic with reasonable maintenance costs. There is no need to design railroads for a speed of 90 miles an hour within the confines of a . . . manufacturing plant.

He enjoined architect-engineers to cheapen designs as much as they felt advisable, and promised that if operators balked, he would personally take a hand.[34] Following on the heels of Somervell's memorandum were orders to each of the projects instructing commanding officers and Constructing Quartermasters to survey all plans with a view to scrapping unnecessary items and reducing costs.[35]

Ordnance, continuing meanwhile to seek additional economies, discovered that material savings might result from changes in layout as well as in design. According to General Campbell, important savings could "be had in the basic layout of the plant with particular respect to the locations of the various elements comprising the plant." He recognized, however, that design and construction had been under way too long on some plants to permit economical changes in layout. He nevertheless asked commanding officers to cut corners wherever they could without hurting progress.[36]

On 18 January, in a far more drastic step, Campbell ordered a fundamental change in plans for many late projects. Scrapping blueprints for permanent facilities, he switched to temporary plants designed for a 5-year life. To be built on the new model were eight projects, including all bag loaders and late shell loading, TNT, and powder plants.[37] Advising Constructing Quartermasters of Campbell's decision, Somervell warned

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[30] Memo, Campbell for Somervell, 16 Jan 41. QM 631 (Admin Bldgs) 1940.

[31] Memo, Campbell for Somervell, 16 Jan 41. Opns Br Files, Ord Projs.

[32] Memo, Somervell for Campbell, 17 Jan 41. Opns Br Files, Ord Projs.

[33] Memo, Styer for Somervell, 17 Jan 41. Same File.

[34] OQMG Constr Div Ltr 27, 21 Jan 41. EHD Files.

[35] (1) Ltr, Campbell to CO Lake City OP, 28 Jan 41. 635 (Lake City OP) I. (2) Ltr, Campbell to CO's various plants, 4 Feb 41. Ord 675/3373 (Misc). (3) Ltr, Constr Div to ZCQM's, 8 Feb 41. QM 635 (ZCQM 5).

[36] Ltr, Campbell to CO's various plants, 28 Jan 41. Ord 675/4949 (Weldon Spring).

[37] Memo, Campbell for Somervell, 18 Jan 41. 635 (Ord Clipping, Belting & Linking Bldgs—Small Arms Ammo).

that complications might arise if drawings for permanent buildings were complete or nearly so, if large quantities of materials were on order, or if construction had already begun.[38] He told his representatives to use good judgment but to spare no reasonable effort to "effect economies and keep costs to a minimum" at the eight plants.[39] Some of the other late starters, the Denver small arms ammunition plant, for example, would have auxiliary buildings of 5-year type but would use plans developed earlier at Lake City for manufacturing units and utilities. Somervell made certain, however, that permanent structures at Denver would have no "gold-plated clocks or other such embellishments."[40]

The costs-reduction drive undoubtedly saved money, though it was difficult to tell how much. At the early, first-wave plants, it eliminated many expensive features. Hospitals, fire houses, police stations, and telephone exchanges went the way of brick residences and administration buildings. Useful but nonessential structures, such as tool and gage shops, became things of the past. Commanding officers and Constructing Quartermasters sought new ways to cut costs. At Lake City, for instance, the officers in charge cheapened the design of nine buildings, lowered specifications for roads, walks, and lighting, and postponed landscaping. The temporary, 5-year plants were even more spartan; so substantial were the savings, that Campbell adopted the 5-year type as standard.[41] After early 1941 the trend in industrial construction was toward ever greater austerity.

Lacking money for overtime and other costly expedients, Somervell tried by other means to push the entire program. Contractors whose projects lagged received a "pep" letter.

> A bridge completed after a battle is over may be a marvel of engineering skill and ingenuity [the message read], but it is *absolutely worthless* for the purpose for which it is intended. The United States mean to arm for defense—the determination of their people is unequivocal. Your work will determine the speed with which additional forces can become effective. You are the country's agent. Immediate and telling action on your part is necessary to place your project on the most efficient basis. *RESULTS MUST BE SECURED.*[42]

Meantime, Groves called two regional conferences of design consultants, contractors, architect-engineers, and CQM's —one at Washington on 20 December, the other at St. Louis on 6 January. At these gatherings he attempted to clear up misunderstandings and explain instructions. But above all he emphasized the importance of completing plants "with satisfactory operating characteristics" at "the earliest practicable" time.[43]

While exerting pressure on the field, Somervell and his staff tried to get the

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[38] Memo, Somervell for CQM Alabama OW, 23 Jan 41. Same File.

[39] Ltr, Somervell to CQM Wolf Creek OP, 27 Jan 41. 635 (Wolf Creek OP) I.

[40] Ltr, Somervell to ZCQM 8, 26 Feb 41. 635 (Denver OP) I.

[41] (1) Ltr, Campbell to CO's Loading Plants, 7 Feb 41. QM 635 (Loading Plants) 1941. (2) Ltr, Somervell to ZCQM 7, 8 Feb 41. 635 (Iowa OP) I. (3) 1st Ind, 8 Feb 41, on Ltr, Campbell to CO Lake City OP, 28 Jan 41. 635 (Lake City OP) I. (4) Ltr, CofOrd to Patterson, 9 Jun 41. USW Files, 004.404 (Plants, Ord and Muns).

[42] Ltr, Somervell to E. I. DuPont de Nemours & Co, Indiana OW, 23 Dec 40. 600.914 (Indiana OW). See also Folder, Lt Gen Somervell in EHD Files.

[43] Notes for Mtgs of Design Consultants, etc., 20 Dec 40, 6 Jan 41. Opns Br Files, Gen, December 16, 1940–June 2, 1941.

remaining first-wave projects under way. As the using services settled questions of requirements and plant location, orders for construction came through. Seven new directives, one in December, three in January, and three in February—added to the backlog inherited from Hartman—brought to twenty the number of jobs for which Somervell had to negotiate contracts. Although he signed but one agreement in December, he completed arrangements for 6 projects in January, 8 in February, and 3 in March. Meanwhile, the number of going projects rose. By late January, 23 were building; by late March 33.[44]

By tightening control over the projects, Groves hoped to eliminate confusion and delays. As far back as November 1940, he had started strengthening the Quartermaster position in the field. Shortly after his appointment to the Fixed Fee Branch, Quartermaster officers took charge of construction at the Iowa shell loading plant, Lake City small arms ammunition plant, and Weldon Spring explosives plant. Early in December, Groves told Campbell, "There is little detailing of Ordnance officers on the job as Constructing Quartermasters."[45] But Campbell was also moving to strengthen his position. In mid-December he insisted on placing his representatives as CQM's at the Morgantown ammonia plant and the Jefferson Proving Ground. Then, a few days after Christmas, he suggested that commanding officers take over as CQM's at all large munitions projects, old and new. Neither Groves nor Somervell was willing to go along. Although they made some concessions—commanding officers served as CQM's at five of the late plants, New River, Wolf Creek, Alabama, Hoosier, and Ohio River—they held on to going projects already under their control and took charge at most new ones.[46]

Increasingly, the Construction Division asserted its authority. In late December Somervell and Campbell sent commanding officers at powder and explosives plants the following joint statement: "You must realize the fact that the Quartermaster Corps is charged by law with all construction activities. Equally, you must recognize that the Ordnance Department occupies the position of a client in private construction work."[47] Six weeks later, in a circular to the field, Somervell took a stronger line. The Constructing Quartermaster was "the official in responsible charge"—"the authorized representative of the Government on the project." As such, he controlled the architect-engineer and constructor. Although the wishes of the operator and the commanding officer would be "fully considered at all times," their needs would "be communicated to and carried out on the project through the Constructing Quartermaster." The quartermaster zones would referee disputes. The document made it clear that the CQM was headman at the project and that his decisions were subject to review only by his superiors in the Quartermaster Corps.[48]

[44] Constr PR's 15, 19 Apr 41; 40, 30 Nov 41.

[45] Tel Conv, Campbell and Groves, 7 Dec 40. Opns Br Files, Ord.

[46] (1) Data compiled from EHD Files, Industrial Projs. (2) Memo, Campbell for Groves, 27 Dec 40. QM 210.213 1940. (3) Opns Br Files, Ord Corresp.

[47] Ltr, Somervell and Campbell to CO's Powder and Explosive Plants, 30 Dec 40. Opns Br Files, Ord Corresp.

[48] OQMG Constr Div Ltr 101, 19 Feb 41. EHD Files.



GENERAL GRANT (M3) ROLLS OFF ASSEMBLY LINE, *Detroit Tank Arsenal, Michigan.*

As it solidified its position, the Construction Division pledged co-operation with the using services. At his meetings with project representatives, Groves defined the builder-user relationship as "a partnership" and emphasized the "paramount importance" of "close co-operation."[49] Privately, he instructed CQM's to be tactful in their dealings with commanding officers. "I expect my people to do the getting along," he told his man at Weldon Spring. "I would like very much to have you go the limit on the idea of cooperation."[50] In this way Groves was able to get along with his "clients"—Ordnance and Chemical Warfare. Campbell afterward commented: "Groves was an exceptionally reasonable man to deal with and had a full conception of the *object* of building the plants. The buildings were merely to house the equipment used to produce munitions required to win the war."[51]

Progress reports reflected improved co-ordination and more unified direction. Between 6 January and 8 February most of the projects launched in the summer and early fall of 1940 made substantial gains. On thermometer charts maintained by Major Robinson in the Control Section, the Philadelphia Armor Plate Plant shot up 29 percentage points; the Springfield Armory, 39; and the Detroit Tank Arsenal, 47. Other early starters—Edgewood, Elwood, Frankford, Gadsden, Picatinny, and Radford— advanced an average of 11 percentage points during this period. At newer projects progress was understandably slower, for the first steps in construction were those most seriously impeded by winter weather. Nevertheless, all of the eleven projects started between mid-December and early February were on schedule by 1 March. Except for one or two trouble spots, the program seemed in good condition.[52]

During the late winter and early spring of 1941, five plants started producing. On 20 February Fred T. Ley & Company completed work on the new M1 rifle plant at Springfield Armory. Early in March the first smokeless powder line at Radford went into operation, and on the 14th General Gregory shared the speaker's rostrum at dedication ceremonies with General Wesson, Judge Patterson, and Governor James H. Price of Virginia. On 15 March, the Philadel-

[49] Notes for Mtgs of Design Consultants, etc., 20 Dec 40, 6 Jan 41.

[50] Tel Conv, Groves and Lt Col Clyde L. Miller, 13 Jan 41. Opns Br Files, Weldon Spring OW.

[51] Comments of Gen Campbell on Constr MS, VIII, 58.

[52] Constr Div Progress Charts, Jan–Mar 41. EHD Files.

phia Armor Plate Plant reached completion. In April the Indiana Ordnance Works produced its first powder and the Detroit Arsenal, its first tank.[53] Considering the season of the year when much of the work went forward and the lack of funds for expediting three of the five projects, the opening of these plants was a notable achievement.

Describing construction "as a miracle of performance," General Campbell cited the example of the Detroit Tank Arsenal.[54] Designed and built by the Chrysler Corporation and Albert Kahn Associates, the arsenal was the first plant in the United States to mass produce tanks. On 11 September 1940 Kahn broke ground for the main assembly building, a huge steel and glass structure, five blocks long and two blocks wide. The scheduled completion date was 31 March 1942. There was some friction at first, as the Constructing Quartermaster, an Ordnance officer, rubbed Kahn the wrong way. On 11 October Hartman relieved the CQM and replaced him with Major Kadlec. Working in harmony, Chrysler, Kahn, and Kadlec forced construction at top speed. On 18 November erection of structural steel began. Work went forward in the bitter cold of the hard Detroit winter. By 28 January the steel members were all in place and half the structure was glassed in. At this point the contractor closed off the completed portion of the building with temporary partitions, so that he could lay concrete flooring and install heavy machine tools. Steam locomotives furnished heat. Fifteen hundred workmen maintained a lively pace. By mid-April 1941 the principal manufacturing units were ready. On the 24th Chrysler formally presented its first tank to General Wesson.[55] Campbell, who attended the presentation ceremonies, later wrote: "The first two tanks rolled out the back door. The steam was provided by two old locomotives which had been run into the shop. Some of the outside walls were of canvas tarpaulin and yet, with the indomitable spirit of all connected, this great job had been done."[56]

More miracles and more indomitable spirit were needful. In the spring of 1941 only a small part of the program was complete. The Army faced new and exigent demands on the munitions front. Pressure for speed was mounting.

Demands for Greater Speed

During the winter of 1940–41, rearmament entered a more critical phase, as the nation assumed new risks and fresh responsibilities. After his re-election, President Roosevelt took bold and forceful measures to assure America's security and Great Britain's survival. On 29 December 1940, in a significant and memorable address, he made common cause with Britain and called upon this country to become the "Arsenal of Democracy."[57] Three days later, in his State of the

[53] (1) Constr Div OQMG, Constr Contracts Awarded or Approved, 12 Nov 41, pp. 9, 37. (2) Compl Rpt, Radford OW, 1940–43, p. 28. (3) Compl Rpt, Indiana OW, 6 Nov 42, p. 81. (4) Rpt, Activities of Constr Div, Jul 40–Nov 41, pp. 216, 198.

[54] Ltr, Campbell to OCMH, 10 Mar 55.

[55] (1) Ltr, ZCQM 6 to OQMG, 25 Apr 41. EHD Files. (2) Ltr, CQM Detroit Tank Arsenal to OQMG, 19 May 41. EHD Files. (3) Comments of Gen Campbell on Constr MS, VIII, 66. (4) Lt. Gen. Levin H. Campbell, Jr., *The Industry-Ordnance Team* (New York: Whittlesey House, 1946), pp. 109–10.

[56] Ltr, Campbell to OCMH, 10 Mar 55.

[57] *Public Papers and Addresses*, IX (1940), 633ff.

Union message, he announced the policy:

> We are committed to an all-inclusive national defense.
>
> We are committed to full support of all those resolute peoples, everywhere, who are resisting aggression and are thereby keeping war away from our Hemisphere.
>
> We are committed to the proposition that principles of morality and considerations for our own security will never permit us to acquiesce in a peace dictated by aggressors and sponsored by appeasers.[58]

Congress affirmed this policy by passing the Lend-Lease Act of March 11, 1941, which, in Stimson's words, "established between us and the nations fighting Hitler . . . a relation which was not substantially dissimilar to that which would have existed had their fighting forces been our own expeditionary fighting forces and we their base or arsenal."[59] The new commitments and the dangers they entailed required major readjustments in military goals. Plans took shape for a second wave of munitions plants. Meanwhile, Ordnance and construction officers intensified their efforts to expedite completion of first-wave projects.

The long-awaited schedule of Ordnance completion dates, which Campbell gave to Somervell on 28 February 1941, reflected Roosevelt's urgent demand for "more of everything."[60] Listing seventeen plants, the schedule resembled the one established earlier for Indiana, Radford, and Kankakee. That is, it set time limits for construction of each production unit, such as a single powder or TNT line. Completed units would operate while construction continued on remaining ones. The list included two dates for each unit, "A" or desirable and "B" or essential. Thus, the "A" schedule for the third and fourth TNT lines at Kankakee was 1 July 1941; the "B" schedule, 1 October. The entire plant was to be ready on 1 December or 31 December, the "A" and "B" dates for the last tetryl lines. While Somervell was happy to have firm target dates at last, the dates themselves raised problems, for Ordnance was in effect calling for a speedup in munitions plant construction.[61]

Before accepting the schedule, Somervell wanted answers to two questions: were the dates feasible and how much would it cost to meet them. Polling the contractors, Groves got a mixed reaction. Six sent favorable replies: Coosa River, a bag loader, Weldon Spring, Radford, Ravenna, Kingsbury, and Iowa could meet the "A" schedule without added cost. Two projects, Indiana and New River, could satisfy the "B" schedule without any trouble or extra expense but would need more money to meet the "A" dates. "We will make every effort to meet the desired dates," explained DuPont's representative at Indiana, "but . . . it will be necessary to work overtime and Sundays . . . and to spend additional funds for betterment of present material delivery dates, which in some cases may not be able to be improved."[62] From the Wolf Creek shell loading plant came the puzzling reply: either schedule was possible with another $5 million. Contractors at the Hoosier plant despaired of

[58] *Ibid.*, pp. 666–67.

[59] *Report of the Secretary of War . . . 1941*, p. 7.

[60] *Public Papers and Addresses*, IX (1940), 642.

[61] (1) Memo, Campbell for Somervell, 28 Feb 41. Ord 675/4276. (2) Min, Constr Div Staff Mtg, 7 Mar 41. EHD Files. (3) Ltr, Farrell to CQM Kankakee OW, 4 Mar 41. 600.914 (Kankakee OW) I.

[62] Ltr, E. I. DuPont de Nemours & Co., Charlestown, Ind., to CQM Indiana OW, 18 Mar 41. 635 (Indiana OW) I.

meeting "A" dates but felt that an additional $4,244,000 might enable them to keep to the "B" schedule. The seven remaining projects offered no assurances whatever. The Alabama powder plant, Ohio River ammonia plant, and Plum Brook TNT plant could furnish no answers at all. At Kankakee, Elwood, and the Baytown toluol plant, completion would depend on deliveries of materials and processing equipment. The case of the Morgantown ammonia plant seemed hopeless; the contract had called for completion in May 1942 and Ordnance was now demanding that production begin in September 1941.[63] When all replies were in, Groves laid the facts before Campbell. Final decision was up to Patterson, who, as Assistant Secretary of War until April 1941 and as Under Secretary thereafter, administered funds for expediting production.[64]

On 1 April Campbell forwarded a new schedule for a dozen plants. The dates indicated that Patterson had loosened the purse strings slightly but was unwilling to empty the purse. "A" schedules would apply to five of the six projects which would require no additional funds. Because Coosa River was still in preliminary stages, decision on that project remained up in the air. Deadlines for Alabama, Hoosier, New River, and Ohio River were also in abeyance. Indiana received an additional $3.2 million to enable DuPont to meet the "A" schedule. "B" schedules would have to suffice for most of the remaining plants. Indeed, Wolf Creek got an additional two months, its final completion date moving from October to December 1941. Morgantown continued to pose a problem. Although Groves said that the "A" date, 1 September, was patently impossible, Campbell insisted "that every effort be made towards meeting the September first date in view of the urgent requirements for Ammonia." Groves accepted the September date reluctantly, complaining, "This will undoubtedly result in continued reports of 'behind schedule' for the Ammonia Plant at Morgantown."[65] Somervell appeared more confident. "Ordnance has been very cooperative in figuring dates for us to meet," he told a conference of zone Constructing Quartermasters early in April. "None of them seem to be dates that we cannot meet if the jobs are conducted reasonably well."[66]

While the Ordnance schedule was under revision, the Chemical Warfare Service was setting new requirements. The five Chemical Warfare projects, which had previously carried no completion dates, suddenly received relatively close deadlines. Edgewood Arsenal was down for 1 September 1941. The impregnite plants at Niagara Falls, New York, East St. Louis, Illinois, and Midland, Michigan, all started in February, were to be ready by October. The charcoal-whetlerite plant at Fostoria, Ohio, not yet under way, was due for completion early in 1942. In addition, on 1 March 1941 Chemical Warfare requested construction of four clothing renovation plants. To occupy government-owned land near Quartermaster depots at Columbus, Ohio, Kansas City, Missouri, New Cumberland, Pennsylvania, and Ogden, Utah, the plants had price tags

[63] Memo and Incl, Groves for Somervell, 16 Apr 41. Opns Br Files, Ord Corresp.
[64] WD Orders, 21 Apr 41.
[65] Memo, Groves for Somervell, 16 Apr 41.
[66] Min, Conf of ZCQM's, 7–10 Apr 41, p. 23. EHD Files.

of $322,600 each. The "desired" completion date was 1 July 1941; the "essential" date, 1 August.[67] Comparatively small though they were, Chemical Warfare requirements added to the ever-growing construction burden.

Pressure was developing for a drastic speedup of the small arms ammunition projects. By early 1941 the demand for rifle ammunition was rising sharply as more and more troops entered training. Ordnance reserves, already depleted by large shipments to Great Britain, were dwindling rapidly. Frankford Arsenal had increased its production but could not possibly cope with the growing shortage. The new small arms ammunition plants had been planned as long-term projects. On 1 March 1941, Lake City carried a tentative completion date of 27 November 1941; St. Louis, a date of 1 April 1942; and Denver, where construction had not yet started, no date at all.[68] Early completion of these three plants was imperative. "The shortage of small arms ammunition," Groves later wrote, "and the terrific shortage which would occur in the event we were attacked was a matter of serious concern to Campbell, Somervell, and myself. I am sure that it must have been in the mind of Wesson." Campbell and Somervell talked to Patterson about the situation.[69] On 7 April representatives of Ordnance, OPM, and the Under Secretary's office agreed to try to obtain processing equipment for the plants by 30 September.[70] A week later the drive was on.

Patterson impressed upon all concerned the urgent necessity for finishing the plants by 30 September. On 15 April he directed Gregory "to take any and all steps necessary to see that construction work on these projects is completed by that date."[71] On 16 April he told an official of the Remington Arms Company, operators at Lake City and Denver, that the President was worried over the outlook for production of small arms ammunition.[72] "We will not be in good shape," said Patterson, "until the three new plants get into operation." He asked Wesson and Gregory to station their "most capable and energetic officers" at the projects, to pay close attention to progress, and to do everything within their power to hasten deliveries of processing machinery. Since St. Louis was the weakest of the projects, he asked Wesson to make certain that the operator, the Western Cartridge Company, clearly understood "the seriousness of our predicament."[73] But in urging these measures, Patterson did not attempt to tell Somervell how to meet the deadlines.

As soon as they got the green light, Groves and Creedon went into action.

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[67] (1) Constr PR's, Jan–Apr 41. EHD Files. (2) EHD, Construction of Chemical Warfare Facilities (MS), 1944, p. 4. (3) Leo P. Brophy, Wyndham D. Miles, and Rexmond C. Cochrane, *The Chemical Warfare Service: From Laboratory to Field*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1959), pp. 254–56.

[68] (1) Thomson and Mayo, *Ordnance Procurement and Supply*, pp. 190–91, 195. (2) Table, EHD, Compl Dates and Progress—Ord Plants.

[69] Groves Comments, VIII, 8–9.

[70] Memo, OCofOrd for Masson Britton, OPM, 11 Apr 41. USW Files, Misc & Sub—Ammunitions thru Dec 41.

[71] Memo, Patterson for Gregory, 15 Apr 41. QM 635 (Ammo Plants) 1941.

[72] Ltr, Patterson to D. F. Carpenter, Remington Arms Co., 16 Apr 41. USW Files, 095 (Remington Arms Co).

[73] Memo, Patterson for Wesson and Gregory, 19 Apr 41. QM 635 (Ammo Plants) 1941.

They sent orders to Constructing Quartermasters, instructing them to "push the work . . . to the maximum extent possible consistent with orderly procedure." They authorized extra shifts and overtime.[74] And they told architects to forget about aesthetics. "I personally don't care what the thing looks like . . . ," Groves informed one CQM, "as long as we get it finished."[75] Creedon, taking every possible precaution against delays, meanwhile gave particular attention to steel.[76] By late April Somervell felt the division was doing all it could to expedite construction. "Provided no delivery difficulties are encountered with respect to materials, especially steel," he advised Campbell, the new deadlines would be met.[77]

At the outset, Somervell had warned that the ammunition speedup would be costly—a sure-fire prediction. A survey of the projects showed that an additional $29 million would be necessary. The bulk of it, $21.5 million, would go for increased payrolls—overtime, extra shifts, and enlarged work forces; the remainder, for premiums for quick deliveries and for salaries of expediters and followup men. St. Louis, where union rules prescribed heavy premiums for overtime and shift work, would claim the lion's share, $12 million. Lake City would require $9 million and Denver $8 million. The total was large but Patterson did not hesitate. The money was soon forthcoming.[78]

The speedup of small arms ammunition plants was only the beginning. Somervell was certain of that. He saw the day fast approaching when "the heat" would be off the housing program and on all the plants instead. Early in April he predicted: "By next summer the people are going to start worrying about the powder and shot for the brave boys and not so much about the brave boys who will be supplied with everything up to a powder puff to take care of themselves." Holding that "the time to get ahead is the first half of a job and not the last half," he insisted on greater speed at all munitions projects.[79] He ordered his staff to hunt out bottlenecks and break them. He brought pressure on Ordnance to hasten selection of the two or three remaining sites and on Patterson to expedite approval of the several late contracts. He ordered zone Constructing Quartermasters to put their most competent engineers on Ordnance projects.[80] For his part, Groves tried to get the projects in shape for the big push he knew was coming. Explaining that it would be "embarrassing . . . to wait and then find out it was too late to speed up," he told a member of Patterson's staff: "We are going ahead on the basis of seeing that every one of [the plant projects] is in condition so that we can step it up. The few that are behind now, we are starting to spend a little extra and go into a certain amount of overtime so

[74] Ltr, Groves to CQM St. Louis OP, 24 Apr 41. Opns Br Files, St. Louis OP—Corresp.

[75] Tel Conv, Groves and CQM St. Louis OP, 30 Apr 41. Same File.

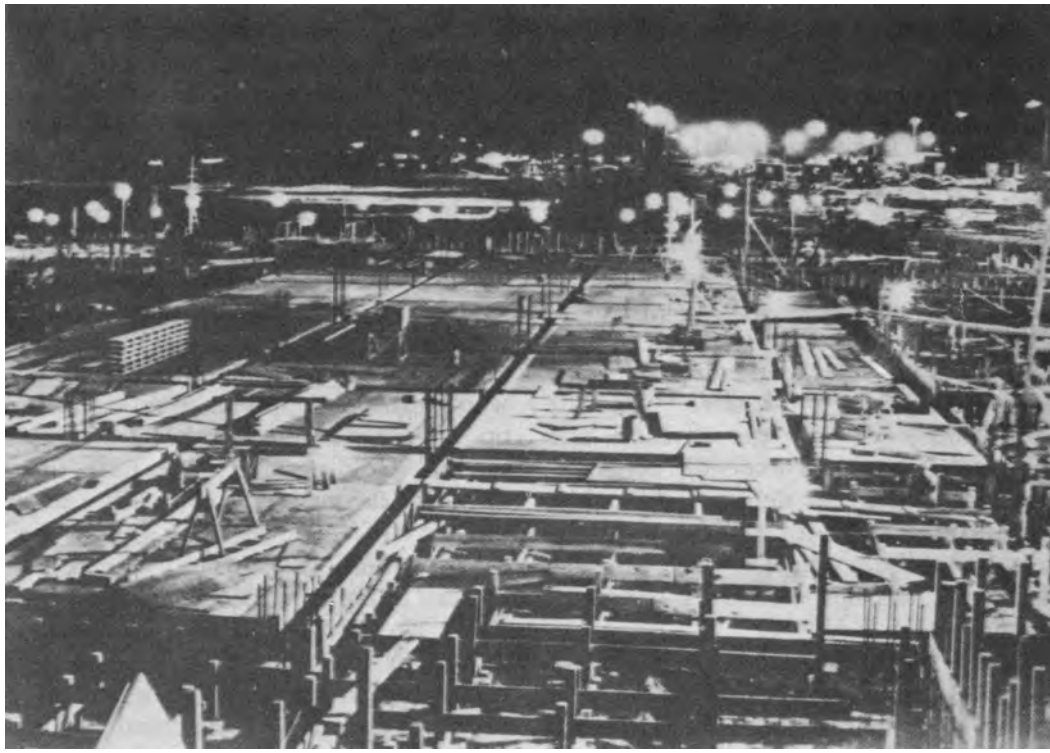
[76] Notes of Conf, Creedon, Wilson, and Reps of various steel companies, 28 Apr 41. Same File.

[77] Memo, Somervell for Campbell, 21 Apr 41. QM 635 (Ammo Plants) 1941.

[78] (1) Ltr, OCofOrd to WD Facils Bd, 5 May 41. Ord 675/7222 Misc. (2) Memo, OCofOrd Fiscal O for Campbell, 23 May 41. Ord 675/8381 Misc. (3) Memo, Patterson for NDAC, 14 May 41. USW Files, Misc & Sub—Ammunitions thru Dec 41.

[79] Min, Conf of ZCQM's, 7–10 Apr 41, pp. 248, 23.

[80] Min, Constr Div Staff Mtgs, 7, 14 Mar 41.



NIGHT SHIFT AT WORK, ST. LOUIS ORDNANCE PLANT

that we will be prepared to expedite them when the time comes."[81] As long as funds were lacking for an all-out drive, there was little else Somervell could do.

Late in April he tried to speed up the whole munitions program. In two memorandums for Patterson on the 23d, he announced his intention to expedite all industrial jobs. Only a few days earlier, General Gregory had received instructions to hasten completion of an armor piercing core plant next door to the St. Louis small arms ammunition plant. Ordnance had taken the first action leading to construction of this project late in February and was now calling for completion on 1 June. The best date Somervell could promise was 30 September. Similar rush orders for other plants might be forthcoming at any time. To avoid being caught off guard, Somervell proposed to put in overtime and extra shifts at all the projects and, in fact, had already issued orders to that effect. He furnished the draft of a letter from the Under Secretary to Knudsen, strongly urging that all Ordnance and Chemical Warfare projects have first priority. The increased speed, Somervell informed Patterson, would up construction costs 25 or 35 percent. More exact

[81] Tel Conv, Groves and Spalding, OUSW, 24 Apr 41. Opns Br Files, Ord.

estimates would be available within a month.[82]

The bid failed. On 24 April Brig. Gen. Sidney P. Spalding, director of the Production Branch, OUSW, gave Groves the bad news. The previous evening Patterson had brought Somervell's memos to Spalding's office, and after talking the matter over, had decided not to send the letter to Knudsen. "At least," said Spalding, "we weren't ready to go ahead on any of the others except the small arms ammunition plants and . . . we would check up and let him [Somervell] know shortly about the remaining plants." Spalding was studying each of the projects to see "whether we are justified in spending a good deal of money on speeding them up."[83] Apparently, he failed to find sufficient justification. On 30 April Patterson ruled out any crash effort on the Chemical Warfare plants. A week later he told Somervell to limit the speedup to small arms ammunition.[84]

This limitation held for another month. Then came the long-anticipated change. On 27 May 1941 the President proclaimed an unlimited national emergency and called for "the strengthening of our defense to the extreme limit of our national power and authority."[85] Two weeks later General Wesson recommended that Patterson scrap existing schedules and direct Gregory to complete the first-wave projects at the earliest possible date. "Furthermore," Wesson wrote, "to the extent that additional overall expense may be involved in expediting the completion of this work, I recommend that authority be given the Quartermaster General to exercise his judgment in this connection." Patterson concurred.[86] Speed was all-important. The time lost in efforts to economize was beyond recall. The Army had to make the most of whatever time remained.

The Steel Shortage

The greatest obstacle to early completion was the shortage of steel. Unlike camps and cantonments, which were largely of wood, munitions plants and depots required huge quantities of steel. Manufacturing buildings were usually steel fireproof structures on reinforced concrete foundations. Doors and window sash were of steel, as was much of the processing pipe that honeycombed the buildings. Steel was a major component of magazines and igloos for storing explosives and also of inert storage warehouses, laboratories, water and power plants, and industrial sewage systems. Many miles of railroad tracks criss-crossed the sites: the Iowa plant had 96 miles; the Elwood plant, 100. Seven-foot chain link fences strung on steel posts enclosed maximum security areas. The Umatilla Ordnance Depot had 20 miles of this fencing; the Radford Ordnance Works, 23.8 miles. Among the iron and steel products that went into the Indiana smokeless powder plant were 16,471 tons of structural steel; 8,737 tons of reinforcing rods; 440 tons of reinforcing mesh;

[82] (1) Memo, Somervell for Patterson, 23 Apr 41, and Incl. QM 635 (Ammo Plants) 1941. (2) Memo, Somervell for Patterson, 23 Apr 41. QM 635 (CWS) 1941.

[83] Tel Conv, Spalding and Groves, 24 Apr 41. Opns Br Files, Ord.

[84] (1) 1st Ind, 30 Apr 41, on Memo, Somervell for Patterson, 23 Apr 41. QM 635 (CWS) 1941. (2) Memo, OUSW for Somervell, 7 May 41. QM 635 (Ammo Plants) 1941.

[85] *Public Papers and Addresses*, X (1941), 193.

[86] Memo, Wesson for Patterson, 9 Jun 41, and approval thereon. Opns Br Files, Equip 1.

7,746 squares of corrugated iron; 185,001 square feet of steel sash; 2,401 tons of steel pipe supports; 17.53 miles of chain link fencing; and rails for 67.6 miles of tracks. The switch to 5-year life design early in 1941 reduced, but by no means eliminated, requirements for steel.[87]

Where steel was concerned, the priorities system tended to work against, rather than for, munitions projects. Civilian production agencies were slow to assist the projects. Priorities for plants and depots were consistently too low and too late. Moreover, steel did not go on the Critical List until May 1941. No priority ratings were applicable to steel before that time. Not until the fall of 1941 did production authorities take steps to curtail use of critical materials in nonessential construction. Throughout most of the last year of peace, vast tonnages of steel went to civilian construction, while defense agencies competed among themselves for part of the industry's product.[88] Six months after Pearl Harbor, a Senate committee reported:

> In the year 1941 approximately $11,600,000,000 was expended for new construction. Of this amount almost $4,000,000,000 represented construction for nondefense purposes. The industry consumed about 15,000,000 tons of steel ingot in this year, over 7,000,000 of which went into construction for nondefense purposes.[89]

One of the first projects to feel the pinch was Kankakee. In January 1941, soon after Ordnance set the July deadline for the first three production units, Stone & Webster reported that the mills could not promise structural steel in time to meet the schedule. The contractors appealed to Creedon for a blanket priority. Because the ANMB had yet to approve priority ratings for construction jobs, Creedon had to refuse. In any case, priorities applied only to items on the Critical List and steel was not among them. By paying premium prices for warehouse stocks, the contractors secured about half the needed steel. Meanwhile, they continued to press for priority assistance. In mid-February Groves asked ANMB to assign the project a high priority, but the board turned him down. Major Wilson tried pressuring the mills but with little effect. The project wobbled along until late March, when it was rated A–1–b. But since steel was not subject to production controls, the rating was of little help.[90]

Gradually the shortage spread. On 19 February, Major Wilson gave Patterson a list of sixteen munitions projects at which steel was critical. Thus far, he advised the Assistant Secretary, few contractors had encountered serious delays in obtaining structural shapes, but he warned that the situation might soon take a turn for the worse. During February and March the number of jobs held up awaiting shipments of steel crept higher. Deliveries of structural shapes were two to four months after order. Rail was increasingly hard to get and corrugated iron was becoming scarce.

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[87] (1) Rpt, Activities of the Constr Div, Jul 40–Nov 41, pp. 196–238. (2) Compl Rpt, Indiana OW, 6 Nov 42, p. 337. (3) Compl Rpts, various other projects.

[88] For a general discussion of the workings of the priorities system see: Smith, *The Army and Economic Mobilization*, chs. XXII, XXIII.

[89] S Rpt 480, Part 8 (1942), p. 12.

[90] (1) Memo, OCofOrd for OQMG, 29 Jan 41. 635 (Kankakee OW) I. (2) Compl Rpt, Kankakee OW, 11 Aug 44, Secs 5.305 and 5.307. (3) Ltr, Stone & Webster to Creedon, 11 Feb 41. 601.1 (Kankakee OW) III. (4) 600.914 (Kankakee OW) I. (5) Ltr, OQMG to Stone & Webster, 1 Apr 41. QM 161 (E. I. DuPont de Nemours Co.).

When, on 1 April, seven Ordnance projects received closer deadlines, vigorous action followed to hasten deliveries of steel. Contractors paid large premiums for warehouse stocks. Troubleshooters intensified their efforts. At the Indiana Ordnance Works, DuPont enlarged its "Urging Department" to 52 persons.[91] Then came the mid-April speedup of small arms ammunition projects.

Whether the plants could be complete by 30 September would depend primarily on supplies of structural steel. When Patterson directed the speedup, steel was on order for the three ammunition plants, but delivery schedules of course reflected original completion dates. Bids on steel for the armor-piercing core plant had not yet come in.[92] Early deliveries were now imperative, but prospects of obtaining them were bleak. The mills, already operating at capacity, were booked far ahead. Labor disturbances were threatening to choke off vital supplies of coal. Warehouse stocks were just about exhausted. "We are facing tough problems," Major Wilson stated. "When you take a plant scheduled for completion one year from now and try to complete it in five months, you have a job on your hands."[93]

The Operations Branch tackled the problem from several angles. Finding, on opening bids for the core plant, that steel would be "awfully late," Groves thought of switching to reinforced concrete but gave the idea up on learning that redesign would take too long. Pursuing what appeared to be another forlorn hope, Wilson scoured the country for reserve stocks of structural shapes.[94] By exerting pressure on mills and fabricators, Creedon obtained fairly good results. Suppliers agreed to step up deliveries to ammunition projects. "We have arranged to take certain materials from jobs scheduled for defense and otherwise," an official of the American Bridge Company explained, "and simply put back other jobs which may be as important as this." But the new schedules were not entirely satisfactory, for under them one building at St. Louis could not possibly be up by the end of September and three other structures at the same plant would be dangerously close to the deadline.[95]

On 28 April, in an effort to wring further concessions, Creedon conferred with representatives of American Bridge, Bethlehem, and the Mississippi Valley Structural Steel Company. Discussion revolved around the four buildings at St. Louis, which Creedon called "the key to the progress." The steel men held out little hope. Bethlehem's representative warned that further changes in rolling schedules would disrupt the whole defense program. "If you were given a priority, would that place the steel on these construction jobs ahead of anything

[91] (1) Memo, Wilson for Patterson, 19 Feb 41. 411.5 I. (2) Opns Br Files, Proj Behind Schedule. (3) Memo, Design Sec Arch Gp for Casey, 12 Apr 41. 411.5 I. (4) Memo, Design Sec for Leavey, 1 Apr 41. Opns Br Files, Ord Corresp. (5) Ltr, OZCQM 7 to Groves, 30 Apr 41. 600.914 (Iowa OP) I. (6) Compl Rpt, Indiana OW, 6 Nov 42, p. 384.

[92] Memo, Somervell for Campbell, 21 Apr 41. QM 635 (Ammo Plants) 1941.

[93] Notes of Conf, Creedon, Wilson, and Reps of Various Steel Companies, 28 Apr 41. Opns Br Files, Ord—Corresp.

[94] (1) Tel Convs, Groves and Mr. Giffels, Giffels and Vallet, 23, 24 Apr 41. Opns Br Files, Armor Piercing Core Plant, St. Louis. (2) Groves Comments, VIII, 9. (3) Memo, Wilson for Groves, 29 Apr 41. Opns Br Files, Ord—Corresp.

[95] Notes of Conf, 28 Apr 41, Creedon, Wilson, and Reps of Various Steel Companies. Opns Br Files, Ord—Corresp.

else you have?" Creedon asked him. "That would not help the situation at all," came the reply. "This schedule is as fast as it is possible to do it. It is a very remarkable schedule." The other industrialists set no great store by priorities, either. "I don't know what we can do that we have not already done," said one of them. Creedon encouraged the men to go back to their home offices and try once more to find a solution. There was no other course he could take.[96]

Professing a good deal of faith in preference ratings, Somervell meanwhile demanded that ammunition plants have top priority. On 24 April General Spalding had asked ANMB to assign these projects an A–1–b rating, but this request was no sooner granted than Somervell complained that the rating was too low.[97] He approached Spalding for an A–1–a priority. "The reaction was not favorable," Wilson told Groves. The only A–1–a ratings granted so far had been for machine tools to make other machine tools. Moreover, Patterson feared that too many top ratings would wreck the priority system.[98] Somervell persisted. On 29 April he telephoned from Denver. Telling Groves to send a transcript of the conversation to Patterson, he said: "Unless we can get the A–1–a priority on these three plants, I can't promise them to them by September 30. . . . If he wants to keep it A–1–b, it'll make it very doubtful as to the completion date."[99] This stratagem failed. On 30 April Patterson again refused to recommend an "A–1–a blanket priority," suggesting that Somervell might later seek the higher rating "on certain items" if necessary.[100]

The day he turned down Somervell's request, Patterson took a salutory step. Mincing no words, he urged OPM to place steel on the Critical List at once. "At the present time," he said, "we know that structural steel is going to various types of civilian construction, hotels, theaters, etc. Unless we can get more prompt deliveries than are at present indicated, our program on plants for which we have the greatest need will be months in arrears."[101] That afternoon he got word that steel would go on the Critical List the following day. He immediately passed the good news on to Somervell, advising him to take every advantage of the situation.[102] Somervell was gratified but did not relax his efforts to obtain top priority for the small arms ammunition projects.

He soon made another try. On 2 May he put it squarely to Patterson: procure an A–1–a blanket priority or forget about the 30 September deadline.[103] This time the Under Secretary gave way. Having just learned that the Navy had obtained A–1–a priority for several important projects, he contended: "A similar rating for Small Arms Ammunition Plants should be readily agreed to by the Navy since it is dependent on Army Ordnance for small arms ammuni-

[96] *Ibid.*

[97] Memo, Spalding for ANMB, 24 Apr 41, and 1st Ind, 25 Apr 41. Opns Br Files, Ord—Corresp.

[98] Memo, Wilson for Groves, 29 Apr 41. Opns Br Files, Ord—Corresp.

[99] Tel Conv, Somervell and Groves, 29 Apr 41. QM 635 (Ammo Plants) 1941.

[100] Memo, OUSW Prod Br for TQMG, 30 Apr 41. QM 635 (Ammo Plants) 1941.

[101] Memo, Patterson for Stettinius, 30 Apr 41. USW Files, Misc & Sub—Steel thru Dec.

[102] Memo, Patterson for Somervell, 30 Apr 41. 411.5 I.

[103] Memo, Somervell for Patterson, 2 May 41. QM 635 (Ammo Plants) 1941.

tion."[104] At a meeting of the OPM council on 6 May, Patterson spoke of the ammunition plants as the "most urgent Army requirement," and Knudsen agreed.[105] Two days later, ANMB rated St. Louis, Lake City, and Denver A–1–a.[106]

Gradually the outlook for the ammunition projects improved. Steel companies advanced delivery dates a bit further, and Major Wilson located warehousemen who claimed to have stocks of structural steel. If all orders were filled, all promises kept, Lake City appeared certain to meet the deadline; Denver, highly likely. All signs pointed to completion of the core plant during August and of three main buildings at St. Louis by the end of September. A fourth building at St. Louis was still in doubt but might possibly get in under the wire.[107] Groves, though encouraged, was skeptical. "It's a question of steel and various other things and that's why I'm not absolutely sure about it," he said of the prospect for completing the four plants on time.[108] Nor was he sure that warehousemen could deliver structural shapes. "Now we don't know," he mused, "lot's of steel people say they've got them, and other steel people say that they are lying and they haven't got them."[109] Others shared Groves' doubts. Colonel Dunstan, the Zone CQM at San Antonio, told that steel was promised to Denver on a given date, remarked: "Of course, that's not exactly the same as the steel rolling in there."[110] Even so, Somervell was confident. Late in May he assured Patterson that the plants would be complete on or before 30 September.[111]

All this was merely a preview of what followed. By May the shortage was growing worse and anxiety was spreading. From project after project came the report: construction delayed for lack of steel. Edgewood, Weldon Spring, New River, Hoosier, the Fostoria Chemical Warfare Plant, the Anniston Ordnance Depot—these and other projects called for help. The clothing renovation plants were in desperate shape. Scheduled for completion no later than 1 August, they were slated for deliveries of structural steel in September and October. Greatly concerned, Patterson persuaded OPM to issue blanket priority ratings to all projects experiencing difficulty with steel.[112] Buoyant, Somervell told his staff: "We can now obtain the priority ratings we desire on steel."[113]

Announcement of OPM's policy brought a flood of requests for priorities, and in due time many were granted. The new ratings, which ranged from A–1–h for bag loaders to A–1–b for explosives plants, seemed to inspire hope. Many now felt confident that steel would soon be forthcoming. But faith in priori-

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[104] 1st Ind, 5 May 41, OUSW to ANMB on the above.

[105] CPA, *Minutes of the Council of the Office of Production Management*, p. 18.

[106] Memo, OUSW Prod Br for TQMG, 8 May 41. QM 635 (Ammo Plants) 1941.

[107] (1) Memo, Wilson for Groves, 1 May 41. Opns Br Files, Ord—Corresp. (2) Memo, Creedon for Farrell, 5 May 41. Opns Br Files, St. Louis OP—Corresp.

[108] Tel Conv, Groves and Shaffer, 19 May 41. Opns Br Files, Ord.

[109] Tel Conv, Groves and CQM St. Louis OP, 30 Apr 41. Opns Br Files, St. Louis OP—Corresp.

[110] Tel Conv, Dunstan and Groves, 10 May 41. Opns Br Files, Ord.

[111] Memo, Somervell for Patterson, 27 May 41. 411.5 I.

[112] (1) Opns Br Files, Proj Behind Schedule. (2) Memo, Patterson for Somervell, 7 May 41. 411.5 I.

[113] Min, Constr Div Staff Mtg, 9 May 41. EHD Files.

ties, though prevalent, was to a large extent ill-founded. A haze of wishful thinking obscured the obvious fact that wholesale granting of priorities would weaken the system. "A preference rating is not a 'magic carpet'," Colonel Vandervoort reminded the CQM at Fostoria, adding:

> The mere assignment of one does not insure delivery of material by the date required. The principal step is to anticipate requirements and to place orders timely; then after placement a follow-up should be made with suppliers to determine whether difficulties have arisen which might delay deliveries.[114]

Vandervoort's advice was sound. A priority was little more than a hunting license.

Priorities became less meaningful as more projects acquired top ratings, a process compared by Donald Nelson to the depreciation of currency in a period of inflation. By mid-June Somervell felt impelled to ask for A–1–a ratings on all Ordnance plants. He did so with the backing of General Wesson, who requested the highest priority for processing equipment as well as for building materials. ANMB denied the request. Nevertheless, the number of plants with A–1–a ratings rose steadily. Just as steadily, the value of these ratings declined.[115] To illustrate, the Weldon Spring plant, after jumping from A–1–e in May to A–1–b in June, went to A–1–a early in July. But too late. Creedon reported that "many vendors held previous A–1–a priorities . . . which were given precedence, thus resulting in delay of material and equipment for this project." Elsewhere A–1–a ratings were likewise ineffective.[116] By August the priorities system had virtually broken down.

On 28 August President Roosevelt abolished the Priorities Committee of OPM and replaced it with the Supply Priorities and Allocations Board (SPAB) in the Office for Emergency Management (OEM). SPAB, as its name implied, not only exercised the priorities function but also allocated materials, that is, decided how much of the total supply of any critical commodity would go for defense, for foreign aid, and for civilian use. Early in September steel and pig iron went under complete mandatory priority control, which meant allocation of the entire national production of these materials. At the same time, SPAB ruled out priorities assistance for expanding plants with no defense orders. A month later it extended this ruling to all nonessential building. Henceforth priorities would go only to defense projects and to projects necessary for public health and safety. Although SPAB's criteria were vague, its orders had a marked effect. According to the New York *Times*, construction in the Eastern states declined 24 percent between October and December 1941.[117] But for first-wave munitions projects, the im-

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[114] Ltr, Vandervoort to CQM, Fostoria CWS Plant, 11 Jul 41. QM 161 (ZCQM 5) 1941.

[115] (1) Donald M. Nelson, *Arsenal of Democracy, The Story of American War Production* (New York: Harcourt, Brace and Company, 1946), pp. 141–45, 155ff. (2) Memo, Somervell for Patterson, 19 Jun 41, with Wesson's Ind. QM 635 (Ammo Plants) 1941. (3) Memo, ANMB for TQMG, 12 Jul 41. 161 (Ord Dept) (Pref Rat) Part 1.

[116] Incl with Memo, Creedon for Groves, 21 Aug 41. Opns Br Files, Weekly PR's—F. R. Creedon.

[117] (1) Executive Order 8875 (6 *F. R.* 6511), 28 Aug 41. (2) OQMG Circ Ltr 221, 2 Sep 41. (3) Reginald C. McGrane, The Facilities and Construction Program of the War Production Board and Predecessor Agencies, May 1940 to May 1945 (WPB Sp Study 19), pp. 67–70.

provement came too late. By the time SPAB's orders began to take hold, the program was nearly over.

Where production controls failed, the Construction Division fell back on other devices—expediting, conservation, and redesign. Within the organization were men who knew how to locate scarce items, trim requirements, and contrive acceptable substitutes. Heading up the expediting drive was Major Wilson, who displayed a marked talent for finding materials others could not find. Sparking the effort to conserve scarce commodities was Harry B. Zackrison, an able engineer who had been with the division since 1933. Directing the work of redesign was Colonel Casey, holder of a doctor's degree from the Technische Hochschule at Berlin and one of the most brilliant engineers in the Army. Seasoned construction officers in close touch with the field, men like Groves and Dunstan, furnished practical suggestions. So did many contractors. By working together, exchanging ideas, and considering problems from different angles, members of the construction team were able to cope with the shortage.

New standards and designs promised to save large quantities of steel. Concrete doors, timber trusses, lighter rail, reinforcing mesh instead of rods—these were some of the suggestions reaching Casey's desk. Others envisaged frame warehouses for inert storage and simpler rail and utilities systems. After reviewing these recommendations, Engineers, construction men, and Ordnance representatives endorsed most of them. Substitutions were many. For example, at the Ohio River ammonia plant, temporary wooden frames supported miles of heavy overhead piping; and at Kankakee, wood and concrete roof decks and timber framing were much in evidence.[118] Describing some of the measures taken to cut steel consumption, Colonel Leavey wrote in June 1941:

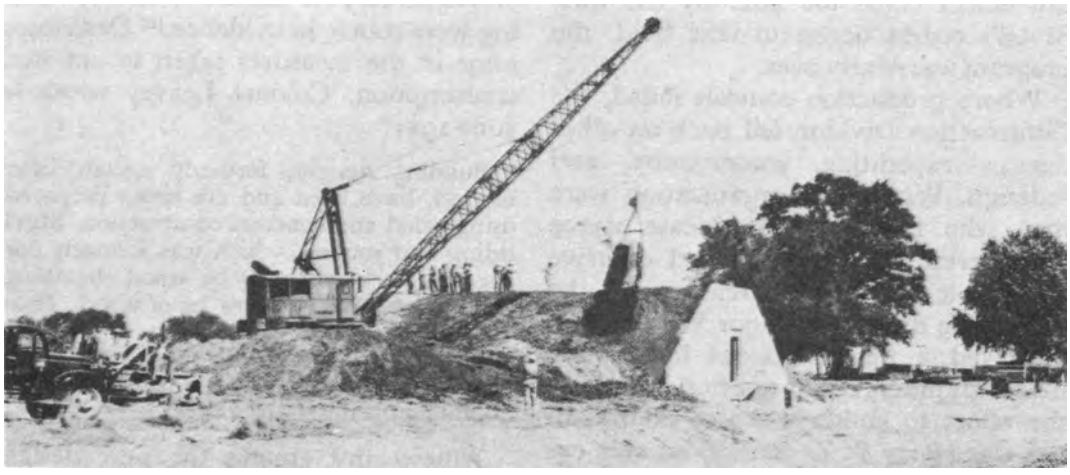
> Building designs, formerly accomplished in steel, have been and are being prepared, using wood and concrete construction. Much siding and roofing, which was formerly corrugated steel, will now be wood sheathing. Steel fence posts will now be of wood. These efforts have been made both to conserve steel and to decrease the time necessary to complete a project because of the delay in obtaining the necessary steel.[119]

Noteworthy among the new designs was one for igloos, the barrel-arched, earth-covered magazines of reinforced concrete used for storing ammunition. These structures were an outgrowth of the lightning-caused disaster which had flattened the Navy's ammunition depot at New Denmark, New Jersey, and part of neighboring Picatinny Arsenal in 1926. Designed in 1928, the standard igloo had two salient features—a semicylindrical shape which would direct the force of an explosion upward rather than outward and an elaborate system of lightning protection which included not only lightning rods but also steel reinforcing rods, closely set and welded. For some years before the emergency the Construction Division had argued unsuccessfully that the igloos were super safe. When Casey began his review of

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[118] (1) Notes of Conf between Reps of Ord Dept, OPM, and Constr Div, 17 Jun 41. 635 Part 1. (2) Memo, Casey for Leavey, 1 Apr 41. Opns Br Files, Ord—Corresp. (3) Memo, Arch Gp Design Sec for Casey, 12 Apr 41. 411.5 1. (4) Memo, Farrell for Groves, 6 Jun 41. Opns Br Files, Staff Mtgs—1941. (5) Compl Rpt, Ohio River OW, 31 Oct 42, p. 15. (6) Compl Rpt, Kankakee OW, 11 Aug 44, Sec 4.206.

[119] Memo, Leavey for Proc Control Br Plan and Control Div OQMG, 27 Jun 41. 400.8 Part 1.



CONSTRUCTING STANDARD IGLOO MAGAZINE

standard plans and drawings early in 1941, he gave the igloo design especially close scrutiny.[120] As Groves explained to one Ordnance officer, "If you're doing 20 or 30 [igloos] or even 100, it doesn't matter; but when you start to build about 1,000, why, then, if it's unnecessary, we certainly ought to know."[121] Casey consulted Dr. Karl B. McEachron, chief of General Electric's high voltage laboratory, about the system of lightning protection. He also weighed a proposal by Colonel Dunstan to eliminate tie beams by reinforcing the concrete slab floor to take the thrust of the arch. After careful study and many consultations, Casey adopted Dunstan's idea, reduced the number of reinforcing rods, eliminated a good deal of the welding, and modified footings and other details. In June, with McEachron's help, he persuaded Ordnance to accept the changes. The new design saved not only steel but labor and money as well. Casey took particular pride in the monetary saving—an estimated $800 to $2,000 per igloo. Since tens of thousands of igloos would eventually be built, the potential saving was indeed sizable.[122]

Systematic conservation reduced steel requirements still further. Beginning early in 1941, when he joined the Federal Specifications Committee on Metals, Zackrison continually searched the specifications with a view to conserving strategic and critical materials. In June, when Patterson inaugurated a comprehensive conservation program for the Army, Zackrison assumed additional duties as Casey's liaison with OPM. In time his contacts widened to include the new Conservation Section of the Com-

[120] (1) Thomson and Mayo, *Ordnance Department: Procurement and Supply*, pp. 360–61, 368. (2) 1st Ind, 12 Jun 41, on Ltr, OQMG to CofOrd, 21 May 41. 633 I. (3) Groves Comments, VIII, 14. (4) 633 I.

[121] Tel Conv, Groves and Maj Rogers, Ord, 6 May 41. Opns Br Files, Ord.

[122] (1) 633 I. (2) Opns Br Files, Igloos. (3) Notes of Conf between Reps of Ord Dept, OPM, and Constr Div, 17 Jun 41. 635 Part 1. (4) OQMG Constr Div Ltr 391, 6 Aug 41. EHD Files. (5) Ltr, Casey to EHD, 11 Jul 55.

modities Division, Planning Branch, OUSW, other government agencies, and various advisory committees of scientists and industrialists. Initially, Zackrison's object was to find substitutes for magnesium, aluminum, tungsten, nickel, and zinc. Savings of steel were incidental. For example, he switched from stainless steel to glass mirrors in order to save nickel. But before long he was giving special attention to steel. New details, such as brick and mortar manhole covers and wood shelving, appeared in the specifications. Many familiar features, such as top rails of chain link fences, disappeared. Most of the changes were relatively minor, important only for their cumulative effect. A few were major; for instance, substitution of flanged beams for I-beams reduced steel requirements on many structures 20 to 25 percent.[123]

In face of the growing steel shortage, Major Wilson applied more aggressive expediting tactics. He kept track of rolling schedules and inventory levels and stationed resident expediters at some of the larger mills. He asked zone and project CQM's to watch for signs of impending delays. At the first hint of difficulty, he dispatched a trouble-shooter to the project.[124] Occasionally, he used unorthodox methods. When contractors encountered difficulty in obtaining rail, he tried "to coax and bluff the railroad companies" into selling stocks of relay rail. When a scarcity of reinforcing billet steel threatened to shut down some jobs, he secured re-rolled rails from the railroads; Quartermaster projects received deliveries when "practically no one else in the country could buy rods."[125] Much of the steel for the armor-piercing core plant came from wreckers who had dismantled the Century of Progress buildings at the New York World's Fair.[126] So vigorous were Wilson's methods that protests were inevitable. A member of the ANMB Steel Committee complained about the routing of "requests for expediting deliveries of required materials to many different sources, with the consequent numerous telephone calls, conflicting instructions, wasted time and money."[127] Criticism notwithstanding, Wilson got results. By November 1941 he could report 18,000 successful expediting actions.[128]

The united efforts of Casey, Zackrison, Wilson, and others eased the pinch. Although many projects continued to have trouble with deliveries, few suffered seriously for want of steel.

Completing the First-Wave Plants

By mid-1941 the outlook was brightening. During July three new plants, Ogden, Elwood, and Iowa, began partial operation; the new Jefferson Proving Ground opened; the Detroit Tank Arsenal started quantity production; and

[123] (1) Memo, Zackrison for Casey, 10 Apr 41. Design Sec Info Office File I. (2) Directive, OUSW, 11 Jun 41, p. 1. (3) Memo, Design Sec for All Unit and Gp Chiefs, 14 Jun 41. Design Sec Info Office File I. (4) Memo, Leavey for Proc Control Br Plan and Control Div OQMG, 27 Jun 41. (5) OQMG Circ Ltr 221, 2 Sep 41. (6) 411.5 Part 1.

[124] (1) Memo, Wilson for Groves, 20 May 41. Opns Br Files, Orgn. (2) Ltr, Wilson to ZCQM 3, 18 Jul 41. Opns Br Files, ZCQM's. (3) Memo, Groves for Styer, 15 Nov 41. Opns Br Files, Augusta Arsenal. (4) Memo, Wilson for Groves, 10 Jul 41. Opns Br Files, Weldon Spring OW.

[125] Rpt, Activities of P&E Sec, 1941. EHD Files.

[126] Wilson's Comments on Constr MS, VI, 105.

[127] Memo, ANMB for Patterson, 14 Oct 41. USW Files, Misc & Sub—Steel thru Dec.

[128] Rpt, Activities of the Constr Div, Jul 40–Nov 41, pp. 64–65.

workmen finished the addition to Frankford Arsenal. On 15 July Patterson announced that the first-wave plants "commenced last fall . . . are either completed or approaching completion." He went on to state, "We believe that they will all be in operation in September." Moreover, he related, "Large quantities of components have already been manufactured and when production of other components at the new plants catches up we believe that the completion of critical items of equipment and ammunition will then quickly accelerate."[129] In a similar vein, Harrison reported "good progress on munitions plants," noting that "with minor exceptions the projects so far approved are well along." He predicted that September would "see in operation about one-half of the productive capacity of the plants" and that all the plants would be approaching full production by the end of the year.[130]

Confident predictions were more easily made than realized. Plants were susceptible to many of the same ills that had plagued camps and cantonments. Contractors sometimes muddled unfamiliar tasks. Constructing Quartermasters were not always equal to their jobs. Shortages of skilled workmen, scarcities of supplies, tardy reimbursements, and inadequate plans were recurring complaints. Groves and Creedon had proven techniques for coping with most of these difficulties. Disregarding line and staff channels, they maintained direct contact with the field. Weekly reports from every CQM, frequent inspections, and hundreds of telephone calls enabled them to keep their fingers on the pulse of the projects. They quickly diagnosed common ailments and applied standard remedies. Where deliveries were slow, they alerted Major Wilson. Where skilled workers were in short supply, they raised wage rates or authorized overtime. Where circumstances warranted, they put pressure on design consultants and field auditors. When Kankakee continued to slip further and further behind, they relieved the Ordnance officer who served as CQM and transferred Kadlec from Detroit to replace him. When friction developed between the CQM at St. Louis and officials of the Western Cartridge Company, they sent another officer to the job.[131]

Groves and Creedon's pharmacopoeia contained no preventive for work stoppages and slowdowns. Between the middle of March and the end of July, 29 strikes, most of them for higher wages, occurred at munitions projects; a total of 49,500 man-days was lost. Hardest hit were Ravenna with 31,100 man-days lost, Radford with 6,826, and Kankakee with 1,117.[132] How many slowdowns took place within this period and how deeply they cut into production was unknown. Kankakee and Elwood suffered to some extent.[133] By far the worst damage was at the St. Louis Ordnance Plant. In the spring of 1941, soon after this project got orders to speed up, signs of a slowdown were evident. "All crafts have a WPA gait," one of the contractor's representatives reported in mid-

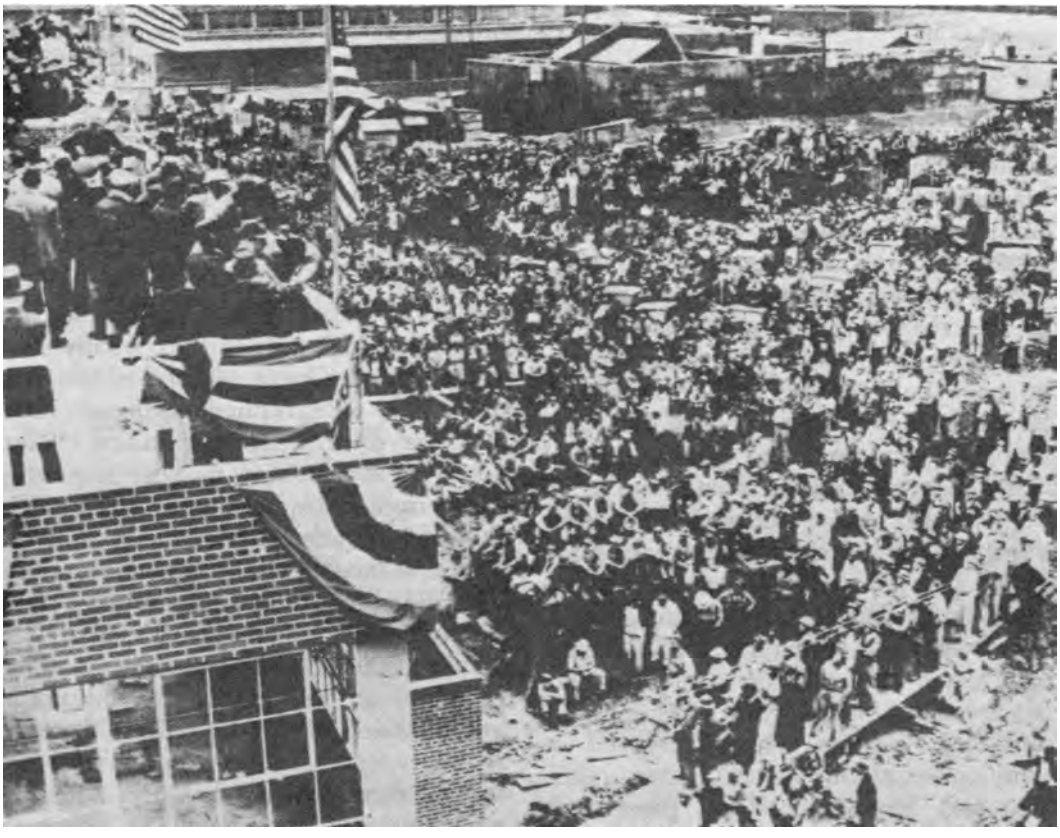
[129] Truman Comm *Hearings*, Part 6, p. 1523.

[130] Memo, Harrison for J. D. Biggers, OPM, 23 Jul 41. QM 600.1 (Def Constr) 1941.

[131] (1) Opns Br Files, Proj Behind Schedule. (2) Min, Constr Div Staff Mtgs, 1941. EHD Files. (3) Rpt, Activities of the Constr Div, Jul 40–Nov 41, pp. 207, 219. (4) Opns Br Files, St. Louis OP.

[132] Statistical Tables, EHD, 1949, Strikes in the Mil Constr Program. EHD Files.

[133] (1) Ltr, E. J. Briggs, Briggs Constr Co., Chicago, Ill., to Truman Comm, 17 Jul 41. Opns Br Files, Ft Bragg. (2) 600.1 (Elwood OP) (Labor) I.



SOMERVELL ADDRESSING CONSTRUCTION FORCE AT ST. LOUIS ORDNANCE PLANT

May.[134] Bricklayers were especially dilatory, averaging 350 bricks a day on straight walls, where 800 to 900 was the norm. Terming their conduct "one of the outstanding disgraces of World War II," Groves related:

> Every effort was made within the power of our organization to make the bricklayers do an honest day's work. Despite repeated promises from Harry Bates, their international president, this could never be achieved. It reached the point where I personally informed Mr. Bates that, insofar as I was able, all brick work would be held to a minimum on Army construction, for the very definite reason that his members were unwilling to do an honest day's work. The number of bricks, per day per man, . . . remained pitifully small.[135]

On 5 July Somervell addressed a mass meeting of all artisans on the project and pleaded for more production, but to little avail. Opinion differed as to the reason for this and other slowdowns. One theory was that workmen were stretching out the work; another, that they were after more overtime; and still another, that the unions were attempting to create

[134] Min, Mtg, OCQM, St. Louis OP, 17 May 41. Opns Br Files, St. Louis OP—Corresp.

[135] Groves Comments, VII, 4.

more jobs. All these theories seemed plausible.[136]

Early in August, widespread trouble flared. An agreement effective on 1 August, between the AFL Building Trades Department and government defense construction agencies, eliminated double time premiums and established a universal time and a half rate for overtime, weekend, and holiday work.[137] On the 2d a rash of protest strikes broke out, all of them at munitions projects. During the next four weeks, 55,747 man-days were lost, more time than in the preceding five months, and this in spite of the fact that most of the strikers stayed off the job only over weekends. Thirteen projects were affected, including Kankakee, Morgantown, Plum Brook, St. Louis, Lake City, and Weldon Spring. The stoppages at Kankakee and Morgantown lasted only one day, but elsewhere they extended over several weekends. Of four major strikes which occurred at Army construction projects between July 1940 and September 1945, three took place during August 1941. A strike at the St. Louis Ordnance Plant involved all crafts and a total of 24,534 man-days lost. Beginning on 2 August this strike dragged on until 30 September. Lake City and Weldon Spring each lost 11,000 man-days in the course of three weekends.[138] Unrest hurt progress during the week even though everyone was on the job. As the CQM at Weldon Spring described it:

> The fact that at various times the different crafts would agree to work under provision provided by . . . [the Building Trades Agreement] and then later withdraw has seriously handicapped the work even though only one craft would refuse to go along. This [has been] unsatisfactorily reflected in all phases of operations and the confusion and dissatisfaction among the workers that were employed has necessarily resulted in a great loss of time during the week as well as on weekends.[139]

Thanks to the Building Trades Department, the commotion finally died down. When Coyne learned of the stoppages, he telegraphed national headquarters of the striking unions: "Contact your local union by wire requesting their immediate co-operation."[140] The Building Trades Department and the nationals faced a challenge—maintaining discipline among the rank and file. When the plumbers at St. Louis persisted in defying the agreement, the national president ordered immediate compliance and followed this up by telling his representative to assume jurisdiction and protect all those wishing to work. After this representative threatened to man the job with other plumbers, the local accepted the time and a half rate. As a "salve to the unions," Somervell authorized 10-hour shifts and hikes in basic wage rates at some projects.[141] By September the strikes had abated and the projects were regaining lost momentum.

Completion of plant buildings was timed to coincide with deliveries of

[136] (1) Rpt, OZCQM 7 to OQMG, 15 Jul 41. LRBr Files, St. Louis OP—Gen Corresp. (2) Comments of Gen Campbell on Constr MS, VIII, 83. (3) S Rpt 480, Part 6, Apr 6, 1942, p. 6.

[137] For a detailed discussion of this agreement see pp. 366–71, below.

[138] Statistical Tables, EHD, 1949, Strikes in the Mil Constr Program. EHD Files.

[139] Telg, CQM Weldon Spring OW to OQMG, 18 Aug 41. 600.1 (Weldon Spring OW) (Labor).

[140] Telg, Coyne to Attached List, 7 Aug 41. LRBr Files, Bldg and Constr Trades Dept.

[141] (1) Telg, President George Masterson, United Assn of Journeymen Plumbers, to F. T. Schlenzig, Gen Organizer, St. Louis, 3 Sep 41. (2) Telg, H. B. Deal & Co. to OQMG, 15 Sep 41. Both in LRBr Files, St. Louis OP. (3) Memo, Creedon for Groves, 11 Aug 41. Opns Br Files, St. Louis OP. (4) Ltr, Fruco Constr Co. to Somervell, 23 Sep 41. 161 (Fruco Constr Co.).

processing equipment. As the big structures were glazed and roofed in, as acid-resistant or spark-proof surfaces were applied to heavy concrete floors, as finishing touches were put to complex piping and electrical systems, crews began tooling up the plants. A function of the using services, procurement of the highly specialized processing machinery was immensely difficult. Secret patents were one obstacle. Specifications calling for scarce materials were another. Moreover few foundries and machine shops were equal to the job. Anticipating emergency needs, Ordnance in the late 1930's had obtained funds for securing machinery for small arms ammunition, powder, and loading plants. As Under Secretary Patterson pointed out, "The reserve machinery thus procured was of immeasurable value."[142] But the reserve was far from adequate. Despite prodigious efforts by Ordnance and Chemical Warfare officers and operating contractors to expedite production of additional equipment, deliveries were disappointingly slow. "In a number of cases," Groves reported, "extra expenditures were made to save time in construction which then stood idle while we waited for the last bit of machinery necessary to make it a productive unit."[143]

As the plants reached completion, unit by unit and line by line, there was an agonizing decision to make. To begin producing ammunition and explosives while construction forces worked nearby would be extremely hazardous. The dust and noise of construction would increase the risk of explosion. In event of an accidental blow, large numbers of workmen, unaccustomed to the perils of explosives, would be within the danger zone. Ordnance was justly proud of its safety record. So were munitions manufacturers, and especially DuPont. Safety was a "must" in their operations. Yet the nation's survival might be at stake. DuPont faced the issue one Sunday morning early in September 1941, when Groves held a meeting at Kankakee. The temporary DNT line at Kankakee, completed in May, had stood idle all these months. Now several TNT lines were almost finished.[144] At the conference Groves explained "that TNT was badly needed, that the shortage would be desperate in the event of war, and that undue regard for the lives and safety of a relatively small number of employees and the safety reputation of the DuPont Company and of the Ordnance Department were far outweighed by the possible thousands of casualties which would result from a shortage of TNT if war came." The project manager left the room and returned a short time later to announce that production would begin as soon as the first TNT lines were ready. "I assumed that he called Wilmington but did not ask him," Groves recounted. "I merely congratulated him on his announced viewpoint."[145] Other operating contractors adopted the same attitude. Plant after plant started up while construction was still in progress. Fortunately, there were no major disasters, though one minor explosion did occur in the latter part of 1941.[146]

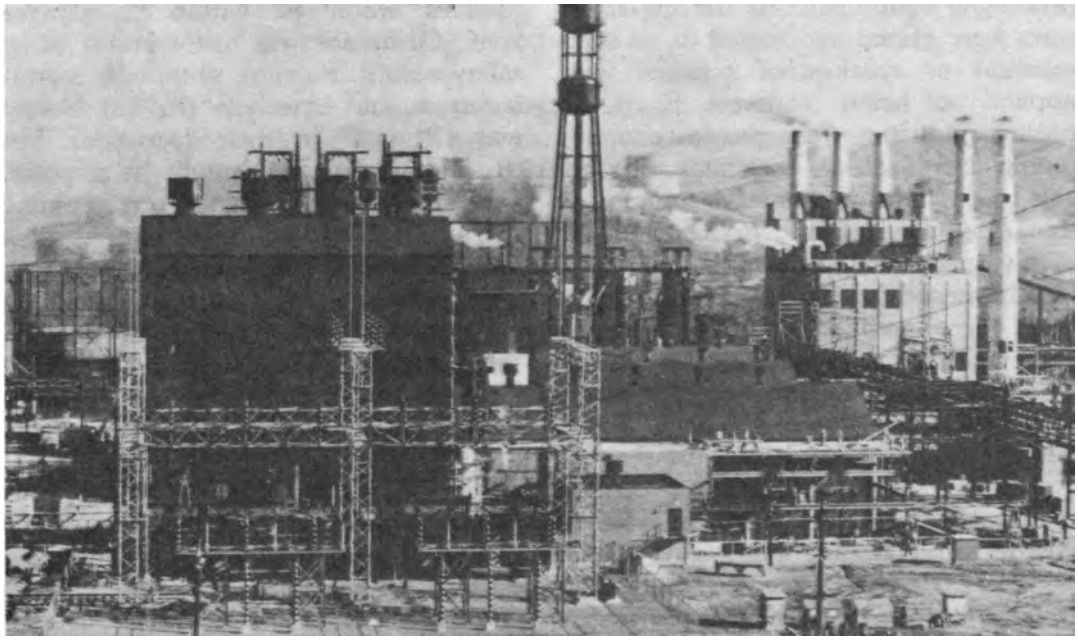
[142] Patterson's Testimony, 15 Jul 41. In Truman Comm *Hearings*, Part 6, p. 1521.

[143] Groves Comments, VIII, 6.

[144] (1) Ltr, CQM Kankakee OW to Somervell, 8 Sep 41. 600.914 (Kankakee OW) I. (2) Compl Rpt, Kankakee OW, 11 Aug 44, Introd, and Secs 1.407, 5.104, 5.201.

[145] Groves Comments, VIII, 7–8.

[146] Two melt loading buildings were destroyed in an explosion at the Iowa Ordnance Plant in December 1941. (1) Compl Rpt, Iowa OP, 15 Aug 42, Book I, p. 1. (2) Ltr, Groves to Dist Engr, Omaha, Neb., 3 Feb 42. 635 (Iowa OP) II.



MORGANTOWN ORDNANCE WORKS, WEST VIRGINIA

The number of Ordnance plants turning out munitions rose steadily. During August Kingsbury, Ravenna, and Wolf Creek began loading shells, the core plant at St. Louis went into operation, and the addition to Picatinny Arsenal reached completion. September saw production start at the Kankakee and Weldon Spring explosives works, the Hoosier and New River bag loading plants, and the Baytown toluol plant. On the 30th the Lake City small arms ammunition plant came through on schedule. Nine days later the Gadsden shell forging plant was ready to begin production. The Denver ammunition plant opened on 15 October, just seven months after the contractor broke ground. On the 20th the first lines at St. Louis were complete, though the plant produced no ammunition for another month. In November Morgantown began turning out ammonia. In December Plum Brook was in shape to produce TNT; and Coosa River, to load bags. By the end of 1941 only two first-wave plants, the Alabama smokeless powder factory and the Ohio River ammonia works, were not yet producing, and these two projects, both late starters, were ahead of schedule.[147]

Construction of Ordnance storage facilities kept pace with production. The five new ammunition depots—Anniston, Portage, Umatilla, Wingate, and Milan—were huge affairs, occupying a total of 110,812 acres. Together, they would provide 3,504 igloos with total floor space of 5,775,512 square feet and

[147] (1) Table, EHD, Compl Dates and Progress—Ord Plants. (2) List, Constr Div OQMG, 24 Nov 41, sub: Ord Plants, Scheduled and Actual Initial Opn Dates. EHD Files. (3) Rpt, OCE, Progress of Mil Constr 42, 31 Dec 41, pp. 117, 139.

38 large magazines with a total of 413,139 square feet.[148] Begun in the late winter and early spring of 1941, the depots made good progress. By late August, Anniston was 32 percent complete; Portage, 55; Umatilla, 30; Wingate, 65; and Milan, not started until June, was 5. At the end of the year, Milan was 84 percent complete; Wingate was 99; and the others were somewhere in between.[149] Provision of inert storage facilities was hardly less rapid. At Ogden 40 warehouses would store casings for the shell and bomb loading plant. By mid-October this $3-million job was 82 percent complete. "To date," Colonel Thomas reported, "thirty-one warehouses have been finished and made available for use, and virtually all of these actually are in use."[150] Elsewhere the story was much the same. None of the plants lacked adequate warehousing at any time.

The Chemical Warfare program came to a close in December 1941. Only one Chemical project had reached completion earlier—the Niagara Falls impregnite plant, which began production on 4 September. Handicapped by low priorities and shortages of expediting funds, the other eight jobs had fallen behind schedule. Deliveries of steel were months late. The contractors, unable to offer much overtime work, were at a disadvantage in the labor market. Through the autumn, as steel trickled in, the projects gained steadily but slowly. Then, spurred by the war crisis, they finished in a blaze of speed. The charcoal-whetlerite plant at Fostoria, Ohio; the impregnite plants at East St. Louis, Illinois, and Midland, Michigan; and the clothing renovation plants at Kansas City, Missouri, and Ogden, Utah—all were completed in December. The work of expanding and rehabilitating Edgewood Arsenal also wound up during the month. The two remaining projects, the clothing renovation plants at Columbus, Ohio, and New Cumberland, Pennsylvania, were ready for use at the turn of the year.[151]

Reporting to Gregory late in 1941, Somervell noted that "huge ordnance manufacturing facilities" stood where there had been "but vacant fields a little over one year ago."

> The whole interior of the United States of America [he wrote] has been transformed into a vast network of great munitions factories, the output of which will forever render this country free of dependence upon any other country for the tools of self-defense. . . .
>
> Today they are producing TNT and DNT, anhydrous ammonia, smokeless powder, toluol, shell forgings, small arms ammunition, armor-piercing cores for shells, armor plate, chemical warfare material, machine guns, rifles and tanks, while others are loading shells and powder-bags. Yet others have been recently authorized and still others are planned.[152]

Rounding out the first-wave plants and completing a second supplementary wave would take time and effort. But the big job was done. When war came to the United States, the new government-owned munitions industry was a reality.

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[148] Rpt, Activities of the Constr Div, Jul 40–Nov 41, pp. 30–32.

[149] (1) Constr PR 34, 30 Aug 41, pp. 78, 82, 88, 103, 98. (2) Rpt, OCE, Progress of Mil Constr 42, 31 Dec 41, pp. 119, 160, 117, 137, 165.

[150] Rpt, Activities of the Constr Div, Jul 40–Nov 41, p. 234.

[151] (1) Rpt, OCE, Progress of Mil Constr 42, 31 Dec 41, pp. 130–33, 134–35, 148–49, 174–75, 98–99, 100–101. (2) EHD, Constr of Chemical Warfare Facils (MS), 1944, p. 15ff. (3) Brophy, Miles, and Cochrane, *Chemical Warfare Service: From Laboratory to Field*, pp. 253–56.

[152] Rpt, Activities of the Constr Div, Jul 40–Nov 41, p. 119.

CHAPTER X

Planning Ahead

"Anyone may be excused for being defeated," said Somervell in December 1940, "but he certainly can have no excuse for being surprised." He intended to foresee developments and to be prepared to meet them. World conditions being what they were, a second, larger building program seemed inevitable, and he would plan accordingly.[1] Soon after taking charge of the Construction Division, he put the question to his staff: what would increasing the Army to 4 million men mean in terms of sites, engineering, personnel, materials, and so forth.[2] Thorough preparations, clear responsibility, sound policies, workable procedures, and a strong organization, ready when the need arose—these were Somervell's goals. Hartman had cherished similar goals but had been unable to achieve them. Commanding far greater support than his predecessor, more flexible and more persuasive, Somervell, in large part, succeeded.

Inspector General Peterson, Somervell's friend and sometime collaborator, started the ball rolling. On 23 December 1940, he wrote General Marshall:

> With the world situation as it is today, no assurance can be given that within a year the War Department will not be undertaking another major housing program. It seems expedient that steps be taken to provide for such a condition, to prevent a recurrence of the major difficulties that have been experienced with the present program, and to insure maximum economy consistent with rapid construction.

Peterson suggested a line of action. The War Department would forecast its requirements and translate them into terms of projects. It would choose sites acceptable not only to users but to builders as well. It would improve standard layouts and revise structural plans in light of recent experience. It would perfect purchasing methods and establish better labor relations. It would develop a more forward-looking organization. Site plans, specifications, estimates, bills of materials, and even personnel assignments would be worked out in advance. Somervell would be all set, ready to call for lump sum bids, when orders came to build.[3] As proposed by Peterson, the idea gained adherents rapidly. Long-range planning—"advance planning" in Armyese—became a co-operative endeavor, embracing many different activities and producing many needed reforms.

Advance Planning—Camps and Cantonments

Additional troop housing was the first planning objective. Meeting on 30 De-

[1] Memo, Somervell for Gregory, 9 Dec 40. EHD Files.

[2] Min, Constr Div Staff Mtg, 20 Dec 40. EHD Files.

[3] Memo, Peterson for Marshall, 23 Dec 40. G–4/30552.

cember at General Marshall's request, Reybold, Twaddle, Peterson, Gregory, and Somervell, together with Brig. Gen. Leonard T. Gerow, who headed WPD, charted a course of action. General Twaddle as G–3 would prepare a schedule of prospective camp requirements for each corps area, giving the type and purpose of each post, the strength and composition of its garrison, and the priorities that would govern construction. Somervell would confer with NDAC on procedures for purchasing materials and with Labor Secretary Frances Perkins on labor policies. On the highly important question of sites, the officers believed the first step ought to be a statement of "general requirements." All agreed that Somervell should take an active part in selection. Accordingly, they adopted a new procedure: G–3 would mark out general areas; Quartermaster officers would then "make a thorough field reconnaissance with a view to developing more specific locations and for the purpose of reporting upon the advantages and disadvantages of alternate sites, insofar as engineering and structural requirements are concerned"; this information would go to corps area and army commanders "for further investigation and final recommendation." Once sites were firm, detailed construction planning would commence. The conferees opened the way for further innovations by proposing that all War Department construction policies "be thoroughly reviewed and brought up to date."[4]

Encouraged by the results of the meeting, Somervell pushed ahead. One after another he issued orders to Colonel Leavey: draw up criteria for selecting camp sites; begin figuring housing requirements for another million men; start revising standard plans and layouts; consider using brick, tile, and other products excluded by the original specifications. He asked the Bureau of the Budget to add $15 million for engineering surveys to supplemental estimates which soon would go to Congress. He conferred with representatives of NDAC and OPM. He probed into the labor situation. Although progress on most fronts was good, on some it was poor. The Budget turned down the $15-million request. No solution to labor relations problems was in sight.[5] Somervell was undismayed by these difficulties; sooner or later, he would overcome them.

One of his first tries was remarkably successful. In conversations with Donald Nelson of OPM, he stressed the advantages of stockpiling lumber. The Army could accumulate lumber gradually, entering the market when prices were low and spacing orders to help maintain production. There would be time for proper drying. Most important, reserve stocks would stand ready against sudden demands. On 15 January, Nelson recommended that the Construction Division stockpile half a billion board feet. Within 24 hours Somervell had the General Staff's approval.[6] By the 30th OPM was demanding to know "rather quickly"

[4] Memo, Reybold for Rcd, 31 Dec 40. G–4/30552.

[5] (1) Min, Constr Div Staff Mtgs, 3, 13 Jan 41. EHD Files. (2) Min, Conf of CAQM's, 27–29 Jan 41, pp. 74–75. (3) Memo, Gregory for Moore, 11 February 41. 600.1 Part 8. (4) Opns Br Files, Lumber. (5) Memo, Somervell for Edward F. McGrady, OSW, 14 Jan 41. QM 600.1 (CPFF) 1941. (6) Memo, Labor Rel Sec for Rcd, 2 Apr 41. Ohly Files, Labor —Constr Policies and Problems 1.

[6] (1) Opns Br Files, Lumber. (2) 411.1 II.

types, quantities, sizes, and destinations.[7] Anxious for the experiment to succeed, Somervell went slowly. Three weeks would go by before he made his first purchase.

In the Engineering Branch, the center of planning activity, January was a strenuous month. Developments proceeded rapidly, as Colonel Leavey rolled up his sleeves. Intensive review of the 700-series plans resulted in numerous changes. The technical staff altered details, refigured stresses, and rewrote specifications. It also prepared new drawings for several types of buildings and issued bulletins for use in planning roads and sewage treatment plants. During January Leavey signed 23 circular letters, nearly half the monthly total for the entire division. A study group investigated commercially available prefabs. The CQM at Camp Polk tested eight experimental barracks, four of steel, two of masonry, and two of hollow tile.[8] Somervell announced that Leavey was creating a special unit to weigh "all these suggestions that have been made with regard to tile buildings, steel buildings, plastic buildings, and every kind of building you have ever heard of."[9] In the midst of these preparations, criteria for camp sites received first attention.

On 26 January, in an 8-page letter to the zones, Somervell detailed new criteria. After outlining military requirements for camps to accommodate at least 30,000 men each, he took up items of interest to the Construction Division—climate, topography, geology, soil conditions, labor, transportation, real estate, and utilities. These matters would receive careful investigation. For every site surveyed, field parties would furnish full particulars on terrain, subsurface rock, natural drainage, flood levels, vegetation, real estate values, availability of adjacent tracts, location of railways and highways, the size of the local labor force, the amount of housing in the area, and more. Water supply, sewerage, electrical power, and fuel would get especially close attention. "Too much stress cannot be laid on the question of utilities," Somervell wrote. "Past experience has shown that where original estimates have been greatly exceeded in actual construction, the failure to properly study in advance the conditions affecting the design of utilities has caused most of the deficits." Groves' yardstick of one hundred gallons per man per day would be the gauge for water supplies. Survey teams would cover all nearby sources, including reservoirs, streams, lakes, and springs. They would measure ground water levels and investigate the cost of drilling wells. Where treatment plants, pumping stations, and connecting lines would be necessary, they would fix locations and estimate costs. They would take equally great care with other utilities.[10]

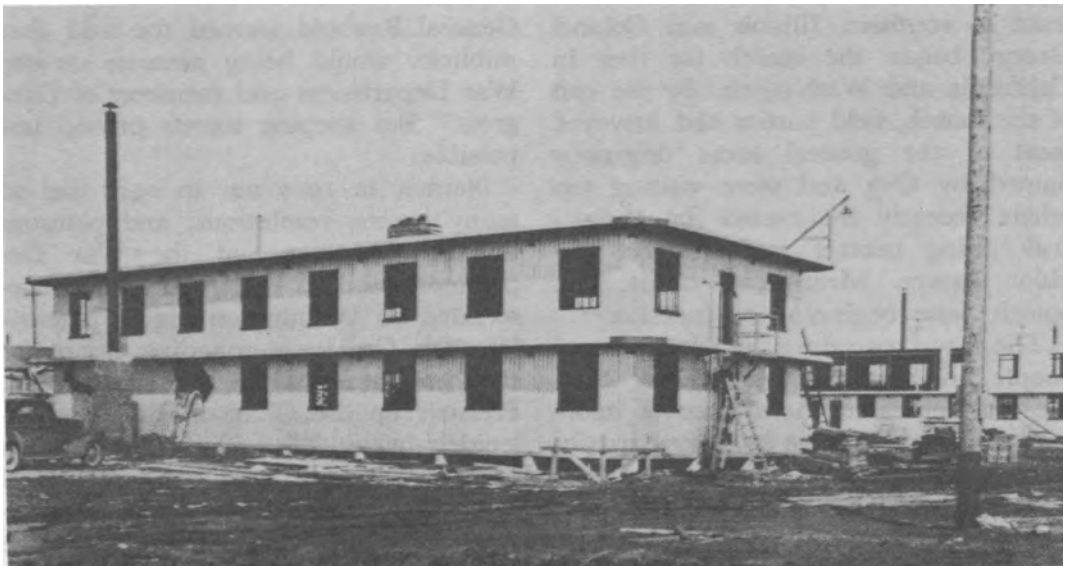
The site selection machinery soon went into motion. In his letter of the 26th, Somervell directed zone Constructing Quartermasters to begin work at once. He inclosed a map showing general areas G–3 had designated for eighteen

[7] Ltr, Dep Dir of Purchases OPM to Somervell, 30 Jan 41. 411.1 II.

[8] (1) Constr Div Circ Ltrs, Jan 41. EHD Files. (2) Memo, Somervell for Leavey, 1 Jan 41. QM 600.1 (Prefab Bldgs) 1937. (3) Ltr, Somervell to CQM Cp Polk, 21 Jan 41. 621 (Cp Polk).

[9] Min, Conf of CAQM's, 27–29 Jan 41, p. 75.

[10] Ltr, Somervell to ZCQM's (except 1st and 2d), 26 Jan 41. QM 685 (ZCQM 3).



EXPERIMENTAL STEEL BARRACKS

triangular division camps. The zones would select three sites desirable from a construction standpoint in each of the G–3 areas and submit their findings to corps area commanders. On the 27th Reybold alerted commanding generals of armies and corps areas: reports from the zones would soon be coming to them. Boards of officers, to be appointed by corps area commanders and to include a zone Constructing Quartermaster, a Medical officer, an Engineer officer, and a representative of the army commander concerned, would then make followup investigations. The boards' recommendations would go to the army commanders, who would forward them with their comments to the War Department for final decision.[11] Explaining the procedure to a meeting of corps area quartermasters late in January, Somervell expressed the hope "that by this new system we won't have to build these camps on places where rock is a few inches beneath the surface and where we have to blast out entire sewer and water lines for a population of 30,000 people."[12]

Investigations were soon under way. The first zone Constructing Quartermaster to report progress was Colonel Green. On 31 January he informed Leavey that maps of general areas in the Fourth Zone were under study and survey teams were at work. A few days later Casey heard from Major Vandervoort that engineering firms from Ohio and Kentucky were exploring sites in the Fifth Zone. During the first week in February Major Hayden inspected a

[11] (1) *Ibid.*, and Incl. (2) WD Ltr AG 601.1 (12–31–40) M–D–M to CG's All Armies . . ., 27 Jan 41. 600.1 Part 8.

[12] Min, Conf of CAQM's, 27–29 Jan 41, p. 74.

tract in southern Illinois and Colonel George began the search for sites in California and Washington. By the end of the month, field parties had surveyed most of the general areas originally named by G–3 and were visiting ten others recently designated for antiaircraft firing centers and armored division camps. Meanwhile, corps area boards were beginning to function.[13]

The new procedure, involving more people and moving more slowly than the old, increased the chance of information leaks and gave interested parties more time to bring pressure to bear. Both Reybold and Somervell had cautioned investigators against publicity of any kind, but with survey teams scouring the countryside, questioning chambers of commerce, and talking to local officials, rumors began to fly. One of the first serious leaks occurred on 2 February, when the Douglas, Arizona, *Daily Dispatch* blazoned the headline: "Some City in the Southwest Will Get New Cantonment, Says Colonel Winston, Investigating Douglas."[14] Winston, a member of a corps area board, had told officials at Douglas that his was a fact-finding expedition, nothing more, and had pledged them to strictest secrecy. Nevertheless, someone talked. The article in the *Dispatch* indicated that the Army was about to build more camps. Other papers picked up the item. General Reybold warned the field that publicity would being pressure on the War Department and members of Congress.[15] But keeping secrets proved impossible.

Neither in 1917 nor in 1940 had so many letters, resolutions, and petitions flooded Congress and the War Department and so many delegations descended on Washington urging particular sites. Citizens demanding camps for their communities besieged Capitol Hill. Pressure on the Chief of Staff was extremely heavy. "As long as this agitation exists," one sympathetic Senator told General Marshall, "there will be hundreds of letters received in your office and my office demanding that something be done about the situation."[16] Appearing before a Senate committee in April 1941, the Chief of Staff referred to the investigations going forward under Reybold and Somervell's direction. "They have been at that for three months," he said. "They have had me involved, it seems, with every chamber of commerce in the United States in one way or another. I am not very popular, I might say."[17] To divorce site selection from politics was immensely difficult; but Marshall attempted to do so, insisting that location of training camps be based "on purely military needs."[18] Among those who received one of his polite but firm refusals was no less a personage than the Senate Majority

[13] (1) Ltr, Green to Leavey, 31 Jan 41. QM 685 (ZCQM 4). (2) Memo, Dreyer for Casey, 5 Feb 41. QM 685 (ZCQM) 1941. (3) Ltr, Hayden to Gregory, 6 Feb 41. QM 685 (ZCQM 6). (4) Ltr, OZCQM 9, Chief Engr to George, 7 Feb 41. (5) Memo, Leavey for Somervell, 26 Feb 41. Last two in QM 685 (ZCQM 9). (6) Memo, Styer for Harvey, 27 Feb 41. Opns Br Files, Constr Advisory Comm. (7) Weekly PR's in QM 685 Various Zones.

[14] Memo, G–4 for TAG, 7 Feb 41. G–4/30552.

[15] (1) Tel Conv, Dunstan and Styer, 7 Feb 41. 652 I. (2) WD Ltr AG 601.1 (2–7–41) M–D to CG Eighth Corps Area, 10 Feb 41. Opns Br Files, ZCQM's.

[16] Ltr, Sen James E. Murray (Mont.) to Marshall, 23 Apr 41. AG 680.1 (7–11–40) (1) Sec 2.

[17] In Truman Comm *Hearings*, Part 1, p. 173.

[18] Ltr, Marshall to Sen Murray, 28 Apr 41. AG 680.1 (7–11–40) (1) Sec 2.

Leader Alben W. Barkley. Barkley took Marshall's explanation in good grace, and so did most other legislators.[19] A few continued to press. When one Senator implied that the Army was discriminating against some states, Marshall assured him "that such is not the case and that the War Department is motivated solely by the desire to proceed on the basis of efficiency in obtaining the maximum amount of training in the shortest possible time."[20]

If political pressure could not bring the Army to an area, public opposition could sometimes keep it out. In May 1941, for example, G–3 designated two general areas for mountain and winter warfare training centers. One was near West Yellowstone, Montana, on the edge of the national park. Zone and corps area groups surveyed the area and settled upon a site which was in many ways ideal for both construction and training. They failed to note that nearby Henry's Lake was a refuge for the last remnant of trumpeter swans in North America. News that the Army intended to build a camp near the bird sanctuary provoked angry protests.[21] Secretary Ickes informed Stimson of the "violent criticism . . . brewing among wildlife interests and nature lovers" and appealed for abandonment of the site. "To install a training camp in the vicinity of Henry's Lake, with artillery practice as one of its principal activities," he wrote, "is certain to endanger the future existence of these splendid birds. . . . From a wildlife standpoint, no more objectionable selection could have been made in the entire Rocky Mountain region."[22] Stimson at first refused to give up the site, but the opposition of naturalists and bird lovers at length caused him to yield. The Army abandoned West Yellowstone.[23]

While site surveys were in progress, Somervell focused on other aspects of long-range planning. Emphasizing that site selection was "just a part of the job," he stated:

> I hope we will . . . also [be] able to lay out the work, complete the plans, so that when the time comes for construction, if it ever does come, we will have completed plans ready and give them to the contractors and tell them to go to work and not just hand out a piece of paper and say, "Here are the plans—let's see some buildings on the lot next week." We have found ourselves in that predicament before and we are now trying to get away from that and want to get the work laid out in a systematic and orderly way.[24]

Experts in many fields participated in this effort. In the Legal and P&E Sections, Majors Jones and Wilson worked out innovations in contracting and procurement. Major Casey, who became chief of Design and Engineering late in January, directed a large and able staff in planning tasks. Bergstrom was his key adviser on architectural matters; Boeckh, on estimates. Leon H. Zach, a Harvard-trained landscape architect and former associate of Olmsted Brothers, who joined Casey in February, master-

[19] (1) Memo, Marshall for Reybold, 7 May 41. (2) Memo, Reybold for Marshall, 9 May 41. Both in AG 680.1 (7–11–40) (1) Sec 2.

[20] Ltr, Marshall to Sen Pat McCarran, 23 Apr 41. OCS 14513–25 to 14593–21 (S).

[21] (1) WD Ltr AG 601.1 (5–8–41) MC–D to TQMG . . . , 12 May 41. 652 (West Yellowstone, Mont.). (2) G–4/32656.

[22] Ltr, Ickes to Stimson, 14 Nov 41. G–4/32656.

[23] (1) Memo and Rcd, G–4 (Mallon) for SGS, 25 Nov 41. G–4/32656. (2) Memo, SGS for G–3, G–4, and TAG, 29 Nov 41. G–4/32656 Sec 2.

[24] Min, Conf of CAQM's, 27–29 Jan 41, p. 75.

planned site development. While he followed closely the work these men were doing, Somervell tackled a job on his own.

On 11 February, the day before the House opened hearings on the big deficiency appropriation bill, he made a second bid for a $15-million engineering survey fund. In a strongly worded memorandum, prepared for Gregory's signature, he reminded General Moore that the money would provide "plans of critical importance to the Nation's defenses." Somervell referred to the international situation and the need for having construction plans "ready for instant action." For years, he pointed out, the Corps of Engineers had received funds for long-range planning of civil projects. He attributed the Corps' ability to carry out construction "in an efficient and economical way" to "this very businesslike and commonsense" procedure. Should not the same procedure be followed on highly important defense projects? Gregory signed the memo and sent it to Moore by special messenger.[25] But nothing came of it. When Harrison telephoned later that day to inquire about the budget, Groves told him the $15 million was out. "Is that final?" Harrison asked. "That's the way we have to present it to Congress," Groves replied, "and we are not allowed to mention the fact that it has been trimmed unless we are asked and I don't know whether General Somervell is going to get asked or not."[26]

Whether by chance or prearrangement, Somervell was asked. Representative D. Lane Powers of New Jersey put the question: "Do you have any funds for planning jobs?" Somervell replied: "No sir. The whole essence of this thing is to have proper plans. In other words, if we could have had a small sum for plans prior to this time, I think I can say conservatively that we would have saved $100,000,000."[27] This statement was to cause Somervell some embarrassment. The press misquoted him as having said that the hundred million would have been saved had he, rather than Hartman, been Chief of Construction at the start of the program. Three months later he was still trying to correct this erroneous impression. But the statement led to other, happier results. The House concluded and the Senate agreed that Somervell should have funds for advance planning. The supplemental appropriation voted in March gave him the $15 million—an important gain toward planning goals.[28] Meanwhile, there were other gains.

Stockpiling of lumber commenced on 24 February, when Major Wilson placed orders for deferred delivery of 95,150,000 board feet. Fifty-one vendors shared in the award; they agreed to process the lumber and hold it in their yards for shipment after 1 May. Their average price, $26.41 per thousand, was well below the average of $33.25 for current delivery which Wilson paid during February. Market conditions being favorable, Wilson continued to buy. In a

[25] Memo, Gregory for Moore, 11 Feb 41. 600.1 Part 8.

[26] Tel Conv, Harrison and Groves, 11 Feb 41. Opns Br Files, Budget.

[27] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on Fourth Supplemental National Defense Appropriation Bill for 1941*, pp. 33, 49–50.

[28] (1) Memo, Somervell for Amberg, 19 May 41. QM 600.1 (Funds) X. (2) Memo, Amberg for Somervell, 20 May 41. USW Files, Legis—H and S Investigating Comm 1. (3) 55 *Stat.* 34.

few weeks he had obligated over $7 million for a stockpile of 265,155,550 board feet. At that point Somervell called a halt. A quarter of a billion board feet would fill 65 percent of known future requirements. With plans for further construction still nebulous, he hesitated to build the reserve higher. The accumulation of a second stockpile could wait until fall. Meanwhile, the division had insurance against a serious shortage.[29]

Changes in the standard lump sum agreement raised hopes for a return to conventional methods of contracting. The lump sum form originally adopted for emergency work carried the usual damages clause, which penalized contractors for delays. Most firms were understandably reluctant to bid competitively on defense contracts containing this clause. A further deterrent was the absence of an escalator clause providing for adjustment of the contract price should materials and labor costs rise. In February 1941, at Somervell's direction, Major Jones set about liberalizing the contract. Assisting him in this work was Joseph P. Tanney, his principal civilian aide. The going was hard, for there were various legal angles to consider and numerous objections to overcome. After soliciting opinions widely—from OPM, the AGC, the Bureau of Yards and Docks, the Bureau of Reclamation, and the Under Secretary's office, Jones and Tanney came up with the following ideas: an escalator clause for long-term contracts; a clause exempting contractors from payment of damages when delays resulted from priority regulations; a more liberal policy on granting extensions of time; and lower damages rates. Patterson gave the necessary approvals.[30] Whether contractors would compete on these terms and submit reasonable bids remained to be seen. Somervell, apparently, thought they would. "Doing jobs on a lump sum basis," he confidently declared, "that is our policy."[31]

"Of course," Major Casey commented, "all of this work is planned to be done on the lump-sum basis and is going to require the preparation of plans and specifications for soliciting bids on the work."[32] Completing the revision of the 700 series was, hence, his first objective. During February and March of 1941, Casey and his staff made innumerable changes in the Quartermaster drawings. On the whole, the new designs were a decided improvement over the old. Heavy timbers and durable roofing materials made for stronger, more lasting structures. The addition of screens, clothing hooks, and balustrades assured troops greater comfort and safety. Substitutions, such as shellac for aluminum paint, promised savings in critical materials. Omission of skirting, "aqua medias," and termite shields made possible substantial savings in funds. Standard station hospitals, widely considered as firetraps, were equipped with fire alarms, sprinkler systems, and draft stops. Hundreds of other changes corrected and

[29] (1) Memo, Wilson for Groves, 25 Feb 41. Opns Br Files, Maj Wilson. (2) Table, Constr Div OQMG, sub: Lumber Awards, Totals, and Av Prices (revised to 30 Jun 41). EHD Files. (3) Opns Br Files, Lumber.

[30] (1) QM 600.1 (Lump Sum Contracts). (2) QM 600.1 (Contracts—Misc) IV. (3) Memo, Capt R. E. Cron for Bergstrom, 11 Jun 41. OCE Legal Div Contracts Br Files, Constr Div Ltrs. (4) 160 Part 2.

[31] Min, Conf of ZCQM's, 7–10 Apr 41, p. 237. EHD Files.

[32] *Ibid.*, p. 125.

refined the 700 series.[33] By April Casey had prepared lithographic prints of the revised drawings. Continuing his review of the plans, he said, "We don't feel at any time they are finished to the last word." Suggestions for further "improvements and economies" were always welcome.[34]

As Casey revised the drawings, he opened up specifications "to permit alternative types of construction."[35] For several months, he and Bergstrom explored the uses of masonry, tile, cinder blocks, plaster, and stucco and tested many types of prefabricated buildings. Their findings took the form of recommendations. They suggested, first, that the Army adopt a plan for two-story hospitals of fire-resistant materials; second, that tents give way to portable prefab huts; and, third, that sturdier materials come into competition with wood. While these proposals gained acceptance in principle, two of them were impracticable during the defense period. Detailed plans for semipermanent hospitals were not complete until December 1941. Money to convert tent camps into hutments did not become available until early 1942. The rule that all changes in standard plans had to clear G–4 at first blocked moves to let field officers substitute other products for wood. At length, with General Robins' help, Somervell persuaded Reybold to rescind the ruling. In April 1941 the construction services received authority to deviate from standard plans. Although wood continued to predominate, other products found a growing market in the Army program.[36]

While the 700 series was undergoing revision, a new set of plans was in the making. Early in January Leavey discovered that the standard 63-man barracks was, by reason of its size, ill suited to many Army units. To illustrate, each infantry heavy weapons company had to have four such barracks, because these companies were slightly too large for three. Of the 81 companies in a triangular division, 51 fitted more easily into bigger barracks. Going into the problem, Casey found that a switch to a larger structure would not only reduce the number of barracks but also pare the size of cantonment areas and shorten roads and utility lines. He lost no time in having drawings prepared. Plans for a 74-man barracks were among the first in the new 800 series.[37]

Completed during the spring of 1941 by Bergstrom and his staff, the 800 series drawings were markedly different from the old 700's. Structures were stronger, utilities more elaborate, and quarters more spacious. Warehouses were larger, and mess halls were arranged for more efficient service. Better ventilated, better insulated, and equipped with better heating systems, the buildings

[33] (1) Constr Div Ltrs 81, 10 Feb 41; 175, 26 Mar 41; 181, 28 Mar 41; 169, 22 Mar 41; 119, 27 Feb 41. EHD Files. (2) QM 621 (Misc).

[34] Min, Conf of ZCQM's, 7–10 Apr 41, pp. 121, 125.

[35] *Ibid.*, p. 126.

[36] (1) Memo, Casey for Bergstrom, 21 Mar 41. 652 (Cp Grant) I. (2) G–4/31741–1. (3) Ltr, OQMG to OUSW, 24 Jun 41. QM 652 (Misc) Jun–Aug 1941. (4) WD Ltr AG 600.12 (1–27–42) MO–D to Cof-Engrs, 30 Jan 42. 652 I. (5) Ltr, Robins to TAG, 14 Mar 41, and 1st Ind, 8 Apr 41. 686 (Airfields) Part 10. (6) Ltr, Somervell to Reybold, 8 Apr 41, and 1st Ind, 15 Apr 41. 600.92 Part 1.

[37] (1) Memo and Incl, Value for Leavey, 22 Jan 41. (2) Ltr, Casey to Reybold, 23 Jun 41. (3) Ltr, Casey to Reybold, 15 Jul 41. All three in QM 621 (Misc). (4) Memo, Design and Engrg Sec for Cof-Engrs, 12 May 41. 600.1 Part 9.

incorporated scores of new features, ranging from ratproofing in kitchens to exit lights in recreation halls. Conferring with representatives of OCE on designs for Air Corps stations, Casey stressed the following advantages of the 800 series: first, barracks were sized to fit most Army units; second, buildings were safer, sounder, and more livable; and, third, while the cost of individual structures would run higher, the cost of complete installations would be "about the same as under the 700 series." He did not concede what many thought was true—that facilities built to the new designs would be semipermanent rather than temporary.[38]

The new drawings had their critics and opponents. "Unnecessary," "a mistake" were typical comments of regular Quartermaster construction officers. Such changes as were desirable could have been made in the 700's, they contended, and all the features added to the buildings did not compensate for the discarded "aqua medias."[39] Veteran employees of the Engineering Branch, alluding to Bergstrom's home state, scathingly referred to the 800 plans as "California earthquake-proof drawings."[40] Even Leavey acknowledged that there were "too many 'long life' precautions" and "too much use of first grade or 'best quality' materials for temporary construction."[41] The Chief of Engineers was lukewarm toward the plans. Opposition from OPM threatened for a time to block General Staff approval of the series. Noting that the blueprints called for many uncommon and outsized lengths of lumber, Nelson protested that deliveries would be slow and that carpenters would waste a great deal of time and material sawing ordinary boards to fit. By yielding a little, Somervell overcame Nelson's objections. Though still preferring the rigid frames made possible by extra long lengths of lumber, he agreed to include alternate specifications providing for shorter lengths in areas where hurricanes and earthquakes were not likely to occur. This concession opened the way for early approval of the series. Used sparingly on going projects, the 800 plans were ready for the next expansion of the Army.[42]

New site plans and layouts developed by Zach were superior to the originals. Detailing the "motivating factors" which influenced his thinking, Zach wrote: "Efficiency of operation, usefulness of the project for its particular phase of troop training, must of necessity take first place. A strong second place, however, was given to economy of construction, and every effort was continually made to consolidate functions and to compact areas to the utmost." Assuming the role of a city planner, he first determined his clients' requirements. Discussions with troop commanders revealed the need to locate cantonment areas no more than half an hour's march from small arms firing ranges. Discussions with The Surgeon General led to improvements in hospital layouts; talks

[38] Notes of Conf, Casey with Maj Hardin, Maj Plank, and Harold A. Kemp of OCE, 23 Jul 41. OCE Airfields Br, Reading File.

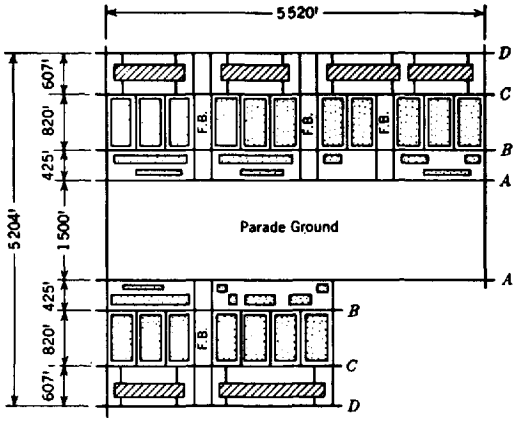
[39] Dreyer Interv, 27 Feb 59.

[40] Deininger Interv, 13 Mar 59.

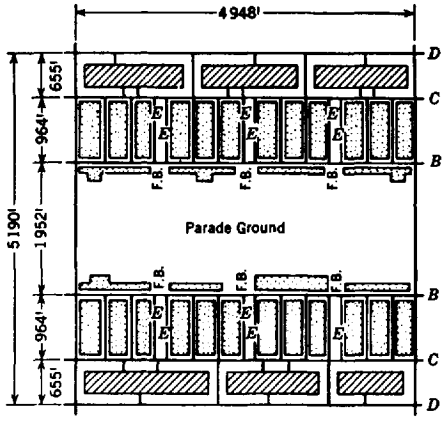
[41] Memo, Leavey for Casey, 14 Jul 41. QM 652 (Misc) Jun–Aug 41.

[42] (1) Memo, OCE Kemp for McFadden, 23 Jul 41. OCE Airfields Br, Reading File. (2) Ltr, Nelson to Somervell, 28 Aug 41. (3) Ltr, Somervell to Nelson, 16 Sep 41. Last two in 411.1 (Lumber) II.

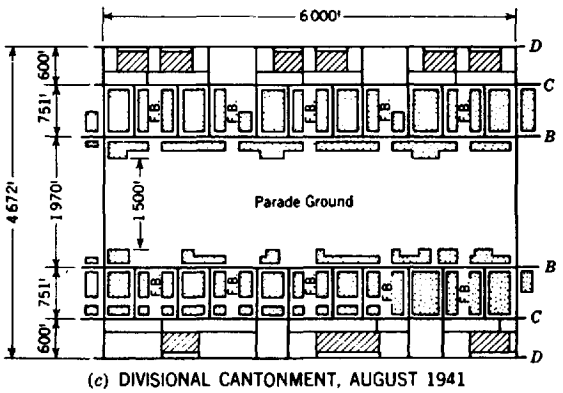
Chart 11—Progressive Improvements in Divisional Cantonment Layouts



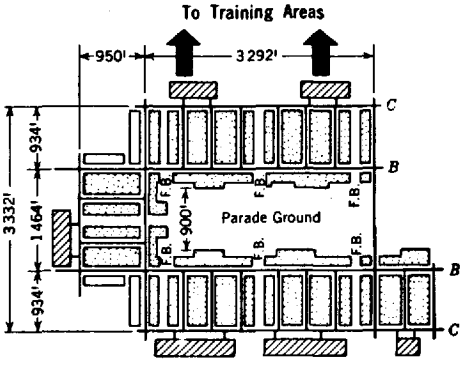
(*a*) DIVISIONAL CANTONMENT, OCTOBER 1940
Total Length of Roads, 71290 Feet



(*b*) DIVISIONAL CANTONMENT, JUNE 1941
Total Length of Roads, 69680 Feet



(*c*) DIVISIONAL CANTONMENT, AUGUST 1941
Total Length of Roads, 65164 Feet



(*d*) DIVISIONAL CANTONMENT, MAY 1942
Total Length of Roads, 40140 Feet

Legend

	Officer and EM Housing
	Motor Storage Areas
A, B, C, D	Primary Roads
E	Secondary Roads
F. B.	Firebreaks

Source: Leon Zach, "Site Planning of Cantonment and Community Housing," *Civil Engineering*, August 1945, pp. 364–65.

with the Provost Marshal General, to schemes for special lighting and fences. Having satisfied the users' needs, Zach considered construction costs. "The real estate promoter who built houses and sold properties on only one side of his streets would soon go bankrupt," he reasoned. With that thought in mind, he proceeded, through successive revisions of typical layouts, to reduce roadage at divisional cantonments by 44 percent and graded areas by 25 percent. (*Chart 11*) Applying the same method to airfield cantonments, he reduced graded areas by 43 percent and roadage by 51.6 percent. He effected similar economies in water and sewer lines.[43] His fresh approach to an old problem produced spectacular results.

A contribution toward better planning, made by Major Boeckh, took much of the guesswork out of building estimates. During the spring of 1941, Boeckh rounded up 70 or 80 qualified engineers and introduced his own copyrighted estimating system.[44] Somervell, who called Boeckh "the best estimator in the United States," described his method:

> Briefly this system consists of finding the unit costs of the materials that go into these various . . . [structures] by getting quotations from the various parts of the country . . . . To that . . . we add the cost of labor for the erection of the units that go into these various types of structures. Having done that, we establish what is a base price, a zero price. Then, with fluctuations in the price of materials and the price of labor, we establish an index for various parts of the country.

This index enabled the Engineering Branch to forecast with a high degree of accuracy the cost of building any structure anywhere. Owing to Boeckh's generosity, the Army paid nothing in the way of royalties for a service which had more than twenty thousand commercial subscribers.[45]

By early May 1941 reports of site investigations were arriving in the War Department. Many locations were recommended—several in each of the general G–3 areas. The task was to choose among them. After study by G–3 and G–4, the site reports went, first, to The Surgeon General for comment and, then, to The Quartermaster General for review. Specialists in Casey's office analyzed each report. Some of the recommended sites seemed unfit for construction. One such site was at Bend, Oregon; a heavy layer of lava rock lay just below its surface, and the nearest source of electric power was 50 miles away, on the other side of the Cascade Mountains. Many of the sites had one or two bad features which, though undesirable, did not warrant disapproval. As they O.K.'d these locations, Casey and Leavey spelled out the difficulties construction would entail. They noted, for example, that it would cost about $300,000 to remove high tension lines crossing a site near Marysville, California, and that subsurface rock would increase the sewer excavation costs at a site near Waco, Texas, by about $200,000. After medical and construc-

[43] Leon Zach, "Site Planning of Cantonment and Community Housing," *Civil Engineering*, XV, No. 8 (August 1945), 363–65.

[44] (1) Opns Br Files, Gen. (2) Boeckh Interv, 21 Jun 59.

[45] Somervell's Testimony, 20 May 41. In H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on Military Establishment Appropriation Bill for 1942*, pp. 686–88.

tion officers had had their say, the General Staff made final selections. At General Marshall's recommendation, Secretary Stimson approved nine new sites in May and fourteen in July.[46]

The time devoted to selecting these locations and the emphasis placed on engineering stood out in sharp contrast to the speed of earlier investigations and their neglect of builders' problems. Between orders for preliminary surveys and approval of the first 9 sites, over three months elapsed. Another nine weeks went by before final agreement on the 14 additional sites. Zone and corps area boards had inspected more than 150 locations. In narrowing the choice, the boards had recommended and the Engineering Branch had reviewed 46 sites for camps and training centers. The twenty-odd sites finally chosen received approval for planning purposes only.[47]

Once he knew where the Army planned to build, Somervell took the next step forward—putting architect-engineers to work. Among the firms chosen to plan the new camps were some of the best and most experienced in the country. Somervell wished to negotiate exclusively with those who had already handled a camp project successfully. Patterson, on the other hand, believed that the War Department ought to spread its work among a larger number of contractors. The two agreed to compromise. The list of architect-engineers for advance planned camps included such firms as J. B. McCrary, Charles T. Main, Black & Veatch, and Leeds, Hill, Barnard and Jewett—all of which had previously designed a camp. It also included a number of newcomers to the program, all reputable though untried. The architect-engineers took fixed-fee contracts and agreed to work under Casey's supervision. Within 90 days of award, Somervell hoped to be ready to build the camps by advertised lump sum contract.[48]

Writing in the July 1941 issue of *The Constructor*, Somervell assured his readers: "If the need to house a larger army becomes apparent, construction can be started with maximum economy and minimum delay."[49] He had attained the first of his planning goals.

A New Approach—Munitions Projects

Keeping pace with plans for additional troop housing were plans for industrial expansion. The munitions program of 30 June 1940 had as its goal productive capacity to equip two million men and maintain them in combat. But since the War Department's mobilization plans visualized a force of four million, the Army regarded the first wave plants as a down payment on preparedness. Thinking ahead to the next installment, Patterson in January 1941 appointed an informal committee of three to draw up a new plant program. Representing the "major production interests involved," this group consisted of General

[46] (1) QM 685 (Cp Sites). (2) G-4/32656. (3) Incl, 7 Jul 41, with Memo, Leavey for Reybold, 8 Jul 41. QM 685 (Cp Abbot).

[47] Rpt, Casey for Leavey, 23 Jul 41. QM 685 (Cp Sites).

[48] (1) Memos, Somervell for Patterson, 28 Mar, 19 May 41. QM 600.1 (CPFF) 1941. (2) Memo, Somervell for Amberg, 31 Jul 41. QM 333.9 (S Investigations).

[49] Brig. Gen. B. B. Somervell, "The Temporary Emergency Construction Program," *The Constructor*, July 1941, p. 116.

Harris, chief of the Ordnance Industrial Service, General Rutherford of the Assistant Secretary's office, and General Somervell.[50] Through the committee, Patterson hoped to avoid "some of the difficulties and delays encountered in the planning and execution of the first phase of this program."[51]

Somervell, who shared this hope, believed it could be realized through careful planning, sound engineering, and the marriage of responsibility to authority. Compelled to follow his predecessor's lead in building the first-wave plants, he sought to handle the second wave differently. He wished to map out the program well in advance of construction. He wished to have a strong voice in site selection. He wished to standardize plans and layouts and to design plants of more or less uniform size. Above all else, he wished to see the Construction Division, the agency responsible for building the plants, equipped with full authority to direct the work. Thanks to Patterson, he was now in a position to make his demands heard.

The first meeting of the informal committee took place on 5 February in General Harris' office. Present, in addition to Rutherford, Harris, and Somervell, were two colonels and a major of Ordnance and two men from OPM. Most of the talk was of strategic boundaries, of distances from sources of raw materials, of proximity to centers of industry, and of availability of power and labor to operate the plants—topics of interest to Ordnance and OPM. But, whenever the opportunity presented, Somervell put in an oar. When General Harris mentioned that an appropriation was unlikely before summer and construction would therefore continue into the winter months, Somervell interrupted: "Have you got any money that you could let us have for planning and we could get these architectural engineers selected, get the plans drawn, and have something that will approach a real estimate. That is what we are going to do in the camps." Harris replied that this might be arranged and passed on to other matters. Again, in the midst of a discussion of locations for small arms ammunition plants, Somervell broke in to ask if the designs would be of permanent or 5-year type. Harris informed him that 5-year would be standard. "Good," said Somervell. While most of the topics covered that day did not directly concern him, Somervell had touched on two matters of importance to the Construction Division—advance planning and standardized design.[52]

On 12 February the committee met again. Somervell did not attend, for that was the day he went before the House Appropriations Committee to defend the overrun. Colonel Leavey, sent to represent the Quartermaster Corps, found himself in a room full of men from Ordnance, OPM, and the Assistant Secretary's office. General Harris opened the meeting, reading off a list of locations that Ordnance had picked for twenty-two plants and the operators it had chosen. A lively debate ensued as to whether the program was too am-

[50] Incls, 27 Jan 41, with Memo, Burns for Patterson, 29 Jan 41. OUSW Production Div Files, 185.6 (Mun Ord Plant Comm).

[51] Memo, Patterson for Somervell, 30 Jan 41. 635 Part 1.

[52] Min, Mtg in Harris' office, 5 Feb 41. OUSW Plng Br Prod Div Files, 185.6 (Mun Ord Plant Comm).

bitious. Madigan, there on Patterson's behalf, suggested that the Army could plan a large number of projects well in advance, "without spending too much money," and then build the ones it needed. Leavey listened while the others spoke, noting perhaps that Madigan was a strong partisan of advance planning and that Harris recognized the advantages of standardized layouts. Then he took the floor: "I would like to suggest a plan similar to what we have prepared for cantonment construction." "What is that?" Harris asked. Leavey described at length the procedure he had worked out for selecting camp sites, how he had prepared engineering criteria, how the site boards went out to select locations, how "our people present these sites on a silver platter." The others raised immediate objections. Madigan pointed out that Ordnance had had "fair success with sites." Colonel Miles reminded Leavey that operating costs were "far more important over a continuing period of time" than construction costs. General Harris stated, "Well, I am not in favor of changing horses in the middle of the stream myself." Leavey stuck to his guns, scoring in the following exchange:

Mr. Madigan. Someone has to get down to brass tacks and say whether it is to be left to Ordnance or Quartermaster. I agree with Colonel Miles. The operating features must be considered.

General Harris. We are the landlords.

Mr. Johnson (OPM). Quartermaster shouldn't be ignored, however.

Colonel Leavey. I think if we are going to build the plants we should have some voice in saying the spots they are going to be built on. Naturally, we would say that only after Ordnance has had their say. The constructor should know where he is going to build before he starts. . . . If we can make plans ahead, we should take advantage of it.

. . . . . .

General Harris. What we have lacked so far is not having sufficient engineering analysis.

Colonel Leavey. That is what I am trying to offer.

General Harris. I see your point and we like assistance.

That the Quartermaster Corps would henceforth have some part in locating plants seemed fairly well assured.[53]

Establishment of a new organization for selecting plant sites soon confirmed this assurance. On 13 March 1941, following passage of the Lend-Lease Act, Patterson abolished the old War Department Site Committee, which had long reflected the Ordnance viewpoint. In its place, he set up the War Department Facilities Board, with General Rutherford as chairman. The other members were Brig. Gen. Oliver P. Echols of the Air Corps, Lt. Col. Theron D. Weaver of the Assistant Secretary's office, and Generals Harris, Reybold, Robins, and Somervell. The board would, first, "investigate the necessity for additional productive capacity" and, then, submit a program to be financed with War Department and lend-lease funds. Finally, after considering recommendations of the Arms and Services and requirements of the Navy and other government agencies, it would select sites. Since four of the members, Reybold, Robins, Weaver, and Somervell, were Engineer officers, construction aspects of selection were likely to receive due weight.[54]

At a meeting on 26 March, the board

[53] Min, Mtg in Harris' office, 12 Feb 41. Same file.

[54] Memo, Patterson for Rutherford, 13 Mar 41. ASF PD Facil and Insp Br, 134 A, Constr Program—Site Comm.

outlined its course. It would observe the strategic boundary and avoid unnecessary concentration. It would co-operate fully with OPM. It would investigate proposed sites thoroughly, considering such factors as estimated cost, labor requirements and supply, power, transportation, and housing. It would clear all projects and all sites with OPM before presenting them to the Assistant Secretary of War and the President for approval.[55]

So far the Army had done nothing to insure thorough engineering investigations of new sites, but this situation soon changed. On 5 April Patterson revised the procedure for locating plants. The Quartermaster Corps would survey proposed sites and the Facilities Board would consider only those Somervell had approved. By May Colonel Leavey had developed criteria for use by architect-engineers in reporting on proposed locations for Ordnance and Chemical Warfare projects. The new system was not infallible. Despite an unfavorable report by the Construction Division, General Wesson insisted that he had to build a plant at Crab Orchard, Illinois. This site, in a depressed area, had the backing of Sidney Hillman and, even more important, of Harry Hopkins, who evidently wished to please an intimate, ex-Congressman Kent E. Kellar.[56] But such cases were rare. For the most part, locations for the second-wave plants, unlike those for the first wave, had the Construction Division's approval.

So negligible had been the influence of The Quartermaster General in the design and layout of munitions plants that any change would have to be in the direction of increasing his powers—and there were many indications that a change was necessary. Blueprints were too long on operators' drawing boards, and constructors marked time while plans underwent painstaking review by Ordnance. Even Knudsen, in OPM, remarked how long it took for drawings to reach the field. "It would seem to me," he wrote Patterson, "that drawings of simple structures could be pushed ahead so as to get the contracting work done."[57] Ordnance excused delays by pointing out that the plants were large and complex and most engineers were relatively inexperienced in munitions work.[58] But when plans for roads, utilities, and administration buildings were not forthcoming, this argument was hardly convincing. Observers noted that designs were neither uniform nor economical. Harrison stated that "construction costs of certain powder and TNT plants . . . have disclosed rather wide variations due to details of design and to construction refinements."[59] One of Groves' inspectors made "the alarming observation" that "the interpretation of safety requirements is different at almost every shell loading plant."[60] Still another practice of Ord-

[55] Memo, WD Facils Bd for Rcd, 26 Mar 41. Same File.

[56] (1) Memo, Patterson for Gregory, 5 Apr 41. 635 (Mun Plants) Part 1. (2) Bull Engrg Br, May 41, sub: Criteria for Rpt on Selection of Sites for Ord and CWS Projs. EHD Files. (3) 635 (Ill. OP) I. (4) QM 333.9 (H Mil Affs Investigation) 1941.

[57] Ltr, Knudsen to Patterson, 3 Apr 41. USW Files, 333 Insps.

[58] Memo, OCofOrd for Patterson, 10 Apr 41. USW Files, 333 Insps.

[59] Memo, Harrison for Biggers, OPM, 23 Jul 41. QM 600.1 (Def Constr) 1941.

[60] Memo, Groves for Gregory (20 May 41). QM 333.1 May–Jun 41

nance attracted unfavorable notice. Frequent expansions of projects, after construction had begun, complicated orderly planning and made necessary radical revisions in layout.[61]

Ordnance was reluctant to give the Construction Division a larger role in design, but Somervell persisted. Early in March Colonel Leavey approached one of Campbell's assistants, only to be rebuffed: Ordnance provided the money and Ordnance would furnish the design, and "after this design was furnished it was not the function of the Quartermaster Department to change it in any respect." Leavey replied that he could not accept such an interpretation and hurried to his chief.[62] Challenging Ordnance's stock statement about the complex nature of the plants, Somervell pointed out to Patterson: "Most of the construction involved in Ordnance plants is of the type daily encountered in industrial engineering. The most complicated structures in all of the work for the Ordnance Department are the power houses, concerning which that Department and its operating agents claim little knowledge." After arguing at length that there was nothing complicated about the jobs and no excuse for handling them differently from other construction jobs, he stated, "This office and the industrial engineers whom it employs, or may employ, are in a position to make an important contribution to the design and construction of all these facilities unless the sciences of engineering and architecture are to be completely disregarded."[63] Patterson, partly won over, ruled that the Quartermaster Corps would design all facilities except the manufacturing buildings, though all plans would be subject to Wesson's approval.[64]

Controversy was forgotten, as the Engineering Branch buckled down to work. Ordnance provided funds for advance planning a dozen plants, and Somervell hired experienced architect-engineers for the jobs. Leavey began to standardize plans and layouts. Lake City would serve as the model for future small arms ammunition plants, and plans for other types of plants would incorporate all recent improvements.[65] The Construction Division was trying hard and Ordnance seemed appreciative. When General Harris appeared before a group of Quartermaster officers on 10 April, cordiality was the keynote. After Somervell had introduced him as "our best client," Harris apologized for past delays. He told the meeting: "Co-operation is absolutely necessary and . . . this is the War Department as a unit in which we are all cogs. If there is anything that we are not doing we want you to say so and say so plainly. Let's not have any misunderstanding arise and the passing the buck from one to another."[66]

Designs for the second-wave plants were a triumph of co-operation. In

[61] Min, Conf on Constr Div, 29 Jan 41, p. 81. EHD Files.

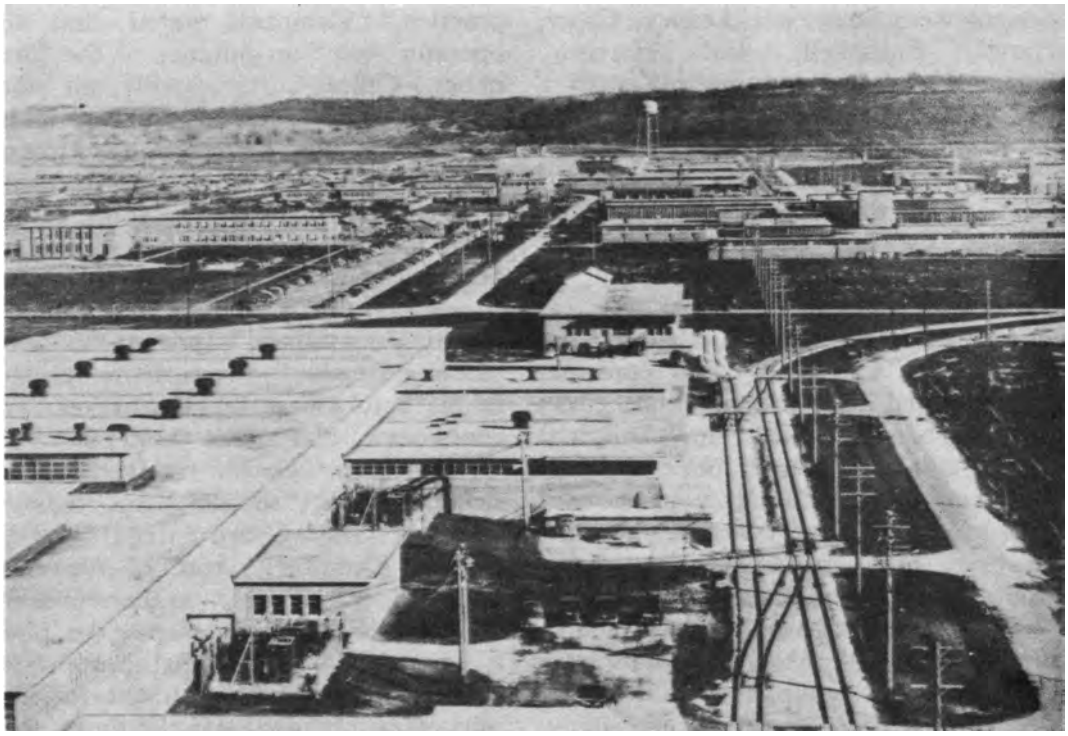
[62] Memo, Farrell for Groves, 13 Mar 41. Opns Br Files, Ord—Corresp.

[63] Memo, Somervell for Patterson, 31 Mar 41. Opns Br Files, Ord Projs.

[64] Memo, Patterson for Gregory, 5 Apr 41. 635 (Mun Plants) Part 1.

[65] (1) Memo, Casey for Richards, 16 Jul 41. QM 635 (Zone VII). (2) Tel Conv, Groves and Campbell, 23 May 41. Opns Br Files, Ord. (3) Tel Conv, Styer and Dunstan, 16 Sep 41. Opns Br Files, Pers—May 41–Jan 42.

[66] Min, Conf of ZCQM's, 7–10 Apr 41, pp. 246–49.



LAKE CITY ORDNANCE PLANT, MISSOURI

the interests of economy, all agreed that new facilities would be "somewhat less permanent" than the first-wave plants and that greater emphasis would be laid on curtailing construction costs.[67] It remained for user and builder to translate these broad aims into detailed plans and specifications. Accordingly, on 26 May, General Wesson appointed a board of Ordnance officers to recommend "general layouts, together with types of construction and equipment to be used in these future plants." The board submitted its recommendations on 6 June: substitute sheet siding for brick and tile; let trucks partly replace railroads in intraplant transportation; build mostly one-story structures; use fencing, lightning protection, and sprinkler systems sparingly; and employ standard plans whenever possible. Wesson passed the report on to Somervell, who was already at work on the same problem.[68]

On 17 June representatives of Ordnance, OPM, and the Construction Division met for an all-day conference on the second-wave plants. Among those

[67] Patterson's Testimony, 15 Jul 41. In Truman Comm *Hearings*, Part 6, p. 1523.

[68] (1) Memo, Wesson for Patterson, 9 Jun 41, and Incl, 6 Jun 41. USW Files, 004.404 Plants, Ord and Mun. (2) Memo, OCofOrd for TQMG, 16 Jun 41. QM 635 (Ammo Plants) 1941.

present were Somervell, Leavey, Casey, Harris, Campbell, and Harrison. Somervell opened the meeting with a call for co-ordination "in the interest of effecting economies of construction and increasing speed of construction." He went on to present plans newly developed by the Engineering Branch. Ordnance accepted practically all of Somervell's suggestions, and he, in turn, agreed to the proposals advanced by Harris and Campbell. The conferees then adopted certain general principles and procedures. Where new buildings would duplicate older ones, original plans and bills of materials would be used in order to save time. Whenever possible, however, additions to existing plants would be of temporary design and only "bare necessities" would be provided. Ordnance would submit schematic layouts of process equipment to the Construction Division for review and analysis.[69] Continued co-operation seemed assured when the two services scheduled further meetings and Somervell agreed to establish a suboffice in Wilmington to work with the Ordnance office there.[70]

But all was not harmonious. On 3 March Somervell sent Campbell a note suggesting that contracting procedures were due for an overhauling. When the two men met a few days later, Somervell brought the subject up again. On the 12th he received a memorandum from Campbell defending the existing arrangement. Pointing out that the Construction Division had itself defined the position of Ordnance as "analogous to that of a client in private construction practice," Campbell stated that the operator was "an adjunct of the Ordnance Office . . . with all that implies." The architect-engineer, under contract to the Quartermaster Corps, received from the operator "the basic and general plans and layouts of the work for the detailing of such, for the ordering of material, and for the actual construction of the plant by the constructing contractor." Indeed, the architect-engineer had to regard the operator as his only source of information. The constructor, also under contract to the Quartermaster Corps, received his instructions from the architect-engineer. Ignoring the Constructing Quartermaster, Campbell wrote of the commanding officer: "He, as the representative of the owner for whom the plant is being built, with funds appropriated to the Ordnance Department for that purpose, is charged, and rightly so, with the duty of being head man at the plant." Campbell pronounced the arrangement sound and asked Somervell if he did not agree.[71]

Somervell emphatically did not. There were, he insisted, two "more satisfactory methods by which the construction of ordnance facilities can be better prosecuted from the standpoint of efficiency, speed, and economy." Under the first, he and Campbell together would select and contract with a design consultant, who would prepare basic layouts and designs in collaboration with Ordnance. The Construction Division would hire the architect-engineer, after considering the recommendations of the design consultant who would advise the architect-

[69] Notes, Conf Between Reps of the Ord Dept, OPM, and Constr Div, 17 Jun 41. 635 Part 1.

[70] Ltr, Casey to McFadden, 29 Aug 41. QM 600.17 (ZCQM 2).

[71] Memo, Campbell for Somervell, 12 Mar 41. Opns Br Files, Ord Projs.

engineer during construction. The division would also hire the constructor, apparently without reference to Ordnance. Under the second method, Ordnance would contract with the design consultant and the architect-engineer. Upon completion, plans and specifications would go to The Quartermaster General, who would then make a separate contract with the architect-engineer for supervisory services during construction and would hire his own construction contractor. Though Somervell favored the first method, he was willing to settle for the second. Both offered clear-cut advantages. "The division of authority and responsibility is more clearly delineated," he argued, "and there would be but one boss of the construction activities in the field." And since the interests of Ordnance would be safeguarded, the sending of a commanding officer to construction projects would be "inadvisable and not necessary."[72]

Once Ordnance knew the tack Somervell was taking, it moved to head him off. On 29 March Wesson wrote to Patterson, "It is my matured judgment that the ends of economy and celerity of completion will best be met by entering into a single contract with a firm to cover management service-design consultant, equipping, operation, architect-engineering, and construction." The contractor would usually sublet architect-engineering and construction work, in which case the subcontractors would be selected by the Construction Division and approved by Ordnance. But he might in some instances elect to do all the work himself. Ordnance would administer the contract titles dealing with management, design consultant services, equipment, and operation, while the Quartermaster Corps would administer the subtitles having to do with architect-engineering and construction.[73] The setup proposed by Wesson was the same one Hartman had successfully resisted in 1940.

Somervell did not learn what Ordnance was up to until the morning of the 31st, when Wesson read the memorandum to him over the telephone and asked for his concurrence. Not only did Somervell refuse to concur, he promptly declared war. He spent the rest of the day drafting an angry letter to Patterson. The gist of his argument was contained in the opening paragraphs:

> This office strongly objects to the method outlined by General Wesson, because it would be contrary to the National Defense Act, since it precludes the QM Corps from discharging the responsibility given it thereunder. In order to discharge its duties and obligations properly, the QM Corps must exercise direct control over all phases of the work entering into the construction of a plant. Where the prime contract includes operation and management, design consultation, architect-engineering and construction, to all intents and purposes, it is administered soley by Ordnance and no direct control by the QM Corps can be exercised. Such a situation would result in a waste of many millions of dollars, since the prime contractor is chosen primarily for his operating ability, and often has little or no knowledge and experience in matters involving design, engineering, and construction.
>
> The whole effect of such a procedure, in addition to the objections just cited, would

[72] Memo, Somervell for Campbell, 15 Mar 41. Opns Br Files, Ord Projs.

[73] Memo, Wesson for Patterson, 29 Mar 41. Madigan Files, 101.6 Gen Corresp.

be to leave this office with the responsibility for mistakes which might be made, and no authority to prevent such mistakes.

Somervell was not content to stop there, but went on page after page. He quoted liberally from the law and the Army Regulations to prove that Congress and the Secretary of War clearly intended The Quartermaster General to have *all* construction, not just the part of it that Ordnance deigned to give him. He stated that the Chief of Ordnance, "although not possessed of officers or staff skilled in matters of construction," insisted on "placing the control of all this work in the hands of persons having no continuing responsibility to the United States." He implied that operators were taking advantage of Wesson's innocence. Unorthodox contracts were in use. Ordnance was approving insurance contrary to Patterson's policies. Superintendents and engineers were receiving excessively high salaries. Some arrangements with utilities companies were questionable. Returning at last to Wesson's proposal, Somervell wrote:

> The construction agencies of the War Department are a clearing house of information on construction practice and materials. All large organizations such as the War Department maintain engineering or construction organizations to carry out this part of their work. Unless there were a sound reason for this, the railroads, the telephone companies, public utilities, and other large concerns would not maintain such organizations. . . . Following General Wesson's reasoning, there is no need for such an organization. He submits nothing to support his statement. Although ex cathedra statements of this kind from the Chief of Ordnance are, of course, entitled to consideration, for them to be at all convincing some cogent reasons and, most of all, facts should support them. There is nothing in the program to date to indicate that the interests of the United States will be better served by officially sanctioning the practices cited above than by placing the construction work in line with customary practice and with the law which states that the Quartermaster General shall have direction of *all* work pertaining to construction.

He ended by recommending that Patterson tell Wesson to confine himself to operating the plants and to stay out of construction.[74]

Five days after Somervell's outburst Patterson adopted the single contract. The Chief of Ordnance would choose a prime contractor, who would have responsibility for all work from designing a plant to operating it, and who would subcontract architect-engineering and construction. Ordnance and Quartermaster would "together negotiate and execute the contract," but the Quartermaster would be responsible primarily for the parts pertaining to construction. The two subcontractors, the architect-engineer and the constructor, would be "selected and recommended" by the Quartermaster, "subject to the concurrence of the prime contractor." Patterson was careful to state that The Quartermaster General would "supervise the construction of the entire project," but whether that supervision could be effective under these circumstances was debatable. It appeared that the fight was over and that Ordnance had won.[75]

But Somervell would not be bested. After recurrent agitation against the single contract, he persuaded Patterson

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[74] Memo, Somervell for Patterson, 31 Mar 41. QM 635 (Ord) 1941.

[75] Memo, Patterson for Gregory, 5 Apr 41. 635 (Mun Plants) Part 1.

to yield.[76] On 14 July 1941 the Under Secretary abolished the single contract. The Quartermaster General would henceforth have "full responsibility" for choosing architect-engineers and constructors. Subject only to Patterson's approval, Somervell would award separate contracts to these firms. Wesson would make arrangements with operators and approve plans and specifications. But he would have no authority for construction in the field. Somervell was at last in a position to control effectively the operations of architect-engineers and builders.[77]

It had been a hard fight, but Somervell had come out on top. He could reasonably expect that future munitions projects would present fewer engineering and construction difficulties than those built in the past.

A Stronger Organization

In an address before the annual convention of the Associated General Contractors on 20 February 1941, Somervell spoke of his "determination to make the Construction Division as competent an agency as exists in the Government."[78] In pursuing this objective, he spared no effort and shunned no opportunity. The big reorganization of December 1940 was followed by innumerable smaller ones. The division underwent a thorough housecleaning. Personnel shake-ups were an almost daily occurrence. Many new faces appeared and some old ones dropped out of sight. Dreyer recalled "a constant gyration in the Engineering Branch."[79] But Somervell knew what he was after—a construction capability second to none. He was aiming high. Whether he could hit the mark remained to be seen.

During the first half of 1941, new names appeared on the division's roster of key personnel. Douglas I. McKay, who became Somervell's special assistant, was a former police commissioner of New York City. John J. O'Brien, who replaced Colonel Valliant as chief of Real Estate, had been a top attorney in the Lands Division of the Department of Justice. Lt. Col. William E. R. Covell, who became Leavey's executive when Nurse, at his own request, went to the Ninth Zone, was a retired Engineer officer, first man in the West Point class of 1915. There were two former employees of the New York City WPA—one was James P. Mitchell, afterward Secretary of Labor in the Eisenhower cabinet, who succeeded Brigham as head of the Labor Relations Section; the other was Oliver A. Gottschalk, who became assistant chief and later chief of the Accounts Branch. As Hartman's men faded from the scene, Somervell brought in his own team.

Other noteworthy personnel changes took place in the Construction Advisory Committee. Seeking to remove all doubt of the committee's impartiality, Somervell decided to enlarge its membership and to place an experienced military engineer at its head. General George R. Spalding, an officer of the highest reputation who had retired as G–4 of the Army in 1938, became chairman on 18 February 1941. Later that

[76] QM 635 (Ammo Plants) 1941.

[77] Memo, Patterson for Wesson and Gregory, 14 Jul 41. QM 600.1 (Ord) 1941.

[78] Brig. Gen. B. B. Somervell, "The Man With the Contract," *The Constructor*, March 1941, p. 52.

[79] Dreyer Interv, 27 Feb 59.

month the appointment of Alonzo J. Hammond gave the group a membership of five. When Blossom resigned on 31 March, a victim of unjust criticism, Tatlow replaced him. General Spalding's term was brief, possibly because he found Somervell's methods distasteful, possibly because he clashed with the committee. Quite likely it was a little bit of both. Upon Spalding's resignation in May Somervell brought in another retired Engineer officer, Maj. Gen. William D. Connor. The choice was a fortunate one. A distinguished soldier and a former superintendent of the U.S. Military Academy, General Connor worked well with his civilian colleagues.[80] From the time of his appointment until March 1942, the committee's membership remained unchanged.[81]

Time and again, Somervell emphasized the importance of good leadership. At a conference with his principal assistants in February 1941, he declared:

> This is a world of people and as Napoleon used to say—I'm very glad he said it because I have repeated it two or three hundred times—"There aren't any poor regiments; there are only poor colonels." Think that one over if you are a boss. Everyone here is a colonel in a sense. Remember there are no poor sections, no poor branches, and no poor units—only poor section leaders and poor branch chiefs and poor unit chiefs.

Even as he worked to improve administrative procedures—to eliminate duplication, to shorten channels of communication, to couple responsibility with authority, and to limit the number of persons any one individual supervised—he kept coming back to the proposition that "personnel is the first thing."[82] One of his strongest efforts was a search for talent. Assessing the results, he stated late in April 1941, "Now we have got the best people you can get to do the job and nobody can do any better than the best."[83]

While attempting to provide better leadership, Somervell expanded his administrative force. As recruitment accelerated, a bottleneck developed in the hiring of civilians. The situation seemed serious. By late winter an average of twenty-eight days was elapsing between the date requests went to the Civil Service Commission and the date new employees reported for work. Several branches were complaining of personnel shortages. On 7 March, 400 persons were awaiting appointments. When the delays continued, Somervell appealed to the Civil Service Commission for help. Commissioner Flemming disclaimed responsibility for the trouble and advised the Quartermaster Corps to mend its ways. First, said Flemming, Somervell should stop recruiting on his own. Second, and more important, he should deal directly with the commission instead of going through General Gregory's office.[84]

Although Somervell showed little inclination to follow Flemming's first suggestion, he welcomed the second. General Gregory's control over appointments had not always worked to the advantage of the Construction Di-

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[80] (1) Dresser Interv, 2 Apr 57. (2) Groves Second Draft Comments, X, 3–4.

[81] Final Rpt of the Constr Advisory Comm, 15 Mar 42. EHD Files.

[82] Notes, Conf on Orgn of Constr Div, 22 Feb 41. EHD Files.

[83] Truman Comm *Hearings*, Part 1, p. 278.

[84] (1) Min, Constr Div Staff Mtgs, 14, 21, 28 Feb, 7 Mar 1941. EHD Files. (2) Memo, Flemming for Somervell, 29 Mar 41. Opns Br Files, Pers—Dec 40–Apr 41.

vision and was believed, in some quarters, to have contributed measurably to Hartman's difficulties. No less an authority than the commission was now advocating that the division handle its own affairs. On 4 April, Somervell forwarded Flemming's recommendation to The Quartermaster General. "This seems to me to be a very constructive suggestion," he wrote Gregory, "and it could be put into effect immediately if your office . . . would be willing to grant authority to the Construction Division to deal directly with the Civil Service Commission." Somervell added that he had no wish to usurp any of Gregory's powers and he pointed out that The Quartermaster General could still cancel any action taken by the Construction Division.[85]

About a month later, after "very careful consideration," Gregory turned down the proposal. Although he wished to give his subordinates as much responsibility as possible, he held that "certain functions" could not be delegated to division chiefs. "I feel," he explained, "that central control of personnel policies and management is necessary. Grades, classifications, and rates of pay should not differ too widely in the various operating Divisions of the office." There had been delays, certainly, and some "creaking and groaning" of the hiring system. However, hundreds of employees had been added to the Construction Division since mid-December. If ever central control hindered the division's work, Gregory would "be only too glad to consider very definite modifications." Until then, the present arrangement would stand.[86] Gregory's decision could hardly have been otherwise. By late April the Construction Division had 2,933 employees as compared with 1,989 in all other divisions of his office.[87] It was no easy matter to keep the tail from wagging the dog.

Somervell was furious. Making little effort to disguise his feelings, he drafted a reply. The Quartermaster General was a "disinterested" party, "remote from the scene of operations" and out of "direct contact with the work." His control of appointments was preventing quick action in situations where success might "hinge directly on our ability to move fast." "It is believed to be a generally accepted principle," Somervell noted, "that an organization the size of the Construction Division, performing a definite type of function and not closely related to the parent organization, should be responsible for the appointment, training and supervision of its personnel." After presenting evidence of "significant delays," he declared, "It would not be an exaggeration to say that much of the lack of proper coordination which I find in various Branches of the Construction Division today is due to the present system of procuring civilian personnel."[88] Styer felt this reply went too far. Substituting his own more diplomatic version, he chided Somervell for "wasting time arguing." Besides, he said, the Construction Division was not entirely blameless.[89] That ended the

[85] Memo, Somervell for Gregory, 4 Apr 41. Opns Br Files, Pers—Dec 40–Apr 41.

[86] Memo, Gregory for Somervell, 7 May 41. EHD Files.

[87] Memo, OCMH Dep Chief Historian for Rcd, 8 Mar 55. EHD Files.

[88] Draft Memo, Somervell for Gregory, 22 May 41. EHD Files.

[89] (1) Routing Slip, Styer to Somervell, 25 May 41, and Incl, 24 May 41. EHD Files.

affair. Commenting afterward on the unsent draft, Groves stated: "This particular memorandum was indicative of Somervell's attitude toward The Quartermaster General during the time that he was head of the Construction Division. Like most aggressive and brilliant leaders (and such he certainly was), Somervell resented control. He wanted to be independent and he was constantly working in that direction."[90]

General Gregory continued to handle appointments of construction personnel, both civilian and military, and with success. By the end of June 1941, the Washington office had 3,210 civilians and 216 officers. Manning the field offices were 11,679 civilians and 966 officers. In addition, 16,183 persons were engaged in maintenance. At the close of the fiscal year, orders were in the works calling 452 Reservists to active duty. In the twelve months since the fall of France, the size of the construction organization had increased several fold.[91] For the second big building program currently taking shape, it appeared to be adequate.

Despite its relatively large size and high level of competence, Somervell's organization had a somewhat makeshift character, a certain make-believe quality. As one skeptical observer remarked, the new setup looked "very good on paper."[92] Viewed closely, it displayed major defects. Many of the men on whom Somervell relied most heavily—Engineer officers and industry bigwigs—were with him temporarily. During the summer of 1941, the exodus began. Among the first to go was Colonel Casey, summoned to the Far East by General MacArthur. A look at the zones was revealing. For all his talk of creating miniature Construction Divisions, Somervell had decentralized some of his functions only partially and others not at all. The transfer of leasing and maintenance work from the corps areas helped the zones but not enough. Intended to be copies of the Engineer divisions, they were pale imitations at best.

All things considered, Somervell had done well. His organization was a vast improvement over Hartman's. What he did not and could not do was to build a stable structure in a few months time and to duplicate the Engineer Department within the Quartermaster framework.

The Building Trades Agreement

Among the hottest issues faced by long-range planners were those involving the construction trades. Problems of labor costs and productivity cried out for solution. Uniform policies on overtime and shift work, firm controls over basic wage rates, an end to strikes and disputes—these were musts in the War Department's view. But prospects of achieving them were dim. NDAC policies aided organized labor. The unions, strong and growing stronger, wanted more, not less. Somervell, thinking, perhaps, of his own White House connections, showed little disposition to challenge Sidney Hillman or the AFL. During the early months of his regime, he won no real concessions from the building trades.

Soon after his appointment to the Labor Relations Section, Mitchell took up the question of overtime, weekend,

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[90] Groves Comments, VI, 3.

[91] Rpt, Activities of the Constr Div, Jul 40–Jul 41, pp. 127, 131.

[92] Tel Conv, Clyde Davis, Los Angeles, Calif., and Leavey, 7 Mar 41. Opns Br Files, San Luis Obispo.



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and holiday pay. Working with him on the problem was Edward F. McGrady, former Assistant Secretary of Labor, who had replaced Major Simpson on Patterson's staff late in 1940. In mid-January Mitchell prepared a study showing how much money could be saved by scrapping the local practices formula in favor of a universal time-and-one-half rate for work in excess of 40 hours a week. Of 44 projects studied, only 5 were working a regular 40-hour week, and only 6 were operating on a straight-time basis on weekends and holidays. At 13 projects, workers were getting time and a half for over 40 hours and for Saturdays, Sundays, and holidays regardless of time worked during the week; at 20 jobs, they were getting double time. On these 44 projects alone, Mitchell figured the net saving would average out to $935,931 per week, or 1.4 percent of total weekly payrolls.[93] McGrady passed the study along to John P. Coyne for consideration by the AFL Building Trades Department.

At Coyne's request, a meeting took place in Patterson's office on 24 January. Among those invited were Assistant Secretary of Labor Tracy, Maxwell Brandwen of Hillman's office, a representative of the Navy's Bureau of Yards and Docks, and Mitchell. Coyne announced that he would ask the AFL Executive Council to "indorse a policy which would establish a 40-hour week from Monday to Friday and payment of time and one-half for all hours worked over 8 hours a day and Saturday, Sunday, and holiday work for all trades on all construction jobs in the country." The announcement fell flat. As Mitchell pointed out, Coyne's plan would "result in serious dislocation of normal practice" in the South and Southwest, where straight time was the going rate for weekend and holiday work, and might "bring about criticism from Congressmen and contractors in that area." Besides, Mitchell said, "The financial saving, if any, on payroll costs would be negligible."[94] Madigan agreed with Mitchell.[95] And another of Patterson's advisers, Huntington Thom, reported: "We are miles apart from the Building Trades for even President Coyne in his proposal . . . would not consider altering the status of premium rates for Saturday and Sunday. As a result, we would be sticking our necks out in vain

[93] Memo, Somervell for McGrady, 14 Jan 41. QM 600.1 (CPFF) II.

[94] Memo, Mitchell for Somervell, 28 Jan 41. QM 600.1 (Labor) 1941.

[95] Memo, Madigan for Rcd, 29 Jan 41. Ohly File, Labor—Constr Problems and Policies 2.

were we to recommend what we think is a fair solution."[96] Patterson decided to let well enough alone, and on 8 February he so informed Coyne. For the next two months, Mitchell made no attempt to reopen the question. Quartermaster projects continued to pay premium rates according to local practice.[97]

Not so crucial as premium rates but nevertheless important was the question of shift work. Since November 1940 the Construction Division had reimbursed contractors for seven and a half hours' pay on the first shift, one-half hour being allowed for lunch on the employee's time; the second-shift lunch period counted as time worked where this was local practice. Authorized only "under extraordinary conditions," third shifts consisted of seven and one-half hours, including a half-hour for lunch counted as time worked; the pay rate on these "graveyard" shifts was one and one-fifteenth times the basic rate.[98] Although Coyne had informally approved this arrangement, local unions had not ratified it.[99]

In April 1941, when it became apparent that continuous 3-shift operations would be necessary to expedite completion of small arms ammunition plants, Mitchell pressed for a firmer understanding. On the 22d he approached Herbert Rivers of the Building Trades Department, who agreed to co-operate. On the 28th, accompanied by Rivers, Mitchell went to St. Louis to lay his proposal before the local unions. The conference was a failure. After most of the locals refused to go along with Mitchell, Rivers came out in favor of eight hours' pay for seven and one-half hours' work on all shifts. Under pressure for increased speed, Somervell accepted Rivers' alternative on 1 May. The new shift policy, which gave workers one-half hour more pay on first and second shifts than the Army had advocated, applied at small arms ammunition projects and other urgent Ordnance jobs.[100]

Faced in the midst of the Ordnance speedup with the prospect of more jobs ahead, Somervell recognized the need for cutting labor costs. So far, basic wage rates had been kept from spiraling. But Mitchell and his staff, noting that more requests were coming in for raises at jobs in progress, feared they could not stem the tide much longer. The trend on overtime rates was to substitute time and a half for straight time in the South, double time for time and a half in the Middle West, and double and a half for double time in the Northeast. Unless wages were stable, labor pirating would be uncontrollable. Moreover, ruling on so many requests for pay boosts and overtime premiums placed an enormous administrative burden on the Labor Relations Section. Under the circumstances, Coyne's earlier proposal now seemed advantageous.[101]

[96] Memo, Thom for McGrady, 8 Feb 41. Same File.

[97] (1) Memos, McGrady for Patterson, 12, 13 Feb 41. Same File. (2) Memo, Mitchell, no addressee, 3 Apr 41. Same File.

[98] Incl, 4 Nov 40, with Constr Div OQMG FF Ltr 15, 6 Nov 40. EHD Files.

[99] Memo, Mitchell for Brigham, 28 Jan 41. LRBr Files, Intraoffice.

[100] (1) Ltr, Mitchell to Rivers, 22 Apr 41. QM 600.1 (Labor) 1940. (2) Min, Conf at St. Louis, 28 Apr 41. (3) Ltr, Somervell to Rivers, 1 May 41. Last two in LRBr Files, St. Louis OP. (4) Ltr, OQMG to ZCQM VII, 19 May 41. 600.1 (Weldon Spring OW) (Labor).

[101] (1) Memo, Somervell for Hillman, 10 May 41. LRBr Files, WPB. (2) Intervs with L. Dale Hill, 4 Nov 49; Robert F. Jacobs, 6 Sep 49; James P. Mitchell, 5 Nov 49.

On 9 May Somervell asked Sidney Hillman to modify NDAC labor policies by substituting Coyne's formula for the local practices rule. Hillman suggested instead that the unions and the federal construction agencies negotiate. Contractors would have no part in the talks. One reason for excluding them was that the government, not the contractors, was paying the bill. Another was that the industry, broken up into at least three interest groups (builders, heavies, and subcontractors), had no single spokesman. Informal talks were soon under way. After sounding out union officials, Mitchell concluded that an understanding was possible. By the first week in June, Hillman thought the time for a formal meeting had come. Somervell promptly drew up an agenda. Included as topics for discussion, along with basic wages, overtime, and shift-work rates, were predeterminations, initiation fees, and a no-strike pledge.[102]

To representatives of the War and Navy Departments, Maritime Commission, Federal Works Agency, and AFL assembled in his office on 23 June, Hillman stated that the purpose of the conference was to agree to a "uniform policy and procedure" about wages, overtime rates, working conditions, and other matters touching labor relations. He then threw the meeting open to discussion. Several of the conferees recommended additions to Somervell's list. Colonel Lorence of OCE suggested two: subcontracting of mechanical items and use of WPA labor. Richard J. Gray of the Building Trades Department proposed a ceiling on the number of civil servants in construction jobs. Others talked of the need for clearer policies and better co-ordination. Then, George Masterson of the Plumbers and Steamfitters' union blew the meeting wide open, by declaring that all labor difficulties on defense jobs stemmed from the failure of government agencies to live up to NDAC policies. At that Coyne stepped in to propose that a committee try to reach an understanding. There was general assent. Each government agency named a man to meet with representatives of the Building Trades on 25 June. The conference then adjourned.[103]

The result of the committee's work was a document, Memorandum of Agreement Between the Representatives of Government Agencies Engaged in Defense Construction and the Building and Construction Trades Department of the American Federation of Labor, better known as the Building Trades Agreement. Signed on 22 July, the agreement took effect on August 1st. Although it omitted some of the proposed topics, it included all the "musts." It eliminated double-time premiums in favor of a universal time and one-half rate as suggested by Coyne in January 1941. Saturdays, Sundays, and holidays would remain premium days regardless of the time worked during the preceding week. Principal sources of supply would be the basis for predeterminations; thus rates for projects in rural areas would be those prevailing in the nearest large city. Once determined, rates would remain

[102] (1) Ltr, Somervell to Hillman, 10 May 41. (2) Mitchell Interv, 5 Nov 49. (3) Testimony of Sidney Hillman, 22 Oct 41. In Truman Comm *Hearings*, Part 8, pp. 2493–94. (4) Ltr, Somervell to Hillman, 10 Jun 41. LRBr Files, WPB.

[103] Notes of Conf, 23 Jun 41, prepared by Capt. J. T. O'Connell, ExecO, Labor Rel Sec OQMG. LRBr Files, Intraoffice.

fixed for the duration of the job but no longer than one year. Second and third shifts would work seven and a half hours for eight hours' pay, but first shift workers would not receive this bonus. The government agencies proclaimed it "policy" to use specialty subcontractors where this was customary. The unions strengthened their no-strike pledge. Finally, the parties to the agreement set up a three-man Board of Review. Representing the federal construction agencies, OPM, and AFL, this board would settle any disputes arising under the agreement. Its decisions would be final.[104]

Within the ranks of the building trades, the pact encountered bitter opposition. Local unions balked at accepting its terms, calling strikes to protest loss of double time and cuts in shift-work premiums, while other protests took the form of slowdowns and absenteeism. National officers of the unions tried to pacify members by pointing out that the agreement would enable the AFL to organize all defense construction workers. As the president of the electrical workers put it, the agreement recognized "the Building Trades Department . . . as the bargaining agency on defense construction jobs." And he added:

> Never before in the history of our country has such material progress been made in the matter of an agreement requiring representatives of *national agencies of our government*, sitting with national representatives of the building trades organizations for the purpose of bringing about an understanding to cover construction work performed by, or for, federal agencies . . . . This is a *national recognition* that has never before been attained and it must be admitted is of paramount value in the matter of negotiating with government officials concerning work on a nationwide basis rather than for only those parts of the country which are well organized.[105]

As the truth of this statement sank in, as the newly constituted board of review began its work of mediation and conciliation, and as shift work and longer hours boosted take-home pay, discipline improved.

Strong opposition to the agreement came from the Construction Workers Organizing Committee, which had followed the United Mine Workers out of the CIO. Charging discrimination, the Construction Workers' president accused the government of negotiating a closed shop contract with the AFL.[106] Questioned on this point by congressmen, Hillman explained: "The reason why the Government agencies dealt with the AFL is very simple. It was merely that the AFL Building Trades Group represented virtually all of organized labor in the construction industry. It was a matter of practical common sense for the agencies to make this choice." Nevertheless, he insisted, "There is nothing in this agreement which prevents the Government agencies from awarding any contract to any employer, regardless of whether he operates under an AFL Contract, a CIO Contract, or with a nonunion shop."[107]

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[104] Memorandum of Agreement Between the Representatives of Government Agencies Engaged in Defense Construction and the Building and Construction Trades Department of the American Federation of Labor, 22 Jul 41. Incl to OQMG, Constr Div Ltr 372, 31 Jul 41. EHD Files.

[105] Ltr, E. J. Brown, President, IBEW, to all locals. In *The Journal of Electrical Workers and Operators*, August 1941, p. 401.

[106] Testimony of A. D. Lewis, 23 Oct 41. In Truman Comm *Hearings*, Part 8, p. 2535.

[107] Testimony of Sidney Hillman, 22 Oct 41. In Truman Comm *Hearings*, Part 8, p. 2511.

Somervell and Mitchell considered the agreement a good one. The advantages they hoped to gain would outweigh the time lost in strikes and the accusations of impropriety. The agreement established uniformity in overtime rates, thereby saving the time of administrative personnel. Although Saturdays and Sundays continued as premium days and on some projects workers began to get premium pay on those days for the first time, the government would probably save money in the long run. On 30 July, Mitchell predicted that 38.1 percent of 750 classifications at 84 projects would cease receiving double time for time worked over eight hours a day; almost 45 percent of the rates paid for work done on Saturdays would decrease, and 57 percent for work done on Sunday; while only 10 percent would increase. Mitchell expected the number of requests for wage increases to decline. And he anticipated fewer strikes.[108] Four months after the agreement went into effect, Somervell reported: "The adoption of this agreement has resulted in the stabilization of major working conditions on defense construction, economies in the cost of overtime work, and a consequent speeding up of the entire program."[109]

With the Building Trades Agreement, well-selected sites, improved plans and procedures, and a stronger organization, Somervell was confident of the future. In November 1941 he informed General Gregory: "The Construction Division is ready to meet any demands the American people shall consider necessary in building for the defense of the United States."[110]

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[108] Memo, Mitchell for Somervell, 30 Jul 41. LRBr Files, Constr Div.

[109] Rpt, Activities of the Constr Div, 1 Jul 40–1 Nov 41, p. 53.

[110] *Ibid.*, p. 122.

CHAPTER XI

The Public Image

Directly or indirectly, military construction affected the life of every American. Farmers who gave up their land for the common defense, workers who took jobs at rush projects, young men who entered military service—all these had a personal stake in the conduct and progress of the program. The contractors, engineers, architects, and suppliers, who made up the vast construction industry, took a deep interest in the undertaking. Residents in hundreds of communities witnessed camps, plants, and airfields building on their home grounds. In fact, all citizens had an investment in the program, for as taxpayers they defrayed the cost. The construction effort thus provided a natural target for critics.

From the beginning a vigilant public bombarded the War Department with letters of complaint. Many writers obviously had an axe to grind. Equipment owners attacked the recapture clause of the rental agreement. Unemployed workmen cried discrimination. Manufacturers deplored the use of rival products. Nevertheless, many correspondents appeared to be civic-minded men and women with patriotic motives. Some maintained that contractors were burying nails and burning lumber. Some denounced cost-plus contracts and labor racketeers. Some reproached the Army for housing men in tents during cold weather. One man objected to the drab appearance of the camps, another to the lack of camouflage.[1] These letters revealed much dissatisfaction with the conduct of the program and widespread ignorance of the problems involved.

During the first fall and winter of defense preparations, newspapers and magazines presented a sketchy and one-sided picture of military construction. Preoccupied with national politics and the European war, the press gave scanty coverage to the building program. Too often stories on defense projects had to be sensational to be considered newsworthy. Troops shivering in tents or wading through mud, Army reservations blotting small towns from the map, jobs falling behind schedule—items like these appeared. Much space was devoted to high costs and alleged union shakedowns.[2] Such events as the postponement of inductions and the relief of General Hartman were duly reported, but accounts of builders' accomplishments were rare. Popular magazines did little to supplement information their readers may have

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[1] (1) Opns Br Files, Delays, Labor, Geog Distr, etc. (2) Opns Br Files, Questions and Answers by CAC, etc. (3) Min, Constr Div Staff Conf, 7 Mar 41. EHD Files.

[2] For example, see: New York *Times*, October 20, 1940, p. 23; October 27, 1940, p. 3; October 31, 1940, p. 1; November 9, 1940, p. 7; November 24, 1940, p. 23; December 13, 1940, p. 17; December 19, 1940, p. 20; December 22, 1940, pp. 1, 26; December 23, 1940, p. 9.

gleaned from dailies. Most periodicals ignored construction. Occasional articles in leading journals were harshly unfavorable in tone. *Harper's* printed the memoir of an erstwhile worker at Camp Edwards, who recounted his "adventures in wood butchery" in the company of a clergyman, a lawyer, a barber, a jeweler, an undertaker's assistant, two cooks, and dozens of Cape Cod fishermen—all employed as carpenters by the Walsh Construction Company.[3] *The Saturday Evening Post* featured an account of the way construction workers had transformed the peaceful little town of Starke, Florida, into a modern replica of a frontier boom town.[4] *Life* ran pictures of Camp Blanding; the caption of one shot read: "Among the 21,000 workers there was once such confusion that when 3 men died, other men drew dead men's pay for a month."[5] *Time* referred to the "deplorable lag in Army housing" and the fanciful assumptions of "armchair constructors."[6] The general implication seemed to be that thickheaded construction officers were bungling the program.

Gradually, a different story emerged, an incomplete story with many inaccurate details, but one which had a good side as well as a bad and which told something of causes as well as of effects. The opening chapters were written by Somervell and an army of public relations men, headed by George S. Holmes.

Publicity and Public Relations

An admirer of Theodore Roosevelt and a student of his well-headlined career, Somervell knew the uses of publicity. "The whole country is extremely interested in the program," he noted at the time of his appointment to the Construction Division. "As the men of the National Guard and draftees arrive in camp this interest will be intensified." He saw an opportunity to enlist popular support. He would hire a public relations man and put him to work at once. He would employ all the mass media—newspapers, magazines, radio, and motion pictures. He would hold public ceremonies with prominent officials participating. He would utilize every possible means "to bring the program before the public."[7] Within a week, Holmes was on the scene.

Soon a campaign was under way to obtain nationwide coverage. On 26 December Somervell's deputy, Colonel Styer, directed all Constructing Quartermasters to co-operate in the "effort to keep the people of the United States advised as to what is going on in the construction program." Every project would have a qualified public relations man to gather information, write it up in readable form, and furnish it to the local press. These same men would forward weekly newsletters to Holmes by airmail every Friday. They would also send photographs—pictures illustrating special features of the work and aerial views showing general progress. Stressing the need for "terse, timely, and interesting" news and accurate facts and

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[3] Craig Clark, "Cape Cod Gets a War Boom," *Harper's Magazine*, vol. 182, March 1941, pp. 369–74.

[4] Lowell Clucas, "Defense Comes to Our Town," *The Saturday Evening Post*, March 15, 1941, pp. 12–13, 98–102.

[5] *Life*, January 20, 1941, p. 36.

[6] *Time*, January 13, 1941, p. 16; March 10, 1941, p. 19. Reprinted by permission from *TIME, The Weekly Newsmagazine*; Copyright Time Inc. 1941.

[7] Memo, Somervell for Gregory, 9 Dec 40. EHD Files.

figures, Styer wrote:

> The public is entitled to know the essential details of the construction program; the obstacles that have had to be overcome in many instances, the sacrifices frequently made by all concerned in maintaining schedules in the face of serious difficulties, the innovations and improvements over previous . . . construction methods developed on the job, and other interesting and important achievements. These things are a legitimate source of news on every project.[8]

The response was generally enthusiastic. Some Constructing Quartermasters put local reporters on their payrolls as part-time employees, an arrangement that facilitated placement of news. Before long, weekly bulletins, photographs, and clippings from local newspapers were coming into the central office.[9]

Meanwhile, Holmes had "loosed a flood" of press releases—"exuberant" handouts, *Time* described them.[10] The tone was reassuring. Past mistakes were being corrected. The program was receiving excellent direction. Somervell was portrayed reorganizing the Construction Division, conferring with the newly appointed Zone Constructing Quartermasters, instituting a program of accident prevention, congratulating contractors whose projects were on schedule, and in other conspicuous roles. The division made a better showing by reporting projects ready for "beneficial occupancy" as soon as some troops moved in or one production unit started operating instead of waiting to report actual completion. Bit by bit, the message began to go over. The New York *Times* gave the program fuller, more balanced coverage than before. Pearson and Allen, in a column on construction, praised Somervell and concluded that a major reason for earlier delays was "the fact that the job was not supervised by the Army Engineers" from the beginning.[11] *Time* reported that "Army performance had improved since the Corps of Engineers' able Brigadier General Brehon B. Somervell moved in on the Quartermaster Corps."[12]

An article in *Fortune* and a War Department picture book surveyed accomplishments. "Camps for 1,418,000," a 17-page spread in the magazine's May 1941 issue, capped weeks of effort by Holmes to place "a readable article" in a periodical "with broad national circulation."[13] Breezily written and copiously illustrated, the story told how forty-six Constructing Quartermasters, "half horse, half alligator," had "conjured forty-six cantonments and tent camps out of prairie mud or pine barrens or rocky defiles."[14] *Citadels of Democracy: Camps and Plants for Men and Munitions*, a handsome 44-page booklet run off by the Government Printing Office in June 1941, was a pictorial record "of six months of toil and sweat—to triumph over tremendous problems, handicaps, and the forces of nature—in achieving completion of the greatest Army building program of all time."[15] Somervell distributed thousands of free copies of *Citadels*, an action he

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[8] Ltr, Styer to All CQM's, 26 Dec 40. EHD Files. See also Telg, Gregory to All CQM's, 26 Dec 40. QM 600.914 1931—.

[9] (1) QM 230.14 (ZCQM 5). (2) Public Rel Folders, EHD Files.

[10] *Time*, January 13, 1941, p. 16.

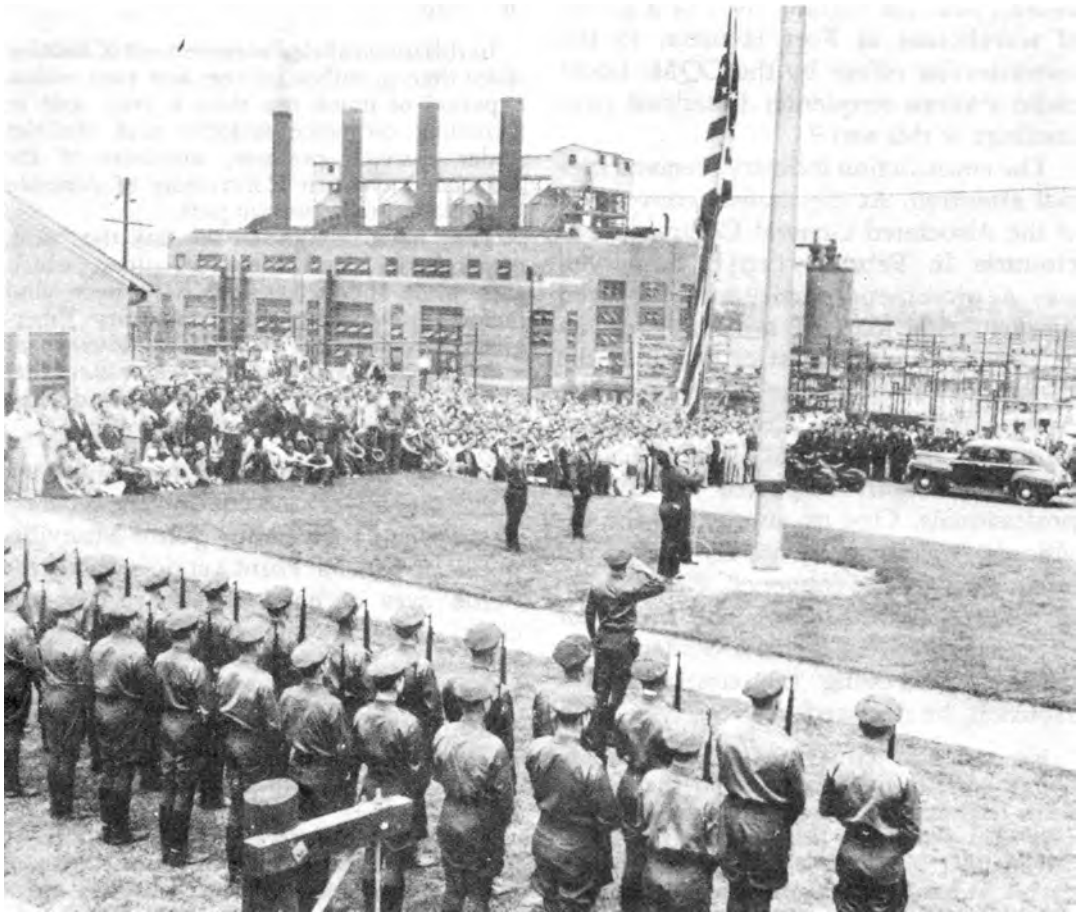
[11] Washington *Times-Herald*, February 15, 1941, p. 16.

[12] *Time*, March 10, 1941, p. 18.

[13] Incl with Memo, Styer for Somervell, 7 Mar 41. Opns Br Files, Things to be Done.

[14] *Fortune*, May 1941, pp. 56–63, 155ff.

[15] *Citadels of Democracy: Camps and Plants for Men and Munitions* (Washington: 1941), p. 6.



FLAG RAISING AT RADFORD ORDNANCE WORKS, VIRGINIA

defended by stating that "the public is entitled to be informed."[16]

A variety of public relations gimmicks stimulated interest and created good will. Somervell took time out from his other duties to assist in cutting a film on Camp Blanding and in editing its subtitles. A photographic exhibit, held at the Walker Art Galleries in Minneapolis shortly after the opening of the Twin Cities Ordnance Plant, attracted favorable notice. A guided tour of Fort Riley proved instructive to 100 members of the Topeka Engineering Club. Ground breakings, flag raisings, and dedications were public occasions. Typical of these ceremonies were the touching off of a stick of dynamite by Texas Governor W. Lee O'Daniel to mark the start of work at the San Jacinto Ordnance Depot, the presentation of a flag to the Army by a group of workmen at the Kankakee Ordnance

[16] Memo, Gregory for Marshall, 22 Jul 41. Opns Br Files, Cong—Hearings, Complaints, Requests.

Works, and the turning over of a group of warehouses at Fort Houston to the commanding officer by the CQM. Local radio stations frequently broadcast proceedings of this sort.[17]

The construction industry received special attention. At the annual convention of the Associated General Contractors at Houston in February 1941, Somervell was a prominent participant—featured speaker, chairman of a conference on defense work, and guest of honor at the banquet. To the spring meeting of the American Society of Civil Engineers at Baltimore in April went Colonel Casey, an officer highly respected by civilian professionals. One or another of the division's members generally appeared when such groups convened. Recognition of industry's contribution and praise for its endeavors were favorite Somervellian themes. Addressing the contractors at Houston, he declared:

> No unbiased critic of the vast billion-dollar building job thrust upon the peacetime facilities of the construction industry overnight can fail to acknowledge the splendid manner in which it has risen to the occasion. It has been a gigantic task. Hammers did not begin to ring until well into October. Spades were not wielded in many locations until heavy frosts had penetrated the ground. The wonder is that so much has been accomplished in so short a time. The man with the contract, in my opinion, has more than made good.[18]

Several months later, in a paper for an AGC symposium on defense construction, he wrote:

> In this unparalleled achievement of housing more than a million officers and men within a period of much less than a year, and in providing ordnance factories and facilities under extreme pressure, members of the Associated General Contractors of America have played an important part.
>
> They have brought to the task the "skill, responsibility, and integrity" upon which they pride themselves and have been vital factors in enabling the Temporary Emergency Construction Program to advance at a rate equal to, and perhaps greater than, that of any other phase of the national defense effort.[19]

In "The Miracle of Defense Construction," an advertisement in *The Saturday Evening Post* paid for by Johns-Manville, publicist Frazier Hunt reported how the "blue eyes of hard-working, super-efficient, 49-year old Brigadier General Brehon Somervell . . . twinkled with pride when he talked to me in his Washington office about the all-important part the building industry is playing." Hunt quoted Somervell:

> You can't exaggerate what has already been accomplished. It's like the statement made by the great General Goethals about the Panama Canal, "Birds were singing in the trees one week and ships sailing by the next." Americans, working for America, have done it again! The whole building industry has come forward in unbelievably fine shape. The results speak for themselves. The efficiency and patriotism of these splendid men have been inspiring.[20]

As a eulogist of the industry, the former WPA administrator had few equals.

Holmes kept the trade press liberally

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[17] (1) Min, Constr Div Staff Mtg, 9 May 41. EHD Files. (2) Ltr, Holmes to CQM Twin Cities OP, 30 Aug 41. QM 000.7 (Twin Cities OP) 1941. (3) *ENR*, May 8, 1941, p. 71. (4) Weekly News Ltr, OZCQM 8, 8 Aug 41. (5) Weekly News Ltr, OZCQM 6, 27 Jun 41. (6) Weekly News Ltr, OZCQM 8, 29 Aug 41. Last three in EHD Files, Public Rel Folders.

[18] *The Constructor*, March 1941, p. 51.

[19] Brig. Gen. B. B. Somervell, "The Temporary Emergency Construction Program," *The Constructor*, July 1941, p. 71.

[20] Frazier Hunt, "The Miracle of Defense Construction," *The Saturday Evening Post*, December 13, 1941, p. 102.

supplied with copy. Writeups on the Army's building program regularly greeted readers. Flipping through the weekly *Engineering News-Record*, they would come across articles like these: "Sewage Treatment for Army Camps," "A Thousand Buildings in Five Months," "Chrysler Builds a Tank Arsenal," "Fighting Mud at Camp Wallace," "Building a Camp in the Wilderness," and "Handling a 20,000-Man Crew on a Camp Job." As many as three such articles appeared in a single issue. News items, such as these, were even more plentiful: "Cantonment construction approaches peak," "Defense housing at Fort Knox goes into high," "Army construction now 'on or ahead of schedule,'" "More civilian experts in army construction set-up," "Camp Shelby completed on time and below cost," "Production started at Charlestown powder plant," and "Labor troubles on Army construction negligible."[21] Leading construction monthlies also featured reports on the program. For example, "Defense Construction On and Ahead of Schedule," "Radford Ordnance Works Opens 3 Months Early," and "Rolling Out the Barracks" were topics covered in one issue of *The Constructor*.[22]

In promoting better public relations, Somervell did not neglect Congress. Late in January 1941 he created a Contract Information Bureau, gave it a ground floor office, and placed Maj. Joseph F. Battley in charge. Explaining the bureau's purpose to his branch chiefs, Somervell said:

> We must . . . set up a foolproof system for informing Senators and Congressmen of the awarding of contracts in their states and districts and other matters of interest on which they have a right to be informed. We must establish a reputation for prompt, accurate and courteous information to these men, who are in fact the Board of Directors of our organization.[23]

In letters to individual congressmen, Somervell pointed out that Battley was "available to anyone in your office or to any of your constituents who may desire information," at the same time adding, "I shall, of course, continue to render you such services as I can personally."[24] The bureau was a success. Battley gave immediate attention to inquiries and complaints. He sent each congressman a monthly bulletin listing contracts in force alphabetically and by state. He arranged for Senators and Representatives to make the first public announcements of contracts awarded for projects in their states and districts. So active did the bureau become that Maj. Alexander P. Gates, who succeeded Battley in June, required five telephones.[25]

Congressmen found Somervell friendly and considerate. Unlike Hartman, who had sometimes kept them waiting in the halls of the Construction Division, Somervell was never too busy to see them. If he did not always accede to their requests, he nevertheless gave them sympathetic hearings. Ranking members of important committees received invitations

[21] *ENR*, March 27, 1941, pp. 63–66, 72–76; April 10, 1941, pp. 40–42, 58–60; May 8, 1941, pp. 86–89; June 19, 1941, pp. 66–68; February 13, 1941, pp. 73–74; February 20, 1941, p. 3; March 13, 1941, pp. 55–56; April 3, 1941, p. 2; May 1, 1941, p. 10; May 22, 1941, p. 36.

[22] *The Constructor*, April 1941, pp. 16–19, 23.

[23] Memo, Somervell for Chiefs of Brs, 21 Jan 41. Opns Br Files, Gen—16 Dec 40 to 2 Jun 41.

[24] Ltr, Somervell to Rep Jennings Randolph, 14 Feb 41. QM 161 (Misc) 1940–41.

[25] (1) Memo, Younger for Chiefs of Brs, 14 Feb 41. EHD Files. (2) Min, Constr Div Staff Mtg, 6 Jun 41. EHD Files. (3) Memo, Styer for Chiefs of Brs, 24 Jun 41. Opns Br Files, OQMG Office Orders.

to the general's home to talk over upcoming legislation. Somervell welcomed opportunities to do congressmen good turns. For example, when he learned that 200 of their secretaries, members of the so-called "Little Congress," were planning an outing to New York City, he asked General Gregory to arrange for a luncheon at the Fort Jay mess.[26] On one thing Somervell's colleagues generally agreed, he knew how to get along on the Hill.

Not everyone was favorably impressed by Somervell's endeavors. Among construction officers there was a feeling that he had hogged the show, that he had made it a point rarely to give public credit to subordinates. After all, they reasoned, the first Roosevelt, while publicizing Teddy, had publicized the Rough Riders, too. Some laid Somervell's actions to a mania for publicity; others, to intense ambition. Many grew to dislike and distrust him. Nor was Congressional approbation unanimous. *Citadels of Democracy* made Representative Taber boil with indignation. In a letter to Stimson, the New York Republican complained:

> I am grieved and surprised that the War Department would do such a thing. The "picture book" can have no possible use, can have no effect upon anyone except one of complete disgust . . . . It savors of the War Department's attempting to sabotage the Defense Program by wasting thousands of dollars upon such a fantastic document with the money so sorely needed for actual defense.[27]

Taking a stand as a member of the House Appropriations Committee, Taber admonished General Marshall:

> I want you in the War Department to realize the very bad impression that the sending of this booklet has had upon those in Congress who have the burden of sending and protecting the War Department's requests for funds. Such a sabotaging of the Defense Program is utterly unfair to those of us who have taken the burden of asking the House of Representatives to trust the War Department with the enormous sums with which they have been entrusted.[28]

Somervell got publicity but not always the kind that would do him the most good.

His intensive public relations effort nevertheless produced some good results. The country received much information about the military construction program. During the first four and one-half months of 1941, newspapers throughout the nation gave Quartermaster projects nearly a quarter-million column lines.[29] Somervell moved into the limelight and acquired new friends in Congress and in industry. His enhanced prestige and influence proved of benefit not only to him personally but also to the organization he headed.

Brilliant accomplishment and glittering success—such was the picture presented by Somervell. A sobering view opened to the public as Congress inquired into construction difficulties and the reasons behind them.

Congressman Engel Investigates

Representative Albert J. Engel was the first to attempt a systematic inquiry. A member of the House Appropriations Committee, the Michigan Republican

[26] (1) Renshaw Interv, 13 Feb 59. (2) Memo, Styer for Gregory, 31 Mar 41. Opns Br Files, Cong—Hearings, Complaints, Requests.

[27] Ltr, Taber to Stimson, 17 Jul 41. Opns Br Files, Cong—Hearings, Complaints, Requests.

[28] Ltr, Taber to Marshall, 17 Jul 41. Same File.

[29] Min, Constr Div Staff Mtg, 16 May 41. EHD Files.

had long advocated giving all military construction to the Corps of Engineers. Throughout the summer of 1940 he followed the progress of appropriations for sheltering Guardsmen and selectees. Engel wished to examine the War Department's estimates closely before voting construction funds but found his plans blocked by the tactics of the Majority. He later recalled his experiences on the September day in 1940 when the House voted the bulk of the money for Army housing: "A clerk of the Appropriations Committee came to my office at 5 minutes to 12 and asked me to approve the Regular Army housing bill, which amounted to $338,000,000, without a full committee meeting. I refused to do this. When I got to the floor, the House was in session, and the bill was being considered. I reserved the right to object, but finally realizing the need of immediate Army housing for the draftees, did not object." Engel continued to pursue the matter. During October he obtained a breakdown of Hartman's building estimates and inserted it into the *Record*. He expected the Army "to account to Congress for every dollar." About the first of December he began a one-man investigation of camp construction.[30]

On 16 January 1941, in a speech before the House, Engel described his efforts to find out "just how this money is being spent." So far he had collected cost data on twenty-three projects. On the basis of this information, he put the construction deficit at $300 million, a figure remarkably close to the War Department's own estimate. He had also made an exhaustive study of Camp Edwards. "In view of the fact that all the projects are handled . . . in the same way," he told his colleagues, "I thought that an analysis of this one job might give us an idea of what happened on a majority of all the jobs." But after dissecting the operations of the Walsh Construction Company, Engel had concluded that it "would be presumptuous for me to make definite, permanent recommendations . . . when I have so small a proportion of the facts before me." Announcing his decision to broaden the investigation, he indicated what he expected to learn. Three years earlier he had suggested to General Craig "that the construction quartermaster work be transferred to the Army Engineering Corps." Promising Congress "definite recommendations" soon, he now stated:

> The Army housing program . . . actually places Army engineers into the Construction Quartermaster Corps. But we still have practically the same conditions existing as before. Construction work requires trained men. It is the engineers' and architects' job; and the sooner we learn this, the sooner we are going to eliminate a great deal of inefficiency, including waste and extravagance.[31]

In February Engel set out to inspect camps in the East and South. Before leaving Washington he asked for a letter giving him entree to any project and permission to examine anything he wished. Somervell furnished the letter and offered the services of Captain Davidson as companion and guide. Engel took the letter but left Davidson behind.[32] His visits were intended to surprise. "I

[30] 87 *Cong. Rec.* 166.

[31] 87 *Cong. Rec.* 166–69.

[32] (1) Ltr, Engel to Somervell, 27 Jan 41. (2) Ltr, TAG to CO's Posts, Camps, and Stations, 3 Feb 41. (3) Ltr, Engel to Somervell, 18 Feb 41. All three in QM 032 (Engel, Albert J.) 1935–43.

do not want the camp to know when I'm coming," he said.[33] For the next few weeks the specter of the ubiquitous Mr. Engel haunted Constructing Quartermasters. Engel would arrive on the scene at an early hour, unannounced and unobserved. He would spend the morning touring the project, taking pictures, talking to workmen, examining materials and equipment, poking into scrap piles, looking everywhere for irregularities. By the time camp authorities became aware of his presence he would be ready to go over the contractors' books and to question the project manager, the auditor, and the Constructing Quartermaster. His departure was as unceremonious as his arrival. Before sundown he would be off to another undisclosed destination and would drive "to the next project that night so as to be able to join the caravan of workers as they arrived at the camp at or before 7 a.m., the next morning."[34]

The uninvited guest taxed the patience of his hosts. The New York *Times* portrayed the congressman at Fort Bragg, backing four generals into a corner.[35] During Engel's visit the Constructing Quartermaster at Bragg, Lt. Col. Lawrence L. Simpson, made an excited telephone call to Washington. "I wanted to assure you that we are being just as diplomatic as possible," he told Groves. But efforts to "ease him along" did not divert Engel. Simpson complained: "He won't let any of us go with him. He wanted to get those pictures and didn't let us know he was here. . . . In the meantime, if he does see anything he can pick up that would look bad, he will do it." Simpson reported that Engel had announced he was going to censure the Quartermaster Corps when he got back to the capital. On hearing this, Groves exclaimed, "Encourage him to go further away."[36] Engel went as far as Blanding; then he headed home. Late in March the Construction Division learned of his return.

Engel was soon ready to lay his findings before Congress. During the first week in April he delivered two lengthy addresses, one on Camp Blanding, the other on Camp Meade. At the Florida camp, Engel had uncovered the following information: 54,000,000 board feet of lumber had been bought for the project at an average price of $40 per thousand; 580,000 tons of lime rock costing $1,250,000 had been used for roads and parkways; rentals on equipment valued at $4,628,605 had totaled $1,992,080 by 20 February; $1,079,400 had been paid out in overtime; half of the 5,000 men who had drawn carpenters' wages had "very little, if any previous experience." Engel implied that the Quartermaster Corps had paid too much for labor, equipment, and materials and hinted at collusion on bids for the limestone contract. His chief target was the Blanding site. After pointing out that 40 percent of the building area was below the level of nearby Kingsley Lake, he went on to contend that the location had added $5,000,000 to the cost of the camp. In conclusion he stated, "There is no question in my mind but that the selection of this site . . . was not only unfortunate and extremely expensive, but shows gross inefficiency and a total disregard for taxpayers'

[33] Memo, Somervell for Moore, 3 Feb 41. QM 333.1 1941.

[34] 87 *Cong. Rec.* 2843–44.

[35] New York *Times*, March 9, 1941, Sec IV, p. 2.

[36] Tel Conv, Simpson and Groves, 20 Feb 41. Opns Br Files, Ft Bragg.

interests."[37] Two days later Engel spoke on Meade. Once again he presented an array of figures as "evidence of waste and extravagance due to incompetency and inefficiency." As before, he directed his ire against men who had chosen the site. "I say here and now," he declared, "that the officers in the United States Army who . . . are responsible for this willful, extravagant, and outrageous waste of the taxpayers' money, ought to be court-martialed and kicked out of the Army."[38]

Interest in the one-man probe flared briefly and subsided. Warmly applauded by his colleagues at first, Engel commanded dwindling audiences in the House. After reporting his early sallies, the press fell silent. The morning after Engel's address on Meade, Somervell remarked to his staff, "I have been speculating, without being able to get an answer in my own mind, as to just what help these speeches are going to be to National Defense."[39] Groves put his finger on one of Engel's difficulties: "He's a better man than I am if he can go to a camp and wander around it for a day and then come up with the whole story."[40] A rigorous investigation of the building program was not a one-man job.

Engel took the floor again on 17 April. His subject was a different camp, Indiantown Gap, but his speech had a familiar ring. Predicting a deficit of $10.3 million, he asserted that prices paid for lumber were 20 to 25 percent too high, that rentals on equipment amounted to 50 percent of appraised valuations, and that one of every five men paid carpenters' wages lacked carpenters' skills. He noted that $15,000 had gone for termite shields in an area where a wooden building had stood since the 17th century without suffering damage from insects. Criticism of the rocky, mountainous site climaxed his remarks. "There is no question in my mind," he said, "that the selection of this site has cost the taxpayers millions of dollars." In a lively exchange, one Democratic congressman insisted that, in fairness to the War Department, evidence of negligence, bad judgment, and waste of public funds be spelled out in the *Record*. Engel countered: "I have had information that the War Department has had engineers go over my Blanding and Meade speeches, made on April 1 and April 3. They have had 2 weeks but no answer has been made by them thus far."[41]

When the War Department continued silent, Engel did not persist. A speech on Camp Edwards, scheduled for 1 May, went undelivered. Offered as an extension of remarks, it was interred in the *Record*'s appendices. An address on Fort Belvoir met the same fate.[42] The one-man probe was over. Engel's findings were obscured by those of other, more thoroughgoing investigators.

House and Senate Committee Investigations

Sooner or later there was bound to be a full-dress Congressional probe. World War I had produced the Chamberlain and Graham investigations; the Spanish-American War, the Dodge; and the Civil War, the Wade. As far back as the

[37] 87 *Cong. Rec.* 2843–48.
[38] 87 *Cong. Rec.* 3004–7.
[39] Min, Constr Div Staff Mtg, 4 Apr 41. EHD Files.
[40] Tel Conv, Groves and Maj Clark (BOB), 4 Apr 41. Opns Br Files, Budget.
[41] 87 *Cong. Rec.* 3158–62.
[42] 87 *Cong. Rec.* A2037–40, A2288–90.

Revolution, Congress had looked into the conduct of military preparations. In fact, as one scholar has pointed out, "of all administrative departments the Department of War has come most often under the inquisitorial eye of Congress."[43] During the fall of 1940 there were rumblings of a Congressional investigation into the Army's defense activities.[44] Early in the new year committees of the House and Senate launched formal inquiries. Military construction was the initial target.

On the morning of 12 February, the House Military Affairs Committee began hearings. First to testify was Forrest S. Harvey of the Construction Advisory Committee. Chairman Andrew J. May opened the proceedings by asking "just how" the Quartermaster Corps let its contracts. Harvey started to explain but was soon deluged with questions.[45] Representative Dow W. Harter inquired why most of the work was going to large concerns. Representative Matthew J. Merritt asked why some firms had received two contracts while other firms went begging. Representative John M. Costello wanted to know why the Army had not broken up large contracts so that more firms could participate.[46] Harvey's explanation of the reasons for giving industrial projects to a few select firms was dismissed by Pennsylvania's Charles I. Faddis with the remark, "I am not convinced that there is as much specialization on contractors as maybe we have been led to believe."[47]

His statement that the advisory committee granted interviews to all comers was contradicted by Louisiana's Overton Brooks, who said he knew several contractors turned away by the committee.[48] When Harvey stated that he could appraise contractors' qualifications from their answers to a questionnaire, Representative Paul J. Kilday rejoined, "I think you are a genius."[49] Several of the Congressmen questioned the advisory committee's impartiality. Representative Andrew Edmiston implied that political considerations had influenced its selections. Kilday suggested that the Associated General Contractors had had a hand in its decisions. Brooks made pointed reference to the fact that Harvey had worked for Leeds, Hill, Barnard and Jewett, the architect-engineer at San Luis Obispo. In two days before the House Committee, Harvey failed to dispel these doubts.[50]

The next witness, Francis Blossom, underwent a cruel ordeal. After a few preliminary questions, one committee member asked him: "Now, since you have been . . . a member of this board has the firm of Sanderson & Porter received any contracts from the War Department?" Blossom's affirmative answer evoked a storm of questions. Was he an active partner in the firm? He was. What would be his share of the fee for the Elwood Ordnance Plant? Approximately $125,000. Although testimony revealed that Sanderson & Porter was eminently qualified for the job and that neither Blossom nor the Construction Advisory Committee had participated in

[43] Marshall E. Dimock, *Congressional Investigating Committees* (Baltimore: The Johns Hopkins Press, 1929), p. 92.

[44] Memo, Col Brennan, WDGS, for SGS, 2 Oct 40. OCS, Notes on Confs–Sep 24, 1940—.

[45] H Comm on Mil Affs, 77th Cong, 1st sess, *Hearings, Inquiry as to National Defense Construction*, Part 1, pp. 1–54.

[46] *Ibid.*, pp. 8, 9, 21.

[47] *Ibid.*, p. 13.

[48] *Ibid.*, pp. 24–25.

[49] *Ibid.*, pp. 40–41.

[50] *Ibid.*, pp. 14, 30–31, 37, 51.

this selection, the Congressmen showed no disposition to let the matter drop.[51] On 15 February, the day after Blossom's appearance, Stimson noted in his diary, "There is no evidence of any impropriety or corruption on the part of Blossom but they are making a big hue and cry over it and it is a very unpleasant thing."[52] The hue and cry continued as Somervell, Patterson, Campbell, and others were questioned about the Elwood contract.[53] Recalled by the committee at his own request, Blossom announced his decision not to participate in the profits of his firm for the years 1940 and 1941. "I trust that it will be understood," he told the House group, "that this is not an inconsiderable sacrifice for me to make. Nevertheless, I make it freely and willingly as my contribution to the welfare of my country."[54] Shortly afterward, he resigned from the advisory committee and returned to private life. "I think," Patterson commented, "that a man of proper sensibilities, being criticized, even though he might not think the criticism just, might be prompted to say, 'I would stand clear of it all together.' I am sure that he came down here from the most patriotic and high-minded motives."[55]

A procession of witnesses passed before the House group. A third member of the Construction Advisory Committee, Mr. Dresser, repeated much of Harvey's testimony. General Somervell defended cost-plus-a-fixed-fee contracts. John J. O'Brien and Congressman Clarence Cannon presented their views on real estate brokers. General Brett reported on the progress of the Air Corps program. On 1 April Chairman May suspended hearings on defense construction.

Thus far the House investigation had aroused only moderate interest. Except for the disclosures concerning Blossom, little new information had come to light. On the whole, questioning had been unmethodical and desultory, and testimony had lagged. The committee had asked many of the officials who came before it to discuss matters of which they had little or no direct knowledge. The practice of permitting members to take turns interrogating each witness had led to tedious repetition. Moreover, the Congressmen were not sufficiently well grounded in construction to conduct a comprehensive inquiry. Chairman May occasionally lost patience with his colleagues. From time to time he urged them to "get along a little faster" or chided them for "going far afield."[56] But his efforts to keep the discussion from bogging down were not entirely successful. After six weeks of hearings the investigation appeared to have run its course.

Then, on 2 April, the inquiry received a new lease on life. That day the House adopted a resolution, authorizing the Military Affairs Committee to make a thorough study of the Army's defense activities. Immediately after passage of this resolution, the committee met to discuss procedures for conducting its probe. It agreed to form three special committees, the second of which would consider real estate and construction. Special Committee No. 2 would have nine members; R. Ewing Thomason of Texas would be the chairman. Soon after

[51] *Ibid.*, pp. 55–95.
[52] Stimson Diary, 15 Feb 41.
[53] May Comm *Hearings*, Part 1, pp. 151–52, 161–70, 186–206, 207–11, 217–32.
[54] *Ibid.*, p. 116.
[55] *Ibid.*, p. 165.
[56] *Ibid.*, pp. 109, 139.

its formation, the Thomason group began to lay plans for carrying out its work.[57]

News that the May committee was preparing to widen its investigation caused some consternation in the War Department. A full-scale Congressional inquiry would place a heavy burden on the Department's staff, which would have to search out data, answer questions, and produce witnesses. The probability that the committee would call for secret information raised a ticklish question—should the Department refuse to furnish classified data and thus raise suspicions that it was hiding behind a security cloak or should it comply with the committee's requests and thus run the risk of aiding potential enemies of the United States.[58] If officials also feared an outbreak of muckraking, this fear soon subsided. During early stages of the inquiry a Quartermaster observer noted: "The House Committee does not appear to be in a belligerent or tense attitude. . . . While the committee is on a 'fishing expedition,' they are entirely relaxed and will investigate in as cooperative a spirit as possible."[59] This spirit of co-operation continued throughout the life of the investigation. By agreeing to take secret testimony in executive session and by limiting requests for information, the committee showed consideration for the War Department. The House inquiry furnished a notable example of good relations between an investigating committee and an executive department.[60]

After reviewing testimony before the full committee, Thomason concluded that "open hearings did not constitute the best vehicle for development of facts." He also saw that few committee members could cope with complexities of military construction. Methods employed by his committee reflected this realistic attitude. Thomason and his colleagues assembled a staff of experts in real estate, labor relations, engineering, business, and accounting. They persuaded the Comptroller General to lend them Albert W. Perry, who became their chief counsel. They made extensive use of questionnaires. They sent investigators to jobs throughout the country and visited a number of sites themselves. They assembled a mass of documentary evidence. Such hearings as they held were closed. In short, the Thomason investigation took on the character of a research project.[61]

On 2 May the Thomason committee sent out its first questionnaire. Addressed to Secretary Stimson, the questions covered such subjects as site selection, land acquisition, plans and specifications, and costs. The committee asked for data on all building projects costing in excess of $5,000,000 and all real estate transactions involving $200,000 or more. The Secretary reacted promptly to Thomason's request. Maj. Carlisle V. Allan of the General Staff took charge of co-ordinating the War Department's work with

[57] (1) H Res 162, 77th Cong, 1st sess, 2 Apr 41. (2) New York *Times*, April 3, 1941, pp. 1, 15. (3) May Comm *Hearings*, Part 2, p. 1.

[58] Memo, Amberg for Patterson, 2 May 41. USW Files, Legis—H and S Investigating Comm 1.

[59] Memo, OQMG Constr Div RE Br, M. M. Epstein, for J. J. O'Brien, 8 May 41. QM333.9 (Constr and RE).

[60] (1) H Comm on Mil Affs, 77th Cong, 2d sess, Interim Gen Rpt Pursuant to H Res 162, 23 Jun 42, p. 2. Cited hereinafter as May Comm Interim Rpt, 1942. (2) Memo, Amberg for Lt Col C. V. Allan, 18 Dec 41. USW Files, Legis—H and S Investigating Comm 2.

[61] May Comm Interim Rpt, 1942, pp. 76–77.

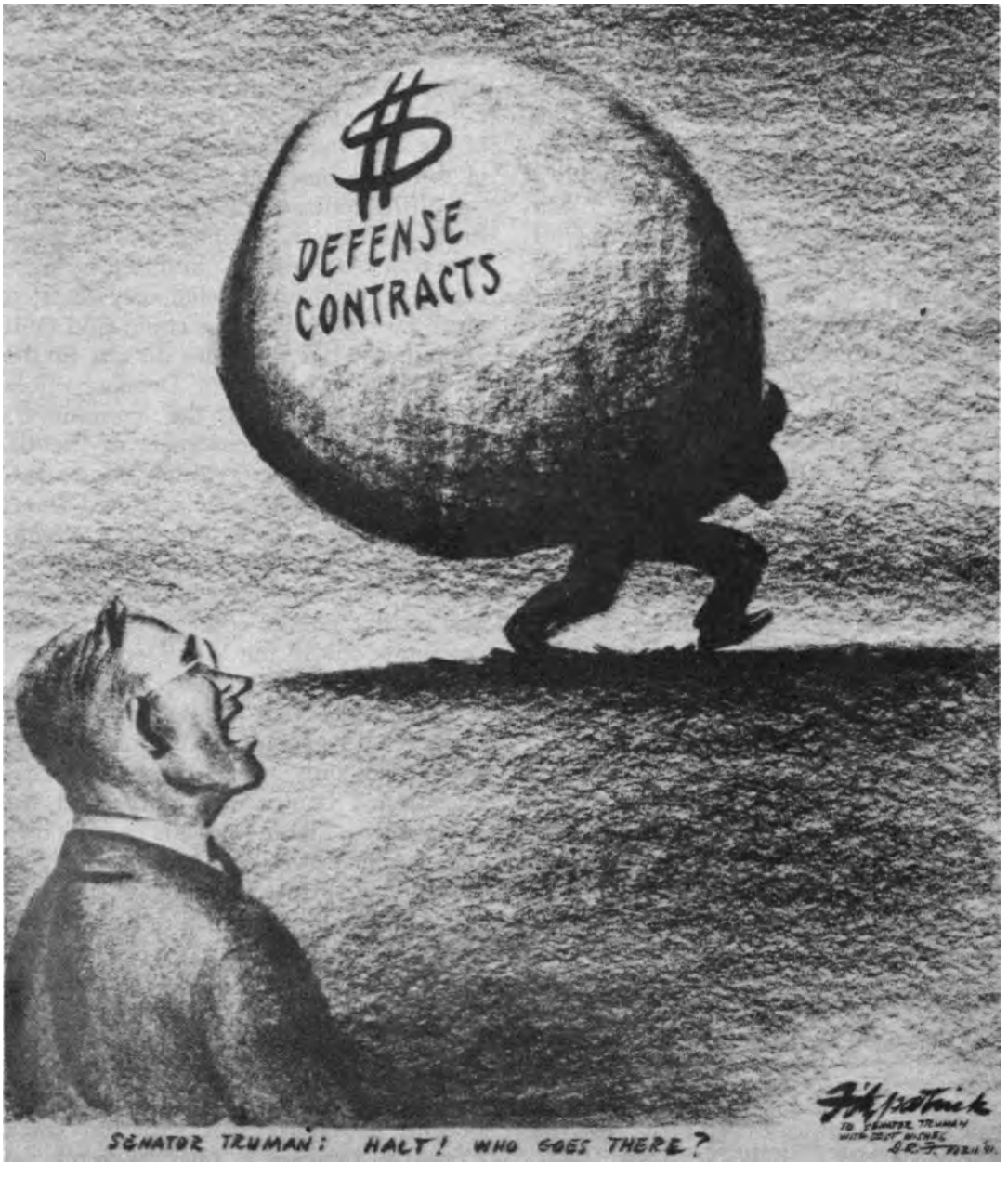
that of the committee. Capt. Clarence Renshaw of Groves' staff drew liaison duty with the Thomason group. Chief responsibility for answering the questionnaire fell to Maj. Garrison Davidson, another of Groves' officers. By 7 May Davidson had a force of six men at work. Two weeks later General Gregory replied informally to Perry. The committee meanwhile had prepared two more questionnaires. One, calling for detailed discussions of the quality and cost of construction, delays, equipment rentals, and fees, was for individual contractors. The other, dealing with the Army's plans for building additional camps, was for the War Department. By the middle of June, answers to most of these queries were in Thomason's hands. During the next two months the special committee inspected construction projects, questioned officials, and analyzed the information it had gathered. Not until the third week of August was Thomason ready to report.[62] Meantime, public interest centered on another investigation.

Among the visitors at the first hearing of the May committee was the junior Senator from Missouri, Harry S Truman.[63] Two days earlier, on 10 February, he had told the Senate that he planned to ask for an investigation of the defense effort. In his speech on that occasion, Truman said that the government's procurement policies were apparently designed "to put the little man completely out of business." After picturing the plight of the little manufacturer and the owner of the little machine shop, he discussed the little contractor. The Senator outlined the criteria adopted by the Construction Advisory Committee. "Were these requirements religiously carried out," he stated, "no one could find fault with them; but the rules do not fit the facts." He charged that Dresser, whom he characterized as the committee's leader, was giving contracts to friends. At the same time, Truman contended, "It is considered a sin for a United States Senator from a State to make a recommendation for contractors, although we may be more familiar with the efficiency and ability of our contractors at home than anybody in the War Department." Like many another member of Congress, Truman believed that the fixed-fee method worked considerable mischief and that it not only stifled competition but encouraged contractors to defraud the government. Recalling his experiences with public works as a county judge in Missouri, he assured the Senate that contractors would take full advantage of their current opportunity to fleece the government. "I consider public funds to be sacred funds," he declared in closing, "and I think they ought to have every safeguard to prevent their being misused and mishandled." Only by getting at the bottom of the present situation could Congress prevent a recurrence of the profiteering of World War I.[64] Three days later, on 13 February, Truman introduced a resolution for a special in-

[62] (1) Ltr, May to Stimson, 2 May 41, and Incl. QM 333.9 (Constr and RE). (2) Memo, Amberg for Patterson, 2 May 41. USW Files, Legis—H and S Investigating Comm 1. (3) Memo, Davidson for Styer (7 May 41). (4) Ltr, Stimson to May, 22 May 41. Last two in QM 333.9 (Constr and RE). (5) Memo, Amberg for Allan, 3 Jun 41. USW Files, Legis—H and S Investigating Comm 1. (6) Renshaw Interv, 13 Feb 59.

[63] May Comm *Hearings*, Part 1, p. 1.

[64] 87 *Cong. Rec.* 830–37.


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DEFENSE
CONTRACTS
SENATOR TRUMAN: HALT! WHO GOES THERE?

vestigating committee, and on 1 March the resolution carried.[65] The chairmanship went to Truman. Named to serve with him were old-line Democrats: Tom Connally of Texas, James M. Mead of New York, Mon C. Wallgren of Washington, and Carl A. Hatch of New Mexico. Republican members were Joseph H. Ball of Minnesota and Ralph O. Brewster of Maine. This investigation, which continued throughout the war, brought its first chairman into national prominence.

The emergence of Senator Truman as inquisitor plunged the War Department into elaborate preparations to defend its record. Even before passage of the Senate Resolution, Patterson had called for reports on matters Truman might look into.[66] Such a request was more or less routine. Early in March, however, Patterson's advisers began advocating a "real attempt . . . to present an affirmative case." "As you know, in many Congressional investigations those in charge attempt each day to make headline news," wrote Special Assistant Howard C. Peterson. "For this reason and because the results of a full-dress investigation will have an important effect on the relations of the War Department with the Congress and the public, I think it is imperative that the testimony of representatives of the War Department be carefully presented and adequately prepared."[67] Patterson took this advice. He put able men on the case: Julius H. Amberg, past president of the Michigan Bar Association and now assistant to Secretary Stimson, would direct the War Department's presentation; Lt. Col. Arthur R. Wilson of G–4, an officer of considerable political acumen, became the War Department's liaison with the committee; Major Davidson became Somervell's. Together with Peterson, these men helped determine the War Department's strategy.

By late March preparations were in full swing. On the 28th Amberg held a meeting with Quartermaster officers, including Gregory, Somervell, and Groves. After outlining the probable scope of the investigation—geographic distribution of defense contracts, favoritism in awards, profits on fixed-fee jobs, selection of camp sites, original estimates and final costs, delays in completion, methods of land acquisition, and union activities—he "urged the frank admission of mistakes where they existed and a full statement of the measures that had been taken to correct them." In a point-by-point discussion, Amberg took the part of devil's advocate while the officers postulated the case for the Construction Division. The sense of the meeting was "that the Quartermaster Corps had very little to apologize for, that in presenting its case to the Committee, every effort should be made to make an affirmative case . . . , rather than to take a purely defensive attitude on all matters that the Committee cares to bring up."[68] Also on the 28th, Secretary Stimson began planning his appearance before the committee. Under that date he wrote in his diary:

> I began to prepare my speech which I am going to make to the Senate Investigating Committee . . . . It is a big chore

[65] (1) S Res 71, 77th Cong, 1st sess, 1 Mar 41. (2) 87 *Cong. Rec.* 1615.

[66] Memo, Patterson for Chiefs of Arms and Services, 27 Feb 41. 3820 (Nat Def) Part 2.

[67] Memo, Peterson for Patterson, 7 Mar 41. USW Files, USW Memos.

[68] Notes of Conf, prepared by Maxwell, 28 Mar 41. QM 381 (Nat Def) 1941.

but I think a very necessary one. We are confronted with an investigation which will undoubtedly try to maximize the blemishes and defects of this great effort that has been made by the War Department for the past year and will entirely obscure the difficulties and the achievements . . . . As I am the first witness, I am going to try to forestall that by making a careful written presentation which will show what we have done and what our difficulties have been and how magnificent the accomplishments have been; in other words, to start the thing off on the right foot and to, if possible, put to shame the attempts to belittle it.

Aided by McCloy and Somervell, the Secretary toiled for days over "this confounded speech." He found it "one of the hardest jobs that I have ever had."[69]

Late in March, amid reports that he was headline seeking,[70] Truman went on the radio. Rumors were rife in Washington, he said, of irregularities in awarding contracts and locating plants, of lobbyists at work, of "outrageous prices" paid for land, and of unconscionable profits and avoidable waste. He intended to get to the bottom of things. "There will be no attempt to muckrake the defense program," he assured his listeners, "neither will the unsavory things be avoided." Coming to the crux of his message, he said:

We recognize the importance of conducting this investigation so as not to add delay and confusion to an accelerated defense program; yet a properly conducted investigation *now* can be valuable both for its deterrent effect on those who might otherwise go wrong, and for constructive suggestions which it can offer to the Congress for legislative action and to the Executive for administrative improvement. So that instead of being a witch-hunt after the mistakes are made and the crimes committed, this committee can be of immense constructive help in bringing the defense program to successful accomplishment.[71]

Shortly after the Senator's radio address, the committee's chief counsel, Hugh A. Fulton, conferred with Amberg. Fulton wanted more information about the War Department's "soft spots" and specific examples of abuses. He mentioned lobbyists, excessive prices, discrimination against small contractors, and mistakes in site selection as topics of special interest. Amberg pointed out "that it would be difficult to get our personnel to inform us that they had done something wrong which should be investigated."[72] Nevertheless, the committee was soon receiving suggestions. Somervell, for one, was closemouthed at first, but, according to Truman, he came around when he realized the committee might be useful to him.[73]

On the morning of 15 April Secretary Stimson took the stand to open the committee's first public hearing. In his carefully prepared statement, he described the sudden and unexpected nature of the emergency. By comparing the situation of 1940 with that of 1917, he brought the Army's current problems into sharp relief. By recalling the prolonged debates of the previous summer, he drew attention to the fact that Congress had allowed the War Department little time to do its job. The Secretary then launched into a discussion of construction and procurement. Leaving ex-

[69] Stimson Diary, 28 Mar, 1, 14 Apr 41.

[70] (1) Interv with former President Truman, 12 Apr 58. (2) Stimson Diary, 15 Apr 41.

[71] Radio Address by Sen Harry S Truman on the Washington *Evening Star*'s Evening Forum, March 24, 1941. Opns Br Files, Questions and Answers—Truman Comm. Reprinted in 87 *Cong. Rec.* A1564–65.

[72] Memo of Conf, Amberg for Rcd, 4 Apr 41. USW Files, Legis thru S–2599.

[73] Truman Interv, 12 Apr 58.

planations to later witnesses, he kept his remarks general. The burden of his testimony was a plea for recognition of the War Department's achievement.[74] "With the magnitude of the task and the speed and pressure under which it was performed, it is inevitable that some mistakes have been made," he told the Senators, "but when the work of this committee is completed, I am confident that it will be found that the total of these mistakes will appear quite insignificant when set against the value of the time saved and the size of the task performed."[75] Patterson, who presented a detailed account of the Army's procurement and construction programs at the afternoon session, followed much the same line as Stimson. "It is fitting," he told the committee, "that we render an account of the manner in which we are performing our trust. We have been vigilant, we believe; but if abuses have crept in despite our vigilance, they must be eradicated."[76] The statements of the Secretary and the Under Secretary seemed to make a favorable impression. After answering the Senators' polite questions and receiving their compliments, the two witnesses stepped down.[77] Describing their treatment by the committee, Stimson wrote later that day: "They were mild as milk and I couldn't help feeling that there was . . . no latent hostility in the air around me."[78]

After a week of eliciting "background information" from such top defense officials as Knudsen and Hillman, the committee got down to the business of construction.[79] On 22 April it called the Chief of Staff to testify on mobilization and troop housing. A parade of construction experts followed him to the stand. Appearing for the Construction Division were Somervell, Harvey, Loving, and Groves. The list of witnesses lengthened to include members of the General Staff, Constructing Quartermasters, contractors, architect-engineers, and renters of equipment. In time the committee quizzed virtually every major actor in the construction drama and many minor ones besides. In its investigation of the building program, the Truman group at first pursued the same line of inquiry as the May committee. The Senators wished to learn the reasons for the overrun in camp expenditures and to uncover dishonesty and extravagance. Early testimony revolved around questions of contracts, real estate, and sites. Such subjects as profits, salaries, wages, and equipment rental rates evoked special interest. The committee bore down heavily on the evils of cost-plus contracts, making no sharp distinction between fixed-fee and percentage types. The probe revealed costly mistakes—General Parsons' layout of Camp Meade was one—and pinpointed instances of waste, such as the payment of $150 monthly rental for a 1917-model truck. It also raised challenging questions: for example, were too many contracts going to big concerns. But it failed to unearth any real evidence of fraud or corruption.[80]

The one major construction scandal that came to light involved General R. C. Marshall. Acting, purportedly, on a tip from Somervell, the committee sum-

[74] Truman Comm *Hearings*, Part 1, pp. 2–16.
[75] *Ibid.*, p. 16.
[76] *Ibid.*, p. 20.
[77] *Ibid.*, pp. 1–75.
[78] Stimson Diary, 15 Apr 41.
[79] Harry S. Truman, *Memoirs*, I, *Year of Decisions* (New York: Doubleday & Co., 1955), 169.
[80] Truman Comm *Hearings*, Parts 1, 2, 4, 6.

moned the former Chief of Construction to answer charges of influence peddling. During the early months of the defense effort, Marshall had served as consultant to the following construction firms: Mason & Hanger Company, Dunn and Hodgson, Consolidated Engineering Company, J. A. Jones Construction Company, MacDougald Construction Company, and Taylor & Byrne. All these concerns had received fixed-fee contracts from the Quartermaster Corps. The committee's investigation, during which Marshall destroyed his files, failed to produce any evidence of official wrongdoing.[81] Nevertheless, disclosure of his activities brought action by the War Department against Marshall and his clients. Secretary Stimson demanded Marshall's resignation from the Reserve Corps. General Gregory deducted the amount of Marshall's fees from payments due his clients.[82] If, as was alleged, Somervell had vowed to fix "Puck" Marshall so "he won't be able to hold his head up in this town," he came near to succeeding.[83] But Marshall, always a dangerous opponent, got his licks in, too. In the course of his testimony, he had managed to place before the committee a proposal for a separate construction corps.[84]

As the committee probed deeper into building problems, it became apparent that responsibility for much of the construction muddle lay outside the Quartermaster Corps. Turning his attention to the Army's mobilization plans, Truman called six officers of the General Staff, several of them retired, for questioning. Their testimony revealed that the Staff had not foreseen mobilization short of war. The absence of a blueprint for peacetime mobilization explained many conditions underlying high construction costs: hasty selection of sites, lack of plans and specifications, and reliance on the fixed-fee contract.[85] Convinced that the Army's M-Day plan had been in fact "an Indian-war plan,"[86] Truman declared that its author "ought to get a currying." "I am going to keep on digging," he told General Seaman, "until I find the fellow who is responsible for this situation, because I labor under the impression that . . . concrete plans for a mobilization of a million men contemplate a place to put them and a place to train them. Evidently you did not have it."[87] Truman's attempt to assess guilt solely in terms of individuals was doomed to failure. Congress and the people shared with the Army responsibility for the nation's unpreparedness. But if Truman's hope of finding a culprit was futile, his opinion of the mobilization plans was well founded. By showing the effects of unrealistic planning on the construction program, he projected a valuable lesson for future military leaders.

With two committees, Thomason's and Truman's, inquiring into construction, speculation arose as to which would be first to report its findings. The House group began writing its initial report around Memorial Day. Within a few weeks Truman was pushing work on his own report. On 12 June, Counsel Perry of the Thomason committee told Captain Renshaw: "I am preparing material to show that the Quartermaster Corps is

[81] Truman Comm *Hearings*, Part 2, p. 581ff.
[82] Opns Br Files, Marshall, R. C.
[83] Lamphere Interv, 26 Jun 56.
[84] Truman Comm *Hearings*, Part 2, p. 603.
[85] Truman Comm *Hearings*, Part 7, *passim*.
[86] *Ibid.*, p. 2002.
[87] *Ibid.*, p. 2018.

doing one of the most efficient jobs of any of the departments, if not the most. After having been kicked around so much I imagine you won't mind that encouragement."[88] Truman's counsel, Fulton, promised to let the War Department assist in presenting his committee's findings. On 15 July he sent an 80-page draft to Amberg and gave him one week to propose amendments. Amberg replied with 32 pages of suggestions. While Truman adopted some of these changes, he disregarded most of them.[89] On 13 August, Amberg warned Stimson that the "confidence of the country may be somewhat shaken by the Senate report."[90] Truman made his findings public the following day. On the 19th the Thomason committee released its report to the press.

The report of the Senate committee constituted a stinging indictment of military ineptitude, shortsightedness, and extravagance. Stating that "the lack of adequate plans" had been the principal reason for the overrun in construction costs, the report cited a number of other contributing factors, among them, inadequate organization, inexperience, speed, winter weather, fixed-fee contracts, and poor sites. Although the stress given to mobilization plans put the bulk of the blame on the General Staff, the Quartermaster Corps was sharply criticized for mistakes in original estimates, for mishandling the land acquisition program, for failing to centralize all purchases of lumber, for permitting contractors to make faulty layouts, for using slipshod administrative methods, for neglecting to take advantage of land grant freight rates, and for paying too much for equipment rentals. With respect to charges of fraud and dishonesty, the committee stated on the one hand that it had found no evidence and on the other called for a "most careful check into this phase of the program." The Senators' recommendations included an unexpected bombshell: they urged "the creation of a separate division of the War Department to be charged directly with . . . construction and maintenance and to be entirely separate and distinct from the Quartermaster Corps."[91]

Thomason's findings to some extent offset the effects of Truman's. "From a military point of view," read Thomason's statement, "there can be no question but that the Construction Division has done a magnificent and unparalleled job of preparing housing accommodations for an Army that was created almost literally overnight." The committee defended some procedures attacked by the Truman group and cited instances of "unjustified criticism." It held that the Construction Division had "been diligent in discovering and frank in acknowledging its mistakes, and, more important, in taking remedial action." On the question of mobilization plans, the committee commented, "It is more than obvious that Congress must share with the Army any censure for failing to foresee a situation that seems so clear today." Yet the Thomason report was not a whitewash—far from it. It emphasized the "staggering" cost of the building program. It revealed instances of nepotism at con-

[88] Tel Conv, Perry and Renshaw, 12 Jun 41. Opns Br Files, Hearings.

[89] (1) Memo, Amberg for Patterson, 16 Jul 41. (2) Ltrs, Amberg to Fulton, 21, 22, 24, 25 Jul 41. Both in USW Files, Legis—H and S Investigating Comm 1.

[90] Memo, Amberg for Stimson, 13 Aug 41. Same File.

[91] Truman Comm Rpt 480, Part 2, *passim*.

struction projects. It called attention to "indiscriminate and exorbitant" pay raises granted by fixed-fee contractors to their employees. Nevertheless, the general tone of the report was complimentary to the War Department.[92]

Although the House and Senate committees continued their surveillance over construction throughout the war emergency—holding hearings, visiting job sites, and issuing reports—after the summer of 1941, "the spotlight of inquiry," as Truman phrased it, "was to be turned elsewhere, as well—on other agencies of the government, on big business, on labor, and on other segments of the economy involved in the total defense effort."[93] As far as construction was concerned, the fundamental investigative work had been accomplished and the most significant contributions had been made in the year before Pearl Harbor. Basic flaws had been exposed and remedies suggested. Those charged with construction had received a clear-cut challenge to do a better job. Moreover, the public record had been extended by hundreds of pages of testimony and public understanding had been deepened by several bipartisan reports.

From the mass of details presented to him by reporters, publicists, and investigators, the man in the street could draw his own conclusions. But whether he saw success or failure, triumph over difficulties or inept bungling, he could hardly escape the conviction that construction was vitally important to defense and that its conduct should be of serious concern to every thoughtful citizen.

[92] H Comm on Mil Affs, Sp Comm 2, Draft of Interim Rpt, Aug 41, *passim*. EHD Files.

[93] Truman, *Memoirs*, I, 172.

CHAPTER XII

Real Estate: A Fresh Departure

Reform overtook the Real Estate Branch, as a controversy developed out of the brokerage contracts arranged by Colonel Valliant in the fall of 1940.[1] Erupting in early 1941, the dispute dragged on throughout the war. Hundreds of persons were involved, some of whom endured much hardship. Exposés, public protests, hearings, investigations, and an attempt by the War Department to repudiate one of its own contracts were highlights of the case, which ended before the Supreme Court. It was a sorry affair, but some good came out of it, for the commotion over the brokerage agreements helped bring about salutary changes in the Army's real estate organization and techniques.

The Case of the Brokerage Contracts

In mid-January 1941 Robert S. Allen, coauthor of the syndicated column, "Washington Merry-Go-Round," quizzed Patterson about rumors of questionable real estate dealings at Jefferson Proving Ground, Indiana. According to Allen's informants, Paul L. McCord, the broker at Jefferson, was paying exorbitant prices for land and drawing an excessive fee. McCord, reportedly, had hired a title company having assets of only one million dollars for this three-million-dollar job. Hinting at political intrigue, Allen told Patterson that McCord and his associates were prominent Republicans. After this conversation, the Assistant Secretary set out to find the facts. Discovering that Gregory knew nothing of the affair, he telephoned Inspector General Peterson. A few hours later, Lt. Col. Rosser L. Hunter began an investigation.[2]

On 27 January, without waiting for Hunter to complete his inquiry, Allen and his partner, Drew Pearson, published "the inside story." Disclosing that an investigation was under way, they suggested that "certain Army brass hats" were unaware of the President's dictum that "no person should be allowed to get rich out of this program." McCord, the columnists said, would make $195,000 on his contract. Having seen a partial breakdown of his transactions, Pearson and Allen concluded that the broker was basing his fee on a gross sales price which included his commission and was thus collecting a commission on a commission. Furthermore, the title company was charging $95 for abstracts that normally cost $35. The columnists also pointed out that the president of this company had headed the Willkie Clubs in Indiana.[3]

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[1] For a discussion of the brokerage contracts, see pp. 177, 182–83, above.

[2] (1) Exhibits B and C, with Ltr, Hunter to Peterson, 17 Feb 41. IG 333.9 Jefferson Ord Pr Grnd, Madison, Ind. (Ltr cited hereinafter as IG Rpt, 17 Feb 41.) (2) Memo, Patterson for Peterson, 14 Jan 41. USW Files, Geog—Jefferson Pr Grnd & Jeffersonville, Ind.

[3] Washington *Times-Herald*, January 27, 1941, p. 6.

Their account brought the affair at Jefferson Proving Ground before the public for the first time.

People in Indiana reacted sharply to Pearson and Allen's story. On reading the column in the Indianapolis *Star*, Joe Goode, a real estate and insurance agent, protested to Patterson that property holders in the Jefferson area usually paid no more than $5.50 for abstracts.[4] Farmer John S. Smith, who had an offer of $16,700 for 377 acres, learned from the newspapers that his neighbor was getting $14,000 for a 165-acre farm. Smith protested to Assistant Attorney General Norman M. Littell: "If a 200-pound hog is valued at $16.00, then a 250-pound one is worth more or a lighter one less."[5] Other Hoosiers accused McCord of using inconsistent and arbitrary methods of appraisal, keeping his offers secret to conceal favoritism, and obtaining options under coercion and threats of condemnation.[6] The Kentucky kinsman of one elderly owner summed up his resentment in the statement, "It looks like the Republicans from Indianapolis have been away from the trough so long that when they get to it, they lie down in it."[7] Echoes of the discontent in Indiana soon reached Congress. During February the House Military Affairs Committee questioned War Department officials not only about McCord's activities but about those of other brokers also. Although the committee centered its attention on percentage contracts and alleged high prices, its members showed increasing concern over the landowners' plight.[8]

Hunter's report to The Inspector General on 17 February cleared McCord and his associates of most of the charges against them. Hunter found no evidence of political finagling or crooked dealing. The title company, far from being weak financially, had a reserve fund double that required by law, an agreement with another firm to share risks, and an insurance policy with Lloyd's of London. McCord was well qualified by his Indiana background and twenty-six years' experience to handle the Jefferson job. Hunter held that option prices were not far out of line and were, under the circumstances, fair to both government and vendor, adding that much of the talk about excessive prices stemmed from farmers' boasts. Stating that any reconsideration of McCord's offers would delay payments and cause owners undue hardship, he recommended paying the option prices. But, said Hunter, profits on the transaction were excessive. The full commission came to $195,000. McCord's net earnings amounted to $50,000. The title company had received $60,000 from the broker and at the same time had collected $48,000 from the owners. Hunter concluded that McCord's fee was exorbitant and that the title company had charged twice for the same services.[9]

Reserving his sharpest criticism for the Real Estate Branch, Hunter charged Colonel Valliant with negligence. Although Valliant lacked personal knowl-

[4] Ltr, Joe Goode, Indianapolis, Ind., to ASW, 28 Jan 41. 601.1 (Jefferson Pr Grnd) (Misc) I.

[5] Ltr, Smith, North Madison, Ind., to Littell, n.d. 601.1 (Jefferson Pr Grnd) (Misc) I.

[6] (1) Ltr, Theodore and Callie Hamilton to US Atty, Southern Dist of Ind., 6 Feb 41. (2) Ltr, H. A. Weaver, Jr., to J. J. O'Brien, 21 Feb 41. Both in 601.1 (Jefferson Pr Grnd) I.

[7] Ltr, Freeman Gilbert, Lawrenceburg, Ky., to Sen Albert B. Chandler, 3 Feb 41. 601.1 (Jefferson Pr Grnd) (Misc) I.

[8] May Comm *Hearings*, Part 1, pp. 155, 173–75, 233ff.

[9] IG Rpt, 17 Feb 41.

edge of McCord's qualifications, he had relied heavily on the broker's judgment. The Real Estate Branch had not disapproved any of McCord's options nor had it checked to see if his prices were reasonable. One staff member had approved payment of $6,450 for 1.5 acres, assuming that such a large sum must include residential or business property, when, in fact, he had no idea what the tract contained. Valliant had requested no breakdown of appraisals and McCord had furnished none. The only breakdowns Hunter could find were tentative estimates on the backs of vendors' copies of options. The commission contract proved to be Valliant's most vulnerable point. According to Hunter, the agreement was ambiguous and therefore subject to manipulation by the broker. In his judgment, the contract with McCord was improper.[10]

As the investigation proceeded, Somervell began a series of reforms. In a terse memorandum, on 18 January, he outlined a course of action. Valliant would investigate "the qualifications, integrity, and local relationships, connections, or interests of real estate brokers . . . before . . . work is entrusted to them." In cases of doubt, he would have option prices checked by independent appraisers. Brokers would furnish detailed breakdowns of prices. Valliant would take care "in the wording of the contract to insure that the broker is not paid a commission on a commission or similar improper procedure."[11] Not content merely to safeguard the future, Somervell attempted to correct past mistakes. An obvious move was reducing McCord's percentage to that of the other brokers. Since the arrangement was not to be retroactive and since work at the Jefferson Proving Ground was almost complete, McCord on 23 January signed a new contract which cut his fee from 6.5 percent of the gross sales price to 5 percent of the net.[12]

On 6 February Gregory assigned Valliant to a Quartermaster depot in New York City. Hunter in his report stated that Valliant's relief from the Real Estate Branch was a result of the investigation at Jefferson Proving Ground.[13] Somervell furnished the only public explanation in an exchange with Rep. Charles I. Faddis of the House Military Affairs Committee:

> Mr. Faddis. How did Colonel Valliant come to be replaced; do you know that, General?
>
> General Somervell. Yes, sir.
>
> . . . . . .
>
> Mr. Faddis. For what reasons, General?
>
> General Somervell. Because I thought the work could be handled better by someone else.[14]

That someone was John J. O'Brien, who was recommended for the job by his superior in the Justice Department, Norman M. Littell.

A few days after O'Brien joined the Construction Division, Somervell suspended payments at all broker-handled projects pending further investigation.[15] The Department of Justice co-operated in the subsequent study of brokers' ac-

[10] *Ibid.*

[11] Memo, Styer for Valliant, 18 Jan 41. QM 601.1 (Misc) Jan–Jun 41.

[12] (1) Memo, Styer for Valliant, 21 Jan 41. (2) Memo, RE Br for Styer, 25 Jan 41. Both in 601.1 (Jefferson Pr Ground) I. (3) IG Rpt, 17 Feb 41.

[13] IG Rpt, 17 Feb 41.

[14] Somervell's Testimony, 1 Apr 41. In May Comm *Hearings*, Part 1, p. 318.

[15] (1) Memo, O'Brien for Somervell, 11 Apr 41. Opns Br Files, H Investigation. (2) Telg, Sp Asst to Atty Gen to OQMG, 13 Feb 41. 601.1 (Kingsbury OP) I.

tivities. Special attorneys went over records at the eight projects and questioned the agents, and Littell visited the site of the Kingsbury Ordnance Works in Indiana. Along with Somervell and O'Brien, Patterson and Gregory examined the findings of the Justice Department. In light of this evidence, Patterson appointed a committee of three, headed by Douglas McKay of Somervell's staff, to re-examine the brokerage contracts. Review would turn upon two points—prices and fees.[16]

McKay and his associates studied prices first. To determine fair market values at each of the eight sites, they averaged per-acre costs at neighboring War Department projects, examined courthouse records, and made spot appraisals. A comparison of these figures with brokers' prices showed that although the brokers had paid more than the land would normally bring, their option prices were, in most cases, about the same as or lower than the Army's. Because the investigation had revealed no evidence of collusion between owners and agents, and because a majority of the brokers had almost completed their work, the committee approved payment of the original option prices at all the projects except those at Burlington, Iowa, and Weldon Spring, Missouri.[17] At the Iowa plant, the committee refused to accept prices 18.5 percent above recent appraisals. After a trip to Burlington, McKay recommended letting paid options stand and cutting the rest to within 14 percent of appraised values. Both the government and the owners considered this settlement satisfactory.[18] Adjustment of differences at Weldon Spring would be more difficult.

The committee turned next to the matter of fees. Concluding that the brokers were making "unjustifiable profits," McKay attempted to reduce their commissions. McCord's was one of the first contracts considered. The committee offered him a lump sum, representing 2 percent of the sales price plus $40 per tract for the title company. McCord rejected the offer. A compromise reached on 21 February slashed his fee to 3.5 percent and gave the title company $50 per tract.[19] A short time later, five more brokers accepted reductions in their fees. McKay did not insist on an adjustment of the Ravenna contract, originally negotiated by the Atlas Powder Company. His efforts to impose new terms on the broker at Weldon Spring were unsuccessful.[20] Before the War Department could benefit from the six amended contracts, it had to work out an arrangement

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[16] (1) Ltr, Littell to Patterson, 6 Feb 41. USW Files, 601 (Land Acquisition). (2) Telg, OQMG to Cockrell, 8 Feb 41. 601.1 (Iowa OP) I. (3) Ltr, Acquisition Agent, Kingsbury OP to OQMG, 7 Feb 41. 601.1 (Kingsbury OP) I. (4) Ltr, Patterson to Littell, 19 Feb 41. USW Files, 601 (Land Acquisition). (5) Memo, Gregory for Littell, 12 Mar 41. QM 601.1 (Misc) Jan–Jun 41.

[17] (1) Memo, O'Brien for Patterson, 25 Mar 41. USW Files, 601 (Land Acquisition). (2) Memo, O'Brien for Somervell, 11 Apr 41. Opns Br Files, H Investigation. (3) O'Brien's Testimony, 18 Mar 41. In May Comm *Hearings*, Part 1, p. 241.

[18] (1) Telg, OQMG to Cockrell, 8 Feb 41. (2) Ltr, OQMG to USW, 18 Feb 41. Both in 601.1 (Iowa OP) II. (3) Memo, Burns for Patterson, 20 Feb 41. USW Files, 601 (Land Acquisition). (4) Telg, TQMG to Cockrell, 20 Feb 41. 601.1 (Iowa OP) I. (5) Memo, O'Brien for Styer, 20 Mar 41. 601.1 (Iowa OP) II.

[19] Outline Data, prepared by RE Br OQMG for H Comm on Mil Affs, 12 Apr 41. Opns Br Files, OQMG–C–RE.

[20] (1) Draft Rpt, prepared by RE Br OQMG for H Comm on Mil Affs (Jul 41). Gideon Files, 6A1. (2) Memo, O'Brien for Somervell, 11 Apr 41. Opns Br Files, H Investigation.

whereby savings would revert to the government rather than to the owners, who had nominally paid the brokers' commissions. Under the new agreements, brokers would refund to the Army the difference between revised and original fees.[21] This arrangement was a tacit admission that Uncle Sam was paying the brokers' fees and that his contracts with them were of the cost-plus-a-percentage type. By late spring O'Brien had made amicable settlements with all but one of the brokers.

Hopes for extricating the War Department from its unhappy situation now rested on R. Newton McDowell, the broker at Weldon Spring. By February McDowell had taken options on 16,500 acres at an average price of $159 per acre. Valliant had approved all but three of these options and had thus obligated the War Department to pay more than 2.5 million dollars.[22] McKay's investigation of this project, although described by Somervell as "impartial and thorough,"[23] was hindered by a lack of information and personnel. McDowell was unable to furnish breakdowns for 248 of the 270 tracts at Weldon Spring, explaining that all but twenty-two of the owners had priced their holdings in lump sums.[24] One of the investigators, U.S. Attorney Harry C. Blanton, "encountered great difficulty in . . . finding anyone qualified to do appraisal work . . . or . . . anyone willing to do so." He wrote: "The real estate dealers have definitely advised me that they are not at all interested as they are very busily engaged in making sales to those who are being dispossessed . . . . They, moreover, do not want to antagonize the owners within the area by making an appraisal which might be at a figure lower than that included in the option."[25] Blanton "combed the county" to find three men willing to undertake the job.[26] When these men appraised ten tracts at prices 40 percent below McDowell's offers, the Construction Division accepted their findings as evidence that his prices were excessive.[27]

Seeking a compromise, Patterson asked McDowell to come to Washington for a conference. The meeting, held on Friday, 7 March, with O'Brien, Blanton, and the McKay committee, demonstrated the futility of further efforts to reach an understanding with McDowell, for the broker flatly refused to accept any reduction in fee. When the committee asked the owners to take lower prices, it was again rebuffed.[28] Two courses remained open to the War Department: it could give in to McDowell, or it could take the case to court. The first alternative was un-

[21] (1) Ltr, OQMG to Chief of Finance, 26 Jul 41. 601.1 (Iowa OP) III. (2) Ltr, D. J. Snodgrass, Dept of Justice, to Constr Div, 5 May 41. (3) Ltr, RE Br to Snodgrass, 26 May 41. Both in 601.1 (Kingsbury OP) I.

[22] (1) Outline Data, prepared by RE Br for H Comm on Mil Affs, 12 Apr 41. Opns Br Files, OQMG–C–RE. (2) Memo, McKay Comm for Patterson, 8 Mar 41. 601.1 (Weldon Spring OP) II.

[23] Memo, Somervell for Patterson, 1 Mar 41. USW Files, Weldon Spring.

[24] Ltr, McDowell to RE Br OQMG, 14 Feb 41. 601.1 (Weldon Spring OP) II.

[25] Ltr, Blanton to O'Brien, 14 Feb 41. 601.1 (Weldon Spring OP) II.

[26] Ltr, Blanton to O'Brien, 17 Feb 41. 601.1 (Weldon Spring OP) II.

[27] (1) Memo, O'Brien for Somervell, 11 Apr 41. Opns Br Files, House Investigation. (2) Memo, McKay Comm for Patterson, 8 Mar 41. 601.1 (Weldon Spring OP) II.

[28] (1) Telg, Patterson to McDowell, 28 Feb 41. (2) Memo, McKay Comm for Patterson, 8 Mar 41. (3) Telg, McDowell to Harry Hopkins, 11 Mar 41. (4) Telg, McDowell to OQMG, 26 Mar 41. All in 601.1 (Weldon Spring) II.

acceptable.[29] "Mr. McDowell," O'Brien explained, "was undoubtedly sincere in his efforts, but the prices for which the lands were optioned are so unreasonable that the War Department is unwilling to assume responsibility for voluntary payment."[30] Patterson resolved to repudiate the contract with McDowell and to take by condemnation the properties on which options were still outstanding. He reasoned:

> I did not see how I as an executive of the Government could authorize the carrying out of the purchases in view of the fact that the prices were reported to me to be greatly in excess of the value of the tracts. It seemed to me that the only course was to send the cases to condemnation in court, with provision for prompt payment of the value conceded by the Government and with the right of the owners to get any further amount found to represent said value.[31]

On 19 March Secretary Stimson asked The Attorney General to institute condemnation proceedings in the U.S. District Court of Eastern Missouri.[32]

McDowell fought to defend his offers. Refusing to accept the judgment of the McKay committee, he told O'Brien: "You do not know whether my prices are excessive or not because you have not been furnished with any intelligent information on the subject . . . . Ewing Wright [a member of the committee], political lawyer from southern Indiana, . . . walked onto this project and in the first five minutes stated these prices are too high and started preaching condemnation proceedings and he did not know a damned thing about it." Furthermore, the committee's appraisers were not qualified for the job, McDowell asserted, citing as evidence their use of 1929 assessments in determining current fair market values.[33] He also charged that the Justice Department had instituted condemnation proceedings merely to create "pork-barrel jobs for lawyers."[34]

Word of the Washington meeting reached Missouri on 8 March, when Sunday papers carried front-page accounts of the government's "squeeze play."[35] The people at Weldon Spring expressed astonishment at the news. A 91-year-old man wired Stimson: "I have observed public affairs since before the Civil War; I have seen my country pass through that supreme test and the lesser test of the late World War and now find it confronted with the present crisis but in none of these periods nor at any other time did I ever hear of the United States of America repudiating sacred convenants with its citizens."[36] A farmer's wife accused the government of regarding the options as "scraps of paper."[37] Another woman complained: "Citizens are not

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[29] Ltr, Stimson to Chm, S Comm on Mil Affs, 17 Apr 41. 601.1 (Weldon Spring OP) III.

[30] Draft of Ltr, prepared in RE Br OQMG to Rep Cannon (22 Mar 41). 601.1 (Weldon Spring OP) II.

[31] Ltr, Patterson to Sen Carl Hayden, 5 Apr 41. USW Files, Geog—Weldon Spring.

[32] Ltr, SW to The Atty Gen, 19 Mar 41. USW Files, Weldon Spring.

[33] Ltr, McDowell to O'Brien, 22 Mar 41. 601.1 (Weldon Spring OP) II.

[34] (1) Telg, McDowell to Patterson, 19 Mar 41. USW Files, Geog—Weldon Spring. (2) Telg, McDowell to Marshall, 19 Mar 41. 601.1 (Weldon Spring OP) I.

[35] St. Louis (Mo.) *Globe-Democrat*, March 8, 1941, p. 2A; March 9, 1941, p. 1A.

[36] Telg, William H. Snyder, St. Charles, Mo., to Stimson, 25 Mar 41. 601.1 (Weldon Spring OP) III.

[37] Ltr, Mrs. Arch Howell, Defiance, Mo., to Mrs. Roosevelt, 11 Apr 41. 601.1 (Weldon Spring OP) III.

permitted to [repudiate a contract] but apparently Uncle Sam can do anything."[38] On 12 March owners met and drew up a petition asking the President to intervene.[39] Although Representative John J. Cochran of Missouri termed the situation "as dangerous from a political standpoint for a Congressman to fool with . . . as it is to fool with TNT,"[40] he and other influential men, among them Chester Davis of NDAC, Senator Carl Hayden of Arizona, and Senator B. Champ Clark of Missouri, supported the owners.[41] The people of Weldon Spring had a stalwart champion in their congressman, Clarence Cannon, who attacked the Army's decision. "The only reason given by the War Department is that they made a mistake," he said, "and because they made a mistake they are going to take it out on the farmers who are innocent third parties."[42]

While preparing to take the condemnation cases to trial, O'Brien tried to settle out of court. Establishing an office at Weldon Spring, he offered to negotiate new options on the basis of a reappraisal by the Federal Land Bank of St. Louis. But most of the owners were in no mood to bargain. One of their spokesmen stated, "If there ever was anything that we consider as a shakedown by the War Department, this surely is."[43] Congressman Cannon commented: "I hardly see what inducement there would be for the landowners to sign another option with the Government . . . when the Government has repudiated all other options signed, and can just as easily repudiate this one." He had learned that the War Department would bring a test suit and if the court ruled in favor of the owners would drop condemnation and pay the original options. "However," he said, "it should not be overlooked that they will pick the one tract in all the entire area in which they think they have the best chance to make a case."[44]

O'Brien's representative at Weldon Spring reported that Cannon had "stiffened up some of the larger land owners."[45] Although the Army continued to negotiate, it succeeded in settling only a handful of hardship cases.[46] Countering charges that the government was coercing the poorer farmers, O'Brien explained that any of the owners could withdraw money deposited in the courts without prejudicing their rights to receive a larger amount should the courts decide in their favor. Owners, warned by their attorneys that they might nullify their rights under the original options, left the money where

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[38] Ltr, Hortense K. Spence, Springerville, Ariz., to McDowell, 27 Mar 41. USW Files, Geog—Weldon Spring.

[39] Min, Mtg of Former Owners Held at Weldon Spring, Mo., on 12 Mar 41. 601.1 (Weldon Spring OP) II.

[40] Ltr, Cochran to Patterson, 2 Apr 41. USW Files, Geog—Weldon Spring.

[41] (1) Ltr, Davis to O'Brien, 12 Mar 41. 601.1 (Weldon Spring OP) II. (2) Ltr, Hayden to Patterson, 31 Mar 41. USW Files, Geog—Weldon Spring. (3) May Comm *Hearings*, Part 1, 1941, p. 315.

[42] May Comm *Hearings*, Part 1, 1941, p. 267.

[43] (1) Memo, H. C. Gelnaw, RE Br OQMG, for O'Brien, 16 Apr 41. (2) Ltr, O'Brien to Littell, 19 Apr 41. (3) Ltr, E. R. Sutton, St. Charles, Mo., to Patterson, 25 Apr 41. All three in 601.1 (Weldon Spring OP) III.

[44] Ltr, Cannon to Clerk of the County Court, St. Charles, Mo., printed in the St. Charles (Mo.) *Daily Cosmos-Monitor*, May 5, 1941.

[45] Ltr, Gelnaw to O'Brien, 7 Mar 41. 601.1 (Weldon Spring OP) III.

[46] (1) Affidavit of President, Kansas City Title Insurance Co., Kansas City, Mo., 26 Mar 45. 601.1 (Weldon Spring OP) 1943-45—Misc. (2) Memo, Amberg for Patterson, 23 Jul 42. USW Files, Geog—Weldon Spring.

it was.[47] The issue rested on the outcome of the trial. Prolongation of the case did not delay construction; the government took possession of the land under McDowell's options, and the Weldon Spring Ordnance Plant went into operation on 29 September 1941.[48]

On 30 March 1942, three cases came before the District Court at St. Louis. One hundred and twenty-three other cases involving roughly $1,325,000 hinged on the outcome of these hearings. Blanton, representing the government, contended that McDowell's option contracts were invalid because they violated the congressional prohibition against percentage agreements, because the broker had set exorbitant prices, and because he had deceived Valliant by representing option prices as fair market values. Counsel for the owners asked the court to uphold the contracts. The three judges who heard these cases handed down their decision on 6 July. Two ruled that the contracts were valid and ordered payment of the full option prices. The third ruled that the contracts violated the Act of July 2, 1940, which outlawed percentage contracts, and were therefore void.[49]

Patterson now had to decide whether to accept defeat or appeal to a higher court. Senator Clark and Congressman Cannon urged him not to prolong the litigation, since delay would inflict further hardship. Owners appealed to the President for immediate payment, pointing out that the Army had led them to believe that it would abide by the test case decision.[50] Meanwhile, Julius Amberg, Stimson's special assistant, conferred with members of the Real Estate Branch and the Department of Justice. "Personally," he advised Patterson, "I think it is a close question of law in which we may be defeated although there is an appreciable chance of success."[51] Despite the risk, he recommended an appeal, advancing these reasons: first, the War Department had not yet received a controlling decision from the courts; second, there was a large sum of money involved; and third, if the War Department now reversed its stand and agreed to pay, Congress might react unfavorably. On 8 August 1942 Patterson asked The Attorney General to appeal.[52]

When the second round ended late in 1943 in a victory for the government, the owners took the case to the Supreme Court.[53] In February 1945, in a 5–3 decision, the Court upheld the legality of the contracts and thus compelled the War Department to pay McDowell's options.[54] The owners then sued for interest on the amount of the original offers. On 3 February 1947 the Court, in a 7–2 split, decided in the War Department's

[47] (1) Ltr, O'Brien to William H. Snyder, St. Charles, Mo. (2) Ltr, R. F. Thiele, St. Louis, Mo., to Gregory, 30 Apr 41. Both in 601.1 (Weldon Spring OP) III.

[48] Telg, Fraser Brace Engrg Co., Inc., to OQMG, 30 Sep 41. 635 (Weldon Spring TNT Plant).

[49] (1) 3d Ind, O'Brien to UMVD, 20 Apr 42, basic missing. 601.1 (Weldon Spring OP) V. (2) Ltr, OCE to Sen W. Lee O'Daniel, 6 Nov 42. (3) Ltr, O'Brien to Patterson, 27 Jul 42. Last two in 601.1 (Weldon Spring OP) VI.

[50] (1) Memo, Patterson for Amberg, 22 Jul 42. USW Files, Geog—Weldon Spring. (2) Ltr, Comm of Owners, Weldon Spring, Mo., to the President, 2 Sep 42. 601.1 (Weldon Spring OP) VI.

[51] Memo, Amberg for Patterson, 6 Aug 42. USW Files, Geog—Weldon Spring.

[52] (1) *Ibid.* (2) Ltr, Patterson to The Atty Gen, 8 Aug 42. USW Files, Geog—Weldon Spring.

[53] Telg, Blanton to O'Brien, 22 Dec 43. 601.1 (Weldon Spring OP) 1943–45 Misc.

[54] *Muschany et al.* v. *United States*, 65 Sup. Ct. 442 (1945).

favor.[55] The controversy over the land at Weldon Spring had ended after six years of litigation.

Changes in Organization and Procedures

Reliance on private brokers was merely a symptom of the ills of the Real Estate Branch. Testifying before the House Military Affairs Committee in March 1941, O'Brien stated: "When I went with the War Department I found that the present land program had apparently not been anticipated. The Real Estate Branch lacked adequate personnel. There was a lack of satisfactory records, and I simply had to start from scratch, you might say, and develop not only an organization but also a land acquisition procedure."[56] While trying to quiet the commotion over brokerage contracts, O'Brien also had to expand the real estate organization and revamp its methods of doing business.

Like Valliant before him, O'Brien required a large force of expert assistants. Although the attempt to solve the personnel problem by using brokers had boomeranged, Somervell still believed such agents could be helpful. It would, he wrote Patterson, be "undesirable to bar the services of honest, reliable, and capable realtors willing to assist the War Department to the utmost in meeting the demands of the National Defense Program."[57] Taking a similar stand, the National Association of Real Estate Boards advised its members: "Better results and greater economies can be obtained if those skilled in these fields are permitted to serve their Government."[58] But this avenue did not offer O'Brien a way out. First, Patterson prohibited the use of private agents without his permission. Then, Congress, over Quartermaster objections, limited brokerage fees to 2 percent of purchase prices, and thus lessened realtors' desire to participate. O'Brien had to seek help elsewhere.[59]

At the time O'Brien took over, the Real Estate Branch had 4 officers and 41 civilians and its organization followed lines laid down in 1925. The new chief immediately began to weed out men he did not wish to keep and to assemble a corps of specialists. Valliant's departure had been the signal for a general exodus, but O'Brien's connections with the legal profession, other federal bureaus, and associations of realtors enabled him to find replacements rather quickly. By July his staff numbered 140; by October, 165. O'Brien split the branch into six sections—Planning and Appraisal, Purchase, Condemnation, Leasing and Claims, Disposal and Legal, and Funds and Records. Because each section consisted of experts in a single field, competent men were more willing to take jobs with the branch and the work went more smoothly. While reorganizing the Washington office, O'Brien was also lining up an advisory board. On 16 June, 14 leading realtors from various sections of the country formed the National Advisory Council

[55] *Albrecht et al.* v. *United States*, 67 Sup. Ct. 606 (1947).

[56] 18 Mar 1941. In May Comm *Hearings*, Part 1, p. 234.

[57] Memo, Somervell for Patterson, 6 Jun 41. QM 601.1 (Misc) Jan–Jun 41.

[58] Excerpt, Natl Assn of RE Bds, Confidential Weekly Ltr, 19 May 41, Incl with Memo, Somervell for Reybold, 4 Jun 41. G–4/30881, Sec II.

[59] (1) Draft Ltr, OQMG to Chm H Subcomm of Comm on Appns, 12 May 41. QM 601.1 C–RE Misc. (2) Address, J. J. O'Brien before Annual Convention of Natl Assn of Real Estate Bds, at Detroit, Mich., 5 Nov 41. Gideon Files, 6B1. Cited hereinafter as O'Brien Address, 5 Nov 41.

on Real Estate. Both Somervell and O'Brien gave the council much credit for the subsequent success of the Real Estate Branch.[60]

Although corps area quartermasters had handled real estate for many years, Somervell believed the function belonged in the zones. The transfer of real estate to the nine zone constructing quartermasters first came up at a Construction Division staff meeting on the morning of 3 January. That afternoon Styer told Valliant to prepare to make the change.[61] The veteran Quartermaster questioned the wisdom of the transfer, contending that while some transactions might properly be arranged by the zones, "a great many should be left to the Corps Area Quartermasters." In view of Valliant's opposition, Styer decided to wait.[62] Somervell later stated that he had intended "to give it all to the Zone Quartermasters and they talked me out of it." Valliant had blocked the move for the time being.[63]

On 29 January, Somervell put the question to the corps area quartermasters. Admitting that the Construction Division had been bypassing the corps areas in real estate matters, he promised to reform. He reminded his listeners that each



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of them had a real estate man who "is supposed to . . . be able to acquire land in quantities—at reasonable prices and in a hurry." He then turned to General Frink of the Fourth Corps Area: "Is there any reason why we should not send you a telegram . . . asking you to buy 50,000 acres at Birmingham, Alabama?" Frink countered with a question of his own. "On things pertaining to the larger camps, big construction projects," he asked, "why would it not be better to set up a real estate section under the Zone Construction Quartermaster?" Somervell beamed. "I think Frink's idea is wonderful," he said. The other corps area quartermasters agreed. "Seems to me General Frink's idea on that is perfectly sound," one remarked, "the only way to do it." "We have only one or two clerks and they are not qualified to do any real estate work," said another. All seemed willing to give up acquisition

[60] (1) Gideon, Mil RE, p. 13. EHD Files. (2) Rpt, OQMG RE Br, Oct 41, Annual Rpt, FY 1941. Gideon Files, 6A3. (3) Table, OQMG, 20 Oct 41, Commissioned Officers and Civilian Employees in the Washington Office of the Constr Div by Br and Sec. Opns Br Files, Pers, May 1, 1941, to Jan 1, 1942. (4) WD Press Release, 16 Jun 41, Natl Advisory Council on RE. QM 601.1 (Misc) Jan–Jun 1941. (5) Memo, Somervell for Patterson, 17 Sep 41. 601.1 II. (6) O'Brien Address, 5 Nov 41.

[61] Memo, Styer for Valliant, 3 Jan 41. Opns Br Files, Territorial Zones.

[62] Memo, Styer for Valliant, 10 Jan 41. Opns Br Files, Territorial Zones.

[63] Notes, Conf of CAQM's, 27–29 Jan 41, pp. 80, 82.

and long-term leasing, but some balked at turning short-term leases over to the zones. Somervell pressed his advantage. He asked the corps area officers if they thought the zones could do leasing. All thought they could. "In other words," Somervell prompted, "you think Zone Quartermasters ought to take over real estate—lock, stock, and barrel?" The corps area quartermasters were unwilling to go that far. Somervell had to compromise. The zones would buy land and arrange long-term leases; the corps areas would rent maneuver areas and make other short-term leases. "If that works," Somervell told the corps area quartermasters in closing, "we will leave it to your judgment to throw as much at the Zone Quartermaster as you want."[64]

Knowledge that other branches of the Army were dabbling in real estate matters strengthened Somervell's determination to take over from the corps areas. Representatives of using Services were negotiating directly with owners. The chief offender was the Air Corps. In one instance, four young air officers descended on an area in Alabama and demanded that the owners surrender their land.[65] Among the persons hectored in this way was an acquaintance of General Somervell's. On hearing of the incident, Somervell asked G–4 to give the Air Corps "immediate and peremptory instructions to desist from real estate operations."[66] The result was a forceful reminder from Reybold to all branches of the War Department that The Quartermaster General was responsible for acquiring military real estate.[67]

Somervell prepared to concentrate real estate activities in the zones. On 29 March he designated the ZCQM's real estate agents of The Quartermaster General and placed them in charge of all transactions in the field except for several types of leasing. The Corps of Engineers would handle leases for Air Corps projects. Short-term leases for maneuver areas, recruiting stations, and the like, remained the responsibility of corps area quartermasters. O'Brien could not make the transfer to the zones overnight, for he had to set up offices and hire personnel. Until the zones were ready to take their new assignment, corps area quartermasters would continue to handle real estate matters.[68]

The transfer order produced bad feeling and confusion. From Atlanta, Colonel Green reported that General Frink was "just a wee bit miffed about the whole business."[69] Frink had understood that the zones would take over acquisition for new construction and nothing more.[70] Comments from other corps areas also reflected dissatisfaction. For example, Maj. Gen. Richard Donovan, commander of the Eighth Corps Area, characterized the instructions as "illogical, if not ambiguous"; and his quartermaster asked for a clearer definition of corps

[64] *Ibid.*, pp. 75–82.

[65] Ltr, RE Br to CAQM Eighth CA, 17 Mar 41. QM 601.53 (ZCQM 8) (RA). (2) Memo, Gregory for Reybold, 25 Mar 41. G–4/14506–157. (3) Ltr, ZCQM 4 to Somervell, 3 Mar 41. 601.1 I.

[66] Memo, Somervell for Reybold, 6 Mar 41. 601.1 I.

[67] WD Ltr AG 601.1 (3–27–41) M–D–M, to CG's All Armies . . ., 31 Mar 41.

[68] (1) Memo, Gregory for Patterson, 17 Mar 41. USW Files, 601 (Land Acquisition). (2) WD Ltr, AG 680.4 (3–17–41) M–D–M to CG's all Depts and CA's, 29 Mar 41. QM 601. (3) OQMG Circ 1–1, Change 2, 8 Apr 41. 601.1 Part 3.

[69] Tel Conv, Green and Younger (1 Apr 41). QM 300.5 (QM Circ 1–1).

[70] (1) Ltr, Frink to Gregory, 4 Apr 41. 601.1 Zone 4, Mar 41–Jan 42. (2) Memo, Younger for Somervell, 20 May 41. QM 333.1 ZCQM 4.

area responsibility.[71] The unenthusiastic reaction of the corps area officers stemmed in part from a reluctance to surrender their duties. Several tried unsuccessfully to maintain control over leases not reserved to them. And although the Ninth Corps Area estimated that it would take six months to complete the transfer to the zone, pressure from Somervell shortened the period actually required to less than three weeks.[72]

Meanwhile, O'Brien was readying the zones for their new responsibilities. Early in April he named experienced men as zone real estate directors. He gave them expert staffs and told them to call on other government agencies or qualified private appraisers if they needed more help. The list of co-operating agencies soon included the Reconstruction Finance Corporation, the Interstate Commerce Commission, and the Federal Land Bank. While delegating work to the zones and employing outside agents, O'Brien kept tight control over the field.[73] Publication of the *Real Estate Manual*, which Patterson praised as "a thorough piece of work," promoted uniformity.[74] Frequent inspections kept O'Brien in touch with activities of zone and project offices.

As the zones swung into action, the Real Estate Branch gained in reputation. The corps areas agreed to relinquish most of their remaining real estate functions. In July 1941, zone constructing quartermasters took over all real estate transactions except trespass agreements for maneuver areas and leases for Air Corps projects.[75] During the fall, federal agencies operating within the Ninth Zone asked O'Brien to co-ordinate all leasing of storage space; and the Federal Works Agency turned all acquisition for the new United Service Organizations (USO) program over to the Quartermaster Corps.[76] As confidence in his organization increased, O'Brien's duties multiplied.

After studying methods of other agencies, O'Brien overhauled the Army procedure. He modernized all phases of acquisition, from initial appraisal to final payment. Looking for shortcuts, he obtained the right to approve routine leases without consulting Patterson, and he discontinued burdensome and time-consuming reports on disposal of buildings at newly acquired sites. Looking for ways to save money, he eliminated highly developed tracts along highways, consolidated rented quarters, and renewed leases at lower rents or relocated in cheaper space.[77]

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[71] Ltr, CAQM 8 to Gregory, 24 Jun 41. QM 601.53 (Zone 8) (RA).

[72] (1) Ltr, CAQM 1 to Gregory, 18 Jun 41, and 1st Ind, 1 Jul 41. 601.53 Zone 1, Leases, RA, 3/41–1/42. (2) 1st Ind, 7 Jul 41, on Ltr, Sixth CA to TQMG, 21 Jun 41. 601.53 Zone 6, Leases, RA, FY 42. (3) Ltr, CAQM 9 to Gregory, 16 May 41, and 1st Ind, 2 Jun 41. 601.1 9th SvC II.

[73] (1) Min, Conf of ZCQM's 7–10 Apr 41, p. 4. (2) O'Brien's Address, 5 Nov 41. (3) Ltr, OQMG to ZCQM 9, 28 May 41. 601.1 (Zone 9) Mar 41–Dec 41.

[74] Ltr, Patterson to Somervell, 9 Jun 41. USW Files, Misc & Sub—Rb-Rea.

[75] (1) Ltr, Gregory to TAG, 12 Jul 41. QM 602 Misc 1933—. (2) WD Ltr, AG 680.4 (7–12–41) MO–D–M to CG's of All Depts and CA's, 28 Jul 41. 601 Part 3.

[76] (1) QM 601.53 ZCQM 9. (2) 1st Ind, 13 Nov 41, on Memo, OUSW for JAG, 22 Oct 41. USW Files, 618.2.

[77] (1) Memo, Somervell for Patterson, 17 Sep 41. 601.1 II. (2) WD Circ 131, 5 Jul 41. EHD Files. (3) 1st Ind, 11 Sep 41, on Ltr, Hayden to Gregory, 8 Sep 41. QM 601.1 (ZCQM 6) 1941. (4) WD Ltr, AG 601.1 (10–25–41) MO–D–M, to CG's of All CA's . . ., 27 Oct 41. (5) Ltr, O'Brien to McIllwain, 5 Nov 41. 601.53 (Zone 1) (Leases, RA) Mar 41–Jan 42. (6) Incl with Ltr, Hayden to Gregory, 19 Nov 41. 601.53 (Zone 6) (Leases, RA, FY 42).

Careful planning of acquisition and streamlined methods of purchasing produced good results. O'Brien stressed the importance of careful appraisals. On learning that a site was under consideration, he immediately asked the zone for a gross appraisal, a map, a tract register, and recommendations as to how to acquire the property. When he received the directive, he was all set to go ahead, making detailed tract appraisals, negotiating or condemning, and securing title and possession. In trying to establish fair market values, O'Brien tapped every available source of information: mortgages, county records of recent sales, and valuations set by other agencies. He weighed in improvements, mineral rights, and severance damages along with the value of the land itself. But he excluded such items as cost of moving and loss of business, discontinuing the practice of acknowledging disturbance damages, followed for a short time and inconsistently by Colonel Valliant. All appraisals underwent review in the field and again in Washington. Reappraisals by the Real Estate Branch often saved thousands of dollars.[78]

While sound appraisals made it easier to purchase by direct negotiation, condemnation was still necessary when disagreements arose over price. Few owners refused outright to sell, but many asked more than their properties were worth. Nor were private owners the only ones; local officials sometimes demanded huge sums for closing state and county roads running through the sites. At first O'Brien followed the practice of condemning individual tracts when negotiations stalled. But, by summer, pressure to get land quickly for second-wave projects had become so intense that he reversed the procedure. General condemnation of entire sites now became the first step. By invoking the War Purposes Act of July 2, 1917, which gave the government extraordinary powers when a state of war was imminent, O'Brien got the courts to grant immediate possession. He then opened negotiations; and if they were successful, he dropped condemnation proceedings. This line of action had many advantages. It froze sales in an area, prevented speculation, and reduced the number of public protests. More important, it permitted an earlier start on construction. But opposition from the Justice Department soon forced its abandonment. Assistant Attorney General Littell did not object to general condemnation, but he did oppose using the War Purposes Act. Repeated representations to the courts that war was imminent seemed to him politically unwise. A compromise resulted: where time was available, O'Brien would follow the usual method of condemnation; where construction was actually delayed, Littell would employ the War Purposes Act.[79]

Acquisition by either condemnation or negotiation was incomplete until owners

[78] (1) Memo, O'Brien for Davidson, 23 Jun 41. Opns Br Files, Future Policies—Camp Constr. (2) O'Brien's Address, 5 Nov 41. (3) Ltr, O'Brien to FCA, 6 Dec 41. 601.1 II. (4) Ltr, O'Brien to ICC, 18 Apr 41. QM 601.1 1941. (5) Ltr, U.S. Atty Western Dist of Ky. to Justice Dept, 4 Dec 41. 601.1 (Zone 5) (USO) Sep–Oct 41. (6) Memo, O'Brien for Somervell, 11 Apr 41. Opns Br Files, H Investigation.

[79] (1) Annual Rpt, RE Br for 1941, 3 Jul 41, sub: Problems in Land Acquisition. Gideon Files, 6A2. (2) Memo, Somervell for Patterson, 6 Jun 41. QM 601.1 1941. (3) Ltr, RE Br to Richards, 8 Jul 41. QM 601.1 (ZCQM 7). (4) Ltr, O'Brien to Littell, 10 Jul 41. 601.1 I. (5) Notes of Conf in Dept of Justice on 6 Aug 41. (6) Ltr, O'Brien to Littell, 21 Aug 41. Last two in 601.1 II.

had their money. But final payments had to wait until titles were clear. Obtaining title evidence was slow work. County records were often poorly organized, and abstractors and title companies had more business than they could handle. Taking steps to overcome delays, O'Brien and Littell agreed to begin securing title evidence as soon as a site came under consideration by the War Department. They reduced the period of search from eighty to fifty years, except where titles were unclear and where a defective title would endanger a large investment, such as an Ordnance plant. In awarding contracts for title work, they considered the promised date of completion as a deciding factor.[80] By August, the Justice Department could assert that, once necessary papers were in hand, title vested in the government in an average of "four days, four hours, and twelve minutes."[81]

As property was removed from tax rolls and local governments demanded compensation for lost revenues, special relief bills were introduced in Congress. O'Brien consistently opposed such legislation, arguing that it would not only set a dangerous precedent but would, in effect, force the government to pay taxes on federally owned land. Moreover, it would substantially increase the cost of the program. Pointing out that the Army was acquiring land in more than two-thirds of the states and that political subdivisions in all of them were losing tax revenue, he recommended that Congress defer action until the Federal Real Estate Board, which had been studying the effects of federal acquisition on revenues of local communities since 1939, could come up with a general solution to the problem. In the meantime, the Quartermaster Corps would make every effort to take cheap lands which were not rich sources of tax revenue.[82]

Relief for the dispossessed was a more pressing need, for during the first year of the emergency, thousands of families were uprooted. Their plight attracted wide attention. Chester Davis wanted the Army to set aside part of the funds appropriated for buying real estate to compensate owners and tenants for losses suffered when it took their farms.[83] But O'Brien, refusing to recognize the disturbance factor as a proper element in valuation, protested that diverting funds to this purpose "would substantially cripple the present land program."[84] After a series of conferences, NDAC, the Construction Division, and other interested agencies finally agreed that the problem was really one of relief and could best be met through grants and loans by the farm security agency. All felt, however, that the Army could do much to ease hardship. O'Brien was as liberal as possible in negotiating prices, allowing up to 10 percent in excess of appraised values. He encouraged camp commanders to send

[80] (1) Ltr, Littell to O'Brien, 25 Mar 41. (2) Ltr, Littell to O'Brien, 18 Jun 41. Both in 601.1 I. (3) Ltr, RE Br to McFadden, 26 Jul 41. QM 601.1 (ZCQM 2). (4) Memo, D. B. Gideon for W. Z. Bowie, 3 Jul 41. Gideon Files, 6A3.

[81] Ltr, Littell to TQMG, 25 Aug 41. 601.1 II.

[82] (1) Ltr, Gregory to Patterson, 24 Feb 41. USW Files, Legis—H Bills 1–4999. (2) Ltr, Stimson to Chm H Comm on Military Affs, n.d. RE Div Files, 5B1. (3) Memo, O'Brien for OQMG Congressional Mail Sec, 20 Mar 41. Gideon Files, 5C1. (4) Ltr, Stimson to Chm S Comm on Public Lands and Surveys, 1 Jun 41. Gideon Files, 3A2a.

[83] Ltr, Davis to Patterson, 29 Jan 41. USW Files, 601 (Land Acquisition).

[84] Ltr, O'Brien to Patterson, 28 Feb 41. USW Files, 601 (Land Acquisition).

soldiers and trucks to help with moving. He asked the zones to co-operate with the Department of Agriculture and with agencies of state and local governments in setting up central clearinghouses where residents could go for aid in finding new farms or new jobs. Most important, by expediting payments, he put cash in sellers' pockets with minimum delay.[85]

Streamlined and revitalized, the Real Estate Branch not only kept abreast of new work but wiped out the inherited backlog. As of 28 February 1941, the branch had acquired 1,053,658 acres of the 7,570,470 required. By 15 November the total requirement had risen to 8,845,079 acres of which only 84,782 acres had yet to be obtained. O'Brien's progress in leasing was equally impressive; during his first nine months with the Construction Division the area leased by the War Department more than tripled. He performed a valuable service in improving relations with Congress and the public, but his greatest contributions by far were lower real estate costs and increased speed of acquisition.[86] Summing up the accomplishments of O'Brien's organization, Somervell said: "The administrative cost of acquisition, as well as that of the land itself, has been reduced and this despite an increase in the speed of acquisition to an extent seldom attained in the Government."[87]

[85] (1) Ltr, BOB to Patterson, 16 Apr 41. Opns Br Files, RE Br Constr Div OQMG. (2) Memo, O'Brien for Somervell, 11 Apr 41. Opns Br Files, House Investigation. (3) Ltr, Gregory to TAG, 3 May 41. 601.1 I. (4) Memo, O'Brien for Davidson, 23 Jun 41. Opns Br Files, Future Policies, Camp Constr.

[86] (1) RE Branch PR's, 21 Feb, 15 Nov 41. EHD Files. (2) Ltr, Holmes to Hayden, 28 Jun 41. QM 601.1 (ZCQM 6).

[87] Memo, Somervell for Patterson, 17 Sep 41. 601.1 II.

CHAPTER XIII

Toward a Four-Million-Man Army

Events of 1941 changed the preparedness goal from *defense* to *victory*. Japan's encroachment into Southeast Asia, the German invasion of Russia, and the sinkings of American ships in the Atlantic increased the likelihood that the United States would enter the conflict. Lend-lease, the freezing of Axis assets in this country, the embargo on shipments of oil to Japan, and the decision to use American warships to escort British merchant convoys were milestones on the road to war. The Munitions Program of 30 June 1940, which contemplated a mobilization force of 4 million men by the spring of 1942, had primarily a protective purpose—hemisphere defense. The Victory Program of 11 September 1941, which envisaged an ultimate force of nearly 9 million, had another end in view—"to defeat our potential enemies."[1] As the crisis deepened, as sterner tasks impended, the Army struggled toward its mobilization goal, a goal it had to attain before it could pursue the larger war objective.

Once again construction set the pace. A 4-million-man army would require many new facilities—a second wave of munitions plants, more training camps, more airfields, and more schools and hospitals. Because the President, in order to affix a bargain price tag to the 1940 program, had deferred most such projects, warehousing, depots, docks, and wharves carried a high priority. Still other requirements—not the least of which was additional office space for the War Department—were evident. Although the Corps of Engineers carried part of the burden, the Construction Division continued to do the bulk of the work. Quartermaster officers played leading roles in launching the new program and charting its course.

Budgetary Politics

The program took shape slowly. In his annual budget message on 3 January 1941, the President spoke of "carrying out the mandate of the people . . . for the total defense of our democracy."[2] Yet the construction funds he requested for the new fiscal year were relatively meager: $160 million for military posts; $95 million for maintenance and repair; $5 million for hospitals; and $118 million for seacoast defenses, of which possibly one-third would go to the Engineers for fortifications. The President also put in for $500 million to expedite production, but $300 million of this amount would go to liquidate contract authorizations carried over from the previous fiscal year.

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[1] Watson, *Chief of Staff*, p. 338. See also *Ibid.*, ch. XI, pp. 331–366; Smith, *The Army and Economic Mobilization*, pp. 126–139.

[2] *Public Papers and Addresses of Franklin D. Roosevelt, 1940*, p. 651.

The low total for construction was in part due to the Bureau of the Budget, which continued to slash War Department requests, and, in part, to the public expectation that National Guardsmen and selectees would begin going home in the fall.[3] To obtain large additional sums would require adroit strategy.

General Gregory got things moving. Since the fall of 1940 he had pressed for a start on the $200-million ports and storage program deferred by the President. Gregory remembered his experience in World War I as a Quartermaster officer at Jeffersonville Depot. "We had thousands of tons of supplies," he recalled, "right out in the open in the corn field, where to get to them with trucks, you had to go through mud. I determined that we would never face that if I ever had anything to do with another war."[4] In 1940 he was particularly concerned about the lack of facilities along the Pacific coast, and late in October he sent Groves west to size up the situation. The outlook was not encouraging. At the Oakland Port and General Depot the only room for expansion was an area of formerly submerged tideland filled with bay mud; to provide firm ground, it would be necessary to do hydraulic filling and to truck dirt from the surrounding hills. Oakland was but one of many big and difficult future projects.[5] Sensing that speed was imperative, Gregory kept after Marshall. "The General Staff," he afterward complained, "was very slow in recognizing the necessity for additional depots and port facilities."[6] He doggedly persisted. In mid-January 1941, when he learned that the War Department would request a fifth supplemental appropriation for 1941, he promptly asked for $175 million.[7]

On 25 February, just before Gregory's estimate went to the Bureau of the Budget, Leavey telephoned Groves: "We have a chance, I think, of getting some supplemental estimates tacked onto a bill being rushed up to Congress and if you have any items you think have to be put in——." "Fifty million," Groves interjected. He was thinking of contingencies, of needed repairs, of a lumber stockpile, of unfinished work at almost every camp. Leavey hesitated—then agreed: "It may get kicked out, but we can try it."[8] Try they did, but with little success. The Budget estimate sent to Congress gave the Construction Division $115 million for ports and storage, $15 million for a lumber stockpile, and not one cent for anything else.[9]

At House hearings on the fifth supplemental early in March, Somervell kicked over the traces. Defying the unwritten law that bound officers to uphold administration measures, he termed the current estimate for storage mere guesswork—a figure "just pulled out of the air" and "not fastened to the ground in any way." He recalled the deficit for

[3] (1) H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the Military Establishment Appropriation Bill for 1942*, pp. 141–43, 10, 680, 398. (2) Memo, Reybold for Moore, 15 Nov 40. G–4/31679–4.

[4] Verbatim Rpt, Meeting with Gregory and Hastings.

[5] (1) Memo, Groves for Gregory, 28 Oct 40. Opns Br Files, Convention in Chicago. (2) Rpt, Activities of the Constr Div, Jul 40–Nov 41, pp. 247–49.

[6] Ltr, Gregory to authors, 24 Mar 55.

[7] Memo, Bayer for Chief Accounts Br, 30 Jun 41. Bayer Papers.

[8] Tel Conv, Leavey and Groves, 25 Feb 41. Opns Br Files, Budget.

[9] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the Fifth Supplemental National Defense Appropriation Bill for 1941*, pp. 131ff.

camp construction, a sore point with some Congressmen, and predicted that a second overrun would follow the granting of the present low request. Testifying before the Senate subcommittee on 27 March, he brought up the matter of a contingency fund. Defining a contingency as "something that a man could not think of in the first place," he told one Senator, "There may be some people who are smart enough to think of everything. They just might exist . . . . They are not in the Army, anyway." When Somervell finished, the legislators were calling for "a statement showing just what it is going to cost." Not yet ready to make such a statement, Somervell promised to come back. "And when I come back," he said, "I will come back with definite figures."[10]

The new appropriation act approved on 5 April provided for a good deal of construction but signaled no real breakthrough. For military posts, ports, and depots, there was $304,821,000; for maintenance and repairs, $2,366,000; for sea-coast fortifications, $3,536,000; and for expediting industrial production, $867,286,000. There was also $98,250,000 for airfield construction tacked onto the bill at the President's request. Welcome though it was, the act was hardly more than an accommodation. Of the construction total, half was in contract authorizations. Moreover, many of the items in the bill had merely advanced from the regular appropriation for 1942.[11]

With passage of this act, Congress completed the round of military appropriations for the fiscal year. Since June 1940, more than $2.3 billion for construction, maintenance, and real estate had become available to the Quartermaster Corps—part by direct appropriation and part by transfer from other agencies. Roughly half a billion of this sum had gone to the Engineers for Air Corps projects. The balance, $1.8 billion, was approximately three times the total expended by the Construction Division from 1921 to 1940. Although the division had let contracts and spent money with record speed during eleven months of defense construction, on 31 May 1941 some $382 million—most of it from appropriations voted in March and April—was still unobligated.[12]

On orders from the President, Patterson early in June directed General Gregory to obligate these funds before the month was out. On the 5th Colonel Leavey wired the zones to advertise at once. Two days later Groves, who had not seen the telegram before it went out, wrote an "amplifying letter," instructing the field to negotiate if plans and specifications were incomplete or if bids were excessive.[13] Meantime, in Washington, the Contract Board under Chairman Loving set to work. They cut the advertising period to five days and wrapped up negotiations rather quickly. In some cases they went to letter contracts—preliminary agreements which sealed bargains in advance of formal contract signings. CQM's started many projects by purchase and hire. Haste had its usual

[10] (1) *Ibid.*, pp. 140–43. (2) S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 4124, pp. 155, 151.

[11] (1) 55 *Stat.* 123. (2) Annual Report Covering Military Activities of the Corps of Engineers for the Fiscal Year 1941, p. 75.

[12] (1) Rpt, Activities of Constr Div, Jul 40–Jul 41, pp. 119–23. (2) Constr PR 24, 11 Jun 41, p. 142.

[13] (1) Telg, OQMG to ZCQM's, 5 Jun 41. QM 600.1 (All Zones). (2) Ltr, Constr Div to ZCQM's, 7 Jun 41. QM 600.1 (Contracts—Misc) IV.

effect. "The contractors are in," Colonel Alfonte telephoned Groves from Fort Benning, "and they say they haven't got time to figure the things, and they are adding a hell of an ante on it." There was nothing Groves could do. "I'm very much disturbed about . . . the mad rush," he told Alfonte, "but it was ordered from the White House and that ends it."[14] By dint of long hours and hard work, the Loving board and the zones completed the job, 100 percent, by 30 June. Among the projects gotten under way were ordnance depots, storage depots, port facilities, and hundreds of new buildings—chapels, service clubs, theaters, motor repair shops, radio shelters, and warehouses—at dozens of existing stations.[15] Early in July Somervell commended his organization for giving him "results, not alibis."[16] The President expressed his satisfaction but kept the pressure on, indicating that he wished to see the funds for the new fiscal year obligated in the same manner and with the same speed.[17]

If haste was becoming more imperative, the Bureau of the Budget took scant notice of the fact. Presented with the revised construction estimates for 1942, it performed the usual thoroughgoing surgery. Where Somervell asked $5 per square foot for storage, it gave him $4. Where he asked for 17,000 maintenance men, it gave him 12,000. Where he recommended a maintenance fund amounting to 5 percent of the total property investment, it approved a sum equivalent to 2.5 percent. The request for a contingency fund met another rebuff. Even more discouraging was the outlook for new projects. With reductions in the strength of the Army slated for the fall of 1941, there could be no request for more troop shelter. What was worse, the Budget made no provision for additional munitions plants. The estimate included approximately $391 million in expediting production funds, but this entire amount was for payment of contracts authorized for 1941.[18]

Somervell decided to fight for larger appropriations. Complaining that his organization was "behind the eight ball," he set himself for a difficult bank shot.[19] He prepared to get around the Budget by appealing directly to Congress. As the date of the hearings drew near, arguments were tested and witnesses were rehearsed. On 6 May 1941, the day before the House subcommittee took up the Quartermaster estimates, Groves told a member of G–4: "The big mistake is to be too modest. . . . I'm in favor of asking for a lot and letting them turn you down if they have the nerve—they won't have the nerve."[20] Early next morning the officers who would testify

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[14] Tel Conv, Alfonte and Groves, 23 Jun 41. Opns Br Files, Ft Benning.

[15] (1) Constr PR 29, 16 Jul 41, *passim*. (2) Memo, Somervell for All Elements Constr Div, 3 Jul 41. Opns Br Files, Constr Div Memos.

[16] Ltr, Somervell for ZCQM 9, 2 Jul 41. Opns Br Files, Zones.

[17] (1) Ltr, Patterson to Gregory, 9 Jul 41. Opns Br Files, Gen Jun–Jul 41. (2) Memo, Leavey for Styer, 20 Jun 41. USW Files, Appns, thru Aug.

[18] (1) Memo, Bayer for Chief Accounts Br, 30 Jun 41. Bayer Papers. (2) H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the Military Establishment Appropriation Bill for 1942*, pp. 397–98, 446–50. (3) S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 4965, p. 30.

[19] Tel Conv, Somervell and Col Brown, BOWD, 16 Apr 41. Opns Br Files, Budget.

[20] Tel Conv, Groves and Col Wilson, 6 May 41. Opns Br Files, Equip 1.

met in Somervell's office to "go over the thing" one last time, before starting out for the Capitol. [21]

Everything went as planned. Setting the tone for the hearing, Chairman J. Buell Snyder began: "We are very glad indeed, General Somervell, that you are here. . . . and we want you to know that you are welcome and that we wish to cooperate with you and help you in any way that we can." Other members of the subcommittee affirmed their confidence in Somervell and praised his organization. Abetted by friendly questioners, the witnesses demolished the Budget's position. They explained that men who were ignorant of construction had slashed their estimates. They demonstrated the need for larger sums than those the Budget had requested. They predicted overruns, delays, and increased costs if the Budget's policies prevailed. Their testimony had the desired effect. Stating that he was "getting tired of seeing deficiencies," Representative D. Lane Powers told Somervell: "I think our committee should take into consideration what you think is necessary . . . and not what the Budget arbitrarily gives you, not having technical knowledge as to a matter of this sort." Mr. Snyder observed that the Budget's recommendations were "merely advisory." Representative Joe Starnes proposed to obviate the need for a deficiency appropriation by voting enough money in the first place.[22] The Construction Division had won its case. Back at his desk, Groves exulted: "They'll give us anything we ask for."[23]

And they did. Satisfied that the Budget estimates were inadequate, the House group urged the Army to state how much it really needed. "If the Budget has anything to say about it," Snyder told General Moore, "you refer them to us." Somervell was free to present his own figures to Congress, and on 20 May he went back to ask the House subcommittee for $157 million in addition to the $280 million originally approved by the Budget. His estimate provided an extra dollar per square foot for storage, an adequate maintenance fund, money for deferred buildings, sums for additional depots and additional tracts of land, and a $25-million contingency fund. Thanks largely to Major Boeckh, Somervell was able to present his estimates as "scientific."[24] The House accepted them as such and its bill granted all Somervell's requests.

Somervell could not request funds for new munitions plants: that was up to the Under Secretary. But, though the Budget estimate for expediting production was woefully inadequate (the sum requested would do no more than liquidate half the unpaid contract authorizations carried over from 1941), Patterson did not appeal to the House subcommittee. Instead he sought $500 million for the second-wave munitions plants from the Reconstruction Finance Corporation. At a meeting on 9 June in the office of Commerce Secretary Jesse Jones, dis-

[21] Tel Conv, Styer and Groves, 6 May 41. Opns Br Files, B&Q.

[22] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the Military Establishment Appropriation Bill for 1942*, pp. 393, 396–400, 414, 444–56.

[23] Tel Conv, Groves and Chamberlin, 10 May 41. Opns Br Files, B&Q.

[24] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the Military Establishment Appropriation Bill for 1942*, pp. 680, 688ff., 686. See also H Rpt 741, 77th Cong, 1st sess, 5 Jun 41.

cussion centered on the possibility of a loan. Among those present were General Burns, representing Patterson, General Harris, representing Ordnance, and Colonels Styer and Jones of the Construction Division. Secretary Jones agreed to advance the money but only on condition that the Defense Plant Corporation (DPC), an RFC subsidiary, do the construction. The Army men accepted the loan on the Secretary's terms.[25] The next day Leavey's executive officer, Colonel Covell, informed Casey: "A decision was reached yesterday with the RFC through its Defense Plants Corporation that they would construct the new Ordnance manufacturing plants . . . . This means that these projects will be handled entirely between the Ordnance Department and the Defense Plants Corporation and that this Division will have no part in their construction."[26]

Neither Somervell nor Campbell was willing to accept this decision. Both appealed to Patterson. On 12 June, with the Under Secretary's permission, Somervell recommended to the Commerce Department that, in "the best interests of the entire defense program," DPC put up the money and leave construction to the Construction Division. "By dint of experience," he emphasized, " . . . many of the obstacles which presented themselves during the first program have been overcome and can be avoided in the second if the same organizations and relationships can prevail."[27] When it became apparent that Somervell had failed, Patterson went to Secretary Jones, who agreed to advance half the money if Somervell did the work. It was not enough. Somervell made a furtive appeal to the Senate subcommittee on military appropriations.[28] When Patterson came before this group on 20 June to testify on another matter, Chairman Elmer Thomas urged him to "make any recommendation you see fit, without regard to the budget." Senators Hayden, Truman, and Chavez also encouraged the Under Secretary to speak up. "So the lid is off," Thomas declared, "and you can make any recommendation you see fit." Patterson recommended inclusion in the bill of $500 million for the second-wave plants.[29] That afternoon he wrote to Secretary Jones, thanking him for his offer and stating that it seemed probable that the War Department would be able to finance the plants itself.[30]

For a time it appeared that Somervellian tactics might be the right generalship for obtaining camp and cantonment funds. Testifying off the record before the Senate subcommittee on the morning of 18 June, General Marshall recommended strengthening the army within the continental limits by 100,000 miscellaneous troops and two armored divisions and substantially increasing the garrisons in Hawaii, Puerto Rico, and Panama. That afternoon, Somervell wrote to General Moore:

It is essential that this office be given

[25] Memo, Styer for Somervell, 9 Jun 41. Opns Br Files, Ord Projects.

[26] Memo, Covell for Casey, 10 Jun 41. OCE Legal Div Files, Contract Progress.

[27] Ltr, Somervell to DPC, 12 Jun 41. Opns Br Files, Ord Projs.

[28] (1) Ltr, Jones to Patterson, 20 Jun 41. USW Files, Appns, thru Aug. (2) Antes Interv, 3 Jun 58. (3) Ltr, Col H. W. Jones to Chief Mil Hist, 10 Mar 55.

[29] S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 4965, pp. 28–30.

[30] Ltr, Patterson to Jones, 20 Jun 41. USW Files, Appns, thru Aug.

directives on the increased construction necessary for this work at the earliest practicable date so that proper plans may be prepared leading to adequate estimates for construction. These estimates must be based on plans if the Army is to conform to the promises made to the House Appropriations Committee. It would be extremely unfortunate if the Army had to go back before this Committee and confess another lack of plans on these garrisons. I should like to urge with all the earnestness at my command the necessity for our being given complete orders on these increases if we are not to fall down on the job we are trying to do for you.[31]

Supporting Somervell, Moore pointed out to Marshall that additional camp construction ought to start soon, "if we expect to avoid the difficulties in winter construction, which caused so much comment this past year." But an appeal to Congress for camp construction funds would anticipate approval for extending the draft and retaining the National Guard in federal service. Marshall let sleeping dogs lie.[32] Although Congress seemed willing to vote whatever sums the Army asked, the Army once again felt constrained to ask for less than it needed. The regular appropriation for 1942, approved on 30 June 1941, granted all requests but contained nothing for additional camps.[33]

July was a time of fresh beginnings. Among the dozens of projects launched during this first month of the new fiscal year, the most important were eleven second-wave munitions plants and five advance planned camps. The Volunteer Ordnance Works, a $35-million TNT plant at Chattanooga, Tennessee, and a $25-million Chemical Warfare arsenal at Huntsville, Alabama, were the largest industrial undertakings. There were also sizable plants for producing anhydrous ammonia and small arms ammunition and smaller ones for making detonators and ammonium picrate, bagging powder, and loading shells. With the funds recently appropriated for expediting production, industrial construction could proceed full steam ahead. There was no appropriation to implement directives issued by General Marshall early in July for two armored division cantonments, a triangular division camp, a replacement training center, and a barrage balloon training center. This construction had to start on a shoestring—$10 million from the Chief of Staff's contingency fund. Having a total estimated cost of nearly $73 million, these five projects could not get far unless Congress provided more money.[34]

The Chief of Staff's biennial report, published on 3 July 1941, implied that the Army would soon request additional funds for troop housing. Expressing "grave concern" over "the hazards of the present crisis," General Marshall "urgently recommended that the War Department be given authority to extend the period of service of the selective-service men, the officers of the Reserve Corps, and the units of the National Guard."[35] The widespread opposition to this proposal, the public

[31] Memo, Somervell for Moore, 18 Jun 41. G-4/30552. Compare Marshall's Testimony, 18 Jun 41. In S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 4965, pp. 1–12.

[32] Memo, Moore for Marshall, 19 Jun 41, and notation thereon. G-4/30552.

[33] 55 *Stat.* 366.

[34] (1) Constr PR 35, 15 Sep 41. (2) Memo, Somervell for Patterson, 6 Aug 41, and Incl. Madigan Files, Canton—Tr Housing.

[35] Biennial Report of the Chief of Staff, July 1, 1941. In *Report of the Secretary of War to the President, 1941* (Washington, 1941), pp. 56–57.

controversy it engendered, and the fierce debate it provoked in Congress formed an interesting chapter in the history of this period. Even before the climactic vote of 12 August, when the House agreed by the narrowest of margins to extend the draft, the War Department was proceeding on the assumption that Congress would act in the best interests of national security. During July, it rushed supplemental estimates to the Hill. Included were requests for $84 million for ammunition storage and $90 million for camps and cantonments.[36]

Thanks largely to Somervell's initiative, the House Appropriations Committee inserted another construction item in the bill—$35 million for a mammoth new War Department building. Since the start of the defense program, the shortage of office space in Washington had been growing more acute. The government had taken over apartment houses, warehouses, residences, and garages for its expanding forces. By the summer of 1941, 24,000 War Department employees occupied seventeen buildings in the District of Columbia and others in Virginia. Conditions everywhere were crowded, and The Adjutant General's office had only 45 square feet per person. In May, the Public Buildings Administration had proposed erecting temporary structures for various agencies on the outskirts of the city. The Bureau of the Budget included $6.5 million for this purpose in the estimate submitted to Congress early in July. Somervell had a better idea, a scheme for housing the entire War Department under one roof. He talked to General Moore about it. Then he talked to Representative Woodrum. When the estimate for temporary buildings came before the House committee, the Virginia Congressman proposed that the War Department work out an overall solution to its space problem.[37] The result was the Pentagon project, a story in itself.[38]

The supplemental appropriation, the last War Department money bill enacted before Pearl Harbor, received Roosevelt's signature on 25 August 1941. The fight for funds had been partially successful. The Army had asked Congress to underwrite programs to mobilize 1,727,000 men and to provide equipment for a force of 3 million. And Congress had done so.[39] But the 4-million-man goal was still inaccessible and the distance to the ultimate victory goal seemed impossibly vast. The War Department could do no more than expedite the work at hand and hope that the Army would be ready when the challenge came.

An accelerated construction program lent substance to this hope. Beginning in July 1941 the monthly value of work placed at Quartermaster projects shot upward. (*Chart 12*) In October, when

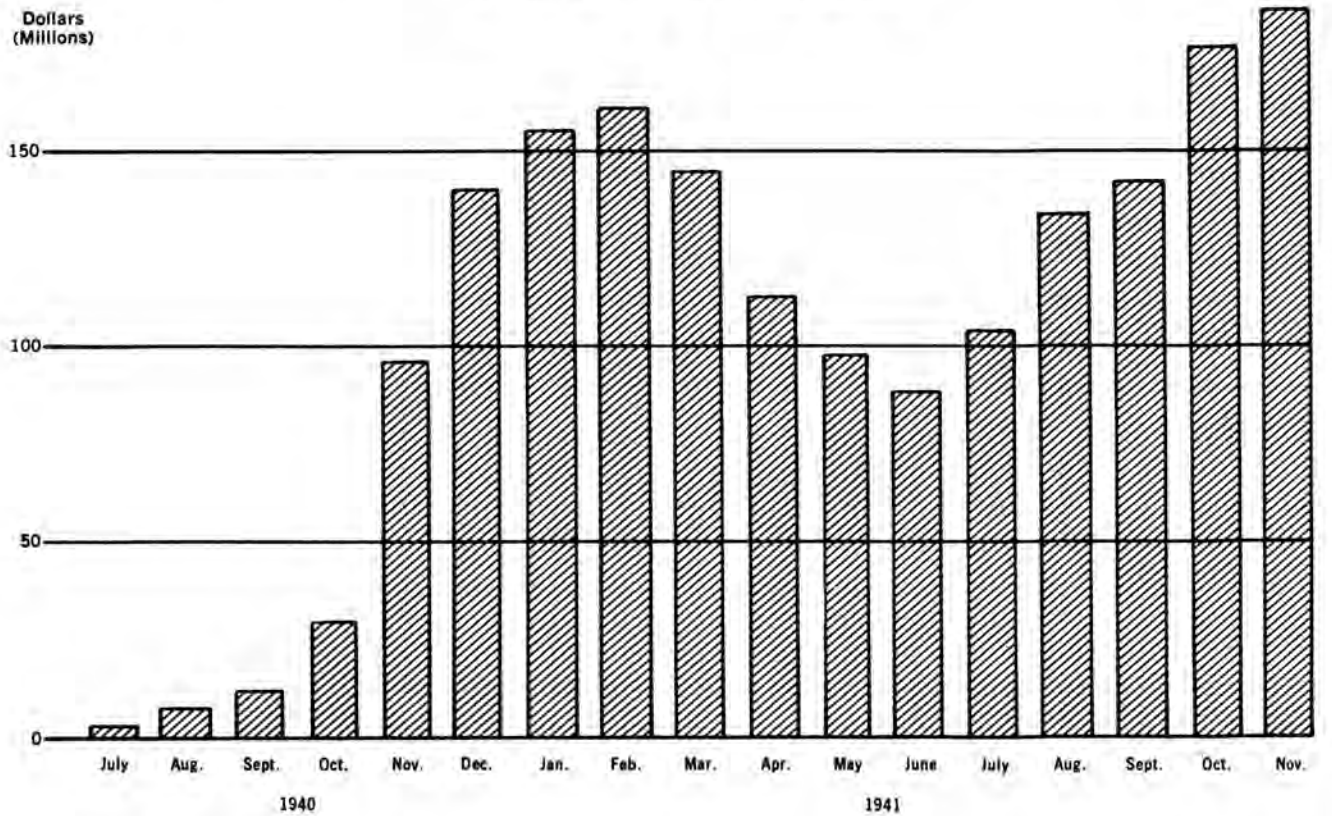
[36] (1) Watson, *Chief of Staff*, pp. 218–231. (2) William L. Langer and S. Everett Gleason, *The Undeclared War, 1941* (New York: Harper and Brothers, 1953), pp. 570–580. (3) H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the First Supplemental National Defense Appropriation Bill for 1942*, p. 84. (4) S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 5412, pp. 129–30.

[37] (1) H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on First Supplemental National Defense Appropriation Bill for 1942*, pp. 488–95. (2) H Rpt 988, 77th Cong, 1st sess, *First Supplemental National Defense Appropriation Bill for 1942*, Jul 24, 1941, pp. 12–14. (3) S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 5412, p. 60.

[38] See pp. 431–39, 511–12, 608–609, below.

[39] (1) H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on First Supplemental National Defense Appropriation Bill for 1942*, p. 3ff. (2) 55 *Stat.* 669.

CHART 12—VALUE OF WORK PLACED BY MONTH ON QUARTERMASTER CONSTRUCTION PROGRAM
1 JULY 1940 TO 30 NOVEMBER 1941



Source: Constr Div PR 41, 16 Dec 41, p. 29.

TABLE 12—SUMMARY OF QUARTERMASTER PROJECTS COMPLETED AND UNDER WAY 5 DECEMBER 1941

Projects	Completed[a]	Under Way	Value of Work In Place
Total	375	220	$1,828,268,053
Camps and Cantonments	61	10	623,532,764
Reception Centers	47	—	8,640,794
Replacement Tng Centers	25	4	110,665,861
Harbor Defenses	37	8	26,549,331
Misc Troop Facilities	113	87	148,009,863
General Hospitals	19	6	24,716,258
Ordnance Plants	20	40	663,865,631
Ordnance Ammo Storage Depots	2	7	72,859,862
Misc Ordnance Facilities	6	20	38,327,548
CWS Plants	7	4	26,815,370
Storage Depots (excl. Ammo)	9	23	76,512,266
Misc Projects	29	11	7,772,505

[a] Includes projects more than 95% completed.
Source: Constr PR 41, 16 Dec 41, pp. 40–43.

more than 150 million dollars' worth of construction went into place, Somervell beat his previous record set in February. He set a new high in November, when the total passed the $175-million mark. Although individual projects lagged, the program as a whole went ahead on schedule. (*Chart 13*) The Quartermaster organization took additions to the work load in stride. For example, the transfer of $18 million from the Federal Works Agency to the Construction Division for 200 USO buildings on 30 September was followed three weeks later by the announcement that 51 buildings had been started. Before the end of November, 191 were under way.[40] Of 220 major projects under construction early in December, 52 were more than one-quarter complete, 42 were more than half, and 84 were more than three-quarters.[41]

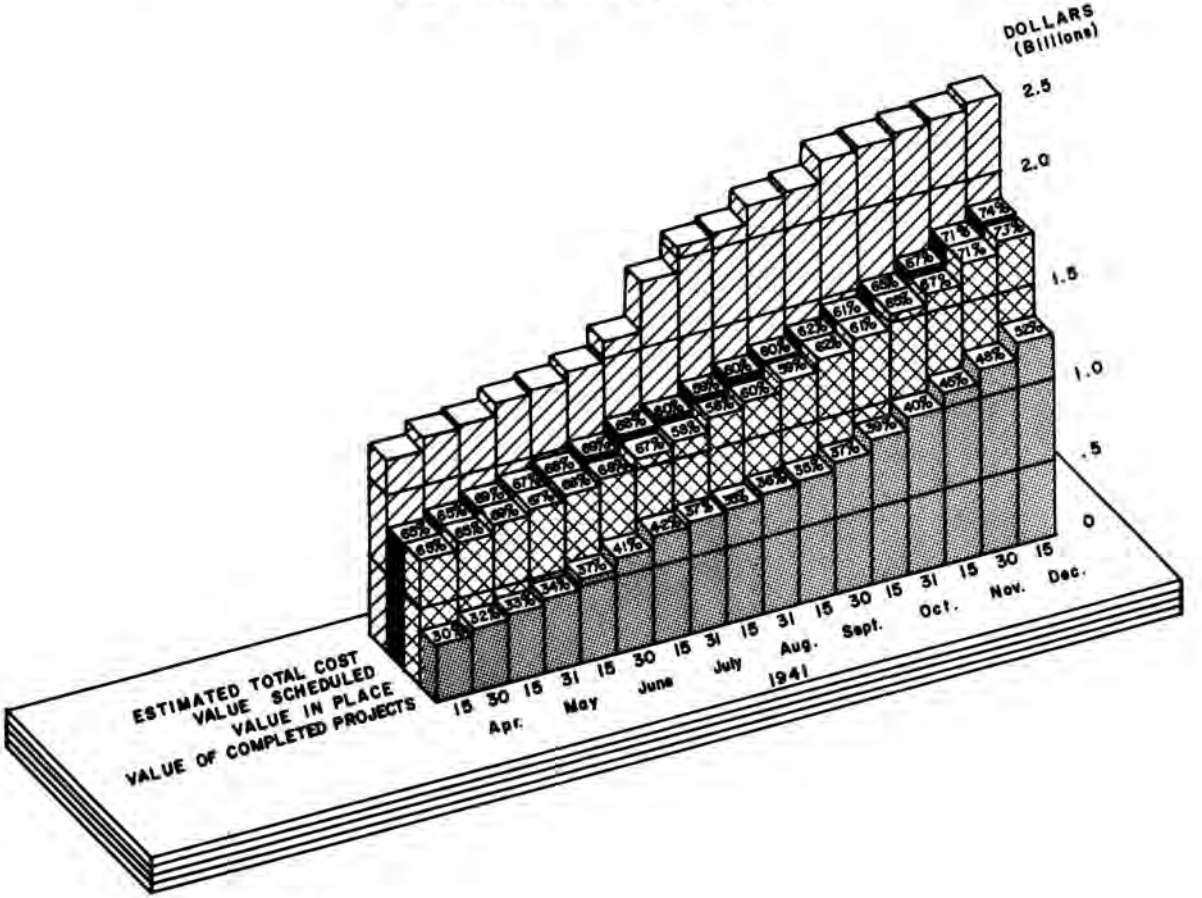
In the five months before Pearl Harbor, the Construction Division accomplished a great deal. On 28 June 1941, the Quartermaster program included 100 defense projects complete or essentially complete and 324 under way; the value of work in place was $1,043,737,019.[42] On 5 December the number of completed projects stood at 375; the number of going projects, at 220; and the total value of work in place, at $1,828,268,053. (*Table 12*) Of the 171 projects started during this period, only one was highly exceptional—the Pentagon. Most of the methods and procedures employed were by now familiar. Only in contracting and contract administration were there striking innovations.

[40] (1) Ltr, Administrator FWA to Stimson, 30 Sep 41. Opns Br Files, Gen, Aug 41–Feb 42. (2) Ltr, Patterson to Somervell, 20 Oct 41. USW Files, 618.2 (Recreation Centers, Grnds, etc.). (3) Memo, Kirkpatrick for Groves, 19 Dec 41. Opns Br Files, Grnd Trs Sec.

[41] Constr PR 41, 16 Dec 41, p. 31.

[42] Constr PR 27, 2 Jul 41, p. 3.

CHART 13—COMPARISON OF COSTS—QUARTERMASTER CONSTRUCTION PROGRAM
1 APRIL TO 15 DECEMBER 1941



Source: Constr Div, PR 41, 16 Dec 41, p. 29.

Contractual Refinements and Reforms

Of all the criticisms directed at Army construction, the harshest and most persistent had to do with contracts. The fixed-fee agreement—the keystone of Hartman's system and of Somervell's as well—was a popular target. The general public and the press displayed a deep-rooted prejudice against it. Politicians identified it with high costs, profiteering, favoritism, and collusion. Specialty firms damned it. Equipment renters chafed at recapture. Materialmen, forced by the slowness of audit-reimbursement to wait for money due them, voiced bitter complaints. Comptroller General Lindsay C. Warren, seeking to guard against dishonest contracting officers and rapacious contractors, viewed the arrangement with distrust. Some War Department officials believed that the fixed-fee method, if not inherently evil, was impractical for public work. Those responsible for construction had to consider every objection, valid or not.

The most vulnerable part of the fixed-fee system was the audit-reimbursement machinery. At times it hamstrung contractors, at times it led to abuses, and it was nearly always slow. Terming it "the most expensive and progress-impeding feature of a cost-plus-fixed-fee job," Madigan described how it might work under strict administration:

> After the job has been operating a short time, the contractor is confronted with his first argument with the contracting officer and auditors in charge concerning whether or not a certain expenditure which he may have deemed necessary is reimbursable. His attention is called to the fact that the particular expenditure, which everybody admits was probably necessary, was not authorided and therefore is against the rules and regulations governing the operation of a fixed-fee contract, which states that the contracting officer has to authorize all expenditures. The contractor, therefore, in order to protect his own financial interests insists that every purchase, large or small, must be approved by the contracting officer before the purchase is made by any of his employees.[43]

Under an easy-going CQM, the story was likely to be different. On a visit to Camp Polk in April 1941, Mitchell discovered that the contractor was paying ten employees yearly salaries of more than $6,000. He cited two cases:

> One employee, bearing the imposing title of "Assistant General Superintendent" is apparently in actuality a chief material clerk, responsible for the receipt, custody, and distribution of materials and equipment. This employee receives $6500 per annum, to which I offer the single comment that "It's nice work if you can get it."
>
> Another employee acts as Assistant General Superintendent in charge of operation and maintenance of automotive equipment, again for the sum of $6500 per annum. This figure occurs so frequently that I am beginning to believe it has some mystic significance. This job is purely that of a master mechanic, and again the salary seems to me out of line.

Proposing a full-scale investigation, Mitchell quipped, "When folk go to Polk they should poke around a little mo'."[44] Bottlenecks in field auditors' offices not only tied up contractors' funds and forced them to borrow but also worked injustice on suppliers. One lumber dealer, calling his trade with fixed-fee contractors "the most high-handed piece of monkey business I have gotten into in a long time," wrote to

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[43] Memo, Madigan for Amberg, 23 Feb 42. Madigan Files, AEM Data.

[44] Memo, Mitchell for Somervell, 12 Apr 41. Opns Br Files, Gen Corresp to 29 Dec 41.

the Construction Division in the spring of 1941: "By what right or token have you, the contractor, or any other department the privilege of taking my lumber, using it, and not paying when the invoices are due under the terms of sale set up by yourselves?
Yes, gentlemen, I am mad and getting madder every day. I want my money."[45] Madigan's solution to these problems was to scrap the contract. "I question," he said, "whether the cost-plus-fixed-fee form . . . , for which I have the greatest personal respect, is workable on government projects."[46] Unable to dispense with fixed-fee contracts, the Construction Division could only try to increase their workability.

Started during Hartman's administration, efforts to streamline auditing procedures continued under Somervell.[47] In late December 1940, the chief of the Accounts Branch, Colonel Pashley, asked most field auditors to cut their staffs to 20 percent of current size, which would leave the government with one timekeeper or materials checker for every five on contractors' staffs.[48] When Constructing Quartermasters tried "to stick to that 20 percent right down to the gnats' eyebrow," he told the field to go as high as 30 percent but to get away from "absolute duplication."[49] Meanwhile, he continued testing the method used in World War I. At Camp Meade and at the Ravenna Ordnance Plant field auditors took over all timekeeping and inspection work from contractors. At Edgewood Arsenal the government took over the contractor's payroll as well. Pashley believed that time would tell which of the two methods produced better results.[50]

Meanwhile, Pashley endeavored to strengthen the field organization. He began in December to form an auditors pool but made slow progress. Somervell complained that the auditing force was "not being built up and overhauled . . . with anything like the speed which should be secured."[51] Moreover, he insisted that Pashley make doubly sure of the honesty of every field auditor. "Integrity," Somervell sermonized, "is what has made the Corps of Engineers successful in its affairs and the record made in this present construction program in the Quartermaster Corps must be equally outstanding in this respect." Any malfeasance would bring "prompt and ruthless action."[52] Firing people was one thing; replacing them was another. Pashley's efforts to recruit auditors continued to have limited success. Some of the men he persuaded to take jobs in the field left after a short time. "Personality upsets and dislike of military type direction by higher grade civilians" lay behind many resignations.[53] Even with the odds against him, Pashley kept trying. By April he had secured enough auditors to keep abreast of the

[45] Ltr, Will B. Duke, Memphis, Tenn., to Constr Div, 23 Apr 41. QM 167 (Ft L. Wood) 1940–41.
[46] Memo, Madigan for Amberg, 23 Feb 42.
[47] See pp. 236–37, above.
[48] Min, Constr Div Staff Mtg, 20 Dec 40. EHD Files.
[49] Notes, Conf of ZCQM's, 7–10 Apr 41, pp. 190–91, 208.
[50] (1) Ltr, C. M. Gall to Pashley, 16 Jan 41. QM 600.914 (Ravenna OP) I. (2) Memo, Gottschalk for Pashley, 3 May 41. OCE Legal Div Files, Changes in Provisions and Policies, CPFF Contracts.
[51] Min, Constr Div Staff Mtg, 20 Dec 40.
[52] Memo, Somervell for Branch Chiefs, 21 Jan 41. OCE Legal Div Files, Changes in Provisions and Policies, CPFF Contracts.
[53] Memo, Pashley for Davidson, n.d. Opns Br Files, Questions and Answers, Truman Comm.

job, though some positions were still vacant. Schemes to offer larger salaries and to set up a school for auditors and accountants held some hope for the future, but as long as the nationwide shortage of professionally trained men continued, Pashley could expect to have fewer than he needed.[54]

Colonel Pashley had no say in choosing a new auditing procedure. Early in March Judge Patterson brought in Arthur H. Carter, senior partner of Haskins and Sells of New York City, one of the country's top accounting firms, to review the fixed-fee audit system.[55] A military background (a West Point education and over ten years' service as a Coast Artillery officer) enhanced Carter's qualifications for the job. After visiting a number of construction projects, Carter on 29 April recommended that the War Department assume "responsibility in the first instance for certain functions now administered by contractors and, to a great extent, duplicated by Government auditors." He suggested that field auditors take over all the work of checking time, preparing payrolls, inspecting materials, and auditing vendors' invoices.[56] He thus set his seal of approval on the procedure used in World War I.

When General Schulz forwarded Carter's report to the Accounts Branch, Pashley turned it over to his deputy, Oliver A. Gottschalk, recently of the New York WPA, and to Thomas A. Pace, head of the Accounting and Auditing Section. Gottschalk in a favorable report maintained that Carter's method offered greater initial protection to the government and speedier reimbursement to the contractor. Pace, reacting adversely, pointed out that the proposed procedure did not constitute an audit, since it provided no check of original records. He argued that changing the setup at going projects would save little or no money and emphasized the advantages of having contractors keep their own records. Besides, he held, big corporations like DuPont would probably refuse to turn their bookkeeping over to the government. Colonel Pashley, agreeing with Pace, recommended that the Construction Division oppose the change. General Somervell sided with Gottschalk. On 15 May Patterson adopted Carter's system. The task of instituting the new procedure fell to Gottschalk, who succeeded Pashley as chief of the Accounts Branch in mid-May.[57]

Because Constructing Quartermasters no longer checked contractors' books but compiled the original records themselves, there was a need for some sort of supervision. Patterson therefore directed Gregory to establish a force of supervisory auditors, who would be independent of the project offices. This force was to see that auditing procedures adequately protected the government,

[54] Notes, Conf of ZCQM's, 7–10 Apr 41, p. 186ff.

[55] Rpt, OUSW Dir of Purchases and Contracts, for FY 1941, p. 18. EHD Files.

[56] Memo, Carter for Schulz, 29 Apr 41. OCE Legal Div Lib, Directives 1940–41.

[57] (1) Memo, Schulz for Gregory, 29 Apr 41. OCE Legal Div Lib, Directives 1940–41. (2) Memo, Gottschalk for Pashley, 3 May 41. (3) Memo, Pace for Pashley, 3 May 41. (4) Memo, Pashley for Somervell, 3 May 41. Last three in OCE Legal Div Files, Changes in Provisions and Policies, CPFF Contracts. (5) Memo, Somervell for Gregory, 14 May 41. Opns Br Files, Gen—Dec 40–Jun 41. (6) Memo, Schulz for Gregory, 15 May 41. OCE Legal Div Lib, Directives 1940–41. (7) Ltr, Gottschalk to Carter, 24 May 41. QM 161 1941.

that field auditors' offices were properly organized and capably staffed, that there was no unnecessary duplication, and that the Quartermaster organization caused no delays in reimbursement. The Under Secretary's directive was easy to carry out. In the zone Accounts Branches, Somervell had a ready-made supervisory force. The transition to the new system went forward with little disruption to the work. At new projects and at older jobs where the Constructing Quartermaster and the contractor were able to reach an agreement, field auditors, working under the watchful eyes of the zones, now performed an important management function, the keeping of original accounts.[58]

Although, as Pashley had predicted, some contractors balked at letting the government keep their records,[59] the new system enjoyed wide use, and most rated it a success. To be sure, Comptroller General Warren looked with some disfavor upon a system which, strictly speaking, was not an audit, but others praised the system highly.[60] Patterson was enthusiastic. On 25 August he advised Secretary of Labor Perkins: "It is estimated that since this procedure was put into effect on June 7, 1941, it has resulted in a saving of approximately $15,000,000."[61] Such news was welcome in Congress, where the Thomason committee commended Carter for eliminating duplication, increasing efficiency, and saving money.[62]

The War Department Insurance Rating Plan made possible further economies. Patterson took the first step toward developing this plan early in January, when he appointed a board of experts to review the insurance provisions of the fixed-fee contract. Somervell gave the project his full support.[63] "This move should not be allowed to die of inanition," he told Leavey and ordered him to "follow through."[64] How far Somervell influenced the board's findings was hard to tell, but his enthusiasm for its work was unmistakable. The plan adopted on 3 May was a boon to the Construction Division. Under it the government obtained reduced rates from insurance carriers. Fixed-fee constructors, architect-engineers, and subcontractors whose premiums totaled $5,000 or more could insure at these reduced rates or "self-insure . . . in a manner satisfactory to the War Department." Contractors paying less than $5,000 in premiums had to obtain competitive bids on insurance rates.[65] Six months after the introduction of the plan, Somervell

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[58] (1) Memo, Schulz for Gregory, 29 Jul 41. 3820 (Nat Def) Part 7. (2) Incl, 30 Oct 41, with Memo, OSW for OQMG, 7 Nov 41. EHD Files. (3) OQMG Constr Div Ltr 286, 7 Jun 41.

[59] (1) Ltr, CQM Indiana OW to Somervell, 14 Jul 41. Opns Br Files, Indiana OW. (2) Ltr, CQM Twin City OP to ZCQM 7, 20 Aug 41. QM 132.3 (Twin City OP) 1941.

[60] Warren's Testimony, 19 Oct 43. In H Comm on Mil Affs, 78th Cong, 1st sess, *Hearings* on H R 3022, Part 2, pp. 237–39.

[61] Ltr, Patterson to Perkins, 25 Aug 41. OCE Legal Div Files, Labor—Gen.

[62] H Comm on Mil Affs, Subcomm 2, Draft of Interim Rpt, Aug 41, p. 15. EHD Files.

[63] Min, Constr Div Staff Mtg, 31 Jan 41. EHD Files.

[64] Memo, Somervell for Br Chiefs, 21 Jan 41. Opns Br Files, Gen, Dec 40–Jun 41.

[65] WD Emergency Constr and Expansion Comprehensive Insurance Rating Plan on CPFF Contract, Incl with OQMG Constr Div Ltr 336, 27 Jun 41. The plan applied to coverages required under fixed-fee contracts. These coverages included workmen's compensation or employers' liability, automobile and property damage liability, and comprehensive liability.

reported that insurance costs on fixed-fee jobs had dropped 20 percent.[66]

Much of the controversy over emergency contracts revolved around fees. By comparing defense profits with previous earnings by the same firms, the Truman committee attempted to prove that fees were unconscionably high. An analysis of constructors' fees at twenty-two camps showed profits averaging more than 450 percent of the contractors' mean annual earnings for 1936 through 1939. A check of twenty-five architect-engineers showed an average increase of more than 300 percent over peacetime profits. Rare instances of contractors whose income had jumped 1,600 and 1,700 percent strengthened the impression that the Army was playing Santa Claus to the building industry.[67] Somervell believed such comparisons were unfair. Appearing before the committee on 25 April, he emphasized that the construction industry had just emerged from a severe depression and that most defense projects were larger and more difficult than the jobs previously handled by the same firms. In his opinion the fees originally set by Hartman and Loving were "about right."[68]

By early 1941, new fee schedules were already under consideration. Colonel Jones and his staff in the Legal and Contracting Section had begun in January to study the possibility of using the old ANMB schedule not as a minimum curve for constructors' fees, as Hartman had done, but as a maximum. Similar investigations were soon under way in Patterson's office.[69] The ANMB's Hogan committee took a dim view of these proceedings, asserting that fees were "already too low."[70] Industry agreed. A prominent constructor, one of a number who protested, told Patterson that "the fees proposed would be much too low, unless the contractor is to act as a mere broker and sublet everything, and if that is contemplated why have any contractor?"[71] But protests were unavailing.

In June 1941, Patterson, with the advice of Madigan, Harrison, and a board of distinguished officers and civilians headed by General Robins, revised the fee schedules for both constructors and architect-engineers. (*Table 13*) The new scales were markedly lower. Where the War Department had previously paid at least $300,000 for a $10,000,000 construction job, it would now pay at most $250,000. Where the old schedule for architect-engineers had listed $48,000 as the average fee for a $5,000,000 project, the new one set $45,000 as the top figure. The industry, which was witnessing a marked decrease in public works construction, accepted the reduced rates, though not without grumbling. Appearing before the Truman committee on 15 July Patterson pointed out that fees on construction contracts had so far averaged 3.3 percent and those on architect-engineer contracts 1 percent of original estimated costs—well below the limit set by Congress. New schedules,

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[66] Rpt, Activities of the Constr Div, Jul 40–Nov 41, pp. 77–78.

[67] S Rpt 480, Part 2, pp. 17–18, 38.

[68] In Truman Comm *Hearings*, Part 1, pp. 318–19.

[69] (1) Memo, Somervell for Br Chiefs, 21 Jan 41. Opns Br Files, Gen Dec 40–Jun 41. (2) Memo, Schulz for Gregory, 27 Jan 41. QM 600.1 (CPFF) II.

[70] Ltr, Hogan Comm to Patterson and Forrestal, 30 Jan 41. 600.1 Part 8.

[71] Ltr, T. A. Scott, Merritt-Chapman & Scott Corp., to Patterson, 6 Feb 41. 3820 (Nat Def) Part 2.

TABLE 13—REVISED SCHEDULE OF FEES FOR ARCHITECT-ENGINEER AND CONSTRUCTION SERVICES, 23 JUNE 1941

Estimated Cost of Construction Work	Maximum Fixed Fee for Architect-Engineer Services	Maximum Fixed Fee for Construction Services
$ 100,000	$ 4,000	$ 6,000
500,000	12,500	17,778
1,000,000	20,000	32,500
5,000,000	45,000	130,000
10,000,000	75,000	250,000
25,000,000	165,000	500,000
40,000,000	246,000	700,000
50,000,000	300,000	800,000
65,000,000	360,000	905,000
75,000,000	400,000	950,000
80,000,000	420,000	970,000
85,000,000	440,000	980,000
95,000,000	480,000	995,000
100,000,000	500,000	1,000,000

Source: Memo, Dir P&C, OUSW, for TQMG, 23 Jun 41. OCE Legal Div Lib, Instructions re FF Contracts, Bk I.

he assured the Senators, would reduce fees even further.[72]

At the same time that he adopted lower schedules of fees, Patterson approved a revised version of the fixed-fee construction contract. Although most of the changes were minor ones, two new clauses were of major importance. The first gave the contracting officer the right "to decide which functions of checking and auditing are to be performed exclusively by the Government and to prescribe procedures to be followed by the Constructor in such accounting, checking, and auditing functions as he may continue to perform." The second, the so-called 25-percent clause, attempted to set a standard for defining a material change and thus for deciding when a fee adjustment was in order. The clause ruled out any change unless there was a net increase or decrease of 25 percent in the number of "units" covered by the contract. Adjustment would take place at the time of final settlement and would turn upon the number of units "exceeding the said 25 percent."[73] If, for example, the original contract called for 400,000 square feet of storage space and the government ordered 100,000 more, the contractor would not receive a higher fee. But, if change orders brought the total to 650,000, he could claim an additional fee based on 150,000 square feet. Complicated and cumbersome, and designed

[72] (1) Memo, Schulz for Schley, 18 Apr 41. 3820 (Nat Def) Part 4. (2) Memo, Schulz for Schley, 22 May 41. 3820 (Nat Def) Part 5. (3) Memo and Incl, Schulz for Gregory, 23 Jun 41. OCE Legal Div Lib, Instructions Re FF Contracts, Book I. (4) Madigan, Interv, 18 Jun 56. (5) Truman Comm *Hearings*, Part 6, pp. 1532–33.

[73] WD FF Form 1 (Rev 19 Jun 41), art. IV, par. 4, art. I, par. 4.

primarily for storage and housing projects, the 25-percent clause eventually fell by the way. Nevertheless, after June 1941 the Construction Division generally defined a material change as one involving roughly 25 percent of the scope of the original contract.[74] Although the revised agreement alleviated some of the administrative difficulties connected with fixed-fee work, it failed to satisfy fixed-fee critics.

Among the most determined foes of the Army's fixed-fee system were specialty contractors. Dissatisfied with the amount of work that came their way during the early months of defense construction, the specialty groups renewed their demand for a contractual clause forcing fixed-fee contractors to sublet mechanical items. Attorney O. R. McGuire, representing a number of specialty associations, hurled a barrage of protests at the War Department. His clients reinforced this opposition by invoking restrictive agreements with unions and suppliers to put the screws on contractors.[75]

Even in the face of these tactics, the War Department refused to alter its policy of leaving the decision when to subcontract up to principal contractors. Writing to McGuire in April 1941, Secretary Stimson summed up his position:

> It is not in conformity with public policy or in the interest of national defense to prevent a substantial general contractor from undertaking to do an entire job himself in any manner he sees fit; and besides, . . . any effort to restrict a contractor in this respect would throw an unwarranted burden upon the appropriations involved by preventing . . . a substantial saving through the elimination of a portion of the subcontractors' profits from the cost of the work.[76]

Somervell scoffed at the subcontractors' complaints, maintaining that the protesting associations were in fact performing "a very large portion" of construction.[77]

The specialty associations refused to take "no" for an answer. On 1 May 1941, they asked Congress to require the subletting of all specialty work. General Somervell hastened to point out the disadvantages of such legislation: first, it would give principal contractors no alternative but to accept unreasonable bids for mechanical items; second, it would in the form presented give specialty firms control of items for which their finances, equipment, and organizations were inadequate; third, it would increase the need for skilled mechanics and possibly result in demands for higher wages.[78] "Considered from any angle," Somervell told Congressman May, "this amendment will result in increased cost, delay in time of completion, and confusion due to lack of coordination and divided responsibilities."[79]

Although the specialty contractors failed to get their measure passed, they succeeded with the help of their employees' unions in bringing about a change in War Department policy. Dur-

[74] (1) OCE, Contract Negotiation Manual (Rev 15 Aug 44), pp. 44–45. EHD Files. (2) Ltr, Reybold to Patterson, 24 Jan 42. 161 (X Ref) I.

[75] (1) Ltr, McGuire to Patterson, 4 Dec 41. QM 600.1 (CPFF Policy) I. (2) Ltr, McGuire to Patterson, 3 Dec 41. 600.1 Part 8. (3) 652 (Cp Edwards) I. (4) 652 (Ft Riley) I.

[76] Ltr, Stimson to McGuire, 25 Apr 41. OCE Legal Div, Contract Br Files.

[77] Ltr, Somervell to Sen B. Champ Clark, 11 Feb 41. QM 600.1 (CPFF) 1941 II.

[78] (1) Memo, OUSW for TQMG, 1 May 41, and 1st Ind, Somervell to OUSW. QM 161 (X Ref) May–Jun 41.

[79] Ltr, Somervell to May, 5 May 41. Same File.

ing talks leading up to the building trades agreement of 22 July 1941 the specialty trades unions asked that the government require principal contractors to sublet items usually subcontracted and to make any contractor who elected to handle such items himself "show affirmatively that such work is ordinarily performed by him and that his existing organization includes capable personnel and suitable equipment for the work." Expressing the Navy's attitude toward this proposal, Admiral Moreell informed Hillman: "The article as written . . . establishes a procedure with such . . . rigidity as to seriously encroach upon the duty and responsibility of the contracting officer to see that the work is performed in a manner such as to safeguard the interests of the Government."[80] Under the building trades agreement, the government accepted the unions' provision, but reserved the right to waive the requirement to sublet when performance of specialty work by subcontractors would "result in materially increased costs or inordinate delays."[81] This agreement, while falling short of the subcontractors' original demands, gave them stronger grounds on which to appeal for work. In August 1941, Patterson made further concessions. He adopted a new method of setting fees, whereby the principal contractor took a flat deduction for subcontracting regardless of whether he wished to sublet. Somervell revised the fee schedule for construction contracts accordingly.[82] Specialty firms seemed assured of a larger share of defense profits.

While the specialty "subs" were winning these concessions, general contractors and third-party renters were intensifying their efforts to do away with recapture clauses. As lend-lease drained supplies of new machinery and obsolescence, wear and tear, and government capture depleted stocks in private hands, resistance to recapture stiffened. With an increasing amount of work available for remaining stocks, owners could ill afford to lose irreplaceable machinery needed for continuation of their businesses. The Army encountered more and more difficulty in renting. Third-parties were reluctant to bid, and those who did asked prices sufficiently high to insure against the risk of losing their stock in trade. Representatives of the construction industry joined with equipment dealers in recommending that recapture be discontinued.[83] Managing Director Herbert E. Foreman of the AGC complained that recapture was putting "the contractor out of a job."[84] By the spring of 1941 Patterson was considering a change.

On 19 June he gave Generals Schley and Gregory permission to waive recapture. Two months later he took up a proposal to strike the recapture clause from the contract. Anticipating lower rents, the Engineers favored the move. Somervell opposed it, arguing that the government should retain the right to

[80] Ltr, Moreell to Hillman, 21 Jul 41, and Incl. OCE Legal Div, Wage and Salary Br Files.

[81] Memorandum of Agreement Between Representatives of Government Agencies Engaged in Defense Construction and the Building and Construction Trades Department of the American Federation of Labor, 22 Jul 41. Incl to OQMG, Constr Div Ltr 372, 31 Jul 41.

[82] (1) OQMG Constr Div Ltr 478, 22 Sep 41. (2) OCE Finance Circ Ltr 252, 20 Aug 41.

[83] (1) 481 (Cp Blanding) I. (2) 481 (Cp Grant) I. (3) Notes of Conf, Reps of Constr Div and AGC, 9 May 41. Opns Br Files, Rental Equip.

[84] Notes of Conf, Reps of Constr Div and Foreman, 3 May 41. Opns Br Files, Rental Equip.

acquire any piece of rented equipment. Despite Somervell's objections, Patterson on 6 September banned the recapture provision from all future fixed-fee contracts. He made no changes in the third-party agreement. Although the Construction Division occasionally forwent recapture on third-party equipment during the latter half of 1941, field officers did not receive authority to waive the provision until mid-1942, a time when the shortage of equipment was most acute.[85]

Streamlined procedures, economy measures, and new contractual clauses failed to pacify congressional critics of the fixed-fee method. The Truman committee recommended curtailment of fixed-fee contracting. Congressman Engel went so far as to offer an amendment outlawing the contract on camp projects.[86] In commenting on the Engel rider, General Somervell made his position clear. "I can say without reservation," he told Representative Snyder, "that the amendment will do more to delay the War Department's construction program than any other device which could be adopted without actually ordering the program stopped. It will delay the completion of the work on an average of six months." Somervell conceded that fixed-fee contracts had certain disadvantages, but, he pointed out: "The cure proposed is worse than the disease. In fact, it will kill the patient."[87]

Fear that fixed-fee contracts might be outlawed prompted consideration of changes which would "appease Congress, but do as little damage to the system as possible."[88] Somervell weighed the advisability of adopting several suggestions made by congressional committees—competitive bids on fees and bonus and penalty clauses. Some of his advisers believed that competition in regard to fees might forestall prohibitory legislation until most of the larger jobs were under contract or until fixed-fee agreements were no longer necessary. Others argued that while competition would reduce fees but slightly, bidding could easily result in awards to inferior contractors whose mismanagement would increase costs and cause delays. Advocates of the bonus and penalty clause maintained that by penalizing builders who ran over their estimates and rewarding those who made savings the Quartermaster Corps would give its contractors an incentive to hold down costs. Opponents of the clause entered a strong plea against its adoption. They pointed out that the British had used a similar provision early in the war with unsatisfactory results. They argued that bonus and penalty clauses smacked of percentage contracting. Finally, they said, where the War Department had sufficient information to draw the sound estimates necessary for a bonus and penalty provision, it could award a lump sum contract. After long and careful study Somervell decided

[85] (1) Memo, Schulz for Schley and Gregory, 19 Jun 41. 481 Part 1. (2) Notes of Conf in OUSW, 22 Aug 41. OCE Legal Div Files, Changes in Provisions and Policies, CPFF Contracts. (3) Memo, Schulz for Gregory, 27 Aug 41. (4) Memo, Somervell for Patterson, 2 Sep 41. Both in QM 600.1 (FF Projs) 1940. (5) OUSW Purchases and Contracts Gen Dir 38, 6 Sep 41. (6) Rpt, Activities of the Constr Div, Jul 40–Nov 41, p. 79. (7) Memo, SOS for Chiefs of Sup Svcs, 9 May 42. 413.8 Part 12.

[86] (1) S Rpt 480, Part 2, p. 35. (2) New York *Times*, June 7, 1941, p. 9.

[87] Ltr, Somervell to Snyder, 9 Jun 41. 600.1 Part 9.

[88] Rpt, Constr Adv Comm for Patterson, n.d. QM 600.1 (FF Projs) 1940.

not to experiment. Leaning heavily upon advice from General Connor and Colonel Jones, he declined to risk popular but dangerous innovations.[89]

One criticism by the Truman committee cited the Army's failure to take advantage of land-grant freight rates. The government had first obtained these special rates during the great period of railway expansion after the Civil War, when it had granted huge tracts of public land to the railroads on condition that charges for hauling troops and property of the United States would be very much lower than commercial rates.[90] The Transportation Act of 1940 had restricted land-grant reductions "to the transportation of military or naval property of the United States moving for military or naval purposes and not for civil use."[91] Although there was little doubt that shipments to the Army's construction projects came within the letter of the law, the Quartermaster Corps had been unable to benefit, for under the fixed-fee contract the United States did not take title to materials until after government inspectors had passed them and inspectors, for reasons of economy, had their offices at job sites rather than at shipping points throughout the country. Spurred on by Truman, Somervell at length found the answer—a contractual clause permitting the government to take title to shipments at points of origin and reserving to the contracting officer the right of "final inspection and acceptance or rejection . . . at the site of the work or an approved storage site."[92] On Somervell's recommendation Patterson incorporated this clause into the standard fixed-fee contract.[93] Savings were reckoned in the millions.

If the Truman committee offered helpful suggestions, it also reached some debatable conclusions. The investigators supported their indictment of the fixed-fee method with questionable statistics. Analyzing 17 fixed-price and 29 fixed-fee camp projects, they found that the former had an average cost per man of $380, the latter of $684. These figures told an incomplete story. A majority of the contracts in the fixed-price sample were for additions to active posts or rehabilitation of abandoned World War I camps, where grading and utilities presented little difficulty. The fixed-fee projects were generally larger and more often in out-of-the-way places; and many were new installations. Most of the fixed-price jobs had started in the late summer and early fall of 1940; a majority of the fixed-fee contractors had begun work later and so had run into expensive winter construction. The committee had oversimplified the problem. Nevertheless, its well-publicized findings served to link fixed-fee contracts inextricably with high construction costs.[94]

In an effort to set the record straight, Somervell ran his own studies of variations in costs per man. At his request, Major Boeckh investigated 7 fixed-fee

[89] (1) *Ibid.* (2) Memo, Connor for Patterson, 7 Aug 41. (3) Memo, Schulz for Amberg, 28 Jun 40. Last two in QM 600.1 (FF Projs) 1940. (4) Memo, Somervell for Patterson, 1 Aug 41. OCE Legal Div Files, Misc. (5) Memo, Somervell for Patterson, 3 Sep 41. QM 652 Sep–Dec 41.

[90] (1) S Rpt 480, Part 2, p. 24. (2) 18 *Stat.* 452.

[91] 54 *Stat.* 954.

[92] Memo, Somervell for Patterson, 17 Nov 41. 161 Part 1.

[93] OUSW Purchases and Contracts Gen Dir 99, 29 Dec 41.

[94] (1) S Rpt 480, Part 2, pp. 35, 41–43. (2) Somervell's Testimony, 27 Mar 41. In S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 4124, pp. 151–52.

cantonment projects and 2 lump sum. His computations showed that climate, weather, site conditions, levels of wages and prices, speed of construction, and other factors unrelated to the type of contract all affected costs.[95] Gavin Hadden of Groves' staff undertook a second, more thoroughgoing study. After analyzing 48 projects, 41 fixed-fee and 7 lump sum, Hadden came up with the following average costs per man: $758 for fixed-fee cantonments against $399 for lump sum; and $751 for fixed-fee tent camps against $355 for lump sum. Warning that these figures were deceptive, Hadden wrote:

> Every one of the lump sum projects is located at a station previously existing and provided with utilities. The existence of roads on the sites of these projects had a double advantage, in reducing the cost of construction of the roads themselves and in reducing the costs of buildings and other utilities by providing for efficient handling of materials and labor during construction.
>
> Every one of the lump sum projects had been started before the first of the fixed-fee projects was started. This had a material effect in lowering costs because the bidders could not foresee the effects of the program as a whole on the labor, materials and equipment markets—effects which had a marked influence in raising the costs of the fixed-fee projects. This factor is not likely to be to the Government's advantage again on any future lump sum projects.
>
> To conclude . . . that future projects could be constructed under lump sum contracts at costs per man as low as those for these past projects would therefore be erroneous.[96]

There was no simple answer to the Truman committee's statements concerning costs of fixed-fee work.

Even as he attempted to counter attacks against the fixed-fee method, Somervell looked for ways to step up fixed-price contracting. In July 1941, when directives came through for the first advance planned camps, he asked Groves and Leavey to confer with representatives of the Associated General Contractors on the possibility of doing the work by lump sum contract. Among those present at the conference, held on 24 July, were Managing Director Foreman of the AGC and heads of six large contracting firms which had recently completed camp projects. The consensus was that only eight combinations of contractors in the United States could bid on a $20-million camp and that any bids offered on projects of this size would include a contingency item of about $5 million.[97] The Construction Advisory Committee also questioned if lump sum contracts were feasible on these projects. Somervell was considering whether to abandon the attempt, when Patterson stepped in.[98]

Concerned by congressional criticism of fixed-fee contracts, the Under Secretary on 1 August called for an all-out effort "to place construction work on a competitive basis."[99] A few days later Somervell advertised for bids on two armored division camps, Chaffee, at Fort Smith, Arkansas, and Cooke, at Santa Maria–Lompoc, California. Pes-

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[95] (1) Tel Conv, Groves and Daley, 8 May 41. Opns Br Files, Memos, Engrg Br. (2) Memos, Boeckh for Casey, 6, 10, 16 Jun, 19 Jul 41. (3) Memo, Leavey for Styer, 26 Jul 41. All in QM 652 (Canton Constr) 1941.

[96] Memo, Hadden for Hastings, 13 Sep 41, and Incl. Opns Br Files, Costs.

[97] Verbatim Rpt of Conf, 24 Jul 41. Madigan Files, Lump Sum vs. FF.

[98] (1) Memo, Constr Adv Comm for Loving, 30 Jul 41. 652 (Camp Chaffee) I. (2) Memo, Groves for Leavey, 28 Jul 41. QM 600.1 (FF Projs) 1940.

[99] Memo, Patterson for Somervell, 1 Aug 41. USW Files, Contracts, Jul and Aug.

simistic, he predicted that attempts to let these contracts would serve as a "further demonstration" of the difficulty of using open bidding on such jobs.[100] But contrary to his expectations, qualified contractors submitted reasonable bids. Contracts amounting to $17,380,670 for Camp Cooke and $15,512,780 for Camp Chaffee were awarded around 1 September. The low bid for Cooke exceeded the cost estimate by little more than $600,000. Although the experiment had been successful, Somervell did not repeat it during 1941. Because plans were incomplete, the three additional advance planned camps begun before Pearl Harbor were fixed-fee projects.[101]

In the fall of 1941, Patterson considered adopting a lump sum agreement as the standard form for architect-engineer contracts. Because the national engineering and architectural societies had declared competition among members to be unethical, and because low bids might come from poorly qualified firms, attempts to advertise were out of the question. For some years the Corps of Engineers had negotiated lump sum contracts for professional services; however, they had done so only when they had preliminary plans and definite information as to the character and scope of work.[102] The Quartermaster Corps had let very few architect-engineer contracts on a lump sum basis. After an investigation of one such contract by the Construction Advisory Committee, General Connor characterized the results as "most unsatisfactory."[103]

On 29 September Patterson approved a form for lump sum architect-engineer contracts. A week later he directed The Quartermaster General and the Chief of Engineers to use this form wherever possible. By 14 November the Construction Division had succeeded in negotiating 9 of the new agreements, 1 for an Ordnance plant, and 8 for troop housing projects. Efforts to let lump sum contracts for additional munitions projects failed. In light of this experience, Somervell recommended using the new form only when time was available for preparing accurate estimates. Pointing out that architect-engineers would not accept these contracts at a price advantageous to the government unless preliminary data were at hand, he continued to use fixed-fee agreements for design and supervision at most urgent projects.[104] Perfected late in the defense period, the lump sum architect-engineer contract came into wide use only after the declaration of war.

For the Quartermaster Corps, defense construction had been largely a fixed-fee proposition. Between 1 July 1940 and 10 December 1941, the Construction Division negotiated 512 lump sum contracts amounting to $88,170,000, or approximately 5 percent of the total value of all its agreements. During the same period,

[100] Memo, Somervell for Patterson, 4 Aug 41. QM 600.1 (FF Projs) 1940.

[101] (1) 652 (Cp Cooke) I. (2) 652 (Cp Chaffee) I. (3) Ltr, Leeds, Hill, Barnard and Jewett, Santa Maria–Lompoc, Calif., to CQM Cp Cooke, 27 Jun 41. QM 600.94 (Cp Cooke) 1941. (4) 652 vol. I for Cps Gordon, Tyson, and Crowder.

[102] (1) OCE, Summary of Contracts in Force by Types as of 31 Jan 41. BP S Investigating CPFF Contracts. (2) Ltr, OCE to Supervising Engr, Diablo Heights, C.Z., 15 Jul 41. 3820 (Nat Def) Part 6.

[103] Memo, Connor for Somervell, 20 Aug 41. QM 652 Jun–Aug 41.

[104] (1) WD Form Lump Sum A-E Contract (approved 29 Sep 41). (2) Memo, OUSW for the CofEngrs and TQMG, 6 Oct 41. OCE Legal Div Files, Contract Forms. (3) Memo, Somervell for Patterson, 14 Nov 41. OCE Legal Div Files, Interpretation of CPFF Contract.

the division let 1,671 advertised lump sum contracts. The value of these competitive agreements was $240,132,000, or roughly 15 percent of the total. Fixed-fee contracts, though comparatively few in number, dwarfed the others in importance. Agreements with 154 construction firms and 149 architect-engineers amounted to $1,347,991,000 or 80 percent of the total.[105] To most construction experts, the fixed-fee method was the logical one to use on high-speed emergency programs. They believed with General Schley that it was "hard to argue against it."[106] But political realities would militate against its use in the years ahead.

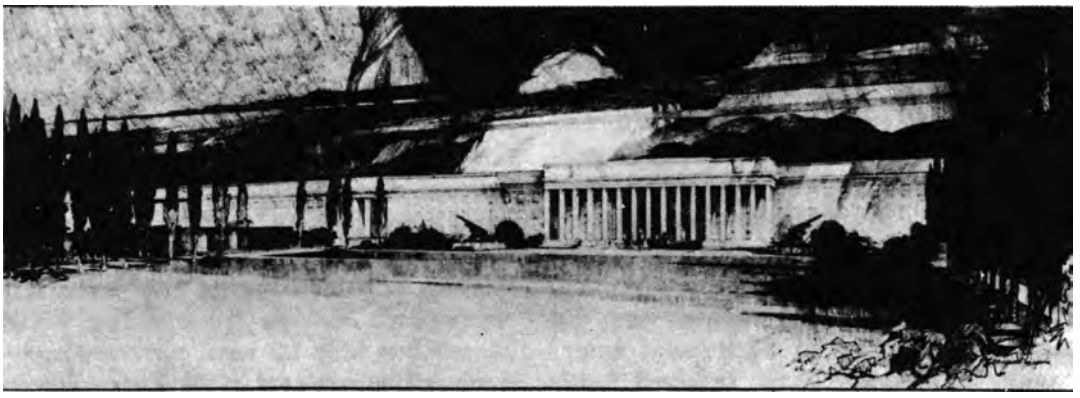
The Pentagon Project

On the evening of Thursday, 17 July 1941, Somervell summoned Casey and Bergstrom to his office. That day, at hearings before the House subcommittee on appropriations, Representative Woodrum had suggested that the War Department find an overall solution to its space problem. Somervell wanted basic plans and architectural perspectives for an office building to house 40,000 persons on his desk by 9 o'clock Monday morning. He envisaged a modern 4-story, air-conditioned structure, with no elevators, on the site of the old Washington-Hoover Airport, on the Virginia side of the Potomac. Designed to accommodate all War Department activities, the new structure would be the largest office building in the world. Casey and Bergstrom faced "a very busy weekend."[107]

Hardly had they set to work before the plan changed. Looking over the airport site in the flood plain of the river, General Reybold concluded that construction there might not be feasible. On his advice, Somervell moved the location some distance to the north and west, to a 67-acre tract in the former Department of Agriculture experimental station, Arlington Farms, now a military reservation. So that the building would harmonize with its new surroundings—it would be just east of Arlington Cemetery and opposite the Lincoln Memorial—he reduced the height to three stories.[108]

The plans were in Somervell's hands on Monday morning. A reinforced concrete structure, the building would have 5,100,000 square feet of floor space, twice as much as the Empire State. Fitted to its site, which was bounded by five roads, it would have five sides, hence the name Pentagon. Most of the interior space would be open, with temporary partitions. Only top officials would have private offices. An area of 300,000 square feet in the basement was for record storage. The layout included parking lots for 10,000 cars. Approved by Marshall, Moore, and Patterson that afternoon, the plan went to Secretary Stimson the following morning.[109] "Skeptical" at first, Stimson at length concurred. "Of course," he noted in his diary, "it will cost a lot of money, but it will solve not only our prob-

[105] Constr PR 41, 16 Dec 41, p. 162.
[106] Schley Interv, 26 Oct 55.
[107] Ltr, Casey to EHD, 11 Jul 55. See also Min, Constr Div Staff Mtg, 18 Jul 41. EHD Files.
[108] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the First Supplemental National Defense Appropriation Bill for 1942*, pp. 500–501, 504, 506.
[109] (1) Memo, Somervell for Rcd, n.d. EHD Files. (2) H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the First Supplemental National Defense Appropriation Bill for 1942*, p. 508.



PENTAGON BUILDING. *Architect's rendering of main entrance.*

lem, . . . it will solve a lot of other problems, including the Navy and a lot of other people all around." Having approved the plan, Stimson took it to the White House and obtained Roosevelt's O.K.[110]

Presenting the plan to the House subcommittee on 22 July, Reybold and Somervell stressed its advantages. It would relieve congestion in other agencies which could occupy government buildings vacated by the War Department. It would save about $3 million a year in rentals. It would obviate the need for a $22-million building proposed for the Navy, which could take over the Munitions Building instead. It would release apartments for residential use again. It would increase the War Department's efficiency by 25 to 40 percent. It would also be more convenient to the public which would no longer have to chase all over town to find the right man. The subcommittee members were favorably impressed. Their main concern was how much the building would cost. Somervell assured them that $35 million would cover everything except the parking area, which might come to about $1 million.[111]

The legislative machinery moved smoothly at first and then suddenly stalled. On the 23d the House Committee on Public Buildings and Grounds met and, after hearing Somervell's testimony, gave its unanimous approval to the project, agreeing to ignore the fact that Congress had voted no authorization.[112] On the 24th the Appropriations Committee reported out the bill, recommending $35 million "for the construction of an office building on the site of the former Department of Agriculture Experiment Farm across the Potomac River to house all of the activities of the War Department."[113] But when the House took up the bill that afternoon, a hitch developed. Representative Merlin Hull, after expressing astonishment at the sheer size of the project, raised a point of order: the proposal

[110] Stimson Diary, 22, 24 July 41.

[111] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the First Supplemental National Defense Appropriation Bill for 1942*, pp. 500–513.

[112] 87 *Cong. Rec.* 6303, 6322, 6366–6367.

[113] H Rpt 988, 77th Cong, 1st sess, 24 Jul 41, p. 12.

"to carpet 67 acres of Virginia farmland with brick and concrete" was unauthorized legislation.[114] Woodrum and other supporters of the project tried to overcome Hull's objections, but he stood pat. Decision on the bill hung fire until the following week.[115]

Unperturbed by this contretemps, Somervell went ahead to select a contractor and a Constructing Quartermaster. To erect the building the Construction Advisory Committee nominated three combinations of three firms each. Its first choice was John McShain, Inc., of Philadelphia, with the Turner Construction Company and George A. Fuller Company, both of New York City. The Fuller and Turner companies were among the giants of the industry, and Turner had pioneered in building concrete structures. McShain had built the Jefferson Memorial, the National Airport, and the Naval Medical Center and had recently completed the first unit of the New War Department Building in downtown Washington. Somervell was happy with the selection of McShain, but he rejected the two big New York concerns in favor of two Virginia firms, the Wise Contracting Company, Inc., and Doyle and Russell, both of Richmond.[116] To direct the work of these contractors, he named Capt. Clarence Renshaw, one of Groves' assistants. A West Point careerist, Renshaw had served as Assistant Constructing Quartermaster in charge of building the approaches to the Tomb of the Unknown Soldier and restoring the Robert E. Lee Mansion.

Friday editions of the Washington newspapers played up the War Department's "$35 million cubbyhole." In a feature article, the *Daily News* reported:

> Not even a castle in the air Wednesday night, "Defense City, Va.,—Pop. 40,000" was on the congressional conveyor belt and the motor was humming . . . . The House was ready yesterday to rubber-stamp the grandiose proposal . . . but there may be some trouble in the Senate where Maryland has a highly vocal representative in Millard Tydings.[117]

The *Post* quoted the "dazed" manager of hard up Arlington County, who despaired of handling the influx without massive federal aid.[118] An editorial in the *Evening Star*, which envisioned a project "so staggering in its proportions as to be difficult to grasp on short notice," deplored the fact that no one had consulted the Commission on Fine Arts and the National Capital Park and Planning Commission.[119] "Just to keep the record straight," Representative Woodrum issued a press release that day, declaring that "the project was wholly and entirely the idea of the War Department," and naming all those up through the President who had approved it.[120]

The following Monday, when the House resumed debate, Representative Hull claimed credit for having given "Congress and at least some of the press an opportunity to consider what was being brought in here under the guise of

[114] Washington *Daily News*, July 25, 1941, p. 10.
[115] 87 *Cong. Rec.* 6322–24.
[116] (1) Memo for GSB, no sig, n.d. Somervell Folder, EHD Files. (2) Ltr, Somervell to Patterson, 25 Jul 41. 600.1 (WD Bldg, Arlington, Va.). (3) Ltr, McShain to Groves, 2 Oct 42, and Incl. 600.1 (Pentagon Bldg) Part 3.
[117] Washington *Daily News*, July 25, 1941, p. 10.
[118] Washington *Post*, July 26, 1941, p. 11.
[119] Editorial, Washington *Evening Star*, July 25, 1941, p. A–8.
[120] Release by Rep Woodrum, Jul 25, 1941. In S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 5412, p. 234.

national defense." Several of his colleagues joined him in objecting to the project, which, said Hull, might cost twice $35 million "before the Federal Treasury gets through paying the bill." Moreover, its opponents held, the building would consume labor and materials already in short supply, increase existing traffic problems, and be a white elephant after the war. Woodrum and his forces fought back. Three times that day Hull and his confederates tried to kill the proposal; three times they met defeat. The House passed the bill with the provision intact.[121]

As the Senate began hearings on the measure, opposition was stiffening. *Time* reported "a sizzling row over the War Department's scheme to move to Virginia and build itself the 'largest office building in the world'."[122] Protests came from the D.C. Chapter of the American Institute of Architects, the National Association of Building Owners and Managers, outraged Washingtonians, and others. In a letter to the Senate Appropriations Committee, Chairman Gilmore D. Clarke of the Commission on Fine Arts objected to the "flagrant disregard" of the policy to reserve the Arlington area for burial of the honored dead and to the "introduction of 35 acres of ugly flat roofs into the very foreground of the most majestic view of the National Capitol." In a similar vein, Frederic A. Delano, chairman of the National Capital and Park Planning Commission and a cousin of the President, wrote: "No other emergency except war would justify such permanent injury to the dignity and character of the area" near the cemetery. Delano concentrated on the "single question of the practicability of the project as a whole," that is, on the problems of utilities and of transportation in relation to the probable residences of employees. His investigations indicated that extending water and sewer lines would pose no special difficulties, but transportation was a different matter, since a mere 12 percent of War Department employees lived in Virginia. He questioned putting the entire War Department staff in one place and recommended scaling down the building to accommodate only 20,000. Delano and Budget Director Harold D. Smith went to the White House to protest the project on 30 July. The next day the President wrote Chairman Alva B. Adams of the Senate Subcommittee on Deficiencies that he had "no objection to the use of the Arlington Farm site" but agreed with Delano that the size of the building should be reduced by half.[123]

When Senator Adams' group took up the matter on 8 August, its primary concern was with the site. Many alternatives lay open, most of them in the District. A last-minute entry was an area earmarked for a Quartermaster depot, three-quarters of a mile southeast of the disputed Arlington Farms location: a switch to this site would surmount aesthetic objections to the project though it would not solve the transportation problem. Somervell held out for Arlington Farms, arguing that

[121] 87 *Cong. Rec.* 6363–6375.

[122] *Time*, August 18, 1941, p. 58. Reprinted by permission from TIME, The Weekly Newsmagazine; Copyright Time Inc. 1941.

[123] S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 5412, pp. 234, 162–63, 141–43, 182–83.

a change of location would mean scrapping plans already drawn, cause a month's delay in getting started, and add materially to the cost of the building. He saw nothing inappropriate in having Arlington Cemetery overlook the home of the War Department.[124]

After the hearings ended, Somervell persisted in trying to sway the subcommittee. At his urging, Patterson wrote to Senator Adams, expressing concern that the War Department might have to accept the depot site, which, with its warehouses, railroad yards, and unsightly shanties, was "unworthy of the dignity of the Department."[125] Somervell also had Bergstrom prepare a memorandum extolling the advantages of Arlington Farms as "superbly located" and terming the depot site "as inappropriate for a building for the War Department as could be found."[126] After inspecting both sites, the Adams subcommittee agreed unanimously on the War Department's choice, and the full Appropriations Committee overwhelmingly endorsed it. There was little opposition on the floor of the Senate. The bill passed.[127]

To get everything in order so that work could start as soon as the President signed the measure, Somervell on 19 August called in Groves, Leavey, Casey, Renshaw, Bergstrom, and McShain. Flourishing a tentative directive, he announced these goals: 500,000 square feet of floor space available on 1 March 1942 and the entire building completed by 1 September. Bergstrom would serve as architect-engineer. Renshaw would report directly to Groves. For an hour and a half, the conferees looked over contour maps, tentative layouts, excavation plans, foundation drawings, structural blueprints, and bills of materials. The meeting broke up on a euphoric note—the project was set and ready to go.[128]

Events of the next few days knocked Somervell's plans into a cocked hat. On the 20th the New York *Times* intimated that the President would veto the $7-billion defense appropriation bill in order to block the Arlington Farms site. As Assistant Secretary of the Navy in 1917, Roosevelt had helped talk President Wilson into putting up temporary buildings on the Mall along Constitution Avenue. Those eyesores were still there. Roosevelt, reportedly, was trying to atone for this early blunder by preventing another, more serious one.[129] The story proved to have substance. Summoning Somervell and McCloy to the White House, the President turned down Arlington Farms. When Somervell objected that a move would cost money, Roosevelt was unresponsive.[130] On 25 August he signed the bill, reserving the right to pick the location. At a press conference the following day, he explained what sort of structure he had in mind. It would be at the depot site and half the size originally contemplated. After the war, he hoped to see the War

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[124] *Ibid.*, pp. 135ff., 171ff.

[125] Ltr, Patterson to Adams, 8 Aug 41. Reprinted in 87 *Cong. Rec.* 7142–7143.

[126] Incl with Ltr, Somervell to Adams, 9 Aug 41. 600.1 (Pentagon Bldg) Part 1.

[127] 87 *Cong. Rec.* 7132, 7141–7142.

[128] (1) Min of Meeting, 19 Aug 41. EHD Files. (2) Ltr, Somervell to ZCQM 3, 20 Aug 41. 600.1 (Pentagon Bldg) Part 1.

[129] New York *Times*, Aug 20, 1941, p. 21, and Aug 22, 1941, p. 14.

[130] Memo, Somervell for Stimson, 20 Aug 41. 600.1 (Pentagon Bldg) Part 1.



CARTOONIST'S VIEW OF CONTROVERSY OVER ARLINGTON FARMS SITE FOR PENTAGON

Department housed in the Northwest Triangle and this building used for storing records.[131]

Pulling down a curtain of secrecy over the project, Somervell followed an independent course. Losing no time in breaking ground at the depot site, he pushed work on designs and blueprints. By early October Bergstrom had completed the basic drawings. These plans depicted a three-story edifice of reinforced concrete in the shape of a regular pentagon. With 4 million square feet of floor space, the structure would be the largest office building in the world. Set in a 320-acre landscaped park, it would overlook plazas and terraces leading up from a lagoon created by an enlargement of the Boundary Channel. A six-acre inner court, numerous ramps and escalators, a large shopping concourse on the first floor, cabstands and bus lanes in the basement, parking lots for 8,000 cars, and an elaborate system of roads were among its distinctive features.[132] Functional, commodious, and, as one general put it, "so right" for the War Department, the building seemed unlikely ever to serve as a records depository.[133]

Taking the plans to the White House on 10 October, Somervell presented Roosevelt with an accomplished fact. Construction had been under way for nearly a month, a thousand men were at work, and hundreds of 30-foot concrete piles were in place. Part of the foundation had been poured and forms for a section of the first story were ready. Predicting completion in 14 months, Somervell put the cost at about $33 million. Falling in with the scheme, the President imposed but one restriction—that there be no marble in the building. When Somervell suggested facing the outer walls with limestone, Roosevelt raised no objection. If it lacked the elegance of the Capital's classic architecture, the new structure would, nonetheless, be handsome and imposing.[134]

Interest in the choice of materials ran high, as competing industries and rival states vied with one another for a share in the prestigious project. Typical of the many letters received by Renshaw was one from a Georgia Congressman, complaining that specifications for granite steps at the entrance limited the choice to North Carolina, Rhode Island, and Maine. Also typical was the CQM's reply: although Georgia granite would not harmonize with the color of the façade, it might find a place elsewhere in the structure.[135] By far the loudest uproar was over the building's 9,000 windows. When invitations went out late in October for alternate bids on steel and wood sash, manufacturers of wood sash promptly cried "foul," claiming that the specifications gave steel an edge. A flood of letters and telegrams inundated the War Department. Somervell and McShain wished to ignore the clamor, but OPM would not agree; and by 10 November new invitations were in the mail. At an opening on the 18th, steel won out. Although the ques-

[131] New York *Times*, Aug 26, 1941, p. 8 and Aug 27, 1941, p. 5.

[132] (1) 600.1 (Pentagon Bldg) Part 1. (2) WD Press Release, 7 Oct 41.

[133] Dreyer Interv, 27 Feb 59.

[134] (1) Washington *Evening Star*, Oct 10, 1941, pp. A–1 and A–19. (2) Groves Second Draft Comments, XIII, 4.

[135] Ltr, Rep Robert Ramspeck to Styer, 2 Dec 41, with 2d Ind, Renshaw to OQMG, 5 Dec 41. 411.8 (New WD Bldg, Arlington).

tion was settled, protests continued for weeks.[136]

Bothersome though they were, outside pressures did not present anything like the trouble raised by shortages of materials. Proceeding under the watchful eye of defense production officials, architect Bergstrom took steps to conserve critically needed metals. His design for concrete structural framework made possible a saving of 43,000 tons of steel, more than enough to build a battleship. His use of concrete ramps instead of elevators reduced steel requirements still further. Drainage pipes were concrete; ducts were fiber; interior doors were wood. An unusual wall design—concrete spandrels carried to window sill level—eliminated many miles of through-wall copper flashings. When OPM called for still more drastic reductions, Somervell agreed to "strip-tease" the entire structure. Bronze doors, copper ornamentation, and metal partitions in toilets were among the first to go, but the stripping process continued throughout the life of the project.[137]

As work progressed on the foundation, an important decision loomed: would walls on the interior courts be of brick or concrete. Groves, who favored brick, afterward explained: "Despite all our past troubles with bricklayers, I thought it would be better to have the exterior of brick . . . . It would put pressure on the bricklayers throughout the country to have this work under the close observation of Congress. The result would have been an overall increase in their production."[138] Moreover, he agreed with McShain that brickwork would be cheaper and faster. But Bergstrom held out for architectural concrete. He planned to leave a gap between the form boards so that the mixture would ooze and form a ridge, thus simulating limestone. At Groves' suggestion, workmen built sample walls, and, on 14 October, McShain telephoned disturbing news—honeycombs had developed in the concrete.[139] Even so, Somervell went along with Bergstrom. Although the concrete walls added $650,000 to the cost of the building, they greatly enhanced the structure's architectural coherence.[140]

Plans were the principal bottleneck. Ordinarily, the architect for a large permanent building had many months start on the contractor. Bergstrom and David J. Witmer, a prominent Los Angeles architect who came in to assist him, had virtually no lead time. In late October McShain reported that if design information were available he could triple his present force. On the 28th Renshaw, McShain, and Bergstrom reviewed the problem but found it unsolvable.[141] Pressure on the architect for delivery of drawings became more and more intense. At times, construction ran ahead of planning, so far ahead, in fact, that Leisenring, who had charge of specifications, referred to his group as the "historical records" section; by the time "specs" were completed, a dif-

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[136] 600.1 (Pentagon Bldg) Part 2.

[137] (1) 600.1 (Pentagon Bldg) Part 2. (2) Constr Div Press Release, 30 Oct 41. EHD Files. (3) Memo, Styer for Leavey, 6 Nov 41. Opns Br Files, Engrg Br.

[138] Groves Second Draft Comments, XIII, p. 4.

[139] Tel Conv, McShain and Groves, 14 Oct 41. Opns Br Files, WD Bldg, Arlington.

[140] (1) Opns Br Files, WD Bldg, Arlington. (2) Memo, Renshaw for Groves, 16 Apr 42. 600.1 (Pentagon Bldg) Part 3.

[141] Memo, Farrell for Groves, 29 Oct 41. Opns Br Files, WD Bldg, Arlington.

ferent material was already in the building.[142]

An unusually high accident rate was an added worry. At a meeting on 5 November the executive committee of the Building Trades Council voted to probe into the "alarming" number of mishaps at the project. In a statement to the press, a committee spokesman referred to several deaths and many severe injuries, including broken backs, and he put the blame on the War Department's failure to enforce its own safety regulations.[143] An investigation by Blanchard and other members of Groves' Safety Section showed that the report was exaggerated. There had been 40 lost-time accidents, with some simple fractures, and one fatality, but no broken backs. Blanchard agreed the accident rate was high—about four times that of the Army program as a whole. Acting on his advice, Groves instructed Renshaw to see that the contractor employed a full-time safety engineer and followed War Department safety regulations to the letter. Although McShain complied, the accident rate did not measurably decline. Perhaps, as he asserted, mishaps were an unavoidable byproduct of speed.[144]

By 1 December 1941, 4,000 men were working three shifts a day on the huge edifice. At night the project blazed with light. Between 2 and 3 percent complete, construction was far enough along so that the pentagonal shape of the building was apparent. The contractors had relocated one mile of railroad line, lowered the water table of the old airport eight feet, started work on the power plant, and graded more than 100 acres of land. Barges were delivering sand and gravel to the Boundary Channel shore. The job was making headway, but the bulk of the work remained. At the rate of progress so far, a little more than 1 percent per month, it would take more than eight years to complete the building.[145]

Events of 7 December 1941 served both to underline the necessity for speed and to confirm the wisdom of those who had conceived the project. From headquarters in the Pentagon, a united War Department would direct American armies to victory in global operations. But the huge five-sided building, like many other projects launched by Somervell, would be carried to completion under different auspices.

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[142] Leisenring Interv, 5 Jun 57.

[143] Washington *Post*, November 6, 1941, p. 11.

[144] (1) Memos, Blanchard for Groves, 7 Nov, 5 Dec 41. (2) Ltr, Groves to Renshaw, 14 Nov 41. Both in 631 (Pentagon Bldg).

[145] (1) Memo, Blanchard for Groves, 1 Dec 41. Opns Br Files, WD Bldg, Arlington. (2) Ltr, Supervising Traveling Auditor to OQMG, 17 Nov 41. 132.2 (Pentagon Bldg).

CHAPTER XIV

The Transfer

As war moved closer, as larger and larger construction tasks loomed ahead, the old problem of responsibility called out for final solution. During 1941 two competing organizations shared the work—one, an element of the Quartermaster Corps, the other, the Corps of Engineers. Although measurably strengthened and to some extent decentralized by Somervell, the Construction Division still exhibited weaknesses resulting from twenty years of scanty budgets and from its position in a multifunctioned supply service. Whether it could withstand increased wartime pressures was uncertain. The Corps of Engineers, a technical branch, specializing in construction and maintaining a large, smooth-running field organization, participated in the military program to a limited extent and, mostly, on a temporary basis. Unless the Corps' emergency construction assignment was continued and enlarged, the Engineer Department would face stagnation and partial dissolution. Patterson's dissatisfaction with the existing arrangement, Schley's concern over the future of his Corps, Somervell's personal ambitions, alleged Quartermaster shortcomings, and Engineer successes—these were among the factors which influenced settlement of the long-standing controversy and brought all military construction under the Corps of Engineers.

A Test for the Engineers

What were the Engineers' qualifications? Where was proof they could do the job? Over the years opponents of a transfer had raised these questions again and again. Embracing fortifications, rivers and harbors improvements, flood control projects, roads, railroads, dams, and canals, the Corps' experience in heavy construction was unequaled by that of any other engineering outfit in the world. But, as its adversaries emphasized, the Corps had little acquaintance with the type of structural work supervised by The Quartermaster General. In fact, the Engineers claimed no special competence in the housing and building fields. Confidence in their organization, in its strength and versatility, explained their willingness to tackle all military construction. The Air Corps program, transferred in November 1940, provided a practical test of the Engineer Department, an opportunity to show what it could do with an unfamiliar and challenging assignment.

"When we took over the air force construction from the Quartermaster, it was just simple chaos," General Plank afterward declared, "and there is nothing that anybody can say by way of rationalization that will change the posture of it from chaos." To Plank, then a major with 20 years' service in the Corps of

Engineers, the confusion was virtually complete. No one appeared to know just how many projects were on the books or how much money had been spent. Procedures followed in selecting sites and preparing layouts seemed "cockeyed and crazy." Washington made decisions which only the field could properly make. No firm guidelines existed for use in designing runways to bear the weight of new and heavier planes. Camouflage and dispersion had received little attention. One encountered critical delays at almost every turn. The situation, in Plank's opinion, "was not alone the fault of the Construction Quartermaster as an engineer outfit, but it was the easy way in which they had worked with the air force."[1] Working with the Air Corps was to be a good deal harder than he anticipated.

Plank, whose position in the Air Corps program corresponded roughly to that of Groves in the larger, more difficult Quartermaster effort, had to start from scratch to build an organization. Because his program was smaller and the work more decentralized, he did not require anywhere near as large a staff as Groves. In the beginning, he had only one secretary and the part-time assistance of Carter Page and Wallace R. Vawter, two of Robins' ablest civil engineers. Almost immediately, the section expanded to 7 or 8 persons, and by April 1941 it had nearly 40. As unit heads, Plank was able to obtain Page, Vawter, and 4 others, 2 civilians and 2 Engineer Reservists. (*Chart 14*) To be his executive, he chose Capt. John L. Person, a graduate of West Point and MIT who had a fine record as an Engineer Regular. Major Hannis, Robins' liaison officer with the Air Corps, also reported to Plank. Over a period of about six months, the organization grew to approximately 100 persons, or about one-fifth the size of Groves' Operations Branch.[2] Meanwhile, under the direction of Robins and Hardin, Plank was trying to bring order out of what he regarded as chaos.

Decentralization was to be the first step. As far back as the spring of 1939, General Schley had made it known that if he assumed responsibility for airfield construction, he would delegate much of his authority to the Engineer field. At that time he said:

> The existing organization of the Engineer Department would be used without material change. The detailed engineering design and all construction would be handled through Division and District Engineers. . . . To get the results required, these organizations must be allowed to handle, with as few restrictions as possible, all engineering design, preparation of construction drawings and specifications, procurement, contracting, accounting, and disbursement.[3]

When he took over the Air Corps program in late 1940, he went into action. The field had long enjoyed considerable freedom in awarding advertised contracts and approving plans and specifications for civil works and fortifications.[4] In December 1940, Schley extended this same procedure to the newly acquired air projects. A short time later, he gave division engineers authority to approve negotiated contracts in amounts up to $500,000 and district engineers, in amounts up to $100,000. General Robins

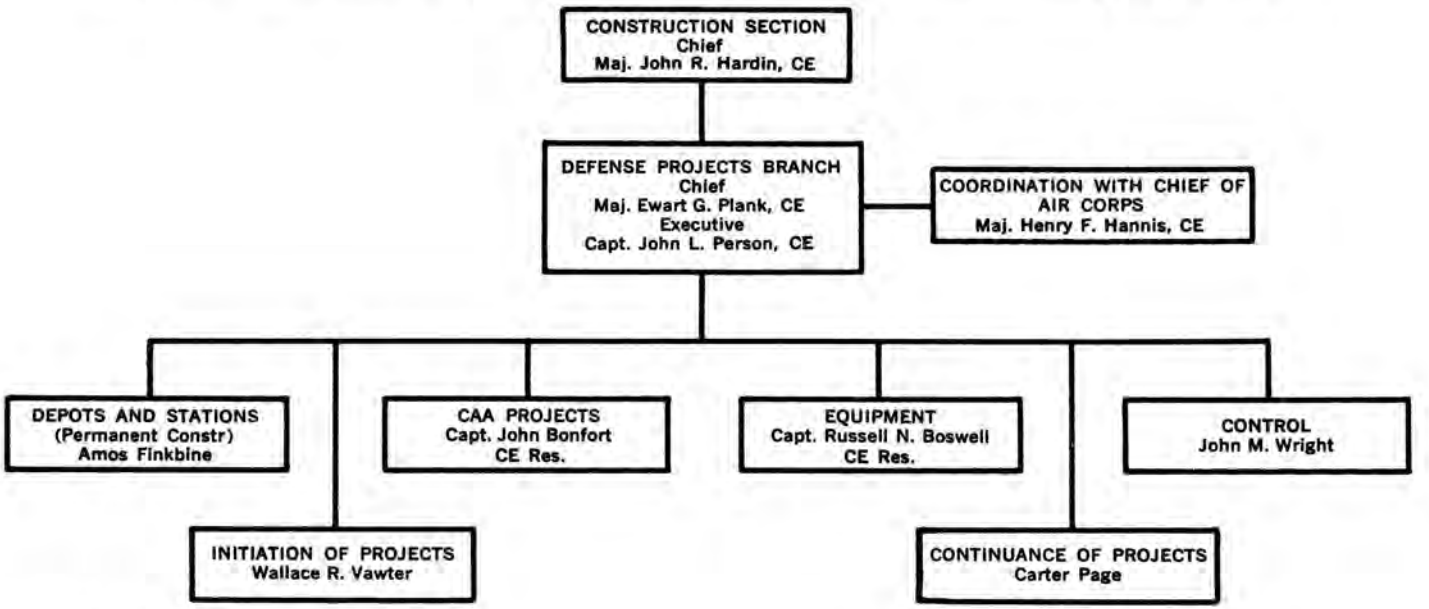
[1] Interv with Maj. Gen. Ewart G. Plank, 5 Dec 50.

[2] (1) *Ibid.* (2) Rpt, Activities of the Constr Div, Jul 40–Jul 41, p. 126.

[3] Memo, Schley for Tyner, 10 Apr 39. G–4/31324.

[4] See p. 268, above.

CHART 14—ORGANIZATION OF DEFENSE PROJECTS BRANCH, CONSTRUCTION SECTION, OCE, APRIL 1941



Source: OCE, Orgn Chart, 26 Apr 41.

would select contractors for negotiated agreements amounting to $500,000 or more from among firms nominated by the field. Although bound by War Department policy in matters of structural design, Schley made the districts fully responsible for water supply and sanitation. He wished to give the field still greater powers, but further decentralization had to await changes in War Department policy and in Air Corps organization.[5]

Quickly and firmly, the Engineer field took hold, applying to Air Corps work methods which over the years had proved successful on rivers and harbors construction. The Engineers' cost accounting system, the oldest in the government and possibly the best, went into effect at air projects. District purchasing departments, familiar with local markets and materialmen, assisted contractors in procuring scarce supplies. District labor relations officers continued the long-established practice of settling local disputes locally. District disbursing officers took over work previously handled with indifferent success by regional finance offices.[6] In placing construction under contract, the districts set a remarkably rapid pace. To cite one example, the Los Angeles District received a large sheaf of Quartermaster drawings for the new Tucson airport on 15 December; by the 24th it had reviewed, revised, and retraced the plans, prepared specifications, and readied the job for advertising. Congratulated by Colonel Tompkins on this and similar feats, Lt. Col. Edwin C. Kelton, the district engineer, replied: "The real answer to our ability to turn out plans and specifications consists of the fact that we are just plain 'damn good.'" Then, in a more serious vein, he added: "I was fortunate in having a large organization of highly trained men with qualifications to handle almost any type of construction. This of course was the secret of being able to get started early on these jobs."[7] The Corps' civil organization was proving its worth on military projects.

There were problems aplenty—of a kind the Engineer field was powerless to prevent. The most exasperating difficulties were traceable to the Air Corps' Colonel Kennedy and his Buildings and Grounds Division. In 1940 and early 1941 the method of site selection in vogue with the Air Corps was to accept tracts donated by various communities. "How old do you have to be," Plank asked, "to know what kind of land you get under those circumstances?"[8] Moreover, Kennedy, with only a small staff to advise him, had set himself up as an arbiter in engineering matters. In choosing sites he consulted construction officers seemingly as the whim prompted. He insisted on preparing all air station layouts in his Washington office. He also dabbled in design; at the time of the airfield transfer, he was pressing for adoption of soil cement, a mixture of cement and natural soil which formed a weak concrete, as a standard paving

[5] (1) Bruner, Outline of Authorizations—Constr Contracts, I, 1–3; IV, 2; VI, 1–2. (2) OCE Circ Ltrs R&H 64, 6 Dec 40; Finance 226, 9 Dec 40; Finance 41, 19 Feb 41; R&H 67, 16 Dec 40; and R&H 71, 23 Dec 40.

[6] (1) OCE Circ Ltrs Finance 224–227, 9 Dec 40; Finance 230, 11 Dec 40. (2) 1st Ind, 7 Dec 40, on Ltr, NAD to Dist Engr Providence, R. I., 3 Dec 40. 686 (Airfields) Part 1. (3) Incl with Memo, Mitchell for Styer, 6 Dec 41. LRBr Files.

[7] Ltr, Kelton to Tompkins, 29 Mar 41. 686 (Airfields) Part 1.

[8] Plank Interv, 5 Dec 50.

material for runways. Other headaches that plagued the Engineer field were attributable not to Kennedy's notions but to the inability of the Quartermaster Corps to furnish basic engineering data necessary for proper design. Among the masses of Quartermaster blueprints, drawings, specifications, manuals, and bulletins turned over to the districts and divisions, there were no criteria for designing paved runways and few plans for Air Corps technical buildings. And there was not much information on airfield drainage or passive defense. Somervell had promised to help make up these deficiencies, but he was slow in doing so.[9]

Illustrative of the troubles facing district engineers were situations at two projects transferred to the Corps on 2 January 1941: Brookley Field at Mobile, Alabama, and Key Field at Meridian, Mississippi. Brookley, also known as the Southeast Air Depot, occupied a 1,350-acre site just south of the city on Mobile Bay. Part of the tract, comprising a small municipal airport, was a donation; additional land, costing more than $500,000, had been acquired by Colonel Valliant. Started late in 1939, work at Brookley had been painfully slow. When the Mobile District Engineer, Lt. Col. Willis E. Teale, took over the project, he saw why. The ground water level was from 1 to 4 feet below the surface. The plasticity index of the soil varied from zero to 20 percent and the liquid limit, from 16 to 35 percent. "Blue mud" or "gook," as some called the soggy subgrade, ran down to a depth of 20 feet. An elaborate drainage system, costing heaven knew how much, would be necessary before paving could go forward. Adding to Teale's worries was a dispute with Colonel Kennedy over the Brookley layout.[10] The district engineer at Vicksburg, Maj. Samuel D. Sturgis, Jr., received a rude jolt when he inspected his new project at Meridian. Key Field, the municipal airport selected by the Air Corps as the site for a tactical base, was on Okatibee Creek, which frequently overflowed and every two or three years inundated the area.[11] Sturgis saw that levees would be necessary to protect the air base. At Kennedy's insistence, runways were of soil cement. "A complete waste of money," Sturgis said. The impervious clay subgrade produced so weak a runway that the wheels of heavy planes "cut through it like a knife."[12] Stronger pavements of concrete or asphalt were mandatory.[13] Like other district engineers who found themselves in similar predicaments, Sturgis and Teale looked to the Chief for more sagacious planning of future Air Corps projects.

At the Munitions Building in Washington, the Chief's office was alive with activity as General Robins and his staff tried to do what was needful. Responsible not only for Air Corps construction but also for designing and building fields for the Civil Aeronautics Authority, Robins prepared his organization for a

[9] (1) Ltr, Div Engr SPD to OCE, 19 Feb 41. 686 (Airfields) Part 6. (2) Ltr, Robins to Brett, 8 Feb 41. 686 (Airfields) Part 5. (3) Ltr, OCE to All Div Engrs, 12 Mar 41. 686 (Airfields) Part 7. (4) OCE Circ Ltr Constr 37, 14 Feb 41. (5) Ltr, Robins to Gregory, 9 Jan 41. 686 (Airfields) Part 3. (6) Ltr, Plank to Gregory, 17 Feb 41. 686 (Airfields) Part 5.

[10] (1) 686 (Brookley Fld) Part 1. (2) Ltr, Dist Engr Mobile, Ala., to Div Engr SAD, 23 Sep 43. 686.61 (Brookley Fld).

[11] Compl Rpt, Meridian Air Base, Oct 41, pp. 57–58, 68–69.

[12] Interv with Lt Gen Samuel D. Sturgis, Jr., 26 Sep 63.

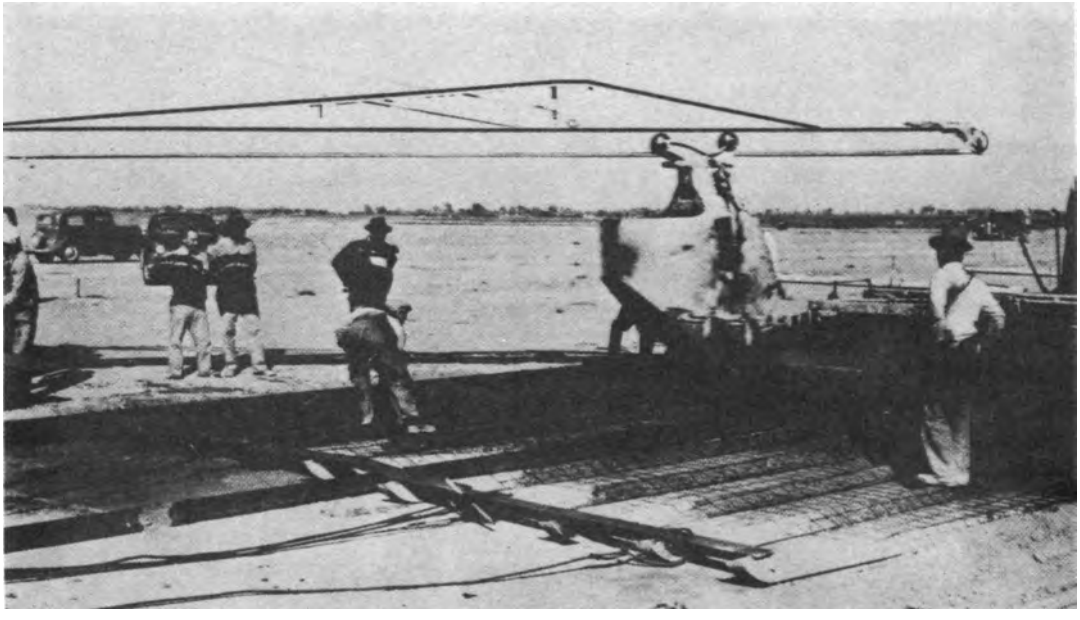
[13] 686 (Key Fld) Part 1.



CONCRETE DRAINAGE CULVERT AT BROOKLEY FIELD, ALABAMA

dominant role in American airport development. Soon a list of works on airfield design was making the rounds, and experts in river, harbor, and flood control work were boning up on the subject. In January seventy-five officers and civilian employees of the Corps began a 6-month course in airport engineering under Prof. Byron J. Lambert of the University of Iowa. William H. McAlpine, the 67-year-old chief civilian engineer, was a tower of strength. "Mr. Mac" went at the task of learning a new specialty with the vigor of someone half his age; he also brought in men experienced in utilities and airport work. Harold A. Kemp, chief of the Washington, D. C., Department of Sanitary Engineering, took charge of a new Airports Division in the Engineering Section; and Gayle McFadden, who had directed construction of La Guardia Field and the Washington National Airport, became Kemp's principal assistant. Knowing that engineering work was slack in some district offices, McAlpine made plans for farming out design jobs to them.[14] By February 1941 *American Aviation* was able to report: "The Corps of Engineers, it is understood, did not especially relish the idea of handling the airport program since it was, admittedly, not well in-

[14] (1) Manual, Engrg Sec OCE, Design of Airport Runways, Jan 41, pp. A1–A7. (2) *ENR*, March 13, 1941, p. 56. (3) Memo, Kemp for Bills, 28 Mar 41. McFadden Reading File.



PAVING RUNWAY, LOWRY FIELD, COLORADO, *October 1940.*

formed or equipped to do this specialized job. But the Corps is now actively at work increasing its knowledge and in a matter of months is expected to have things well in hand."[15]

Design standards for airfield pavements were a prime desideratum. Before the emergency, commercial planes of 25,000 pounds gross weight, having 12,500-pound wheel loads, were the heaviest in use. Runways, taxiways, and aprons to carry planes of this size posed no unusual engineering problems; accepted highway methods served well enough. During the thirties neither the Air Corps nor the Quartermaster Construction Division had shown much concern over pavement design. As late as 1939 the Air Corps had assumed that in the event of war all planes except heavily loaded bombers could operate from sod fields. Hence, the Construction Division had developed no detailed engineering criteria for paved runways.[16] In 1940, the Army had virtually no idea how to design for wheel loads exceeding 12,500 pounds. Yet bombers with wheel loads of 37,000 pounds were coming into use and far heavier ones were in prospect. Thus, the Engineers inherited, along with the Air Corps program, a complex and urgent technical problem. Continued development of the air arm would depend on their ability to design stronger pavements to take heavier planes.

Recognizing that district engineers needed help in planning runways and needed it fast, McAlpine got in touch

[15] *American Aviation*, February 15, 1941, p. 5.

[16] (1) Memo, OCofAC Plans Div for Arnold, 12 Aug 39. AAF 611 A. (2) 1st Ind, 8 Nov 39, on Ltr, OCE to TQMG, 30 Oct 39. 686 (Airfields) Part 1.

with leading experts in paving design and with the Civil Aeronautics Authority, the Public Roads Administration, the Portland Cement Association, and the Asphalt Institute. Using information they provided, he hastily compiled a manual, Design of Airport Runways, which he published in January 1941. The manual, which included sections on grading, drainage, and runway layout, devoted considerable space to various formulas developed by specialists in the design of rigid (concrete) and flexible (bituminous) pavements. Among the formulas for rigid types was one advanced by Prof. Harald M. Westergaard of Harvard University; Westergaard had developed it originally for highways but in 1940 had extended the principle to runways. Another, devised by Frank T. Sheets, president of the Portland Cement Association, was based on observations and measurements at the Bates Test Road in Illinois. The manual warned against using these formulas as "the necessary or sole basis for establishing the thickness of concrete slab in all cases." Similarly, it pointed out that successful use of formulas for flexible pavement design would require accurate measurement of the bearing capacity of the subsoil—a measurement for which there was as yet no standard yardstick. Sketchy and tentative, the manual was to serve as "a general guide in runway design and not as a source of specific instructions."[17]

Through tests and investigations, the Engineers sought to extend their knowledge. In late January 1941, the Waterways Experiment Station at Vicksburg, Mississippi, began studying general problems of airfield drainage, soil stabilization, and flexible pavement design. On 14 February, Colonel Tompkins asked the districts and divisions to try out low-cost paving materials on runways, taxiways, and aprons and to report their findings to him as soon as possible. A short time later, he directed the Norfolk District Engineer, Lt. Col. John F. Conklin, to experiment with circular metal plates as a means of determining the bearing capacity of soils under flexible pavements. At Langley Field and at the Williamsburg Test Road of the Virginia State Highway Department, Conklin was soon at work exerting pressures on a plate and then measuring the effect on the subgrade below it.[18] Conducting experiments and analyzing results took time. While all this research was in progress, the Engineers were exploring other aspects of airfield design.

At bases transferred from the Quartermaster Corps, an important safeguard was lacking. From the air, Westover Field near Chicopee, Massachusetts, stood out in bold relief from the surrounding countryside. Construction forces had denuded the land of vegetation; and all day long, clouds of dust rose from the reservation. The buildings, crowded into about one-third of the available space, stood in the close, regular formations that mark military posts. Westover was not unique. Other bases along the Atlantic, Gulf, and Pacific coasts were highly visible from the air—inviting targets to possible enemy attackers.[19]

[17] Design of Airport Runways, pp. 15, 32, 1, *passim*.

[18] (1) Ltr, WES to CofEngrs, 6 Feb 41. 686 (Airfields) Part 5. (2) OCE Circ Ltr Constr 37, 14 Feb 41; Constr 84, 6 May 41.

[19] (1) Memo, Engr Bd Camouflage Sec for Rcd, 29 Jul 41. 686 (Airfields) Part 26. (2) Memo, Burton for Robins, 5 Dec 40. 467 Part 1.

Efforts to remedy this situation began shortly after the Air Corps program went over to the Engineers. On 13 December 1940, General Robins advised the field: "Modern air attack technique, as demonstrated by European conditions, clearly indicates that concealment and camouflage of airfields . . . is of fundamental importance for those installations which are so located as to be in danger of aerial attack." He asked the districts and divisions to give especial weight to this factor in site selection, layout, and design.[20] Soon plans were under way for a comprehensive program of camouflage and concealment. On 19 February, the Acting Chief of Engineers, Brig. Gen. John J. Kingman, asked General Marshall to "issue instructions requiring that concealment be given fundamental consideration in selecting sites and laying out airfields" and to "require the immediate camouflage of airfields . . . in areas near the coastline."[21] In answer Marshall asked the Engineers what this program would cost. Their reply—$700,000 for planning alone—met with prolonged silence on the part of the General Staff.[22] Regretfully, Robins concluded "that the War Department apparently does not consider camouflage of fields important enough to justify the additional expense involved."[23] Subsequent appeals for money got nowhere. Without additional funds district engineers could attempt no dispersed layouts nor could they adopt any costly concealment measures. At most projects they could do little more than preserve vegetation.[24]

The one notable exception was Bradley Field near Windsor Locks, Connecticut. Late in December 1940, the district engineer at Providence, Lt. Col. John S. Bragdon, chose a site a few miles from Windsor Locks to replace an unsatisfactory one the Air Corps had previously selected at Hartford. Bragdon was enthusiastic. The new site was ideal for an airport: the ground was high and dry; the sandy soil was firm and easily drained; little grading was necessary; and there were unobstructed approaches from all directions.[25] He worked zealously on plans for the field. With Robins' help, he persuaded Colonel Kennedy to go along with a scheme for camouflage and dispersal, even though it meant extending utility lines at a cost of some $500,000. The General Staff at first held back, unwilling to spend the money. "However," Robins wrote, "approval was finally obtained on the basis that it was experimental."[26] Told to go ahead, Bragdon spared no effort to make Bradley invisible from the air. With advice from the Engineer Board, he blended the airfield into the landscape of the tobacco-farming Connecticut countryside. Inspecting the project in July 1941, an officer from the board noted: "The principle of dispersion is carried out to the nth degree." Describing the

[20] Ltr, Robins to Div and Dist Engrs, 13 Dec 40. 467 Part 1.

[21] Memo, Kingman for Marshall, 19 Feb 41. 467.

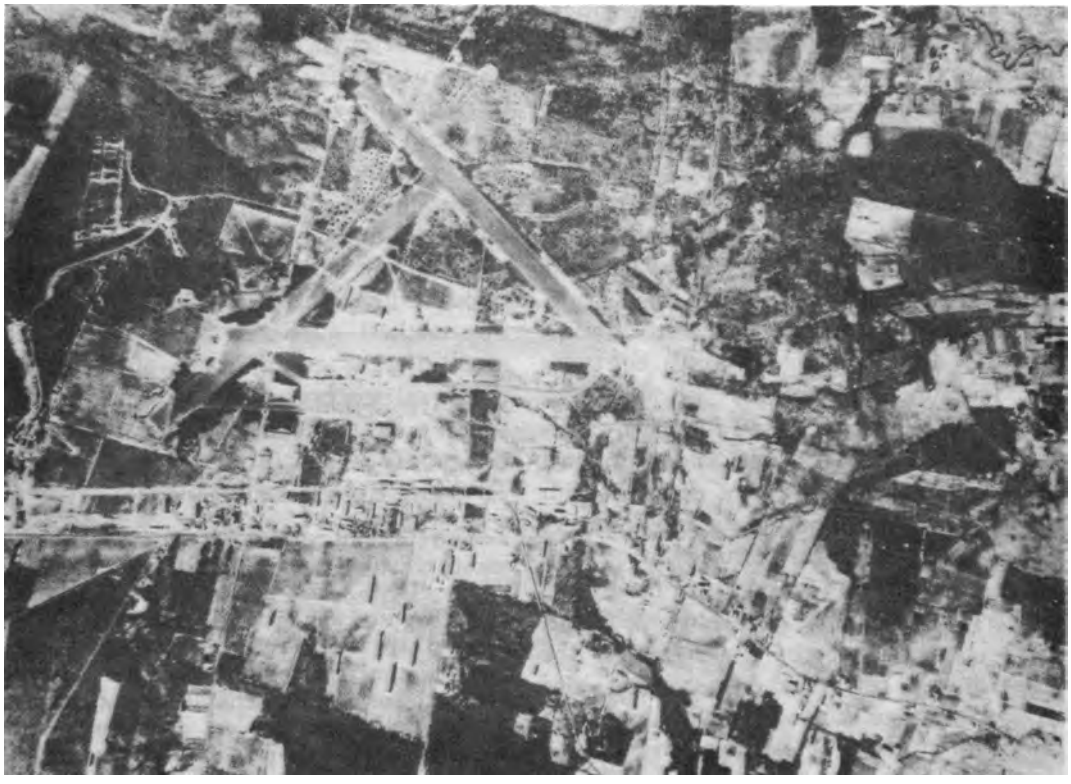
[22] WD Ltr AG 007.5 (2-19-41) M-D to the CofEngrs, 17 Mar 41, and Inds. 467 Part 3.

[23] 1st Ind, 7 Apr 41, on Ltr, Kingman to Robins, 22 Mar 41. 467 Part 1.

[24] (1) Ltr, OCE to TAG, 3 Oct 41. 618.33 (Airfields) Sep 41-Jun 43. (2) Ltr, Hardin to Arnold, 4 Nov 41. 467. (3) OCE Circ Ltr Constr 101, 4 Jun 41.

[25] Ltr, Bragdon to Schley, 23 Dec 40. 686 (Bradley Fld) Part 1.

[26] 1st Ind, 7 Apr 41, on Ltr, Kingman to Robins, 22 Mar 41. 467 Part 1.



BRADLEY FIELD, WINDSOR LOCKS, CONNECTICUT

field further, he wrote:

> The tobacco sheds and farms of the environment are carried out over the field as the concealment scheme. . . . The writer noted with interest that tobacco sheds were simulated by butting end to end two regulation army barracks buildings with one common roof. All buildings are painted a dark reddish-brown to approximate the color of nearby tobacco sheds.
>
> The various building units to house personnel and equipment are well scattered over the entire grounds. . . . Large buildings are out in the open, like the tobacco sheds in the environment. Small clusters of buildings are dispersed about in the heavy woods and . . . all unnecessary clearing, grading, grubbing, and the cutting-down of any large trees are avoided. Some building units are located in gullies, with large trees giving complete overhead concealment.
>
> All existing paths and roads were left intact. Most of the new roads seem to follow the general contour of the ground. All tanks are underground or are otherwise concealed by trees.

He had only one criticism—the hangar and control tower, both bright in color, stood conspicuously in the open.[27] On 7 December 1941, the field at Windsor Locks was the only one in the United States built on a dispersed layout. When General Arnold prescribed passive pro-

[27] Memo, Engr Bd Camouflage Sec for Rcd, 29 Jul 41. 686 (Airfields) Part 26.

tection for all stations in the air frontier, Robins reproduced Bragdon's plan and distributed it as a model.[28]

Gradually, the Engineers began to take a hand in building design. During the early months of 1941, requests trickled in from the Air Corps for new plans and for changes to existing ones. When, in mid-January, Colonel Kennedy decided that the standard control tower was unsatisfactory, he asked Kemp to design a better one. Within a month the new plan was on its way to the field. In February Kennedy called for a 31-cadet barracks for use at reception centers and pilot training schools. By early March the drawings were complete. Meanwhile, more requests were coming in: for a building to house low-pressure chambers which could simulate high-altitude flight, for a heating system for hangars, for re-estimates of warehouse costs, and so forth. Few of these early jobs presented much difficulty. For example, by adding pressure lines and extra piping, Kemp quickly adapted a standard warehouse to take low-pressure chambers. The Engineers' first challenging assignment in structural design involved storage facilities for war reserves of aviation gasoline. Turned over to Lt. Col. Ludson D. Worsham, the district engineer at Pittsburgh, late in January, this work was virtually complete by the first of March.[29]

All of this was preliminary. During the first quarter of 1941 the Construction Division continued to carry the burden of designing Air Corps structures. When the next wave of air projects broke, the burden would shift to the Engineers.

Anticipating an upsurge in Air Corps construction, General Robins looked for ways to get around obstacles to further decentralization. Early in February, he approached General Brett about the possibility of giving some of Kennedy's approval authority to air commanders in the field. Referring to the preparation of layouts in the Buildings and Grounds Division, Robins maintained:

> The present system . . . is not the most efficient and expeditious method of accomplishing this work. It does not take advantage of the intimate knowledge of the ground and local utilities problems which exist in the District and Division Engineer Offices, nor does it enable responsible Air Corps field commanders to express their views before a definite plan is settled upon.[30]

Both Plank and Kemp favored the change.[31] The division engineer at San Francisco, Col. Warren T. Hannum, expressed the viewpoint of the Engineer field. In a letter to Schley on 19 February, he stated: "Insofar as possible to observe in the field, it appears that the bottleneck causing delay in planning . . . lies in the Office of the Chief of the Air Corps."[32] Bringing Kennedy around would take time and patience, but Robins intended to persist. With Somervell he resolved to cut through a second obstacle—the G–4 "freeze order"

[28] Ltr, OCE to SPD, 11 Dec 41. 686 (Airfields) Part 44.

[29] (1) OCE Circ Ltr Constr 16, 18 Jan 41, and Amendment 1, 14 Feb 41. (2) Ltr, Hardin to Div Engrs, 4 Mar 41. 686 (Airfields) Part 7. (3) Memo, Kemp for Vawter, 21 Mar 41. 686 (Airfields) Part 8. (4) Ltr, Kennedy to Schley, 7 Feb 41. 686 (Airfields) Part 5. (5) Ltr, OQMG to OCE, 23 Jan 41, and Inds. QM 600.1 (AC—Transfer to Engrs). (6) Ltr, Plank to ORD, 28 Jan 41. 635 (War Reserve) Part 4. (7) Ltr, Worsham to Schley, 1 Mar 41. 635 (Airfields) Part 1.

[30] Ltr, Robins to Brett, 8 Feb 41. 686 (Airfields) Part 5.

[31] Memo, Kemp for McAlpine, 27 Jan 41, and Plank's notations thereon. 686 (Airfields) Part 5.

[32] Ltr, Hannum to Schley, 19 Feb 41. 686 (Airfields) Part 6.

requiring Reybold's approval of major changes in standard plans. This would also take some doing, but difficulties did not dissuade the two men from trying.[33]

By the spring of 1941, the airfield transfer was virtually complete and directives for brand new Air Corps projects were coming into OCE. Rounding out facilities under the First Aviation Objective—the 12,000-pilot, 54-group program approved by Congress in the fall of 1940—were 7 airfields, 2 gunnery stations, 2 schools for mechanics, and 3 depots for overhauling engines. A second, larger increment of air projects underset the Second Aviation Objective, a goal of 84 combat groups and 30,000 pilots a year announced by General Marshall in February. To meet this objective, two dozen installations would be necessary—20 flying training stations, 2 depots, a gunnery school, and a cadet reception center. The fourth and fifth supplemental defense appropriations for 1941, approved in March and April, carried funds totaling $284,250,000 for additional air construction.[34] In launching the new projects, the Engineers got off on a different footing with the Air Corps.

Meeting with Colonel Chamberlin on 4 March, Kennedy, Tompkins, and Hardin agreed to revise site procedures. To choose locations for air depots, the General Staff would appoint War Department site boards, each to include an Engineer member named by General Schley. Initial choice of sites for other air projects would be up to the field. For training stations the commanding generals of the three Air Corps training centers—the Southeast, Gulf Coast, and West Coast—would convene investigating boards composed of air, Engineer, and medical officers. The same general procedure would apply to tactical bases, with the regional Air Force commanders convening the boards. Reports on all sites, whether from War Department, Training Center, or Air Force boards, would go first to General Brett for review and recommendation and then to G–3 and G–4 for final decision.[35] In practice the Engineers played a larger role than the one formally assigned them, for as a rule General Reybold would accept no site until Robins O.K.'d it.[36]

The new procedure went into effect just in time to prevent some serious mistakes. In February the Air Corps had begun picking locations for the Second Aviation Objective. By March, when district engineers entered the picture, this work was far advanced. At Greenville, Mississippi, Major Sturgis looked over three sites that the Southeast Training Center thought desirable. The Mississippi Delta, with its swamps, alluvial soil, and networks of drainage ditches, its heavy rains and thick fogs, seemed to Sturgis a most unlikely place to put an air base. He suggested that the Air Corps pull out of the area and build

[33] (1) Memo, Hardin for Robins and Tompkins, 12 Mar 41. 686 (Airfields) Part 7. (2) Ltr, Robins to TAG, 14 Mar 41. 686 (Airfields) Part 10.

[34] (1) Craven and Cate, *Men and Planes*, p. 137ff. (2) Memo, Hardin for Plank, 4 Apr 41. 686 (Airfields) Part 10. (3) 55 *Stat.* 34, 123.

[35] (1) Memo, Chamberlin for Rcd, 6 Mar 41. G–4/31791–6. (2) Memo, Kennedy for Chamberlin, 17 Mar 41, and Incl. G–4/32750. (3) WD Ltr AG 580 (3–21–41) M–D, 26 Mar 41. 686 (Airfields) Part 11. (4) WD Ltr AG 580 (5–7–41) MC–F–M, 13 May 41. 686 (Airfields) Part 14.

[36] D/F, Reybold to Schley, 31 May 41. 686 (Lubbock Fld) Part 1. See also 686 Part 1 for Victorsville, Calif.; Merced, Calif.; Valdosta, Ga.; Columbus, Miss.; etc.

farther north. When the airmen insisted on staying at Greenville, he did the best he could; rejecting the sites proposed by the training center, he chose another, the highest and most easily drained he could find in the area.[37] To the east, in the Mobile District, Colonel Teale also had to contend with a hard-to-build-on site. The Air Corps had selected and the General Staff had approved a 1,200-acre tract near Tuskegee, Alabama, for a field to train Negro pilots. On investigating this site, Teale found the soil was gumbo clay, "the poorest type for road building purposes . . . in the State of Alabama." He reported to Schley: "The conditions encountered are so adverse that very serious consideration should be given to abandoning the site and selecting another one." Relocating the project on another site he had in mind would, he estimated, save at least $700,000 and 6 months' time.[38] Colonel Tompkins persuaded Brett to follow the district engineer's advice. A hastily convened training center board rubber-stamped Teale's choice.[39] Other district engineers were no less vigilant. Most egregious errors made under the old procedure were swiftly uncovered and rectified.

By May, the Airport Division of the Engineering Section was hard at work studying site board reports and preparing recommendations for G–4. Because many of the reports contained little or no engineering data, Kemp and his assistants were often at a disadvantage.[40] In some instances, they had to content themselves with making general comments such as "the site appears suitable for development of an Air Corps Pilot Training School," in the case of a tract at Valdosta, Georgia;[41] or with merely quoting from a board report, as when they wrote of a site at Victorville, California: "[It] is described as 'reasonably flat desert land . . . with a sandy surface and gravelly loam of decomposed granite well drained.' From this description it would appear that the site is satisfactory from a construction viewpoint."[42] Before giving Reybold the green light on such locations, Plank checked with the districts to make sure that further investigation was unnecessary. In most cases, district engineers, who had served on the site boards, advised against making additional studies.[43]

While the work of site selection went forward, the Engineers were facing up to another challenge: designs for special technical structures at the new air depots. Among the largest and most complex of the Air Corps projects, carrying price tags of $14 million each, the 5 depots authorized in 1941 were to include separate buildings for testing and repairing engines, radios, armament, and equipment and for storing bombsights, chemicals, and explosives. Buildings serving most of these purposes could be found at the 4 original Air Corps

[37] 686 (Greenville Fld) Part 1.

[38] Ltr, Teale to Schley, 4 Apr 41. 686 (Tuskegee Airfield) Part 1.

[39] 686 (Tuskegee Airfield) Part 1.

[40] (1) Memo, Kemp for Plank, 27 May 41. 686 (Midland Fld) Part 1. (2) Memo, Kemp for Vawter, 4 Jun 41. 686 (Enid Fld) Part 1.

[41] Memo, Kemp for Plank, 21 May 41. 686 (Moody Fld) Part 1.

[42] Memo, Kemp for Plank, 27 May 41. 686 (Victorsville Fld) Part 1.

[43] (1) Telg, Schley to SWD, 28 May 41. 686 (Enid Fld) Part 1. (2) Ltr, Dist Engr Denison, Tex., to Schley, 8 Jun 41. 686 (Perren Fld) Part 1. (3) Telg, SAD to Schley, 22 May 41. 686 (Moody Fld) Part 1. (4) Telg, LMVD to Schley, 12 May 41. 686 (Lake Charles Fld) Part 1. (5) Telg, SWD to Schley, 3 Jun 41. 686 (Enid Fld) Part 1.

depots at San Antonio, Texas; Middletown, Pennsylvania; Patterson Field, Ohio; and Sacramento, California. The Sacramento Depot dated from the late thirties; the other 3, from World War I. Under construction at the Mobile and Ogden depot projects were technical buildings of recent design, but by February 1941 the Quartermaster Corps had standardized plans for only 2 or 3 such structures. When General Brett issued rush orders for 5 big new projects, the Engineers had a problem on their hands.[44]

At Wright Field, Ohio, on 1 March, Kemp conferred with officers of the Air Corps' Materiel Division. Before them were Quartermaster plans in various stages of completion, sketches prepared by Colonel Kennedy, and plans for buildings at Mobile and Sacramento. After deciding which types of buildings to construct, Kemp and the air officers turned to Maj. Fred T. Bass, the district engineer at Cincinnati, who also attended the meeting, asking him to take the plans, sketches, and partly finished drawings and quickly work out standards for all the technical structures. Responsibility for reviewing Bass' standards and Quartermaster typicals for barracks, warehouses, and the like fell to Col. Edwin H. Marks, the Ohio River Division Engineer.[45] It was a big assignment, bigger in fact than Bass and Marks at first realized.

A look at the plans turned over to him convinced Bass that redesign would greatly simplify construction. Although he knew the work would take more time than Kemp had budgeted, Bass felt that he could both "speed actual construction" and cut building costs.[46] Uncertain that the Cincinnati District could handle a crash job of this size, General Schley engaged Graham, Anderson, Probst & White of Chicago, a top architectural firm then doing air base designs for the Puerto Rico District. Under Bass' general supervision, the architects started reviewing and revising plans for twelve technical buildings late in April. By mid-June their work was complete and the Engineers had first-rate standard plans for the new Air Corps depots.[47]

Less conspicuous than the efforts to produce depot designs, but equally successful, were General Robins' moves to bring about much-needed changes in procedures. Since the airfield transfer, Robins had been doing missionary work, trying to get the Air Corps to decentralize its construction planning. By February there were signs he was making headway. Finally, in March, he turned the trick. General Brett established four air districts in the United States and listed as one of their duties co-operation with the Engineer field. With the help of high-ranking Air Corps officers whom he had known well for many years, Robins now persuaded Colonel Kennedy to ease up on layouts—a little at first, then entirely. In April, Kennedy agreed to let district engineers make preliminary lay-

[44] (1) Craven and Cate, *Men and Planes*, pp. 124–25, 138. (2) Ltr, Tompkins to Brett, 8 Mar 41. 686 (Airfields) Part 15.

[45] (1) Notes of Conf at Wright Fld, 1 Mar 41. 686 (Airfields) Part 15. (2) Ltr, Tompkins to Marks, 13 Mar 41. 686 (Airfields) Part 7.

[46] 2d Ind, Bass to Schley, 21 Apr 41, on Ltr, Plank to Marks, 4 Apr 41. 686 (Airfields) Part 11.

[47] (1) 1st Ind, 20 Mar 41, on Ltr, Tompkins to Marks, 13 Mar 41. 686 (Airfields) Part 7. (2) Ltr, Kingman to Patterson, 21 Apr 41. 686 (Airfields) Part 12. (3) Ltr, Schley to Patterson, 28 Apr 41. 686 (Airfields) Part 14. (4) Ltr, Bass to Schley, 2 Jul 41. 686 (Airfields) Part 22.

outs based on rough sketches furnished by the Buildings and Grounds Division. But he still insisted that each layout have his approval before construction started. Under continued prodding, Kennedy at length gave way. In June, Hardin was able to inform the districts that construction could begin as soon as local air commanders accepted layouts.[48] Robins' powers of persuasion were also effective with his fellow Engineer officer, the G–4, General Reybold. Arguing for recision of the "freeze order" on design, Robins emphasized the need "for modifying mobilization type buildings at times to take advantage of local conditions." He held that the change would "permit competition between suppliers, . . . take advantage of available skilled labor, and . . . tend to reduce costs and to obtain high type of materials for the same cost." Finally, he assured G–4 that no increases in cost or losses of time would result.[49] In April Reybold yielded and revoked the "freeze order."[50]

Lifting the "freeze" unleashed forces it had held in check. The door was now open to those who wished to improve upon the spartan standards of the mobilization plans, and none were more eager to enter than air station commanders. Hardly had the countermand hit the field when districts began complaining. From Los Angeles, Colonel Kelton appealed to the Chief's office to "prevent our being placed in the unenviable position that the Quartermaster has been in for years." On 16 April he wrote Tompkins:

> I have had two official letters prepared to the Chief on the following . . . but have torn them up. This office has just begun to receive numerous requests for small jobs at March Field, Hill Field, and for alterations in the fields that we are building at Tucson, Phoenix, and Muroc Lake.It is expected that these requests will multiply, especially if we show an indication of being liberal. I think the problem is about to become serious, particularly as the small jobs take such a great amount of time in proportion to the amount of money expended that we will lose sight of our main objective which is to provide new air fields for the Air Corps.[51]

Another forceful protest, this one to the Chief, came from Major Sturgis on 15 May.

> There is no apparent limit to the requests or demands of Air Corps Station Commanders for modifications, changes, improved facilities, and additional installations, both minor and major in character [Sturgis wrote]. These Commanders have formed the habit of visiting or of sending staff officers to inspect numerous other projects, completed or under construction, in order to obtain ideas for improvements. . . .[52]

Indorsing Sturgis' letter on to Schley, Brig. Gen. Max C. Tyler of the Lower Mississippi Valley Division expatiated on the activities of the commander at Meridian, who spent his weekends "flying to other fields for the purpose of collecting new ideas" so that Meridian could be in the commander's words, "the best Air Corps cantonment in the United States."[53] Clearly, air comman-

[48] (1) Plank Interv, 5 Dec 50. (2) Ltr, SPD to Schley, 19 Feb 41. 686 (Airfields) Part 6. (3) *Civil Engineering*, vol. XI, no. 4 (April 1941), p. 207. (4) Ltr, Kennedy to Robins, 17 Apr 41. 686 (Airfields) Part 11. (5) OCE Circ Ltr Constr 103, 13 Jun 41.

[49] Ltr, Robins to TAG, 14 Mar 41. 686 (Airfields) Part 10.

[50] OCE Circ Ltr Constr 67, 10 Apr 41.

[51] Ltr, Kelton to Tompkins, 16 Apr 41. 686 (Airfields) Part 13.

[52] Ltr, Sturgis to Schley, 15 May 41. 686 (Airfields) Part 15.

[53] 1st Ind, 22 May 41, on n. 52.

ders had to be restrained. The question was how.

There were several suggested solutions. General Tyler was for reinstituting the "freeze."[54] Kelton's idea was "to publish some instructions placing the responsibility squarely on the shoulders of the District Engineer until the Post is turned over to the Air Corps."[55] Sturgis was already following a plan of his own devising. Minor changes which seemed desirable and entailed no great expense, he approved automatically; but requests for major alterations or complete new buildings, he returned with the suggestion that their sponsors seek approval from the War Department.[56] Robins thought Sturgis was on the right track. He issued instructions to the districts "that minor additions or changes to authorized construction need not be specifically authorized by higher authority, but that in the case of major changes request for authorization should be submitted by the Commanding Officer through channels to the Chief of the Air Corps."[57] At the same time he and General Brett issued identical circulars, stressing the need for co-operation between Engineer and air officers in the field.[58]

Free to improve upon standard plans and specifications, the Engineers gave critical attention to the Quartermaster drawings. Concerned by reports of leaking roofs, sagging floors, and other defects in mobilization structures, General Schley on 20 May asked the field to review the 700 series plans and offer constructive suggestions. Before the week was out, replies were coming in. From Providence, Rhode Island, Lt. Col. Harley Latson, the acting district engineer, reported that Quartermaster typicals were "too general" and therefore "ambiguous and confusing." Moreover, he wrote, they were poorly prepared, improperly organized, and difficult to read. He appended a long list of recommended changes.[59] Similarly lengthy lists came from other district engineers—Lt. Col. Leonard B. Gallagher at Boston, Lt. Col. Lee S. Dillon at New York, Lt. Col. Robert C. Hunter at Sacramento, Col. Beverly C. Dunn at Seattle, and Lt. Col. Cecil R. Moore at Portland, Oregon—as well as from most of the divisions. Recommended changes totaled several hundred.[60] Hardin and Plank wanted them made fast. "As you know," Kemp told McFadden, "the date of September first, set by me for completion of the revisions, was not acceptable to the Construction Section. They want more action."[61] More action was what they got. Relying on the engineering sections in the district offices, Kemp prepared lists of desired changes and rushed them to the field. He thus enabled district staffs to doctor up the 700 series for use until he could complete his own thoroughgoing revision and publish new plans.[62]

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[54] *Ibid.*

[55] Ltr, Kelton to Tompkins, 16 Apr 41.

[56] Ltr, Sturgis to Schley, 15 May 41.

[57] Ltr, Dist Engr Detroit to GLD, 4 Oct 41. 686 (Airfields) Part 37. See also OCE Circ Ltr Constr 94, 26 May 41.

[58] (1) OCE Circ Ltr Constr 85, 6 May 41. (2) Ltr, Tompkins to Kelton, 6 May 41. 686 (Airfields) Part 13.

[59] Ltr, Latson to Schley, 26 May 41. 686 (Airfields) Part 16.

[60] 686 (Airfields) Parts 15, 16.

[61] Memo, Kemp for McFadden, 20 May 41. McFadden Reading File, 1941.

[62] (1) OCE Circ Ltr Constr 105, 16 Jun 41. (2) Memo, Kemp for Hardin, 23 Jul 41. McFadden Reading File, 1941.

Recalling the planning done in 1941 by McAlpine, Kemp, McFadden, and the district staffs, Plank said: "We really went about the business . . . from an honest to goodness engineer standpoint."[63] The record bore him out. Illustrative of the Corps' professional standards were exceptionally well-defined criteria for site selection published in July 1941. An example of sound engineering judgment was the Corps' rejection of artificial design concepts put forward by the Air Corps, such as Kennedy's idea that all runways at major fields be of concrete.[64] An instance of engineering foresight was the Corps' insistence on developing a timber frame hangar to take the place of steel, despite Kennedy's declaration that he was "unalterably opposed."[65] The Corps' scientific attitude was perhaps best seen in its continuing research into the strength of runway pavements and the bearing capacities of soils.[66] A technical branch, the Corps had once again exhibited technical proficiency in this, the latest of its successive engineering missions.

After they had hurdled major obstacles in dealing with the Air Corps and had overcome serious deficiencies in plans, the Engineers took the program in stride. Tasks that had cost the Quartermaster Corps a good deal of trouble, they handled with relative ease. As the only federal construction agency that went "back to the people," the Corps had long ago developed a grass roots approach in dealing with the public.[67] This approach worked just as well for military projects as for river, harbor, and flood control jobs. For example, district real estate men knew the fair price of the land in their areas, and the owners knew they knew. Moreover, bargaining was often on a friendly basis. The district representative might preface his offer by asking: "How's Aunt Mollie?" Condemnation was a rarity in the Engineer program.[68] Similarly, General Schley was able to give due weight to congressional recommendations on behalf of constituents. Although he regularly consulted the Construction Advisory Committee in selecting firms for negotiated contracts, he was less dependent on the committee's advice than was The Quartermaster General. Merely by picking up the telephone and calling one of his district engineers, he could get an on-the-spot appraisal of a contractor's ability and reputation. Thus he could confidently turn down the concern picked by the committee for a $1,440,000 airfield at East Baton Rouge, Louisiana, and choose instead a combination recommended by both the district engineer at New Orleans and the district congressman. The contractor performed creditably—evidence that political necessities and public interest need not be incompatible.[69]

In sharp contrast to the Quartermaster Corps, the Corps of Engineers relied heavily on competitive fixed-price contracts. Schley declared it "the general policy on construction . . . con-

[63] Plank Interv, 5 Dec 50.

[64] (1) OCE Circ Ltr Constr 126, 3 Jul 41. (2) OCE Circ Ltr Constr 145, 12 Aug 41. (3) 686.61 Part 3.

[65] 1st Ind, 14 Apr 41, on Ltr, Hardin to Kennedy, 8 Apr 41. 686 (Airfields) Part 10. See also Ltr, OCE to SAD, 17 Sep 41. 686 (Airfields) Part 34.

[66] See ch. XIX, below.

[67] Interv with Gen Reybold, 12 Mar 59.

[68] (1) Sturgis Interv, 17 Oct 63. (2) Constr Div OQMG, Real Estate PR, 15 Nov 41.

[69] (1) Final Rpt of the Constr Adv Comm, 15 Mar 42. EHD Files. (2) 686 (Harding Fld) Part 1.

tracts to obtain bids from contractors throughout the continental limits of the United States."[70] With the engineering force at his disposal, he was in a position to implement this policy. There were exceptions, to be sure—offshore bases, aircraft assembly plants, and other large and very urgent projects. Nevertheless, by the fall of 1941, Patterson could report that in dollar value approximately 60 percent of the Engineers' construction work was fixed-price as compared with under 25 percent for the Quartermaster program. "Of course," Patterson stated, "in fairness to the Quartermaster Corps I want to point out that their projects in the main have been larger projects and projects where perhaps more speed was required." He emphasized, however, that the Engineers were "habituated to the system" of competitive bidding. "That is their general rule, unquestionably," he said, "and wherever the engineers depart from it they do it with reluctance and only under the spur of necessity, where speed is of the essence and they have got to do it."[71] Needless to say, congressional critics of negotiated fixed-fee contracts endorsed the Corps' policy.

There were some troubles, of course. District engineers, as always, faced problems peculiar to their localities. At Vicksburg, in a cotton-growing region, Sturgis was naturally confronted with shortages of materials and skilled workmen. At Detroit, in strong union territory, Lt. Col. Ralph G. Barrows had two strikes at one project within a month.[72] The air commanders' unceasing quest for "something better" forced the Engineers to keep a watchful eye.[73] For example, when the commanding officer at MacDill Field asked for $3,000 worth of "Coolite" glass in his hangars to reduce heat and glare, Col. William C. Weeks of the Jacksonville District turned down the request and accomplished the same result by spraying blue paint on ordinary window glass at a cost of $50.[74] Friction with the Buildings and Grounds Division continued. After the organization of the Army Air Forces (AAF) under General Arnold's command in June 1941, Kennedy, offering no explanation, withdrew his permission to start construction before he approved layouts. On occasion district engineers were able to force quick approvals by calling attention to delays; but there was many an exasperating wait for approvals. There was also some confusion, as when the Air Corps sent a layout for the air base at Greenville, South Carolina, to the field at Greenville, Mississippi.[75] Plank recalled numerous other "little battles" with Kennedy. "We won some, we lost some," he said. The skirmishing did not die down until 1942, when Col. Walter J. Reed took charge of the Buildings and Grounds Division.[76] But except for those concerning layouts, the disputes did not appreciably retard construction progress.

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[70] Memo, Schley for Patterson, 7 Mar 41. 3820 (Nat Def) Part 3.

[71] Patterson's Testimony, 30 Sep 41. In H Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on H R 5630, p. 8.

[72] (1) Sturgis Interv, 17 Oct 63. (2) Table, prepared by EHD, Work Stoppages on Mil Constr Jobs, Jan–Dec 1941.

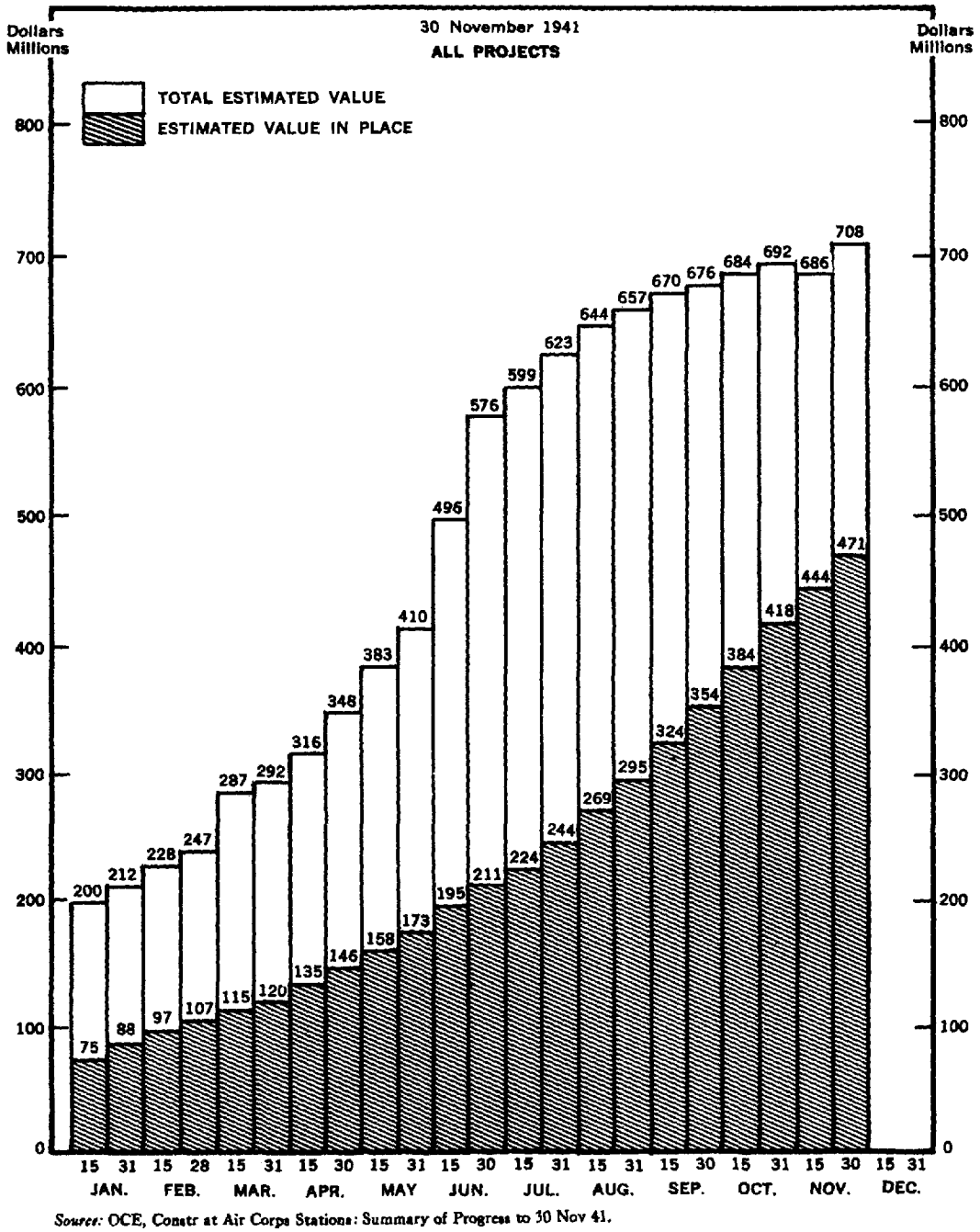
[73] Reybold Interv, 12 Mar 59.

[74] 686 (MacDill Fld) Part 6.

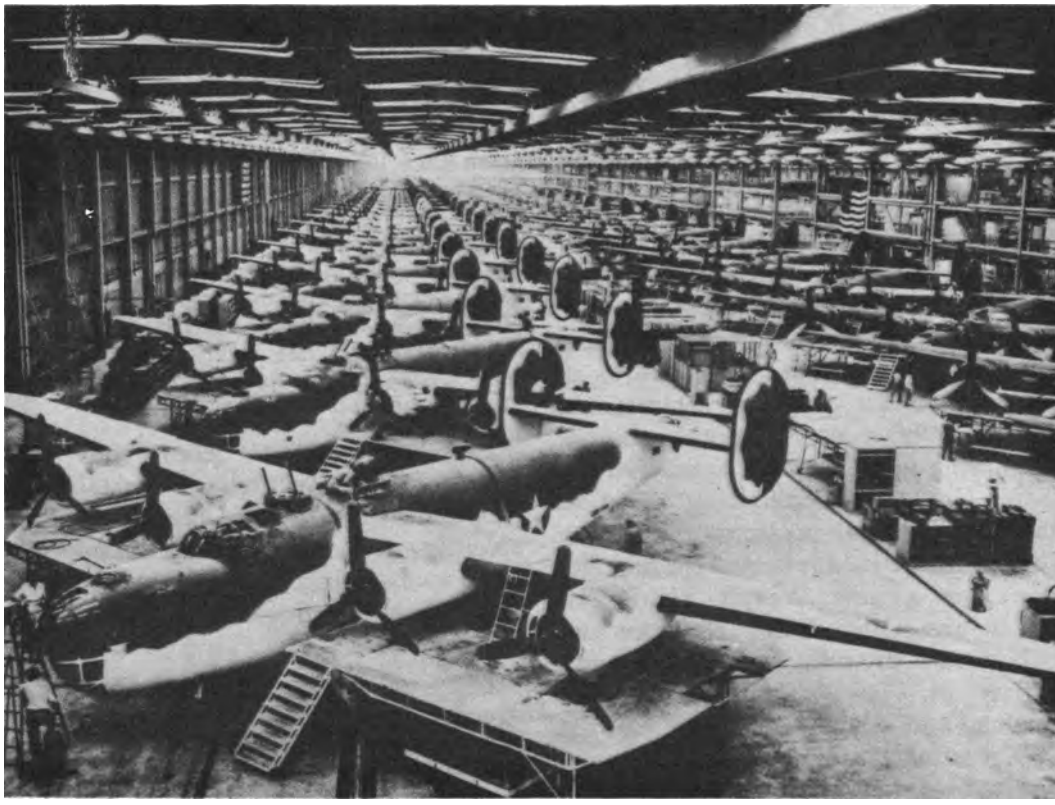
[75] (1) AR 95–5, 20 Jun 41. (2) Ltr, Kennedy to Robins, 9 Jul 41. 686 (Airfields) Part 23. (3) 686 Part 1 for Kaye, Midland, and Greenville Flds. (4) Sturgis Interv, 26 Sep 62.

[76] Plank Interv, 5 Dec 50.

CHART 15—CONSTRUCTION BY THE CORPS OF ENGINEERS AT AIR CORPS STATIONS—U.S. ARMY



Source: OCE, Constr at Air Corps Stations: Summary of Progress to 30 Nov 41.



FORT WORTH AIRCRAFT ASSEMBLY PLANT, TEXAS

Between 1 February and 30 November 1941, the Engineers put in place Air Corps construction with an estimated value of $396 million. (*Chart 15*) A week before Pearl Harbor, airmen were occupying new facilities at 96 stations—fields, depots, schools, and replacement centers. Twenty more new installations were nearly ready for use, including three of the four big aircraft assembly plants. In January 1941 the air program had amounted to $200 million and was 32.5 percent complete. In November the program stood at $708 million and was 66.5 percent complete. As their work load increased, the Engineers had gained momentum, narrowing the gap between work accomplished and work undone.[77]

Many praised the Engineers' performance, but Secretary Stimson probably put it best. Reviewing the Corps' construction for the Army Air Forces and the CAA and its efforts on the offshore bases and other defense projects, he wrote: "It has performed these heavy tasks with its usual efficiency and thoroughness."[78]

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[77] OCE, Constr at AC Stations: Summary of Progress to 30 Nov 41. EHD Files.

[78] *Report of the Secretary of War to the President, 1941* (Washington, 1941), p. 13.

Reaching a Decision

By the early summer of 1941, the Engineer organization was deeply committed to military construction work. At the close of the fiscal year, General Schley reported an unexpended balance of $378 million for rivers and harbors and flood control as against $694 million for AAF, CAA, and overseas base construction. During the previous twelve months, the Corps had received $210 million for civil works and upwards of $800 million for military projects. As Schley had foreseen, civil appropriations were drying up. More and more civilians of the Engineer Department were at work on airfield projects. The map of the Engineer field reflected the change; there was a new Wright Field District in the Ohio River Division and a whole new division, the Eastern, with districts in Newfoundland, Bermuda, Jamaica, and Trinidad.[79] Work for the CAA was likely to continue. Engineer officers held key positions in that organization; Brig. Gen. Donald H. Connolly was CAA Administrator and Lt. Col. Lucius D. Clay was his assistant. But military airfields were another story. Suspended over the Corps like a Damoclean sword was the cutoff date in the McKellar amendment, 1 July 1942, the day responsibility would revert to The Quartermaster General. Schley could not afford to wait for the blow to fall. He had to eliminate the threat.

On 12 May 1941 he made his move. In a memorandum to the Chief of Staff, he quoted the language of the McKellar amendment. Calling Marshall's attention to the expiration date, he wrote:

> If it is desired that the Corps of Engineers continue to perform military construction works to carry out the War Department program after June 30, 1942, it is suggested that proper legislation be prepared to extend the provisions of the above quoted law.
>
> Since there may be advantages to the War Department in the utilization of the Engineer Department organization at any time for construction of War Department projects, it is suggested that such legislation may properly be in the form of an amendment to the National Defense Act of 1920.[80]

Schley had reason to believe that Congress might be willing to entertain this proposal. A number of Congressmen had recently gone on record as favoring some such change. In his speech before the House on 16 January, Representative Engel had said:

> If you do not want to transfer the Construction Quartermaster Corps to the Army Engineering Corps, you ought to put engineers into the Construction Quartermaster Corps; but, for heaven's sake, stop the lawyers filling teeth and the dentists practicing law injustices.[81]

At an appropriation hearing three weeks later, Representative D. Lane Powers had informed Major Hardin: "My personal opinion is that the engineers should do all construction for the Army."[82] Similarly, at a hearing before the House Military Affairs Committee, Representative Charles H. Elston had stated:

> I think we all recognize that the Army engineers are a very, very capable outfit; in my judgment, much better than any of

[79] (1) *Annual Report of the Chief of Engineers, U.S. Army, 1941*, Part 1, vol. I, pp. 22, 1. (2) Maj. Gen. J. L. Schley, "National Defense Construction Program of the Corps of Engineers, U.S. Army," *The Constructor*, July 1941, pp. 69–70.

[80] Memo, Schley for Marshall, 12 May 41. G–4/31324.

[81] 87 *Cong. Rec.* 194.

[82] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the Fourth Supplemental National Defense Appropriation Bill for 1941*, p. 133.

the other Bureaus operating in and around Washington; and I think we have got to recognize that now we are engaged in a large national-defense program, and some work that the Army engineers would otherwise have done is not going to be undertaken. . . . The Army engineers will have more time to devote to national-defense work.[83]

Always strong, the Corps' congressional support grew stronger as committee investigations revealed Quartermaster shortcomings but raised no criticism against the Engineers.

When Schley sent his memo to Marshall on 12 May, a very different proposal was under consideration at the top level of the War Department—Benedict Crowell's recommendation for a separate construction corps. On 5 May Patterson had asked his executive, General Burns: should the Construction Division be lifted out of the Quartermaster Corps and assigned all construction for the Army. The existing Quartermaster-Engineer arrangement was neither "logical nor . . . wholly satisfactory in practice," the Under Secretary said. "The Construction Division of the Quartermaster Corps is now better organized and could in my opinion take the entire load as a separate service."[84] In his reply the next day, Burns questioned whether a change was necessary and pointed out that any reorganization would mean delay. It was time, he felt, to "stop agitating the question . . . and drive through on basis of the present set-up modified only as experience directs."[85] Burns' advice went unheeded. The agitation continued.

Patterson brought the matter up again at a conference in Stimson's office on 19 May, saying that he thought it essential to have one construction branch instead of two. General Marshall agreed and said he would like to see a separate construction corps with Somervell in charge. "As I understand it," Stimson interposed, "you want a new Construction and Maintenance Corps, separate from the Engineers and Quartermaster, with detailed officers from those arms." The colloquy continued:

Patterson: I see no evidence of personal supervision of Quartermaster construction on the part of the Quartermaster Corps.

Marshall: General Gregory has confidence in General Somervell and has delegated the authority to him.

. . . . . .

Stimson: This would not include river and harbor work, I understand.

Moore: There was a big fight after the last War, on this subject.

Marshall: It was a three-cornered fight between the Quartermaster, the Engineers, and General R. C. Marshall, who wanted to take over. It ended with no change being made.

Stimson: Would this Construction and Maintenance Corps be purely for the emergency, or would it be maintained after the emergency?

Marshall: It would be kept as a detailed Corps.

The Chief of Staff thought the change could be brought about without stirring up much controversy.[86] The top men in the War Department seemed to be veering toward Crowell's view.

Coming at this time, the Engineer proposal was inopportune. General Marshall did not wish to amend the defense act as Schley had suggested, for

[83] May Comm *Hearings*, Part 1, pp. 180–81.
[84] Memo, Patterson for Burns, 5 May 41. USW Files, Constr thru Nov 41.
[85] Memo, Burns for Patterson, 6 May 41. Same File.
[86] Conf in OSW, Stimson, Patterson, Marshall, Moore, *et al.*, 19 May 41. CofS Misc Confs 1938–42.

he was considering asking Congress for another, far more drastic change. He did initiate discussions on the subject of extending the authority under the McKellar amendment to 1 July 1944, but at a conference on 7 June 1941, Generals Moore, Reybold, and Gregory decided against it. Schley's memorandum came back to him with a one-word indorsement, "Noted." He immediately resubmitted it but could get no further action from the General Staff.[87]

Meanwhile, Madigan at Patterson's request was trying to figure out how the long-standing question of responsibility ought to be resolved. Both the Under Secretary and his adviser believed a change was desirable. Patterson was disturbed by reports that portions of the program were lagging. Madigan had received complaints from contractor friends about their headaches with two Army construction agencies, two sets of regulations, and two systems of bookkeeping. Clearly, the time had come to settle the problem of organization once and for all. But still to be decided was the form the settlement would take.[88]

Madigan studied the problem for 3 months, during which he talked at length with Crowell, Robins, Reybold, and Harrison but did not consult The Quartermaster General. Although Gregory knew through the grapevine what was going on, he let matters run their course. While Somervell never mentioned it to his superior, he was directly involved. He lent Colonel Covell to Madigan to work on the study and he sent Major Robinson to help. Throughout, Somervell himself worked closely with Madigan, who relied heavily on his advice.[89] Most War Department insiders knew of Somervell's conduct toward Gregory. And few of them ever forgot it.

Somervell almost certainly could have become chief of a separate corps had he so desired, but that was not what he wanted. General Schley was due to retire in October 1941, and Somervell wanted desperately to succeed him. Perhaps, as some believed, Somervell had "overglamourized" the office of Chief. Nonetheless, he went all out to get it. He asked Madigan to get it for him; and Brig. Gen. John C. H. Lee, himself in line for the post, spoke to Stimson on his friend Somervell's behalf. But the gift was not Madigan's to give, and Stimson declined to intercede. The next Chief of Engineers, like his predecessors, would be nominated by a board of three officers, including two Engineers, appointed by the Chief of Staff.[90]

There were formidable obstacles in Somervell's path. According to his temporary rank of brigadier general, he stood 14th on the list of Engineer officers; according to his permanent rank of lieutenant colonel, he stood 58th. His recent career had been outside the Corps. The circumstances of his appointment to the Construction Division and his taking of Engineer officers to staff that organization had caused some resentment among members of his own Corps.[91] Illustrative of General Schley's attitude

[87] D/F, Reybold for Schley, 10 Jul 40, and Rcd thereon. G–4/31324.

[88] (1) Memo, Patterson for Madigan, 9 May 41. USW Files, Constr thru Nov 1941. (2) Madigan Interv, 18 Jun 56.

[89] Madigan Interv, 18 Jun 56; Groves Interv, 19 Jun 56.

[90] (1) Madigan Interv, 18 Jun 56; Lee Interv, 25 Apr 57. (2) Stimson Diary, 13 Jun 41.

[91] (1) OCE, *The Officers of the Corps of Engineers, U.S. Army* (Washington, 1941), pp. 1–5. (2) Schley Interv, 26 Oct 55; Reybold Interv, 12 Mar 59.

toward him was an incident recounted by Madigan. One day in the summer of 1941 a high-ranking Engineer officer came into Patterson's office with a paper in his hand. It was Somervell's efficiency rating, and on it Schley had written: "Officially, the whereabouts of this man is unknown to me."[92] Still Somervell was sanguine. The Engineers had long sought the military construction function. Now they needed it. If the Quartermaster Construction Division went over to them, would he not be the logical man to head the combined organization as Chief of Engineers.

As Madigan probed deeper into the subject, he became convinced that military construction properly belonged with the Corps of Engineers. The Construction Division, under Somervell, was an Engineer organization in fact if not in name. Engineer officers were running the Quartermaster program. Somervell had patterned his organization in Washington and in the field on the older and stronger Engineer Department. Moreover, the Engineers already had airfields. The Quartermaster General, Madigan reasoned, ought not to have construction; he should concentrate on fulfilling his other missions. Nor was a separate corps desirable. In time of peace it would have little more to do than post maintenance. Real estate belonged with construction, and, Madigan concluded, so did repairs and utilities.[93] When Groves learned that Madigan planned to give the Engineers the unwanted task of maintenance, he became alarmed. He pleaded with Somervell not to saddle the Corps with housekeeping chores. But Somervell, who had only a limited acquaintance with life on Army posts, failed to see Groves' point. Repairs and utilities would be part of the package.[94]

On 15 August 1941, Madigan submitted his findings to Patterson. In a 20-page report, he set forth the case for consolidating all War Department construction, real estate, and maintenance activities in the Corps of Engineers. He presented the time-honored arguments. The Corps was a technical branch specializing in construction. Madigan stressed the civil works experience and the wartime mission of building in theaters of operations. The Corps possessed "a well-established, relatively large and going organization." Madigan pointed out that because of their civil program the Engineers could maintain this organization in time of peace. Moreover, he asserted, military construction would further the training of Engineer officers. As for the maintenance function, he pointed to the "obvious advantage" of having structures kept up "by the same organization which built them." Madigan supported his conclusions with statistical tables and maps. As an appendix to the report he included a draft of a bill transferring these Quartermaster functions to the Engineers.[95] Patterson read the report and promptly approved it.

Having decided what course to take, the Under Secretary moved fast. On the 15th, the same day Madigan turned in his report, Patterson recommended to Stimson "that the entire job . . .

[92] Madigan Interv, 18 Jun 56.

[93] (1) *Ibid.* (2) Rpt, Madigan to Patterson, Consolidation of Constr Work, WD, 15 Aug 41. EHD Files.

[94] (1) Groves Interv, 19 Jun 56. (2) Groves Comments, IX, 3.

[95] Rpt, Madigan to Patterson, Consolidation of Constr Work, WD, 15 Aug 41.

be given to the Engineers." In a memorandum for the Secretary, Patterson said:

> The Engineers . . . are now organized, and have been for years, on a country-wide basis. They have their district organizations. . . . If they had had charge of Army construction a year ago, they would have moved in with a going organization and the program, I am sure, would have been carried out in better fashion than was the case with the Quartermaster.

He informed the Secretary that new legislation would be necessary, adding, "If you approve, I will see that the bill is prepared and put into the proper channel."[96] On the 15th he also wrote to Marshall, attaching a copy of his comments to Stimson and stating, "I am sure that such a measure would clear up a good many of our troubles."[97] On the 16th the Secretary returned Patterson's memo with the notation: "I fully approve of this. You begin the necessary steps to carry it out. HLS."[98] At that Madigan was ready to send the bill to Congress, but Patterson restrained him. This was a matter for the Chief of Staff. General Marshall was with the President, conferring with Churchill off the Newfoundland coast. They would have to wait. Meantime, Madigan took a copy of his report to the Secretary of the General Staff, who agreed to show it to Marshall.

Upon his return to Washington, the Chief of Staff sent for Madigan, who gave the following account of their conversation. The time was 8:30 A.M.; the probable date was Monday, the 18th of August. Marshall began by saying that he had read Madigan's report and liked it, but he had a somewhat different plan in mind. He did not think construction should go to the Engineers. He favored establishing a separate corps. A major general, a man with a strong technical background, would head the new organization. His staff would be heavily civilian. The major general would prepare estimates, appear before Congress—before Marshall could go further, Madigan broke in. That major general, he said, would have the same standing on the Hill as a Salvation Army general. "Every member of Congress knows the Chief of Engineers by name," he declared. "If you want to throw away the best political contact anyone ever had with Congress, I can't stop you." Madigan had scored. Marshall saw the light. "We'll put it in the Engineers," he said. Madigan rose to leave, then he turned and said, "One favor; no staff study, please." Marshall agreed. He wrote "O.K., GCM" on the report and asked Madigan to take it to General Moore to implement. Marshall then added a condition of his own. Madigan was to handle the defense of the bill before the congressional committees. The Chief of Staff wanted Army officers kept out of it.[99]

During the last 2 weeks of August, several other noteworthy developments took place. Around the 20th, the President sent his nomination for the next Chief of Engineers to the Senate. The choice was General Reybold.[100] On the 29th Stimson took a résumé of Madigan's

[96] Memo, Patterson for Stimson, 15 Aug 41. AG 020 (4-21-39).
[97] Memo, Patterson for Marshall, 15 Aug 41. G-4/31324.
[98] Quoted in Memo, Reybold for Marshall, 26 Aug 41. G-4/31324.
[99] Madigan Interv, 18 Jun 56.
[100] *ENR*, August 21, 1941, p. 7.

study to a Cabinet meeting and showed it to the President. Roosevelt looked it over, said he "loved it," and initialed it "O.K., FDR."[101] At this point General Gregory appeared in Patterson's office to ask if rumors that a transfer bill would soon be introduced were true. Patterson said they were. Gregory thereupon decided to appeal to the Chief of Staff.[102]

In a memorandum to Marshall on 4 September, he defended his construction record and protested against the proposed transfer. Gregory pointed out that the Quartermaster Corps had labored "in the heat of the day" to accomplish the tremendous task of housing the new Army. It had done the work well, he said, and had done it on time. Submission of a bill to relieve the Quartermaster Corps of construction at this time would, he declared, have "a rather unfortunate effect upon the morale of the Quartermaster officers who will feel that the transfer is being made because of the manner in which the work was being performed rather than for other considerations." Gregory proceeded to attack Madigan's arguments for a change. The Quartermaster Corps had handled construction at military posts for over a century and a half. Rivers and harbors work afforded no experience for building cantonments and munitions plants. In any event, work in the United States was merely incidental to the Engineers' real mission—construction in theaters of operations. "It is inconceivable," Gregory contended, "that during a major emergency involving active operations, that the Engineer Corps should or would neglect its important functions on the field of battle by directing its personnel . . . to carry on routine construction in the Zone of the Interior." To state that military construction in this country would give the Engineers valuable experience was untrue. Combat construction was quite different from any work performed by the Quartermaster Corps. "Both the Engineer Corps and the Army as a whole would suffer by any attempt to combine these two inherently different activities." Gregory regarded maintenance and repairs as "a distinct and separate problem." This work was intimately bound up with Quartermaster duties at every Army post.



GENERAL REYBOLD

[101] (1) Madigan Interv, 18 Jun 56. (2) Memo, Patterson for Dir of the Budget, 29 Aug 41. USW Files, Constr, Transfer QM–CE.

[102] (1) Gregory's Testimony, 1 Oct 41. In H Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on H R 5630, p. 70. (2) Patterson's Testimony, 22 Sep 41. In S Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on S 1884, p. 26.

WAR DEPARTMENT
OFFICE OF THE UNDER SECRETARY
WASHINGTON, D. C.

August 28, 1941

MEMORANDUM FOR THE PRESIDENT:

Subject: Transfer of Army Building Construction to Corps of Engineers.

The present law requires that building construction for the Army be done by the Quartermaster. In 1940 Congress provided that the Secretary might assign part of the construction program to the Engineers. The Secretary, accordingly, assigned all Air Corps construction and all work on the Atlantic island bases to the Engineers.

The result is that now two-thirds of the construction work is being done by the Quartermaster, one-third by the Engineers.

I have drafted a bill which will put all Army construction work with the Engineers. It seems plain: first, that responsibility for construction work should be concentrated in one branch; second, that the Corps of Engineers is the branch best suited for handling the work.

The Engineers, as you know, do a great deal of civilian construction in normal times, rivers and harbors, flood control, etc., and are a going concern. The Quartermaster, on the other hand, has normally no adequate organization to handle construction. If we had had the Engineers on the entire construction program last year they would have moved in with an experienced organization and much waste would have been avoided.

The Secretary of War, the Chief of Staff and all others in the War Department familiar with the problems, are in favor of placing this entire work with the Engineers.

If you will give your approval, I will advise the Budget that the bill is in accordance with your policy and will take the necessary measures.

Robert P. Patterson,
Under Secretary of War.

OK FDR
8/29/41

> The Quartermaster Corps is already on the job [he wrote]. It is in intimate touch with every phase of Army life. There is a Quartermaster officer wherever a group of soldiers can be found. The Engineer Corps, on the other hand, handles specialized work usually completely aloof from the rest of the Army and entirely out of touch with the day to day life of military organizations.

He strongly advised the Chief of Staff to keep things as they were.[103]

Marshall had no intention of preserving the *status quo*, but he was impressed with Gregory's argument concerning maintenance and repairs. He turned to General Moore for advice.[104] After consulting Reybold, Moore informed the Chief of Staff that maintenance was not a separate problem; it was closely related to new construction. "Maintenance of buildings, of sewer and water systems, and of roads certainly is not to be classed as housekeeping activities," Moore wrote. "It is civil engineering and would be of immense value to combat engineers." In closing, Moore repeated Madigan's statement: "The proposed consolidation will insure that all structures of the Army are maintained by the same organization which built them and which is familiar with their design and construction."[105]

That settled the matter. Gregory's protest had failed. Attention now centered on Congress.

The "Madigan Bill"

On 3 September 1941 Senator Elbert D. Thomas introduced the transfer measure in the Senate; five days later Representative May introduced an identical measure in the House.[106] The bills went to the Committees on Military Affairs. Meanwhile, in the War Department, sponsors of the plan began to map their strategy, conscious that there must be no tactical blunders while hearings were in progress. Patterson and Madigan carefully selected the men to appear before the congressional committees. Only one military man would testify—the Chief of Staff. The other witnesses would be Knudsen, Harrison, Patterson, and Madigan. When Knudsen and Harrison informed him that they would be unable to attend the hearings, Patterson did not replace them. To obviate the need for testimony by The Quartermaster General, Marshall would introduce Gregory's memorandum of 4 September.[107] That others might come forward to oppose the transfer had to be considered.

A possible opponent of the transfer was Senator Truman, whose investigating committee had recently gone on record as favoring a separate construction corps. His views would carry weight with the Senate. In mid-September Amberg learned that Truman was on his way to St. Louis and would be there for a few days at the Hotel Coronado. Madigan flew to St. Louis, went to Truman's room, and, sitting on the bed, persuaded him to go along with the transfer. Madigan wrote out a telegram to Chairman

[103] Memo, Gregory for Marshall, 4 Sep 41. QM 600.1 1918–41.

[104] Handwritten note, Marshall to Moore, undated. OCS 16600–88.

[105] Memo, Moore for Marshall, 8 Sep 41. OCS 16600–88.

[106] 87 *Cong. Rec.* 7250, 7393.

[107] (1) Marshall's Testimony, 22 Sep 41. In S Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on S 1884, p. 20. (2) Memo, Patterson for H. C. Peterson, 16 Sep 41. (3) Memo, Patterson for Knudsen, 17 Sep 41. Last two in USW Files, Constr, Transfer QM–CE. (4) Memo, Harrison for Patterson, 19 Sep 41. WPB Files, 411.33 (Constr Projs—Mil) 1940–41.

Reynolds of the Senate Military Affairs Committee: "Recommend that Senate Bill 1884 be favorably reported. It does not meet completely the recommendations of Special Committee . . . , but it is a step in the right direction." Truman signed the telegram and Madigan sent it.[108]

Important though they felt it was to have key Senators on their side, proponents of the measure knew that success or failure might hinge upon the attitude of the construction industry. It therefore came as a relief to them when *The Constructor*, official organ of the AGC, announced that the "national association is taking no position with respect to the legislation."[109] At first no such assurance was forthcoming from the engineering societies. On 11 September, the *Engineering News-Record* pointed out that the Corps of Engineers had "hitherto done little" building construction.[110] A week later the magazine expressed doubt that the Engineers could handle the job.[111] Members of the profession registered concern. Over the years the Corps of Engineers had relied heavily upon its own forces for engineering and design. Fearful that the Corps would discontinue the Quartermaster practice of contracting for professional services, representatives of engineering societies throughout the country went to Washington to confer with high-ranking Engineer officers. Reybold and Robins assured them there would be no change in the method of doing business. Apparently satisfied, the delegates returned home.[112] A short time later, the *News-Record* changed its tune. Commenting editorially on the proposed transfer, the publication stated:

> Consolidation of the Construction Division of the Quartermaster Corps with the Corps of Engineers . . . would appear to be a logical step toward greater efficiency in army construction. And not only should it save the nation money and time in an emergency such as that of the present, but consolidation will be an advantage to both of the Army organizations involved. Neither has had a fair deal under the artificial division of authority that existed heretofore.
>
> . . . . . .
>
> So, from many angles, the consolidation promises advantages. It gives the Army, in one branch of the service, the efficient decentralized and experienced construction and contracting organization of the Corps of Engineers and the building design, construction and maintenance experts of the Construction Division of the Quartermaster Corps. It gives to these previously separate forces the abilities that each lacked separately, and it guards them against being made scapegoats in impossible situations. It furthermore assures the nation an efficiency in emergency defense construction which it has previously been denied.
>
> There is one other advantage. When peaceful times come back again the men who served temporarily in the Corps of Engineers during this emergency will go back into civil life with a broader experience in construction operations than could have been obtained in either of the two agencies of the old set-up; and the professional soldiers who remain in the Corps of Engineers with its broadened scope of peacetime activities will gain the more diversified experience that is so essential to efficient expansion in some future emergency.[113]

[108] (1) Memo, Amberg for Madigan, 17 Sep 41. USW Files, Constr, Transfer QM–CE. (2) Madigan Interv, 18 Jun 56. (3) Telg, Madigan to Patterson, 21 Sep 41. Madigan Files, Bill—Re Consolidation.

[109] *The Constructor*, October 1941, p. 26.

[110] *ENR*, September 11, 1941, p. 66.

[111] *ENR*, September 18, 1941, p. 1.

[112] (1) Tel Conv, Styer and Dist Engr Chicago, 16 Jan 42. Opns Br Files, GLD. (2) Patterson's Testimony, 30 Sep 41. In H Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on H R 5630, pp. 9–10.

[113] *ENR*, September 25, 1941, p. 53.

On the morning of 22 September, the Senate Military Affairs Committee began hearings on the proposal. Appearing as the first witness, Patterson gave the War Department's reasons for advocating a change. The request for legislation, the Under Secretary stated, was not a reflection upon General Gregory and his organization. The Quartermaster Corps had performed creditably under most adverse conditions. Nevertheless, Patterson testified:

> I submit that better results will be obtained by placing the work with the Engineers . . . . The Engineers in normal times have a well-established, large, active organization for construction work, due to the many projects of a civilian character which they direct and carry to completion. In war or in time of national emergency, it requires no great effort to turn that organization to the task of building what may be needed for the Army. The Quartermaster Corps, on the other hand, has little to do in the way of construction in normal times, and its organization is necessarily not on a large scale. With the coming of an emergency, it has to build its organization from the grass roots. There can be no question, I think, that the waste that always goes with haste will be kept to a minimum if the Engineers take over the entire task.

To strengthen his case, Patterson read a letter in which Harrison and Knudsen gave the bill their unqualified indorsement.[114] General Marshall followed the Under Secretary to the stand. "I think this is a very important measure," he told the committee. "It is fundamentally sound; it is logical; it should have been done long ago." After introducing Gregory's letter, he continued: "I am speaking with very great frankness to you gentlemen. There is no doubt whatever in my mind that this is the thing to do. It is businesslike, it is decidedly to the advantage of the Government, and it certainly would be a great help to the War Department."[115]

The Senators were well disposed. When Marshall submitted Gregory's memorandum, the committee members paid scant attention to the argument for keeping construction in the Quartermaster Corps. Nor did they comment on Patterson's thin excuse that Madigan had not discussed the matter with The Quartermaster General because one or the other of them had always been "out of town." After Marshall concluded his remarks, several members announced that they were ready to vote then and there. But Senator Chan Gurney objected. Although he favored the bill and intended to vote for it, he demanded that The Quartermaster General be heard. The committee asked Gregory to appear that afternoon. Just before the noon recess, Chairman Reynolds read a telegram from Senator Truman urging the committee to report the bill favorably.[116]

At four o'clock that afternoon, General Gregory found himself in the position that his predecessor, General Rogers, had occupied twenty years before. Not wishing to be in diametric opposition to Patterson, Marshall, and Stimson, Gregory told the committee that his department or the Corps of Engineers could do construction equally well. But on the question of maintenance, he took a stronger stand. This function was bound up with Quartermaster activities on every post and could not be separated from them without loss of

[114] S Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on S 1884, pp. 2–17.

[115] *Ibid.*, pp. 17–22.

[116] *Ibid.*, pp. 26, 36–37.

efficiency. Moreover, Gregory stated: "The Engineer Corps is primarily a combat organization. Its officers are trained along those lines. They are eligible for promotion in the line. To saddle them with the task of maintenance and repair—which would occupy, if done properly, at least half of their personnel—seems to me rather poor organization." Madigan countered by introducing Moore's memorandum for Marshall on the maintenance question. The Senators proceeded to give the measure their unanimous indorsement and reported the bill out favorably that afternoon.[117]

The House committee hearings, held on 29 September and 1 October, proved to be more searching. The Congressmen were less inclined to accept Patterson's and Marshall's arguments than the Senators had been. Representative Faddis saw no reason why the Quartermaster Corps could not perform all construction and thus put an end to the duplication that War Department spokesmen made so much of.[118] Representative Kilday questioned Madigan closely. Apparently suspecting some subterfuge, Kilday kept probing for hidden motives. He did not like the treatment Gregory had received. Although Madigan had worked on the transfer for three months and had discussed it with scores of persons, including Somervell, he had not gotten around to The Quartermaster General. Furthermore, Kilday felt that Gregory had been less than candid. Chairman May, a strong supporter of the bill, tried to end discussion on this point by ruling that it had nothing to do with the legislation under consideration. Kilday declared that it did. When he threatened to appeal to the committee, May gave in and let him continue. Under questioning, Madigan admitted that officers were prohibited from expressing opinions contrary to those of the President, the Secretary of War, and the Chief of Staff. "This phase of the Army regulation," Kilday emphasized, "always confronts an officer who appears before a committee."[119]

Members of the House group seemed interested in hearing Gregory's side of the case. But on the stand, The Quartermaster General again refused to speak out against the proposed consolidation. There was, he said, no question but that all construction ought to be under one branch. Whether that branch was to be the Corps of Engineers or the Quartermaster Corps was a matter for Congress to decide. "This bill," Gregory stated, "has been presented as a War Department bill, and I feel that I cannot properly oppose it." On the question of maintenance, he told the committee that he had a "decided feeling." This function, as he had pointed out to the Senate group, was a part of Quartermaster work at every post and should remain so.[120]

The hearings were over. All had not gone well. Marshall feared that Madigan had "antagonized the committee." Several members had joined Kilday and Faddis in opposition to the transfer. These men felt that construction could be consolidated as conveniently in the Quartermaster Corps as in the Corps of

[117] (1) *Ibid.*, pp. 38–49. (2) S Rpt 680, 77th Cong, 1st sess, Sep 22, 1941.

[118] H Comm on Mil Affs, 77th Cong, 1st sess, *Hearings* on H R 5630, p. 43.

[119] *Ibid.*, pp. 55–57.

[120] *Ibid.*, pp. 60–61.

Engineers. Moreover, they were convinced that higher-ups had muzzled Gregory. So powerful was their opposition that the committee failed to report the bill to the House. Chairman May sent word to Marshall that he thought it would be necessary for General Somervell to come before the group and make a "strong presentation" in order to break the deadlock.[121] The Chief of Staff apparently saw no merit in this suggestion, for he did not send Somervell to testify. Possibly Marshall believed that the Congressmen had already heard every conceivable argument. Possibly he felt it would be unwise for Somervell to submit himself for questioning; some representative would probably ask what part he had played in the legislative planning, while he was Gregory's assistant.

Two weeks went by during which Patterson and Madigan pondered their next move. No word came from the House committee. On 13 October Chairman May informed the Under Secretary that the leadership was disinclined to press for early passage of the bill.[122] Patterson grew impatient at the delay. In his talks with Congressmen he emphasized that the President was interested in the measure. On the 14th he sent a photostatic copy of the memorandum bearing Roosevelt's handwritten "OK" to the House committee chairman.[123] That day, the committee voted 14 to 5 in favor of the bill. House Majority Leader John W. McCormack still held back. With him, as with the committee members, Patterson stressed the fact that the bill had the President's approval.[124]

The Senate passed the measure on 16 October, but the House was slower to act. Although Majority Leader McCormack was on the whole favorably disposed toward the bill, he feared that Quartermaster officers would suffer discrimination when they came under the Chief of Engineers. Patterson assured McCormack that General Reybold had promised to give "all officers of the Quartermaster Corps now engaged in construction work . . . the same measure of consideration that would have been accorded to them had they been connected with the Corps of Engineers over the past years." Reybold needed these men, Patterson maintained, and would give them every opportunity to serve in positions of responsibility equivalent to or better than the ones they then occupied.[125] McCormack believed that everyone would be better satisfied if an amendment to this effect were added to the bill. As agreed upon by McCormack and Patterson, the amendment stated that all officers on duty with the Construction Division would come under the jurisdiction of the Chief of Engineers "in their present rank and subject to all permanent and temporary advances in rank that may be accorded officers in the Corps of Engineers, without additional examinations of any kind."[126] The amendment gained prompt acceptance. On 21 November the House

[121] Memo, Lt Col Carlisle V. Allan for Marshall, 1 Oct 41. OCS 16600-88.
[122] Memo, Patterson for Madigan, 13 Oct 41. USW Files, Constr, Transfer, QM-CE.
[123] Ltr, Patterson to May, 14 Oct 41, Same File.
[124] Memo, Patterson for Madigan, 14 Oct 41. Same File.
[125] Ltr, Patterson to McCormack, 21 Oct 41. Same File.
[126] Ltr, Patterson to McCormack, 18 Nov 41. Same File.

passed the measure and on 1 December the President signed it into law.[127]

The long struggle was ended. Happy over the outcome, Patterson congratulated Madigan. Calling the act the "Madigan Bill," the Under Secretary presented him the pen the President had used to sign the measure. "It is appropriate," Patterson said, "that you have this little memento, because it was due to your efforts that this very salutary move has now been consummated."[128] Although the transfer of maintenance caused some misgivings, the Engineers were on the whole well satisfied. The long-sought construction function was theirs.

Consolidation

Somervell took the lead in drafting a plan for the merger. Early in September, shortly after the transfer bill went to Congress, he and Styer framed a proposal for the Chief of Engineers, outlining a scheme for consolidating the two construction agencies. In his preface to this plan Somervell wrote:

> In the reorganization of the Office of the Chief of Engineers and in the consolidation of construction work in the field, which represent the greatest change of activities of the Corps in its entire history, care should be taken not only to take advantage of the best in both the Corps of Engineers and the Quartermaster Corps but to place emphasis on the major task or mission of the new organization. The construction work of the Quartermaster Corps overshadows overwhelmingly the construction work being done by the Corps of Engineers, and military construction both in amount and importance bids fair to continue to be the major effort of the Engineers for several years . . . . Under no circumstances should the less important, slow moving, civil works be permitted to dominate the reorganization for vital, fast-moving and extensive requirements.[129]

Proceeding from these assumptions, he proposed sweeping changes in the Engineer setup. The central office in Washington, which would direct all construction, military and civil, would be organized along the lines of Somervell's own office. Division boundaries would be fluid: for military construction, they would coincide with those of the corps areas; for civil works, they would continue to follow major watersheds. The new organization would have plenty of rank. There would be a deputy Chief of Engineers, a major general; and a brigadier would head each Engineer division.[130] The plan was both general and tentative, for many details were lacking and many problems unsolved.

In taking the initiative, Somervell may have been seeking an answer to questions surrounding his own future. Keenly disappointed over the failure of his bid for the top Engineer post, he began, evidently, to picture himself as deputy chief. Through the fall of 1941 he importuned Madigan to get him a second star, but Madigan was powerless to help.[131] The new Chief's attitude toward Somervell was much the same as Schley's. "A firecracker," Reybold later said, "but ruthless. He didn't care who

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[127] (1) 87 *Cong. Rec.* 9005, 9400. (2) 55 *Stat.* 787.

[128] Ltr, Patterson to Madigan, 3 Dec 41. USW Files, Constr, Transfer, QM–CE.

[129] Memo on Consolidation of Constr Div OQMG with the Corps of Engrs, 12 Sep 41. Opns Br Files, Orgn and Consolidation.

[130] (1) Memo, Somervell for CofEngrs, 8 Sep 41. Madigan Files, Consolidation Bill, Collateral Data. (2) Memo, Styer for Somervell, 10 Sep 41. Opns Br Files, Orgn and Consolidation.

[131] Pagan Interv, 8 Mar 57; Madigan Interv, 18 Jun 56.

he hit."[132] While continuing to hope for a favorable outcome, Somervell retreated into the background, leaving Styer to work out details of the merger with Robins and his group in OCE.

Concerted planning began in mid-October, when the Senate passed the transfer measure. On the 17th, after conferring with OCE, Styer drew up a plan for combining Somervell's Washington office with Robins'. The new Construction Division, OCE, like the old one in OQMG, would have five branches—Engineering, Operations, Contracts and Claims, Real Estate, and Repairs and Utilities. The Fortifications Section, OCE, long a part of the Chief's Military Division, was to be under Operations. Headquarters would be in the Railroad Retirement Building, where Somervell had his office, rather than in the New War Building with the rest of Reybold's staff. By 21 October, when G–4 directed Gregory and Reybold to collaborate on plans for the transfer, Styer's blueprint for reorganizing OCE had already won acceptance.[133]

Combining the two field systems posed a far knottier problem than joining the central offices. The Engineer divisions, unlike the zones, were not coterminous with the corps areas. Only two cities were headquarters for both a corps area and a division. On 21 October, declaring it "essential that effective close liaison be maintained at all times between" the construction agency "and the Corps Area Commander and his staff," Styer proposed that the boundaries and headquarters of nine Engineer divisions be the same as those of the zones. Two divisions, Upper Mississippi Valley and Lower Mississippi Valley, would stay as they were; they would have no part in military construction but would devote themselves exclusively to civil works.[134] This plan ran into strong opposition from the Engineers. Another solution had to be found.

While the new field setup was under discussion, Reybold and Gregory came to an understanding about maintenance and repair. The Chief of Engineers would "operate all plants and installations and perform those functions which, in a city, would be the responsibility of a city manager." The Quartermaster General would continue to have charge of branch depots and to run bakeries, laundries, shoe repair shops, and the like. On 19 November G–4 sent the plan to the Chief of Staff with the recommendation that it go into effect fifteen days after the transfer bill became law. General Marshall concurred.[135]

By mid-November Styer was ready with a new scheme for reorganizing the field. For the time being, there would be no changes in division boundaries and no moving of headquarters. Zone offices at Boston, New York, Baltimore, Chicago, Omaha, and San Francisco would combine with districts in those cities. The zones at Atlanta, Columbus, and San Antonio, where the Engineers had no offices, would become districts

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[132] Reybold Interv, 12 Mar 59.

[133] (1) Memo, Styer for Robins, 17 Oct 41, and Incl. Opns Br Files, Orgn and Consolidation. (2) WD Ltr AG 600.12 (10–20–41) MO–D to TQMG, 21 Oct 41. QM 600.1 (Transfer of Constr Activities from QMC to CE) 1918–41.

[134] Memo, Styer for Robins, 21 Oct 41. Opns Br Files, Orgn and Consolidation.

[135] (1) Ltr, Gregory and Reybold to TAG, 10 Nov 41. 601.1 (QMC) Part 1. (2) Memo, G–4 for CofS, 19 Nov 41. G–4/31324. (3) Memo, Gregory for G–4, 24 Nov 41. QM 601.1 1918–41.

and the Zone Constructing Quartermasters would become district engineers. As yet Styer had proposed nothing controversial; now he proceeded to do so. According to his plan, districts in the same cities as corps area headquarters would deal directly with the Chief's office on maintenance and on all construction coming under corps area commanders. Thus he would create from former zones superdistricts co-equal with Engineer divisions. Forwarding this plan to Robins on 17 November, Styer explained its advantages. First, it would cause little interference with work in progress; second, it would make full use of existing field offices; and third, it would retain essential relations with corps area commanders. Robins sent the plan to the divisions for comment.[136]

Division engineers reacted strongly. From Colonel Hannum at San Francisco came the comment:

> The organization of the Engineer Department in three echelons, the Office of the Chief of Engineers, the Division Engineer, and the District Engineer, is the result of many years' experience; and its suitability for rapid expansion to meet efficiently any temporary or permanent major increase in work has been amply demonstrated, especially so in connection with the Air Corps construction assigned to the Corps in the present calendar year. It is my fixed opinion that this organization and procedure should not be departed from until the necessity therefore is amply demonstrated by experience.
>
> The suggested plan offered by Colonel Styer appears to endeavor to make the field organization of the Engineer Department fit into the present field organization of the OQMG, instead of fitting the work of the latter into the organization and procedure of the Engineer Department.[137]

Writing from Vicksburg, General Tyler complimented Styer on his "careful and exhaustive study" of a "difficult problem," but pronounced the result unsatisfactory. "In my opinion," Tyler warned, "any plan that is dependent upon a compromise between our present decentralized organization and a centralized responsibility will suffer the same fate as has attended previous efforts in that direction." Similarly, Col. John S. Bragdon of the South Atlantic Division complained that Styer's plan did "not make use of the decentralized organization of the Corps of Engineers."[138] Col. C. Lacey Hall of the Ohio River Division had this to say:

> Consolidation with the Corps of Engineers, which it was desired to secure by the new Act, can only be carried out effectively if the Department's tried and true system is exercised on all the work to which it applies. The Division Engineers are supposed to be officers of experience, qualified to take some engineering load off the Department. There should be no construction work within their Division not under their control.

To a man, division engineers opposed letting districts do business directly with the Chief.[139]

At a meeting held by General Robins shortly before the transfer, their conduct was revealing. At General Reybold's request, Groves agreed to present his "views as to how the work should be carried on if transition difficulties were

[136] (1) Memo, Styer for Robins, 17 Nov 41, and Incl thereto. Opns Br Files, Orgn and Consolidation. (2) Ltr, Robins to Tyler, 21 Nov 41. 600.1 (QMC) Part 1.

[137] Ltr, Hannum to Robins, 25 Nov 41. 600.1 (QMC) Part 1.

[138] (1) 1st Ind, 26 Nov 41 on Ltr, Robins to Tyler, 21 Nov 41. (2) Ltr, Bragdon to Robins, 1 Dec 41. Both in 600.1 (QMC) Part 1.

[139] (1) Ltr, Hall to Robins, 29 Nov 41. (2) Replies from other Division Engineers. Both in 600.1 (QMC) Part 1.

to be minimized and if the Engineers were to come out with the reputation that we wanted to come out with." On being introduced by the Chief as "an authority who knew what he was talking about," Groves sensed a sudden chill. There before him was a very senior group. General Tyler, a former Assistant Chief of Engineers, had been president of the Mississippi River Commission and Engineer of the Lower Mississippi Valley Division since 1939. Col. John N. Hodges of the North Atlantic Division had been a temporary brigadier general when Groves was a cadet. And in 1919 Colonel Hannum, then a temporary colonel, had been a member of the board that passed on Groves' promotion to 1st lieutenant. To Groves it appeared that the division engineers thought they "could handle the program very easily, even if the Quartermaster had, as they put it, fallen down." Their attitude, he afterward wrote, "was quite contemptuous of the achievements of the QM. It was also very contemptuous of any ideas and views which I presented. They simply were not mentally prepared for the problems which they were going to face."[140] The reaction of the division engineers to Groves and his reaction to them could not be viewed wholly in terms of a junior instructing his elders. Deep-seated differences of opinion as to organization and methods lay beneath the surface.

The shape of things to come was more clearly discernible, when, on 25 November, Somervell became Assistant Chief of Staff, G–4. He had not sought the post and did not want it. In fact, he considered the appointment a reversal. Mrs. Somervell, reflecting her husband's mood, complained that they were back where they started.[141] The general, in a farewell letter to the Construction Division, expressed deep regret "that this necessitates the severing of the fine and long to be remembered associations . . . with the many loyal individuals . . . who compose this splendid organization."[142] The unwelcome G–4 post would eventually be the springboard to a much more prominent position. Meanwhile, Somervell's departure from the construction scene helped smooth the way to consolidation. Colonel Styer became Acting Constructing Quartermaster General. His term was brief.

With the signing of the transfer bill on 1 December 1941, preparations for the changeover went forward rapidly. Robins directed district engineers to report to divisions on all matters except repairs and utilities and to keep division engineers fully informed of all their activities. Styer told Constructing Quartermasters when and to whom they would report; completed arrangements for transferring funds, property, and records; briefed chiefs of using services on the workings of the Engineers' decentralized organization; and prepared implementing orders.[143] The consolida-

[140] Groves Comments, X, 14–15. See also Hardin Interv, 29 Apr 64.

[141] (1) Tel Conv, McShain and Groves, 23 Dec 41. Opns Br Files, WD Bldg, Arlington. (2) Pagan Interv, 8 Mar 57.

[142] Ltr, Somervell to Members of Constr Div, 25 Nov 41. Opns Br Files, Drafts.

[143] (1) OCE Constr Circ Ltr 202, 9 Dec 41. (2) Telg, Gregory to George, 13 Dec 41. Opns Br Files, Telgs. (3) Ltr, Robins to Tyler, 15 Dec 41. 600.1 (LMVD) Part 1. (4) WD Ltr AG 600.12 (11–10–41) MO–D, 3 Dec 41. EHD Files. (5) WD Circ 248, 4 Dec 41. (6) Memo, Reybold for Wesson, 11 Dec 41. 600.1–614a. (7) Memo, Daley for Leavey, 11 Dec 41. Engrg Br Files, Office Orgn.

tion machinery moved with clocklike precision.

Among the men and women involved, there was considerable uncertainty and heartache. Old loyalties could not be tossed lightly aside. Adjustments were not always easy. There was bitterness on the part of some Quartermaster officers and experienced civilian employees. There was the usual lack of desire to leave an old home for a new one. The situation demanded delicate handling, and it received it. All Regular Quartermaster officers on construction duty had complete freedom of choice as to whether they would remain with construction or go to other duties in the Quartermaster Corps. Regulars with sound background in construction could, if they wished, transfer permanently to the Corps of Engineers. Many fine construction officers—Thomas, Nurse, and Dunstan, among the older men, and Renshaw, Kirkpatrick, and Sciple, among the younger—traded the Quartermaster insignia for the Engineer castle. A number, with brilliant construction records, among them Danielson, Hastings, and Dreyer, did not choose this course. Cognizant of the feelings of the Quartermaster group, the Engineers tried to give every consideration consistent with the country's welfare to the problems of each individual, military or civilian.

On 16 December 1941 the transfer was effective. That day General Reybold, noting that construction had become the first unified command in World War II, remarked:

> Consolidation of the construction functions of the Quartermaster Corps and the Corps of Engineers brings together organizations that are engaged in a 3½ billion dollar defense program, embracing projects in every State, in Alaska, Panama, and Hawaii, and at island bases throughout the Western Hemisphere. This vast program engages the attention of some 600,000 individuals, including contractors' employees. If we were organized as a corporation we should be the world's largest. In fact, this merging of functions involves about the same number of persons as might be affected if the United States Steel Corporation should decide to combine with the Bell Telephone System.

"Obviously," he added, "it will take some time to work out all the details."[144]

Time was pressing. Barely more than a week had passed since the attack on Pearl Harbor.

[144] Quoted in Lt. Gen. Eugene Reybold, *Engineers in World War II: A Tribute* (Fort Belvoir, Va., 1945), p. 3.

CHAPTER XV

The Impact of War

The United States entry into the war galvanized the rearmament effort. Referring, on 9 December 1941, to the gradual buildup during the preceding 18 months, President Roosevelt stated, "It is all only a beginning of what still has to be done."[1] Maximum strength in minimum time replaced earlier goals. Sights were much higher than before. Schedules were much tighter. Demand was heaped upon demand. Pressure was ever increasing. A construction program of gigantic size and staggering complexity paced the all-out drive to mobilize resources. During the first critical year of war, several thousand military projects estimated to cost more than $7 billion assumed acute urgency. As head of the newly unified construction command, General Reybold declared: "The job may be tough, but we can and will do it."[2] The sooner this promise was redeemed, the sooner would the war be won.

The All-Out Program

The Pearl Harbor disaster had an almost immediate impact upon the building program. A warm clear Sunday in most parts of the country, 7 December 1941 was a workday at most major projects. Construction crews, pressing to take advantage of the waning autumn weather, learned of the surprise attack when loudspeaker systems broadcast the news and when officers, many of whom customarily wore business suits, suddenly appeared in uniform to announce the outbreak of war. Word passed through union ranks that a nationwide walkout scheduled for Tuesday by the Welders Brotherhood had been called off. At the Ravenna Ordnance Plant, strikers returned to their jobs. As excited workmen left for home that evening, armed guards patrolled every project. Telegraphic orders from General Reybold had called for precautions against sabotage.[3] In a few hours the whole outlook had changed. For some months the construction program had shown signs of tapering off. It was now certain that much more work would be coming.

The rush began the following morning. In a memorandum for Groves, General Campbell asked that all Ordnance plants "be completed and available for production at the earliest dates possible."[4] Telephoning Leavey from G–4, Colonel Chamberlin relayed instructions from Somervell to push camp construction "vigorously to completion." At Styer's

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[1] *Public Papers and Addresses*, X, 526.

[2] Maj. Gen. Eugene Reybold, "Mobilizing Construction for Victory," *The Constructor*, March 1942, p. 51.

[3] *ENR*, December 11, 1941, p. 13.

[4] Memo, Campbell for Groves, 8 Dec 41. Madigan Files, Ord–TNT.

direction, Groves issued expediting orders to the field.[5] Meanwhile, requests for additional projects deluged General Moore's office. On Monday afternoon, shortly after Congress declared war against Japan, a group of construction officers appeared to testify before the Senate Appropriations Committee. The estimate under consideration, the third supplemental for 1942, had received a thorough going-over in the House two weeks earlier. The Representatives had pared several items and had closely questioned Somervell and Reybold about construction costs.[6] Now, the Senators wasted no time trying to economize. Instead, they concentrated their efforts on providing all that was necessary and on getting "this bill passed at the earliest possible opportunity."[7] Recalling "the beating we took" before the House committee in November, Colonel Plank described what happened on the Monday after Pearl Harbor. "We were just given a blank check," he said. "That's how quickly the damn thing changed. And, of course, from then on, you didn't have any troubles in terms of getting funds."[8]

Face to face with the grim actuality of war, military leaders made hasty reappraisals of construction needs. Taking note of "the national situation," General Campbell on 8 December outlined the "order of preference" for various types of Ordnance plants. TNT topped the list. Tanks, small arms ammunition, anhydrous ammonia, and oleum also ranked high.[9] With Groves' help, Campbell began at once to map plans for quickly increasing TNT capacity.[10] Reacting to the news from Hawaii and the Philippines—to reports of aircraft destroyed on the ground at Hickam and Clark Fields—General Arnold on 9 December called for camouflage and revetments at stations within the air frontiers and for additional runways and auxiliary fields to permit wider dispersal of planes. For a time there was talk of "a fighter base every five miles."[11] Anticipating a "greatly increased volume of shipments overseas," Somervell conferred on 10 December with Quartermaster, Ordnance, and lend-lease representatives. The result was a decision to build intermediate general depots to regulate the flow of supplies to ports on the Southeast, Gulf, and West Coasts and to construct special ammunition loading piers at all principal ports.[12] Estimates could not be ready in time for inclusion in the bill then before the Senate. Requests for additional funds would go to Congress early in the new year.

The old dictum, "time is of the essence," took on added meaning. On 9 December Patterson told Reybold that speed was all important and money was no object. Complete construction with "utmost dispatch," he directed, and

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[5] (1) Memo, Styer for Groves, 8 Dec 41. Opns Br Files, Opns Br. (2) Memo, Styer for Patterson, 8 Dec 41. 652 I.

[6] H Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings on the Third Supplemental National Defense Appropriation Bill for 1942*, Part 2, pp. 154–244.

[7] S Subcomm of the Comm on Appns, 77th Cong, 1st sess, *Hearings* on H R 6159, pp. 80, 54–84, *passim*.

[8] Plank Interv, 5 Dec 50.

[9] Ltr, Campbell to Groves, 8 Dec 41. Opns Br Files, Ord–Corresp.

[10] (1) Memos, Groves for Campbell, and Styer for Wesson, 9 Dec 41. Same File. (2) Memo, Groves for Styer, 11 Dec 41. Madigan Files, Ord–TNT.

[11] Craven and Cate, *Men and Planes*, pp. 145–47.

[12] Memo, Somervell for Marshall, 11 Dec 41. G–4/32582–4.

expedite work "by every feasible means." The Engineers had only to ask to receive necessary funds.[13] On the 10th Colonel Hardin wired the field, authorizing division and district engineers to exceed budgets on "truly urgent and important" jobs.[14] Two days later General Robins suspended regulations requiring bids on purchases of materials. Before the week was out, the administration had sanctioned continuous operations at war projects, and building trades officials had renewed their no-strike pledge.[15] Calling on construction men to "place their full energies at the nation's disposal," the *Engineering News-Record* editorialized: "Building for defense is a thing of the past. The construction industry's new standard must be emblazoned 'building for battle.' There is a great difference. Time was short. Now there is no more time."[16]

In the ten days that followed Pearl Harbor, forty-five construction directives appeared, twice the number released during the preceding 10-day period. A flurry of orders for enlarging projects under way—a $20-million expansion of the Twin Cities small arms ammunition plant, a $4-million annex to the Detroit Tank Arsenal, and an additional 500,000 square feet of floor space at the Pentagon, to cite a few examples—preceded authorizations for entire new installations, including two TNT plants, West Virginia and Longhorn, with a combined estimated cost of $46 million. Planning activity quickened as money flowed in for design of four division camps at preselected sites, two ammunition depots, a gun casting plant, and an internment camp for enemy aliens.[17] Slowly the first dim outlines of the mammoth wartime program were beginning to emerge.

Passage of the first wartime appropriation bill loosed a flood of orders. Approved on 17 December 1941, the measure carried more than one and a quarter billion in construction funds—$827,820,000 for military posts and $388,000,000 for expediting production, plus smaller sums for seacoast defenses, maintenance, and war-related civil works. Directives came in rapid succession for 4 general hospitals, 3 division camps, 13 air bases, 10 ammunition docks, 6 regulating depots, 3 holding and reconsignment points, 3 staging areas, and more. Requests were soon in Robins' hands for large new industrial projects: the Lake Ontario TNT plant; the Buckeye anhydrous ammonia plant; a chlorine plant at Edgewood arsenal; and the Wabash River Ordnance Works, the first facility in the United States for production of the superexplosive RDX. Work piled higher. Although troop housing requirements were still in question—the course of the war and the rate of deployment overseas would be determining—General Marshall gave the Engineers a green light to proceed with construction of 6 more advance planned cantonments and 5 temporary tent camps

[13] Memo, Patterson for Reybold, 9 Dec 41. QM 600.1 (Engr, Transfer of Constr) 1941.

[14] TWX, Hardin to Div Engrs, 10 Dec 41. 686 (Airfields) Part 44.

[15] (1) Memo, Robins for Campbell, 13 Dec 41. Opns Br Files, ZCQM's. (2) Memo, Amberg for Covell, 15 Dec 41. USW Files, Constr, Dec—. (3) Ltr, Harrison to Patterson, 15 Dec 41. Opns Br Files, USW. (4) *ENR*, December 11, 1941, p. 13.

[16] *ENR*, December 18, 1941, p. 52.

[17] (1) Constr PR 41, 16 Dec 41, p. 146. (2) Constr PR 46, 26 Feb 42, *passim*. (3) Ltr, Renshaw to Reybold, 17 Dec 41. 631 (Pentagon Bldg).

in early January. An emergency railroad bridge across the Potomac, a huge munitions depot at Chambersburg, Pennsylvania, and scores of other projects swelled the program's size.[18] Meanwhile, far greater increases were in prospect.

In his state of the union message to Congress on 6 January 1942, the President called for "all-out scale production" to "hasten the ultimate all-out victory." Presenting a program for attaining "overwhelming superiority" over the Axis Powers, for building armaments "to the utmost limit of our national capacity," he announced production goals of 60,000 planes, 45,000 tanks, and 20,000 antiaircraft guns for 1942; 125,000 planes, 75,000 tanks, and 35,000 antiaircraft guns for 1943; and similarly huge quantities of "a multitude of other implements of war." Turning to military manpower, he envisioned a force capable of protecting the Western Hemisphere, conducting offensives on a global scale, and inflicting "total defeat" upon the enemy.[19] In terms of construction alone, the effort required was stupendous.

To administer the all-out program, the President on 16 January 1942 created the War Production Board (WPB). Unlike NDAC and its successors, OPM and SPAB, the new agency was to be a powerful one-man directorate with sweeping authority and broad responsibilities. Advised and assisted by board members, the WPB chairman would perform the following duties:

> Exercise general direction over the war procurement and production program.
>
> Determine the policies, plans, procedures, and methods of the several federal departments, establishments, and agencies in respect to war procurement and production, including purchasing, contracting, specifications, and construction; . . . and issue such directives in respect thereto as he may deem necessary or appropriate.

Compliance with the chairman's orders was mandatory, and his decisions were final.[20] For the post of chairman or "production czar," Roosevelt chose Donald M. Nelson, former executive director of SPAB. Named to the board were Vice President Wallace, Secretaries Stimson, Knox, and Jones, William S. Knudsen, Sidney Hillman, Leon Henderson, and Harry L. Hopkins. Among the first matters this group considered were the size and urgency of the construction program.[21]

As plans crystallized, the magnitude of the construction task became apparent. By mid-January General Marshall had decided that an army of 3,600,000 would have to be ready before the end of 1942. Ground and service forces would increase by 1,270,000 men. More than 750,000 men, including 50,000 pilots, would augment the air forces. Thirty-seven divisions and forty-five air groups would come into being.[22] This expansion would go forward side by side with efforts to step up lend-lease aid, to stem enemy assaults, and to launch full-scale offensives. Camps to house additional units; training, transport, storage, and hospital facilities;

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[18] (1) 55 *Stat.* 810. (2) Constr PR's. (3) Memo, Somervell for Marshall, 1 Jan 42, and approval thereon. G–4/32626 Sec 2.

[19] *Public Papers and Addresses*, XI, 36–40.

[20] Executive Order 9024, 16 Jan 42. (7 *F.R.* 3).

[21] Civilian Production Administration, *Minutes of the War Production Board* (Washington, 1946), p. 4.

[22] (1) WD Ltr AG 381 (1–14–42) Misc C–M, 17 Jan 42. GHQ Records, 320.2/62. (2) WD Ltr AG 320.2 (1–3–42) MR–AAF to Arnold, 19 Jan 42. G–4/31453–25.

factories to outproduce the enemy and give the United Nations vast superiority in weapons; defense installations and strategic bases; power plants and harbor improvements; flood protection for war industries: the list of needed projects seemed almost interminable. According to WPB estimates, essential war construction would amount to $10 billion during 1942.[23] The bulk would be military.

Heading the President's "must" list, planes received first consideration. On 16 January Roosevelt sent to the Capitol what was, in Representative Cannon's words, "the largest estimate for war equipment ever submitted to any committee or any Congress in the history of the world."[24] Included in the $12.5-billion request for aircraft and air ordnance was an item of $933 million for facilities to expedite production. The major part of this expansion, mainly additions to privately owned plants (capacity which could be used after the war to produce commercial planes), would be accomplished under Defense Plant Corporation contracts. To be built by the Corps of Engineers were plants for which there was no foreseeable civilian use—four huge bomber assembly plants at Marietta, Georgia, and at Cleveland, Chicago, and Oklahoma City; a score of modification centers for adapting standard-model planes for use in various theaters; and Ordnance and Chemical Warfare facilities for producing air force weapons and ammunition. Estimated to cost roughly $350 million, these projects were a substantial addition to the Engineer work load.[25]

After more than a month of intensive planning, calculations, and recalculations, a munitions plant program finally emerged on 17 January. At a meeting in General Harris' office, plans firmed up for new Ordnance manufacturing facilities with a total estimated cost of $2.5 billion. Eight ammonium nitrate plants, 7 toluol, 6 small arms ammunition, 4 TNT, 2 smokeless powder, 2 tetryl, and one RDX would be built from the ground up. There would also be 10 new plants for loading shells, bombs, fuzes, and boosters, 3 for casting guns, one for producing gun tubes, one for making optical glass for gun sights, and one for assembling military power units. A large tank arsenal, two armor plate plants, a hull welding plant, and government-owned-and-built annexes to plants of railway equipment and other manufacturers would augment productive capacity. Most of the facilities constructed in 1940 and 1941 would undergo expansion. The Chemical Warfare Service proposed a less ambitious program, comprising one new arsenal, two new plants, and additions to existing capacity, and carrying a price tag of about $100 million. In succeeding months the program fluctuated with changing requirements. For example, the number of small arms ammunition plants dipped from six to five and the number of smokeless powder plants rose from two to three. Yet the basic plan, drawn in January, held up rather well. Superimposed upon a going billion-dollar plant program, the war munitions projects increased the

[23] McGrane, Facilities and Construction Program, p. 73.

[24] H Subcomm of the Comm on Appns, 77th Cong, 2d sess, *Hearings on the Fourth Supplemental National Defense Appropriation Bill for 1942*, p. 1.

[25] (1) *Ibid.*, pp. 2–3, 35ff. (2) Constr PR's.

overall industrial construction task to enormous size.[26]

To cope with the anticipated flood of equipment and supplies, the Army would need much more depot storage space. Excluding Air Corps depots, the Army had 85 million square feet of covered storage available or building in December 1941, roughly half the space required for the 3,600,000-man force contemplated for late 1942. Proposing "to keep ahead of the production program," General Somervell announced plans in January for expanding existing depots and providing a dozen new ones, 7 for Ordnance ammunition, 3 for Quartermaster supplies, one for Engineer, and one for Medical. With the addition of 2 motor reception parks, the cost came to $280 million.[27] As time marched on, this program grew. Ten holding and reconsignment points and 12 new supply depots, 6 Ordnance, 4 Engineer, and 2 Quartermaster, brought the total estimated cost to well over $400 million. Six air depots, ranging in cost from $2.3 to $23 million, pushed the total almost to the half-billion mark.[28]

Amid concern over the rapid growth of the building program, plans went forward for sheltering the expanding army. On 15 January 1942 housing was available for approximately 1,700,000 officers and men at posts throughout the country, and facilities for 500,000 more were under construction. From a welter of information—induction schedules, tentative troop strengths, and projected overseas movements, the General Staff computed additional requirements for 1942: accommodations over and above those already authorized for some 700,000 airmen and at least 425,000 ground troops. Proposals called for building dozens of new installations and expanding scores of old ones. Blueprints for advance planned cantonments and air stations were dusted off and readied for use. Meanwhile, to ease a critical shortage of canvas, General Gregory recommended converting all tent camps to hutments. Another big wave of mobilization construction was fast gathering force.[29]

Troubled by the prospect of "imposing again a tremendous burden of cantonment construction on the country," Secretary Stimson looked for ways to economize.[30] To find them was not easy. Long-range plans for sheltering additional troops incorporated the 800 series drawings for high-quality mobilization structures. Having expended so much effort and money on blueprints and layouts for advance planned cantonments, Somervell naturally hoped to build them. What other course was open? Because of the shortage of canvas, permanent tent camps were out of the question. Could existing stations be enlarged? Utilities systems would largely determine how far. Could plans for the cheap, light buildings designed for use in theaters of operations be adapted for use in the United States? Only with a great deal of work. A suggestion by Madigan raised questions of public relations and military discipline. Returning

[26] (1) Memo, Harris for Patterson, 23 Jan 42, and Incls. Madigan Files, Ord—Gen. (2) Constr PR's.

[27] Memo, Somervell for Marshall, 17 Jan 42. 681 Part 2.

[28] Constr PR's.

[29] (1) Constr PR 43, 15 Jan 42, pp. 61–62. (2) Memo (Madigan) for Rcd, 17 Jan 42. Madigan Files, Mun Plants and Depots. (3) 686 (Airfields) Part 48. (4) G–4/32656 Sec 2.

[30] Stimson Diary, 19 Jan 42.



HUTMENTS, FORT SILL, OKLAHOMA, *July 1942.*

aboard ship from a visit to Puerto Rico early in the war, Patterson's adviser on construction had noted that Miami Beach was blacked out. Struck by the thought that the war would hurt resorts, he had come up with a scheme for leasing big luxury hotels. Under pressure from Stimson, Somervell at length found an acceptable solution. Five cantonments would be built according to plan. Beyond that, minimum standards would apply. The capacity of existing posts would be stretched to the limit. New housing would be theater of operations (TO) type. Whenever possible, the Army would lease or buy civilian properties, including resort hotels.[31]

[31] (1) Stimson Diary, 20 Jan 42. (2) Ltr, Robins to Sen William Langer, 24 Jan 45. 601.53 VI. (3) Madigan Interv, 18 Jun 56. (4) TWX, Reybold to Div Engrs, 21 Jan 42. 652 (NAD). (5) WD Ltr AG 600.12 (2-5-42) MO-D-M, 6 Feb 42. QM 600.1 1942-43.

Once the decision to pare requirements was firm, a command construction program for the ground forces took shape rapidly. First came orders to expand existing stations. Wherever land was available and water, sewer, and power systems could take the load, camp garrisons were to increase to 35,000 men. Next came directives for complete, new installations: twenty camps, six overseas discharge and replacement centers, and dozens upon dozens of lesser projects. Efforts began at once to acquire preselected sites, to pick additional ones, and to provide modified layouts and TO drawings. Late in January, when General Gregory won his case for converting tent camps to hutments, the burden grew even heavier. During the first four months of war, the estimated cost of all ground troop projects jumped $800

million.[32] The total would continue to rise.

Construction plans for the four continental air forces and the several air training commands unfolded much more slowly. Clamorous demands for countless projects followed the outbreak of war. Requests for auxiliary fields alone numbered in the hundreds. On 17 January the Engineers learned informally that a $3-billion program was in the offing, though, as Colonel Plank observed, this figure was "obviously general and purely preliminary."[33] That same day General Arnold issued a call for "Spartan simplicity" and started "a complete overhauling of our plans and concepts."[34] Just what his plans would finally entail was not apparent for some months. During the first quarter of 1942 the Air Forces issued directives for roughly 200 command projects—tactical fields, pilot and technician schools, bombing and gunnery ranges, CAA airports, and miscellaneous stations. The number of projects doubled in the second quarter and doubled again in the third. Not until fall, when it passed the $1.5 billion mark, did the program begin leveling off.[35]

Available when Japan attacked were 75,000 hospital beds, 16,000 at general and 59,000 at station hospitals. To care for the 3,600,000-man force would require fifteen more general hospitals and scores of new station hospitals with total capacity for about 100,000 patients. Surgeon General Magee wished to erect semipermanent fireproof buildings of tile and concrete blocks, using plans prepared by the Quartermaster Corps in 1941. So did Robins, Groves, and other Engineer officers. Somervell went along with the idea for a time, but as pressure for saving labor and materials mounted, he withdrew permission for semipermanent structures, first, at station hospitals and, then, at generals. Consequently, most medical facilities built after Pearl Harbor were of cantonment or TO type. Further savings resulted from take-overs of civilian hospitals and conversions of private schools and hotels. Nevertheless, the Army needed an initial $60 million in construction funds for general hospitals alone.[36]

The construction burden grew, as still more projects crystallized. A $50-million program of war-related civil works included flood protection for vital industries, channel improvements at key ports, and additions to important hydroelectric plants. Relocation centers for the west coast Japanese, though relatively modest in cost, introduced unusual complications. Special housing for the Women's Army Auxiliary Corps (WAAC), emergency highway bridges across the Potomac, an airfield at West Point for cadet flight training—these and a host of other miscellaneous projects added

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[32] (1) TWX, Reybold to Div Engrs, 21 Jan 42. (2) Constr PR's 41 and 49, 16 Dec 41 and 15 Apr 42. (3) WD Ltr AG 600.12 (1-27-42) MO-D to CofEngrs, 30 Jan 42. 652 I.

[33] (1) Craven and Cate, *Men and Planes*, p. 145ff. (2) 686 (Airfields) Parts 44-50. (3) Memo, Plank for Groves, 17 Jan 42. Opns Br Files, Memo-AF Sec.

[34] Ltr, Arnold to Brett, 17 Jan 42. 686 (Airfields) Part 50 A.

[35] Constr PR's.

[36] (1) Smith, *Hospitalization and Evacuation*, pp. 68-70, 78-79. (2) WD Ltr AG 322.3 (12-19-41) M-D to CofEngrs, 20 Dec 41. 632 Part 1. (3) D/F, G-4 for CofEngrs, 19 Feb 42. (4) Memo, Robins for Somervell, 14 Jan 42. Last two in G-4/29135-II. (5) Tel Conv, Groves and Strong, 31 Dec 41. Opns Br Files, G-4. (6) Constr PR's.

to the strain.[37] Two secret undertakings begun in the summer of 1942 presented unheard-of difficulties. One was the Holston Ordnance Works, a huge industrial plant at Kingsport, Tennessee, designed around a new and untried process for making RDX. The other, by far the larger and more complex, was the Manhattan Project.

With the country at war, the Bureau of the Budget readily acceded to military requests and Congress acted swiftly to provide necessary funds. The supplemental appropriations voted soon after Pearl Harbor were dwarfed by subsequent money bills. In the spring of 1942 billions upon billions became available in lump sums titled "Expediting Production," "Engineer Service, Army," and "Seacoast Defenses," unspecified parts of which were for military construction. The largest single direct appropriation in the history of construction came in late April, when Congress voted $5,275,000,000 for the Corps of Engineers. A direct appropriation of $2,438,000,000, approved on 2 July, was to be the last until late in the war. In a relatively short 7-month span, Congress had provided well over $10 billion in construction funds.[38]

Rapidly, throughout the early months of war, construction directives multiplied. During February 1942 authorizations ran to $200 million a week; during March, to $500 million. The months that followed saw little slackening of the pace. There were many hundreds of jobs to be started, virtually all at once, and then forced through at top speed. To meet military goals for 1942, the value of work placed would have to average nearly $600 million per month.[39] The challenge was unique in the annals of construction. Success or failure would depend largely upon the effectiveness of the newly consolidated construction forces under General Reybold's command.

The War Construction Command

The weight of the mammoth war construction program fell on an organization in the throes of transition. The shift of building functions from one agency to another forced serious readjustments. Two systems had to be combined and two teams made to pull together. Policies and procedures had to be revised and channels of command realigned. Offices had to be relocated, units amalgamated, and personnel reassigned. Old ties had to be severed and new relationships formed. The upheaval was bound to cause turmoil and uncertainty. Likening every such change to "a major surgical operation," Groves pointed out that "it usually takes several years to get an organization back on its feet."[40] In this case a speedy recovery was imperative, for the construction transfer

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[37] (1) WPB Constr Research Statistics Div, 25 Apr 42, Breakdown of Estimated Direct Mil Constr for 1942. WPB 411.33 (Constr Proj Mil) Feb 42–Oct 46. (2) Constr PR's. (3) H Subcomm of the Comm on Appns, 76th Cong, 2d sess, *Hearings on the Sixth Supplemental National Defense Appropriation Bill for 1942*, pp. 130–31.

[38] 56 *Stat.* 128, 219, 611.

[39] (1) Memo, Control Sec OCE for Robins, 24 Mar 42. 600.914 Part 1. (2) Memo, Control Sec OCE for Robins, 13 Apr 42. 600.1 Part 13. (3) Memo, Control Sec OCE for Robins, 28 Apr 42. Opns Br Files, Memoranda–Constr Control Br. (4) Memo, Somervell for Reybold, 26 Mar 42. 600.1 (Secret File No. 1 of Two Secret Files).

[40] Groves Second Draft Comments, V, 1.

took effect only nine days after the Pearl Harbor attack.

Initial steps toward consolidation involved the two Washington headquarters. Early on the morning of Saturday, 13 December, movers started work. Day and night throughout the weekend, trucks rumbled back and forth between the New War Department and Railroad Retirement Buildings, transferring files and equipment. The merger took place the following Monday. General Robins, with Colonel Hardin and other members of his immediate staff, moved into Somervell's old suite. Elsewhere in the Railroad Retirement Building, Engineer construction groups merged with branches of the former Quartermaster Construction Division. Reporting to Colonel Groves in Operations were the following sections: Fortifications, under Maj. Francis J. Wilson; River and Harbor, under Maj. Albert H. Burton; Flood Control, under Maj. Miles Reber; and Air Corps Projects, under Lt. Col. Ewart G. Plank. Reporting to Colonel Leavey in Engineering were Mr. McAlpine and his staff of navigation, flood control, and airport technologists. Minor elements of OCE, for example, labor relations and safety units, meshed into the old Quartermaster structure. The space occupied by the newcomers had housed the accounting, procurement, personnel, control, and public relations units, which joined General Reybold in the New War Building.[41] Planned weeks in advance, the physical regrouping went off without a hitch.

In merging the top echelons of the two organizations, General Robins sought to preserve continuity and discourage contests for position. His immediate staff included men from both OCE and the former QM Construction Division. He named two executives, Colonels Hardin and Styer. As advisers he selected William H. Rose, a World War I Engineer general and retired Sears, Roebuck official who had recently returned to OCE as a civilian; Douglas I. McKay, whose background as Police Commissioner of New York City made him an ideal choice as consultant on protective security; and Mr. McAlpine. Initially, Robins retained all of Somervell's branch chiefs. Changes in key personnel came about gradually, seemingly as a matter of course. Late in December 1941 Colonel Leavey left for duty in the British Isles to be replaced by Lt. Col. James H. Stratton, a graduate of West Point and Rensselaer Poly and lately district engineer at Caddoa, Colorado. Early in the new year Colonel Styer began devoting more and more of his time to helping Somervell with a plan for reorganizing the Army. One by one Styer's duties devolved on Colonel Groves. It was Groves' impression that Robins wished to replace him and that Somervell and Reybold kept him where he was.[42] But friction, if it did exist, was below the surface. Topside, it appeared to observers, the transfer "just plain clicked."[43]

At the operating level, problems were more numerous. Among members of the Quartermaster group, the transfer was decidedly unpopular. Many veterans of the long struggle to keep construction

[41] (1) OCE Memos 3 and 5, 9 and 11 Dec 41. (2) Maj. Gen. Eugene Reybold, "Unity of Command in Army Wartime Construction," *The Constructor*, July 1942, p. 78ff.

[42] Groves Interv, 19 Jun 56.

[43] Plank Interv, 5 Dec 50.

in the Quartermaster Corps were bitter over the outcome. Many were uncertain of the future, fearful that the Engineers might not play fair with them. The military careerists wondered if they would be stigmatized as former Quartermaster officers. Civilians worried lest they be superseded by longtime Engineer employees. With the coming of Robins and his staff, the atmosphere of the division changed. Officers were more in evidence. Rules and procedures altered. A number of Quartermaster people had difficulty making the adjustment.

Concerned over this situation, Robins and his officers sought "to allay feelings of resentment and hurt among personnel coming from one proud organization to another."[44] They made special efforts to reassure members of the Quartermaster group and persuade them to stay with their jobs. Detailing his part in this endeavor, Hardin reported:

> I spent a great deal of personal time . . . trying in some way to convince them, trying even to sell them, the idea of the Corps' procedures and how badly we needed them. Maybe I did convince some to remain that might not otherwise have done so. . . . It was, I am sure, a matter of great concern to all of us in the Chief's office that we not lose any of these valuable people. We did our best to try to keep them within the Corps' framework.[45]

But conciliation was slow work at best. It took time for members of the two organizations to learn to live together.

Involving several hundred offices throughout the country, consolidation of the field systems proceeded at a measured pace. The first step, taken on 16 December 1941, involved the quartermaster zones. At Boston, New York, Baltimore, Chicago, Omaha, and San Francisco, zone and district offices combined; and zone constructing quartermasters became assistants to various division engineers. At Atlanta, Columbus, and San Antonio, cities where the Engineers had no established organizations, zones changed into districts, with the former heads of zones as district engineers. The next move, absorption of the Quartermaster projects, 220 in all, was to be gradual. In a telegram to the field on 12 December, General Reybold pointed out the dangers of going too fast.[46] Just before Christmas, division engineers received letters from General



GENERAL HARDIN

[44] Ltr, Gen Hardin to authors, 21 Apr 64.
[45] Interv with Gen Hardin, 29 Apr 64.

[46] (1) SO 197, 10 Dec 41, par. 2. (2) OCE Circ Ltr Constr 202, 9 Dec 41. (3) Control Br OCE, Rpt on Admin Devs of the CE, 7 Dec 41–1 Dec 42. (4) Telg, Reybold to Div Engrs, 12 Dec 41. Opns Br Files, Gen–Aug 4, 1941–Feb 19, 1942.

Robins asking that they transfer no project until "the Division and District offices to which the transfer is to be made are fully prepared to take over the duties and responsibilities involved without delaying the progress of the work." Warning against "blanket transfers," Robins suggested that the limit for any district ought to be one major project a week. Several months would be necessary to complete the take over.[47]

In the field as in Washington, the shift caused some stress and strain. A few Quartermaster stalwarts, unwilling to co-operate with the Engineers, refused to discuss their work or delayed surrendering their authority. Many Quartermaster Regulars, unhappy over the transfer, debated whether to join the Corps of Engineers. One of the first to decide was Colonel Richards, former head of the Seventh Zone, who in late December asked to be relieved of construction duties in order to return to the Quartermaster Corps. Some twenty other Regulars, including such top men as Danielson, Burgheim, McFadden, and McIlwain, followed Richards' example.[48] Explaining his decision, General Danielson said: "The temptation to continue was quite strong. . . . However, my service had been with the Quartermaster Corps and that was the determining factor in so far as I was personally concerned."[49] In an effort to counter this trend, Styer appealed to experienced construction officers who seemed to be on the fence. On 6 January 1942, he wrote to Colonel George:

> We had hoped that the qualified people who had been carrying on this work so successfully during the emergency construction program would like to transfer to the Corps of Engineers.
>
> I do not know how much thought you have given to this matter, but I would like to see you make this step, and feel sure that the Chief of Engineers would like to count you among the officers of the Corps . . . .

Identical letters went that same day to Dunstan, Hayden, Jabelonsky, Nurse, Thomas, and Vandervoort, all of whom eventually joined the Engineers.[50] Giving the reasons for his action, Colonel Thomas said that although he was sorry to see the transfer come about, he wanted to stay in construction.[51]

As the dust began to settle, General Robins gave more authority to the field. He empowered division engineers to execute contracts in amounts up to $5 million and to approve virtually all plans and specifications and districts to make agreements involving up to $2 million and to furnish most designs. He also lodged direct responsibility for real estate, repairs and utilities, labor relations, and construction operations in the field. And he reaffirmed the channel of communications within the Corps—from Chief of Engineers, to division engineer, to district engineer, to area, and back by the same route.[52] Boasting that "one phase" of construction was "going on as

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[47] Ltr, Robins to Div Engrs, 23 Dec 41. 600.1 (UMVD).

[48] (1) Renshaw Interv, 13 Feb 59; Thomas Interv, 27 Dec 55. (2) Ltr, Styer to Admin Div OCE, 30 Dec 41. (3) 020 (OCE—Rpts of Activities, Mil Pers Br) Jan–Mar 42.

[49] Answers to EHD Questionnaire, 18 May 59.

[50] Ltr, Styer to George, 6 Jan 42, and related documents. Opns Br Files, Pers—Jan 1, 1942 to —.

[51] Thomas Interv, 27 Dec 55.

[52] (1) Bruner, Outline of Authorizations—Constr Contracts. (2) Ltr, OCE to TAG, 11 Dec 41. 600.1 (QM Corps) Part 1. (3) Ltr, Styer to Div Engr MRD, 20 Jan 42. Opns Br Files, MRD.

usual," General Reybold stated in March 1942:

> The Army Engineers still are operating on the principle of decentralization. We are still "giving a good man a job," we are still "giving him the authority and the means," and we are still letting him "go to it." In time of peace this system was highly beneficial—in time of war it is more than beneficial—it is vital.[53]

Among the men on whom the Chief relied most heavily were the division and district engineers. As befitted their position, the division engineers were distinguished officers, proud of their profession, and steeped in the traditions of their Corps. All but one were West Point graduates, all had completed advanced courses at the Engineer School and the Command and General Staff School or the Army War College, and all had records of superior service in war and peace. With an average age of 55—two were 49, four were in their early 60's—they were in order of rank and seniority: Brig. Gen. Max C. Tyler, Lower Mississippi Valley; Col. Warren T. Hannum, South Pacific; Col. Roger G. Powell, Great Lakes; Col. John N. Hodges, North Atlantic; Col. Richard Park, North Pacific; Col. C. Lacey Hall, Ohio River; Col. Frank S. Besson, Missouri River; Col. Malcolm Elliott, Upper Mississippi Valley; Col. Joseph D. Arthur, Jr., Caribbean; Col. John S. Bragdon, South Atlantic; and Col. Stanley L. Scott, Southwestern. The fifty-six district engineers were a more heterogeneous group. Twenty-two were non-West Pointers. Eight were retired Engineer colonels, who had returned to active duty in 1941. Five were former Quartermaster officers. Although one was over 70 and several were in their late 60's, most of the district engineers were between 40 and 55. On the whole they were able men. Some were to attain high rank. Before the war ended, two would be major generals and nine, brigadiers. In the postwar period, Colonel Sturgis of the Vicksburg District would be Chief of Engineers.

Within the Construction Division, opinion differed as to how much authority should be vested in the field. Most Engineer officers shared the belief that in time of great emergency, a well-constituted organization could not be too decentralized. Floods, tornadoes, and other disasters had instilled the lesson that where minutes count, where lives may depend on speedy action, decisions must be made on the spot. Discussing the war construction program, Hardin said:

> It was too big for any strict control from the Washington office. Things were happening in the field at such a rapid rate that it was impossible for any group of men, no matter how competent they might be, whether they worked 24 hours a day or only 12, to influence the direction with too much detail. You could see what was happening and maybe guide the future . . . . But if you held the reins on the people in the field who were so energetic and so enthusiastic about accomplishing results, . . . you'd find them losing their initiative . . . .[54]

Many who had served with the Quartermaster Corps questioned this thinking. From their viewpoint the Corps of Engineers appeared to have gone overboard on decentralization. This attitude

[53] Maj. Gen. Eugene Reybold, "Mobilizing Construction for Victory," *The Constructor*, March 1942, p. 53.

[54] Hardin Interv, 29 Apr 64.

raised complications, some of which were quickly solved and some of which persisted.

Engineering, the largest of the Construction Division's branches, adjusted most easily to the new pattern. When he succeeded Colonel Leavey in late December 1941, Colonel Stratton counted 1,400 persons on the Engineering roster, the great majority of them transfers from the Quartermaster Corps. "My immediate and first duty," Stratton reported, "was to effect a decentralization." Early in January he called in his section chiefs and gave them their instructions: "Tell everyone we have a job for everyone in this branch, either here or in the field. . . . I know many of the Quartermaster people particularly are worried. No one will be out in the street."[55] Gradually over the next four to five months, largely through transfers to district offices, he reduced the staff to about 500 persons.[56] Stressing the importance of this move, he later said, "We would have bogged down hopelessly had we not effected decentralization of the engineering of the program."[57]

Against stiff opposition, O'Brien modified the machinery for acquiring military real estate. With Patterson squarely behind him, the Real Estate chief had reason to expect that the Engineers would give him a relatively free hand. He intended to employ the same setup in the Engineer divisions as in the Quartermaster zones and to have the same personnel handle acquisition as before. But division engineers upset this plan by delegating responsibility to the districts, which had long procured land for civil projects. When O'Brien protested, Patterson backed him up.[58] The division engineers held firm. General Tyler reminded Washington that the Lower Mississippi Valley Division had "been buying a great deal of real estate for a number of years and that we have maintained an excellent real estate organization in each of the three Districts."[59] Similarly, Colonel Hannum argued: "The present emergency requires that real estate operations shall be promptly and intimately coordinated with construction activities." This, he asserted, could "be more readily accomplished by placing responsibility . . . upon the District Engineer."[60] The division engineers appeared to be on solid ground; authority delegated to them by the Chief could be further delegated to the districts. For the time being, at least, the real estate function was decentralized—overdecentralized, O'Brien believed—to the district offices.

Of the Construction Division's branches, only Operations continued to exert rigorous, centralized control. Direct contact with the projects, countless telephone calls, and frequent visits typified the methods of Groves and his lieutenants. Fully half of their action directives were oral. "Batting the right people on the head at the right time"

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[55] (1) Ltr, Stratton to OCMH, 1 Mar 55. (2) Min, Conf in Engrg Br, 5 Jan 42. Engrg Div Airfield Br, Office Files.

[56] Constr PR 51, 15 May 42, p. 284.

[57] Ltr, Stratton to OCMH, 1 Mar 55.

[58] Ltr, Robins to Div Engrs, 24 Jan 42. 601.1 (Gen).

[59] 1st Ind, 28 Jan 42 on Ltr, Robins to Tyler, 24 Jan 42. 601.1 (LMVD) I.

[60] 1st Ind to CofEngrs, 9 Apr 42, on Ltr, Kelton to Hannum, 30 Mar 42. 601.1 (Los Angeles DO).

was one of their favored techniques.[61] Clearly, this *modus operandi* did not square with decentralized control and formal channels. But Groves believed "it was simply not possible to accomplish the work on any other basis."[62] Maintaining close supervision over the jobs, frequently bypassing division and district engineers, he continued to run the show from Washington. Enlarged from 500 to 800 persons during the early months of the war, the Operations Branch functioned within the new framework much as it had within the old.[63] Attempts to force it into the Engineer mold were largely unsuccessful.

Despite many trials and occasional frustrations, General Robins pressed steadily forward with the work of unification. By the last week in February he could report that activities, "both in the field and in the central office," had been "combined, coordinated, and reorganized."[64] A short time later, General Reybold informed Congress that the merger had taken place "without disturbance either to construction progress or to the orderly procedure of our normal civil functions."[65] The Engineers were not alone in judging the operation a success. Particularly gratifying to them was a report from the House Military Affairs Committee that "the transfer of functions from one Corps to another was accomplished with a minimum of disturbance and without any disruption to the work whatever."[66]

Hardly was the construction merger complete when a sweeping reorganization altered Engineer relationships with top echelons of the War Department. On 9 March 1942 the Army formed three overall commands—Army Ground Forces (AGF) under Lt. Gen. Lesley J. McNair; Army Air Forces (AAF) under General Arnold; and Services of Supply (SOS) under Somervell, who rose to three-star rank. The War Department General Staff and the Office of the Under Secretary contracted in size and limited their activities to high-level planning. Along with the other supply arms and services, the Corps of Engineers became an operating division of SOS.[67] (*Chart 16*) During most of 1941 Reybold, as G–4, had exercised supervision over Somervell, then Chief of Construction. Now their positions were reversed. As before, the Chief of Engineers would report to the Secretary of War on civil matters, but on military programs he would report to Somervell.

The reorganization led to changes in the Construction Division. During March 1942 most members of the Construction and Real Estate Branch, G–4, transferred to Robins' office. At the same time, Somervell began drawing personnel from the Engineers into SOS. Old titles were exchanged for new. General Styer became Chief of Staff, SOS, while Colonel Groves, at Somervell's suggestion, became Deputy Chief of Con-

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[61] Antes Interv, 3 Jun 58.

[62] Groves Comments, X, 4.

[63] (1) Constr PR 48, 31 Mar 42, p. 261. (2) Hardin Interv, 29 Apr 64.

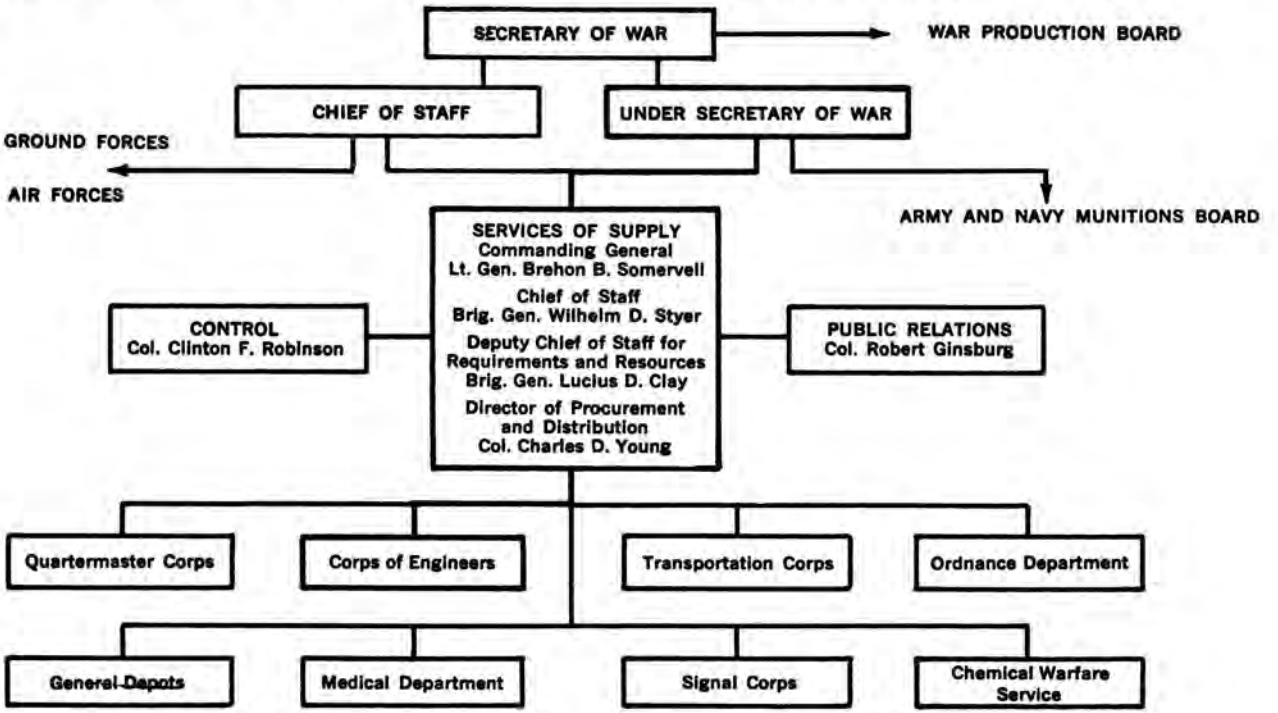
[64] Rpt, Constr Div OCE to OUSW, 24 Feb 42. Hadden Papers.

[65] Reybold's Testimony, 23 Mar 42. H Subcomm of the Comm on Appns, *Hearings on the Sixth Supplemental National Defense Appropriation Bill for 1942*, Part 2, p. 122.

[66] Quoted in Reybold, "Unity of Command in Army Wartime Construction," *The Constructor*, July 1942, p. 78.

[67] (1) WD Circ 59, 2 Mar 42. (2) For a discussion of the organization of SOS, see Millett, *The Army Service Forces*, pp. 23–42.

CHART 16—POSITION OF CORPS OF ENGINEERS IN WAR DEPARTMENT AFTER 9 MARCH 1942



Source: ENR, June 4, 1942, p. 79.

struction, OCE. Col. Frederick S. Strong, Jr., who had headed the G–4 unit, succeeded Groves in Operations. When Mitchell went to join Somervell, Lt. Col. Clarence D. Barker reported from the Southwestern Division to head up Labor Relations. These shifts in the Construction Division lineup were to be the last for some time. Because Robins and Groves agreed that stability was essential, the central office organization in effect on 1 April 1942 (*Chart 17*) remained substantially unchanged until after the war construction program passed its peak.[68]

The organization in the field was more fluid. As military projects mushroomed and civil programs continued to decline, as the volume of work increased in some areas and decreased in others, and as unusual problems arose, General Reybold revised the map of the Engineer Department. He redrew boundaries and relocated headquarters. He created new districts and abolished old ones. He opened special offices, one at Wilmington, Delaware, to expedite approvals by the Ordnance sub-office, another at New Orleans, Louisiana, to facilitate purchases of lumber from Southern mills. In the spring of 1942, as construction activity increased along the eastern seaboard and in the region of the Rockies, he established three new Divisions—the New England, with headquarters at Boston, under Col. Beverly C. Dunn; the Middle Atlantic, with headquarters at Baltimore, under Col. Thomas F. Farrell; and the Mountain, with headquarters at Salt Lake City, under Col. Edward M. George. Designed by the Chief to further decentralization and improve administration, these changes won acceptance as a matter of course.[69]

Innovations which ran against established Corps principles were not well received. One highly controversial change was pushed through by O'Brien in the summer of 1942. At a mid-June gathering of division engineers, he announced that he was taking acquisition of real estate out of district hands. Citing examples of overly generous prices paid for land by district representatives, he asserted, "It has been impossible to rely upon appraisals submitted by the District Engineers' offices."[70] A few days later, O'Brien issued instructions placing "all field real estate activities, civil and military," under the exclusive jurisdiction of division engineers. District real estate sections were to shut down immediately.[71] This order met stubborn resistance: protests flooded the Chief's office; and compliance was slow. The attitude of the field was expressed by Col. William W. Wanamaker of the Denison District, who termed O'Brien's approach "fundamentally wrong," and by Colonel Hall of the Ohio River Division, who advised General Reybold that "a sudden change in procedure" was "impracticable."[72] At length, on 14 August, O'Brien issued a second order, instructing division engineers to take over district real estate sections and or-

[68] (1) 020 (OCE) Part 1. (2) Groves Comments, X, 3. (3) OCE Orgn Charts, 1942. EHD Files.

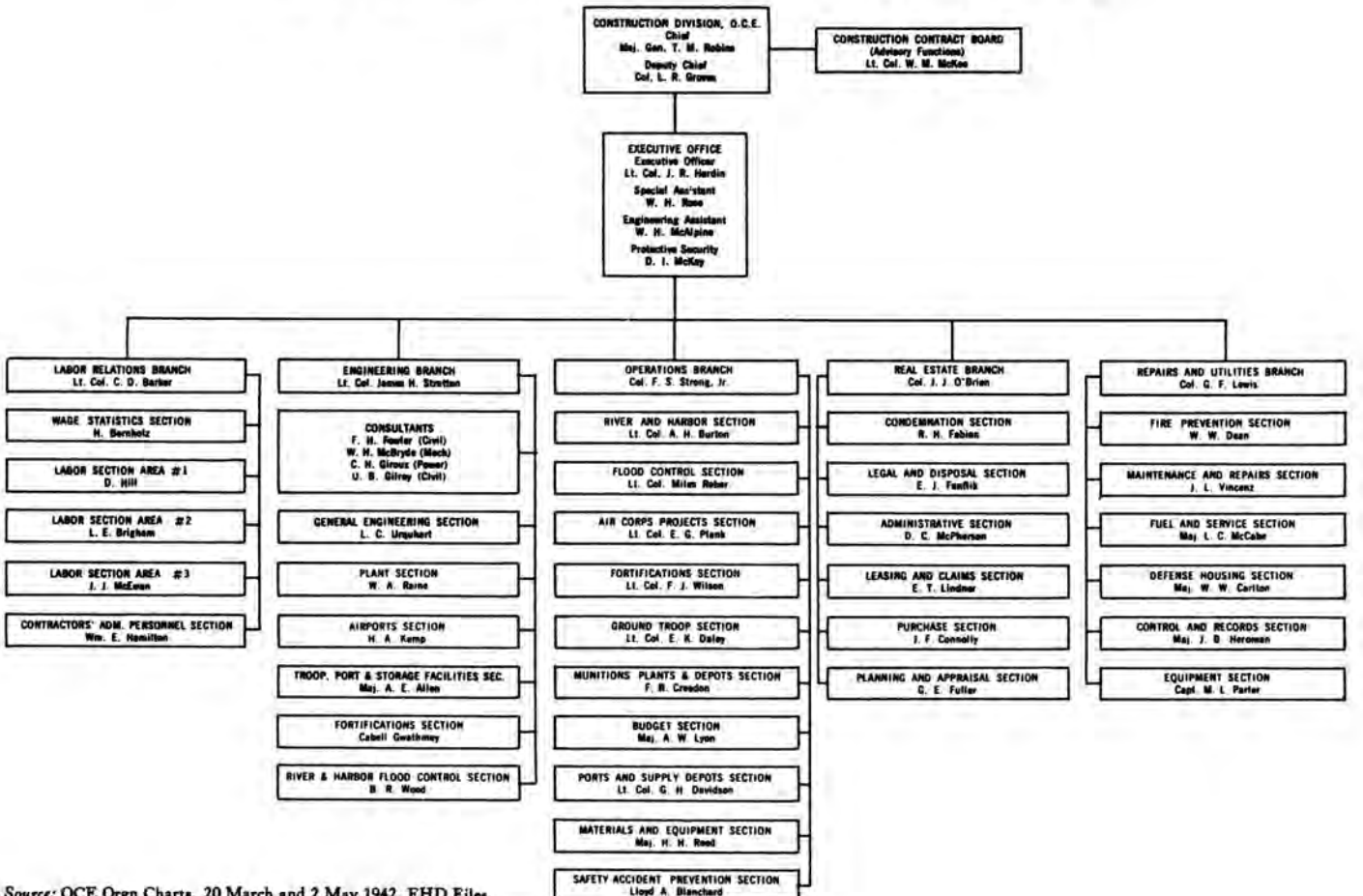
[69] (1) Control Br OCE, Rpt on Administrative Devs of the CE, 7 Dec 41–1 Dec 42. (2) Reybold, "Unity of Command in Army Wartime Construction," *The Constructor*, July 1942, pp. 78–79.

[70] Speech delivered by O'Brien to Mtg of Div Engrs, 16 Jun 42. Gideon Files, 6B1.

[71] Ltr, Robins to Div Engrs, 19 Jun 42. 601.1 (MtD) I.

[72] (1) Ltr, Scott to OCE, 20 Jun 42. 601.1 III. (2) Ltr, Hall to Reybold, 24 Jun 42. 601.1 (ORD) I.

Chart 17—Organization of Construction Division, OCE, April 1942



Source: OCE Orgn Charts, 20 March and 2 May 1942. EHD Files.

ganize them as division sub-offices, to be located in the same cities as the districts but, "if possible, in a space apart."[73] This time the divisions gave way. Describing the results, Sturgis wrote:

> Real estate sections in the Districts were abolished or a few retained only . . . for the, by then, small number of civil projects. This worked out very poorly as District real estate sections long ago had learned the obstacles and the attitude of the American people—the hard way, if you please. They also knew well the local inhabitants and had a sense of fair play.

Strangers, unacquainted with local problems and local customs, O'Brien's representatives antagonized owners in the Vicksburg area and "created angry attitudes" toward the War Department. "In sum," Sturgis stated, "land acquisition for military projects . . . should have been left with the Districts."[74] Rightly or wrongly, the issue was settled. For the duration of the war, district engineers had little or nothing to do with acquiring real estate.

A struggle with General Somervell overshadowed the intra-Corps conflict over real estate. Upon the reorganization of the Army in March 1942, the nine corps areas had come under Somervell's command. Precisely what their role would be in SOS was not clear at first. Several months went by. The corps areas grappled with confusion, while Somervell's headquarters studied the question.[75] Finally, the answer came. On 22 July Somervell changed the name of the corps areas to service commands and clothed them with direct responsibility for "supply, personnel, administrative, and other service functions." The service commands under Somervell's authority would carry out all Engineer missions, except major new construction and related real estate activities. As a member of Somervell's staff, the Chief of Engineers would furnish technical advice and direction. Division engineers would wear two hats, the customary one for new construction and a second for duties as directors of real estate, repairs, and utilities on the staffs of the service commanders. Thus, Somervell returned to the service commands functions he had taken from the corps areas in 1941: post maintenance; the operation of utilities; and leasing and acquisition connected with command activities. According to him, the new setup was "indispensable to the proper conduct of this war."[76] General Reybold saw it differently. Work for which he was responsible was assigned to commands over which he had no direct authority—a violation of accepted organizational principles. In Reybold's words, the system was "a mess."[77]

Opponents were unable to block the plan. Protesting division engineers discovered that the Chief's hands were tied. When Colonel Farrell called from Baltimore on 23 July, predicting trouble "if we're in the chain of command through the Commanding General here," Groves advised him: "That was all very pointedly discussed. You know who's doing it. There is nothing that I know

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[73] Ltr, O'Brien to Div Engrs, 14 Aug 42. 601.1 (MtD) I.

[74] Comments of Gen Sturgis on Constr MS, 1963, XII, 1. Cited hereinafter as Sturgis Comments.

[75] (1) Millett, *The Army Service Forces*, pp. 312–14. (2) Maj Richard M. Leighton, History of Control Division, ASF, 1942–1945 (MS) (1946), I, 58–62.

[76] Hq SOS, Svc Comd Orgn Manual, 22 Jul 42, pp. ii, 14, 25.

[77] Reybold Interv, 12 Mar 59.

of that we can do about it."[78] Wishing to keep all real estate activities under O'Brien's firm control, Patterson did attempt to do something. On 31 July he wrote to Somervell:

> In connection with the Service Command reorganization, I am concerned that the purchasing and leasing of real estate is made a responsibility of the Service Commands, rather than of the Chief of Engineers.
>
> As you know, the Real Estate Section of the Office of the Chief of Engineers, formerly with the Construction Division of the Quartermaster Corps, has been run most effectively since you went with the Construction Division in January 1941. The work of purchasing and leasing real estate is one that is likely to lead to scandals, and it will be much harder to control if it is scattered in the nine Service Commands.[79]

Patterson's letter had no apparent effect. Somervell continued on his course.

On 10 August, professing "a bold disregard for anachronistic precedents," he promulgated the basic organizational directive for the service commands. Nine division engineers reported to service commanders for additional duty as Directors of Real Estate, Repairs and Utilities. (*Table 14*) In their new capacity, these nine would operate outside Engineer channels. They would do their work as directors "under the complete jurisdiction of the Service Commander." Any instructions they received from the Chief of Engineers would have to come through Somervell and the commanding generals. Their territorial jurisdiction would extend to the boundaries of the service commands, which differed widely from the boundaries of the Engineer divisions.[80] Not only would the division engineer–directors serve two masters and perform two sets of duties, they would also have two geographic limits to observe.

With nine service commands, each comprising a cluster of states, and thirteen Engineer divisions, each conforming geographically to a major watershed, confusion was inevitable. Many post commanders had to deal with two division engineers, one for major new construction and another for leasing, routine purchases of real estate, maintenance, and repairs. As engineer of the Ohio River Division, Colonel Hall supervised new construction at Camp Forrest, Tennessee, which lay within the jurisdiction of the Fourth Service Command's Director of Real Estate, Repairs and Utilities—the South Atlantic Division Engineer. At Camp Millard, Ohio, Hall wore his second hat. There he represented the Fifth Service Command, while the Great Lakes Division oversaw construction. Bitter complaints came from service commanders who found the setup troublesome.[81] By the fall of 1942 there was general agreement that command and division boundaries ought to be coterminous.

Opinions differed as to which boundaries should obtain. Since the fall of 1941, Somervell's thinking on the subject had not wavered. Then, he had unsuccessfully advocated redrawing division boundaries to coincide with those of the corps areas. As recently as June 1942 he had renewed this recommen-

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[78] Tel Conv, Farrell and Groves, 23 Jul 42. Opns Br Files (MAD).

[79] Memo, Patterson for Somervell, 31 Jul 42. USW Files, Misc and Sub—Rb–Rea.

[80] WD SOS, Services of Supply Organization Manual, 1942, Part IV, Foreword, chs. I–III, ch. IV, Sec 5.

[81] (1) 323.3 (Serv. Comd's). (2) Histories of 2d and 5th Serv Comd's, n.d. EHD Files.

TABLE 14—DIVISION ENGINEER SERVICE COMMAND ASSIGNMENTS

Divisions	Service Command
New England	I
North Atlantic	II
Middle Atlantic	III
South Atlantic	IV
Ohio River	V
Great Lakes	VI
Missouri River	VII
Southwestern	VIII
Mountain	IX

Source: WD SOS, Services of Supply Organizational Manual, 1942.

dation, but Reybold had demurred. Now the question had come up again. The Engineers offered a proposal for dividing the Ninth Service Command into two parts to make a tenth and for moving the boundaries of the other commands. Although Somervell apparently considered this solution for a time, he at length decided to leave the commands as they were.[82]

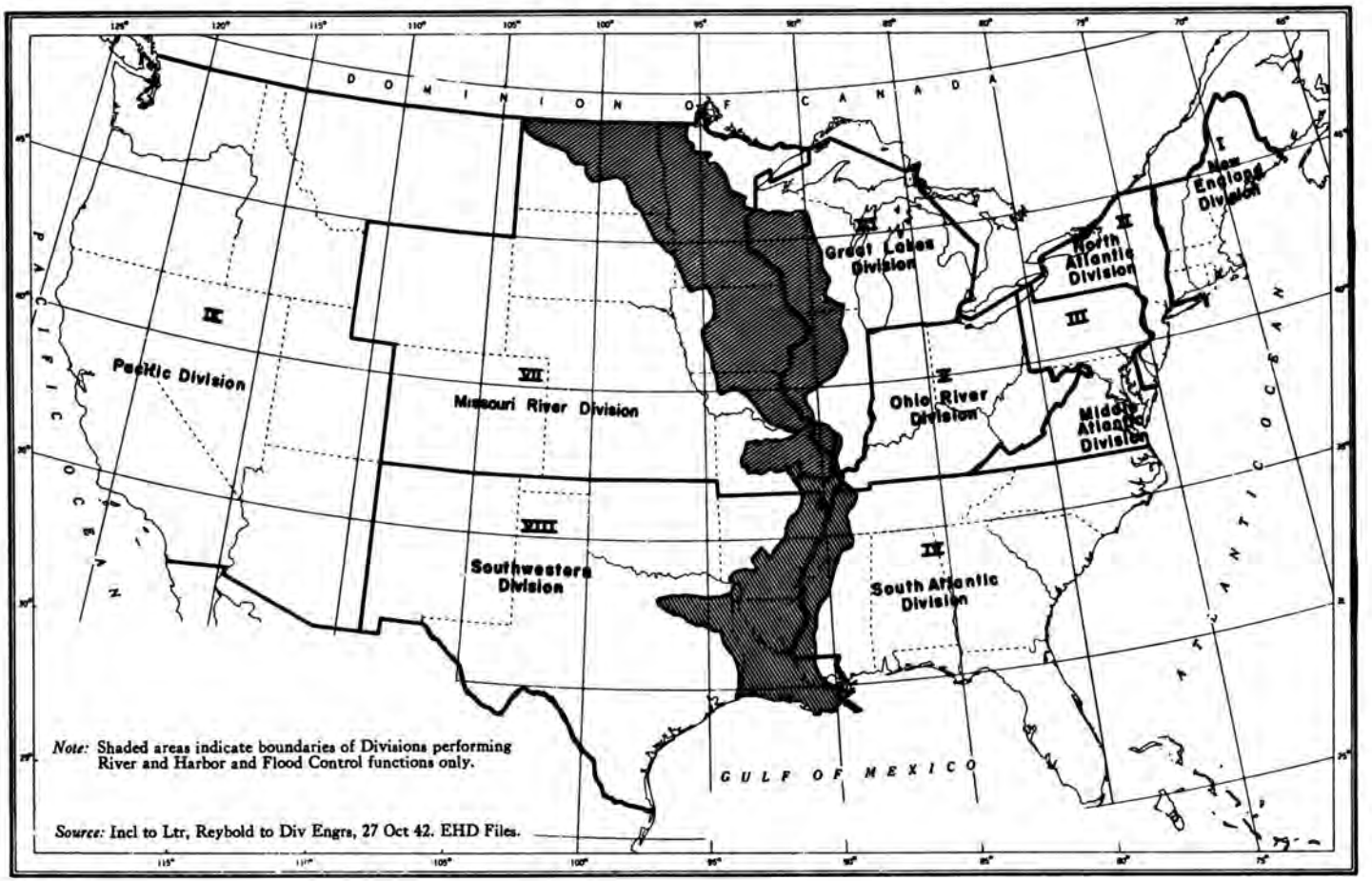
Late in October 1942 General Reybold announced a plan for realigning the Engineer divisions. While bowing to Somervell's demands, he endeavored to preserve the essential features of the permanent organization for civil works. The Chief's plan was somewhat complex. Under it, there would be eleven Engineer divisions. (*Map 3*) Nine would have both military and civil functions. For war construction, real estate, and repairs and utilities, their boundaries would be identical with those of the service commands. For navigation and flood control work, their boundaries would follow major watersheds. The two divisions in the Mississippi Valley would have only civil projects and their borders would remain unchanged. Districts normally would have either civil or military missions, seldom both. District boundaries would be flexible, extending sometimes into two divisions; but no district engineer would report to more than one division headquarters. During November, after details were out of the way, districts received their assignments. The North Pacific, South Pacific, and Mountain Divisions combined to form the Pacific Division, with headquarters at Salt Lake City. General Hannum would head the new division. On 1 December 1942 the plan went into effect.[83]

Reshaped, consolidated, and decentralized, the organization for military construction attained a high level of efficiency during the year following Pearl Harbor. An amalgam of several and at times opposing elements, a product of different and at times discordant views, the organization nevertheless with-

[82] (1) Memo, Somervell for CofEngrs, 8 Sep 41. Madigan Files, Consolidation Bill, Collateral Data. (2) Memo, Styer for Reybold, 3 Jun 42, and 1st Ind, 23 Jun 42. 322.01 Part 1. (3) 323.3 (Serv Comd's).

[83] (1) Ltr, Reybold to Div Engrs, 27 Oct 42. EHD Files. (2) OCE GO 45, 21 Nov 42. (3) *ENR*, November 19, 1942, p. 56; November 26, 1942, p. 5.

Boundaries of Engineer Divisions, December 1942



MAP 3

stood the strains imposed upon it. Despite some initial creaks and groans, the new machinery in the end proved equal to the challenges of war.

The Big Push

Seeking early in 1942 to describe the construction task ahead, General Reybold said, "I must borrow a word from Hollywood: the job is colossal."[84] In this context, that tired, oft misused adjective seemed appropriate. The undertaking was truly gigantic, dwarfing those previous great endeavors, the building of the Panama Canal and the emergency construction programs of 1917–18 and 1940–41. In urgency, complexity, and difficulty, as in size, it surpassed anything of the sort the world had ever seen. The speed demanded, the sums of money involved, the number and variety of projects, the requirements for manpower, materials, and equipment, and the problems of management and organization were unparalleled. So formidable was the enterprise that some questioned whether it was possible.

The Chief of Engineers had few doubts on that score. He knew the Corps to be a great construction organization unequaled in experience, size, and capability. In the past, whenever a job had come up that no one else could do, the government had called upon the Engineers. There had been no failures and there would be none now.[85] The 1930's had been a decade of peak activity in civil works. Recalling the Fort Peck and Bonneville Dams, the work along the lower Mississippi, and the projects at Pittsburgh, Johnstown, Muskingum, and scores of other places, General Reybold said: "We have had, so to speak, a tune-up bout for the championship fight that is now upon us."[86] Seasoned by more than a year of high-pressure defense preparations and strengthened by the transfer of the Quartermaster Construction Division, the Engineer Department, in the Chief's opinion, was capable of shouldering an even heavier load than the one thrust upon it by the war.[87]

Reybold's approach to war construction problems was consistent with this thinking. Convinced that the Corps knew how best to organize and to get results, he made no changes in basic policy following the outbreak of hostilities. Instead, he stuck to traditional principles and applied time-tested formulas. Holding with most of his fellow Engineers that decentralization was the art and heart of war, he placed his main reliance on the field, regarding the divisions as "our fundamental unit" and their decision-making power as "the negation of red tape." Shortly after Pearl Harbor he announced that the era of fixed-fee contracts was over. He intended to use the Corps' "old standby," the fixed-price contract, in all but exceptional cases.[88] Having what he

[84] WD Press Release: Address of Gen Reybold at dinner of Washington Chapter, ASCE, 27 Jan 42. EHD Files.

[85] Reybold Interv, 12 Mar 59.

[86] Maj. Gen. Eugene Reybold, "Mobilizing Construction for Victory," *The Constructor*, March 1942, pp. 51–52.

[87] Maj. Gen. Eugene Reybold, "Unity of Command in Army Wartime Construction," *The Constructor*, July 1942, p. 78.

[88] Maj. Gen. Eugene Reybold, "Mobilizing Construction for Victory," *The Constructor*, March 1942, p. 53. See also OCE Circ Ltrs 1012, 2 Jan 42, and 1042, 9 Jan 42. General Reybold's contracting policies are discussed in ch. XVII.

thought to be the right setup and the right procedures, Reybold did not immerse himself in construction matters. Adopting the attitude that the Chief of Engineers was "too big a man" to worry with details, he left the direction of the program largely to others. Construction, as he put it, was "pretty well delegated down."[89]

Too great for one man, the burdens of leadership were shared by General Robins and Colonel Groves. One of the the Engineers' most respected senior officers, Robins had a reputation for sound judgment, cool-headedness, and tact. Friendly with top men in other branches, he moved easily in high circles of the War Department. Subordinates responded to his fatherly personality with loyalty and affection. Recalling their relationship, Hardin later said: "His calm forthright manner under all conditions and especially in periods of stress and criticism, his consideration of others, keen perception and ability to come to quick firm decisions made him an ideal superior to work for."[90] Colonel Groves, whose appointment as Robins' deputy in the spring of 1942 confirmed the position he had occupied since shortly after the transfer, was noted more for forcefulness than for diplomacy. Critical and demanding, he was as unsparing of himself as he was of others. Each of these men assumed the role he was best equipped to play. Robins charted the overall course and dealt with persons outside the Corps, while Groves, acting under him with full authority, took charge of production.

Stepping up the pace was their first order of business. Soon after war was declared, a drive was under way to expedite all urgent projects. On orders from the Chief's office, division and district engineers took the initiative. They relied heavily on overtime and continuous shifts, enlarged work crews, and offered premiums to contractors and materialmen for early deliveries. They also diverted equipment and supplies from civil to military jobs, eliminated nonessential work, and employed virtually every known timesaving device.[91] All this was merely the beginning. Discussing what had to be done, General Reybold pointed out:

> To increase the tempo of all work and to accelerate the completion dates of all projects requires an almost perfect balance and timing of and for land acquisition, preparation of plans and specifications, approval of locations, layouts, and designs, assemblage of field forces, procurement of material, coordination and direction.[92]

He thus emphasized the need for systematic planning and concerted effort.

In the first hectic weeks after Pearl Harbor, while consolidation was going forward and the huge war program was taking shape, Robins and Groves pressed for solutions to longstanding difficulties and tried to anticipate future troubles. They launched fresh attacks on old, familiar problems—delays traceable to using services, careless selection of sites, bottlenecks in design, and low priorities. After weighing probable requirements against resources, they ordered further savings of materials and equipment. Confronted with a shortage of contrac-

[89] Reybold Interv, 12 Mar 59.

[90] Ltr, Hardin to authors, 21 Apr 64.

[91] (1) 230.44 Part 1. (2) 686 (Airfields) Parts 44 and 45. (3) 635 Part 1.

[92] Memo, Reybold for Somervell, 2 Jul 42. 600.914 Part 1.

tors for large and complicated jobs, they tested a scheme for stretching the capacity of experienced firms. By probing continually for weak spots in the system, for potential sources of delay, they hoped "to foresee problems *before* they arise and to have planned solutions and planned policies ready for promulgation at the proper time."[93]

In the interests of speed and efficiency, General Robins urged the using services to fall into step with the Engineers. Emphasizing that close co-ordination at the local level would reduce confusion and minimize delay, he called on them to decentralize approvals. Response to this appeal was mixed. The Chief of Ordnance and The Surgeon General refused to relax their control over designs and layouts. General Arnold, on the other hand, was willing to make concessions. Early in 1942, he delegated authority for approving layouts to the field.[94] At the same time, he relieved Colonel Kennedy as head of the Buildings and Grounds Division and replaced him temporarily with Col. Walter J. Reed. An Engineer officer, Col. James B. Newman, Jr., became Reed's deputy and after a few months succeeded him. Relations with the Air Forces improved markedly. "As soon as we got Walter Reed in there, lots and lots of things smoothed out like that," said Plank, snapping his fingers, "and then, when Jim Newman got a little tighter hold, many other little things smoothed out immediately. . . . We were brothers working together—some friction, of course, but not significant."[95]

Concerned by forecasts of crippling supply shortages and belated deliveries, Robins launched determined assaults on problems of requirements and procurement. To strip designs to bare essentials, curtail the use of critical materials, and keep shipments flowing to the projects were high on his list of objectives. A sustained Corps-wide effort to achieve these ends featured a whirlwind revision of structural plans directed by Colonel Stratton, the saving of huge quantities of critical materials through the work of Harry B. Zackrison, and the choice of the Construction Division as the principal lumber purchasing agent for the federal government. This effort was crucial to the success of the program as a whole. Its story constitutes an important chapter in the history of wartime construction.[96]

To improve methods of choosing sites was another of Robins' aims. With the advent of war, engineering aspects of site selection took on increased importance. If contractors were to meet accelerated schedules, they must have sites which lent themselves to high-speed construction methods. No time and effort could be spared for extensive clearing, grading, and draining, and no scarce equipment could be diverted to such work. "I know of no better security in the fulfillment of the responsibility of the Engineer Department for expeditious and economical construction," Robins wrote, "than to assist in initial selection of sites which facilitate rather than hin-

[93] OCE, Rpt of Improvements in Constr Procedures, 24 Feb 42. Hadden Papers.

[94] (1) Groves Second Draft Comments, XIV, 3–4. (2) Memo, Creedon for Strong, 7 May 42. Opns Br Files, Munitions Plants and Depots Sec. (3) 632 Part 2. (4) Ltr, OCAC to CG, AFCC, Bolling Fld, 6 Feb 42. 600.13 (Airfields) Part 1.

[95] Plank Interv, 5 Dec 50.

[96] See ch. XVI, below.

der construction."[97] Supported by Somervell in G–4, he persuaded the General Staff to put Engineers in charge of site investigations for cantonments and general hospitals. Although corps area and medical officers would normally assist them, district engineers would conduct surveys and prepare reports. Subject to G–4 approval, selections would be up to the Chief of Engineers. Unable to gain a larger role in locating plants and airfields, Robins stressed the importance of Engineer membership on site boards and the need for a proper engineering evaluation of each proposed site. He insisted that all concerned maintain vigilance to prevent costly mistakes.[98]

Not the least of Robins' worries was personnel. In January 1942 the Engineer construction establishment in Washington and the field included some 1,600 officers and 70,000 civilian employees. Even to maintain this strength was difficult enough in the face of demands for troop-age officers to serve with units, heavy selective service levies, and competition from industry and from other war agencies. To increase it vastly, as Robins had to do, was a Sisyphean labor. The Engineer reserve was practically exhausted, and most retired Regulars who were able to serve had returned to active duty in 1941. The usual sources of trained administrative personnel were running dry. Only by commissioning men from civil life, searching endlessly for undiscovered talent, refusing to let employees transfer to other government bureaus, opening more jobs to women, and occasionally winking at applicants' qualifications was the Engineer Department able to build up to a peak strength of approximately 4,700 officers and 180,000 civilians by the mid-summer of 1942.[99] The inexperience of many of these people was a disadvantage that could not be entirely overcome.

Directing part of his abundant energies into planning an accelerated plant construction program, Colonel Groves came to grips with several pressing problems. The first had to do with design and supervision. The few concerns qualified for highly complex munitions jobs were already heavily overloaded. Using untried firms would entail serious risks. As a way out of this dilemma, Groves suggested a "master design and procurement" contract, under which a single company would supply drawings, furnish consulting services, and purchase process equipment for a group of projects. In early 1942 the first such agreement, for three TNT plants, Lake Ontario, Longhorn, and West Virginia, went to DuPont.[100] A second problem had to do with process machinery. By taking various expensive shortcuts, the Engineers could trim several months from plant completion schedules. The question was whether deliveries of machinery could keep pace with construction. "We are making use of the only known means of improving delivery," Groves reported

[97] Ltr, Robins to Div Engrs, 26 Mar 42. 686 (Airfields) Part 54.

[98] (1) Memo, Styer for Stratton, 5 Jan 42. Opns Br Files, Engrg Br. (2) OCE Circ Ltrs 1038, 7 Jan 42, and 1059, 13 Jan 42.

[99] (1) Constr PR's. (2) Control Br, OCE, Rpt on Administrative Developments of the CE, 7 Dec 41–1 Dec 42. (3) OCE Circ Ltr 1090, 19 Jan 42. (4) 210.1 (Engrs, Corps of) Parts 7 and 8. (5) 210.3 (Engrs, Corps of) Parts 18–19.

[100] (1) Memo, Styer for Patterson, 12 Dec 41. QM 600.1 (TNT Plants) 1941. (2) Memo, Creedon for Madigan, 15 Jan 42. Madigan Files, Munitions Plants and Depots.

on 2 January 1942, "applying for AA priority ratings on appropriate items and authorizing increased payments for overtime worked by vendors."[101] He soon contrived additional means, sending top government expediters to plants producing equipment and calling on experienced contractors, such as E. B. Badger & Sons and Stone & Webster, for assistance.[102] While it was Groves who put these ideas across, much of the credit for them was due Creedon, whose ingenuity and expertise were major factors in the success of the munitions program.

Combating delays at current projects was also in Groves' department. In the first weeks of the war—the program as a whole was then slightly ahead of schedule—scarcely more than a handful of major projects were behind. Immersed in the details of the transfer, in carrying the big Quartermaster organization over to the Engineers "practically single-handed," as Hardin put it, Groves relied on his principal assistants to push construction, Creedon at munitions plants, Daley at ground troops projects, Plank at airfields, and Davidson at ports and supply depots. From time to time, he dispatched specialists from the Chief's office to trouble spots in the field: for example, he sent Zach to assist with a difficult layout at Camp Wood, Missouri, and Kirkpatrick to investigate problems with the sewage system at Camp Stewart, Georgia. The Pentagon, a center of public interest and a magnet for politicians, was one of the few projects to which Groves gave close personal attention in the early winter of 1941–42.[103] This period of relative calm along the operations front did not last long.

As the avalanche of war directives descended on them, the Engineers began to fall behind. Each week saw a widening of the gap between the estimated cost of the program and the value of construction in place. During January 1942 new directives totaled $670 million and the value of work put in place was $210 million. During February, these figures were $800 million and $200 million, respectively. Meanwhile, the number of jobs behind schedule increased from 50 on 31 December to 76 on 28 February and the number not started rose, alarmingly, from 60 to 193.[104] Unless the pace accelerated greatly, the program would bog down.

Flooded with orders, the Construction Division threatened to become a bottleneck. Reduced, as the Engineers decentralized, from 3,000 members in mid-December to 2,200 on 1 March, the staff was hard pressed to cope with the heavy new demands laid upon it. As one officer remarked, there were simply not enough people to "crank out" that much work. Moreover, the presence of two groups in the office, one accustomed to Engineer methods of operation and the other not, sometimes made for misunderstanding. Under the

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[101] Memo, Groves for Robins, 2 Jan 42. Madigan Files, Ord–TNT.

[102] (1) Memo, Robins for Patterson, 5 Jan 42. 635 Part 2. (2) Memo, Groves for OCofOrd, 8 Jan 42. Madigan Files, Ord–TNT. (3) Ltr, OCE to WPB, 4 Feb 42. 635 Part 2.

[103] (1) Memo, Somervell for Reybold, 26 Dec 41. 600.914 Part 1. (2) Hardin Interv, 29 Apr 64. (3) QM 685 (Camp Sites). (4) Memo, Kirkpatrick for Groves, 10 Dec 41. Opns Br Files, Cp Stewart. (5) Opns Br Files, WD Bldg, Arlington. (6) 600.1 (Pentagon Bldg) Parts 2–3.

[104] Constr PR's 42, 31 Dec 41, pp. 34, 31; 44, 31 Jan 42, pp. 50, 47; 46, 28 Feb 42, pp. 56, 51.



COLONEL STURGIS

circumstances, confusion and delay were inevitable. Papers choked the in-baskets. Decisions were slow. As of 24 January there were 18 major directives which had been in the office awaiting action for two weeks or move.[105]

The points of sharpest impact were in the field. Districts and divisions, though strengthened by participation in defense construction, were nevertheless unprepared for the tidal wave that hit them in early 1942. Colonel Sturgis' troubles illustrated what the field was up against. Prior to 1941 the Vicksburg District had expended an average of $10 million a year for civil works. Totals for 1942 would probably reach $14 million for civil and $46 million for military projects, an increase of 500 percent. Yet since 1940, the district's personnel strength had increased only 55 percent, from 320 employees to 500. Appeals to the Civil Service Commission, the Chief's office, and other Engineer districts for qualified men had been of little avail. An advertising campaign was producing scant results. By February 1942 Sturgis was at his wits' end to know where to turn. And Vicksburg, which had ranked fifth among the prewar districts according to volume of work, was better off than most. One effect of understaffing was the growing backlog of directives awaiting action by districts and divisions.[106]

A certain dualism characterized the newly consolidated organization—the Quartermaster Corps of Engineers, some jokingly called it. Many area engineers in charge of important projects had served as Constructing Quartermasters. Accustomed to being largely independent and to dealing direct with the Washington office, they tended to resent control by districts and divisions. Commenting on this situation, Groves said:

> There was a considerable amount of friction from time to time between outstanding Area Engineers . . . and their District and Division Engineers. It must be remembered that in many instances these Area Engineers had had over a year's experience in this type of construction . . . and it was not surprising that they would know more of the details and even more of the general problems than a District Engineer who had not had the same experience.[107]

Most district engineers viewed the matter differently. In a speech to fellow of-

[105] (1) Constr PR's 41, 16 Dec 41, p. 167; 46, 28 Feb 42, p. 256. (2) Antes Interv, 3 Jun 58. (3) Memo, Somervell for Reybold, 31 Jan 42. 600.914 Part 1.

[106] (1) Ltr, Sturgis to Reybold, 28 Feb 42. 326.01 (Org Res) Part 14. (2) Sturgis Interv, 26 Jan 64. (3) Constr PR 46, 28 Feb 42, p. 54.

[107] Groves Comments, X, 13–13a.

ficers of the Lower Mississippi Valley Division, Colonel Sturgis caustically remarked:

> Sometimes I get quite embarrassed at the old time-worn methods under which we operated until the great metamorphosis took place. . . . Under the old system, when I wanted to get instructions about a project, I went to the Division Engineer. Now, I get them from the Area Office . . . . After all, it's the Area that's doing the job and all we've got is the responsibility.[108]

Division engineers were strongly in favor of time-worn methods and time-honored channels, and evidently Robins was too. But Groves, proceeding along "the path of speed and action" he had followed in the Quartermaster Corps, often short-circuited districts and divisions to exercise centralized control. Whether this state of affairs caused delays was debatable. In fact, as some conceded, it may have helped keep everyone on his toes. That it produced conflicts was beyond doubt.[109]

"The great problem," as Groves saw it, "was to combine the Engineer and Quartermaster procedures and to see to it that this amalgamation not only was efficient in the end but that it was efficient at the very start."[110] His analysis was sound. But his solution to the problem ran against the Engineer grain. Reflecting the attitude of most Engineer Regulars, Hardin reminisced:

> I thought it was bad . . . taking responsibility out of the hands of the decentralized organization and trying to run the show from a Washington office. I always agreed and I would say so today that there are times and there are conditions when direct contact from the Washington level to the job area may be necessary. But it is always a highly desirable thing at least to contact the responsible official in the field and tell him what you did and why you did it. Now General Groves might not always have done this. . . . He was working under great stress and time didn't permit him, maybe, to call these District Engineers and say, "I have contacted your area officer and told him so and so."[111]

Commenting further, Hardin wrote:

> The belief that direct contact from a branch or division chief in OCE was a preferred and necessary procedure was very difficult to change and control, but the backlash from the District or Division Engineer when such procedures were employed was generally prompt and vigorous.[112]

On their visits to Washington, division engineers seemed to avoid Groves, but they seldom missed an opportunity to complain to his superiors. When these complaints were unavailing, some tried obstructive tactics. For example, General Tyler advised Sturgis not to answer telephone calls from Washington.[113] Balancing the feeling against Groves within the Corps was Somervell's strong faith in his ability and the Engineers' awareness of that faith.

In January 1942 Somervell named to the top G–4 construction post a man after Groves' own heart. Chosen to succeed Colonel Chamberlin as head of the Construction and Real Estate Branch was Col. Frederick S. Strong, Jr. A 1910 West Point graduate, Strong had been an Engineer officer until 1919, when he resigned from the Army to go into the

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[108] Speech by Sturgis at Vicksburg, Miss., 14 Nov 42. Sturgis Files, Personal.

[109] (1) 1st Ind, Robins to Gregory (Basic Missing), 18 Feb 42. QM 685 1942. (2) Groves Comments, X, 12. (3) Sturgis Interv, 26 Jan 64.

[110] Groves Comments, X, 12.

[111] Hardin Interv, 29 Apr 64.

[112] Ltr, Hardin to authors, 21 Apr 64.

[113] (1) Hardin Interv, 29 Apr 64. (2) Groves Comments, X, 16. (3) Sturgis Comments, IX, 2.

real estate and land development business. From 1927 to 1941, he was a member of the Booth Investment Company of Detroit, serving successively as vice president, president, general manager, and director. Recalled to active duty in 1941, he had served as Constructing Quartermaster of the most important zone, the Fourth, and later as district engineer at Atlanta. Commenting on Strong's appointment to G–4, Groves observed:

> During his service in Atlanta as Zone CQM, Strong had been thoroughly indoctrinated with my viewpoint that no delay was excusable and that most delays were caused by slowness in decision, not only on the site, but in the higher echelons. Strong was a brilliant man. He stood Number One in his class and had lost none of his intellectual keenness. His criticism of other people's work was always extremely sharp.

Wishing to keep this valuable officer on his own team, Groves opposed Strong's assignment to the G–4 post; but Somervell, as usual, had his way.[114]

Strong soon made his presence felt. Visiting the Construction Division and traveling widely throughout the country, he questioned officers and key civilians as to their difficulties and complaints. Stepping up inspections by members of his staff, he obtained detailed reports on a number of major projects. Poring over the Engineer progress reports, he grasped an overall view of the program. His first move came on 12 February, when he turned over to Somervell a list of 14 important projects that were "substantially behind schedule" and also warned him that architect-engineering on the Pentagon was not keeping pace with construction. Somervell promptly wrote to Reybold, asking what steps he was taking to correct the deficiencies Strong had noted.[115]

Replying to Somervell on 25 February, Robins stressed extenuating circumstances. Unusually severe weather had hampered construction at many of the projects Strong cited; at Schenectady General Depot it had been too cold to lay bricks without protection, which was "not covered under the terms of the lump sum contract in force." Owing to low priorities, several jobs had fallen behind while waiting for delivery of materials. Delays at several others were traceable to the Air Corps, the Public Roads Administration, or the Ordnance Department. In the case of Fort Sam Houston, shown as 31 days behind but actually on schedule, Strong had been misled by a typographical error in the progress report. With better weather, higher priorities, and additional overtime, most of the projects were now moving along in fine style. Design work on the Pentagon was picking up speed.[116] Whatever reassurance Somervell might have gained from Robins' memo was dispelled by the next bimonthly progress report. On 2 March, after seeing the latest report, he advised Reybold: "In general, the whole program is not moving along as rapidly as might be desired or as is consistent with the 'All-Out Effort' for War." Gratuitously he added, "Present exigencies demand an extraordinary effort."[117]

That same day Strong launched a

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[114] Groves Comments, X, 12, 4.

[115] Memo, Somervell for Reybold, 12 Feb 42. 600.914 Part 1.

[116] Memo, Robins for Somervell, 25 Feb 42, and Incl therewith. 600.914 Part 1.

[117] Memo, Somervell for Reybold, 2 Mar 42. 600.914 Part 1.

slashing attack against the Engineers. In a report to Somervell, which featured examples of "inordinate delay," he said:

> It seems evident that the present tempo of the Construction Division derives from the conservative practices of the Engineer Department under its normal program and that the more flexible and dynamic operations required under present conditions are bogging down in a mass of administrative impedimenta. Some of the things I feel are wrong under present war conditions, when we must get the work done not a minute too late, are:
>
> Confusion and indecision in the Central Office, with a hodge-podge of control on some matters and attempted decentralization on others; hence, confusion in the various lower echelons as to the responsibility of each.
>
> Too many echelons: Central Office, division, district, area, and even job offices.
>
> Too many old officers and old civilians thinking in terms of peacetime Engineer Department procedure.
>
> Lack of flexibility in employing certain engineering talent, in design, in use of materials, and general lack of ingenuity in solving problems and getting the work going.

Moreover, he complained, district engineers were "so enmeshed in administrative detail" that they had no time to keep abreast of what was going on at their projects. Strong predicted that unless the system promptly received a thorough overhauling, the program would fall further and further behind.[118] Somervell passed the report on to Reybold with the comment that some of the delays seemed "inexcusable."[119]

Before the Engineers could respond, changes overtook them. On assuming command of the Services of Supply, Somervell acted swiftly to insure aggressive leadership. To head his Control Division, he chose his longtime associate and fellow Engineer, Col. Clinton F. Robinson, widely known as "Somervell's hatchetman." Robinson's attention promptly focused on the construction program. Meanwhile, at Somervell's insistence, Groves became Deputy Chief of Construction and Strong took over the Operations Branch.[120] Soon after these appointments, a call went out for division and district engineers to meet in Washington.

Arriving for the conference, the field officers were in no mood to admit to serious shortcomings. Their general feeling was that the record spoke for itself. Between 7 December 1941 and the last day of February 1942, they had started construction at the unheard-of rate of $200,000,000 per week.[121] While struggling under the crushing load of directives, combating shortages of various kinds, and battling winter weather, the Engineer Department had scored impressive gains. Momentum was increasing. Districts and divisions were gearing up as rapidly as possible. A great thrust forward would come when the weather broke. Continued harassment and interference from Washington would only hinder the work. As a group, the division and district engineers regarded Robins' new deputy with antipathy. Some senior officers were heard to mutter the phrase "too big for his britches."[122]

Among the items on the conference agenda were progress reports and rela-

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[118] Memo, Strong for Somervell, 2 Mar 42. 600.1 Part 12.

[119] Memo, Somervell for Reybold, 3 Mar 42. 600.1 Part 12.

[120] Reybold Interv, 12 Mar 59; Groves Interv, 19 Jun 56.

[121] Lt. Gen. B. B. Somervell, "Construction Goes to War," *The Constructor*, July 1942, p. 64.

[122] Sturgis Comments, IX, 2. See also Hardin Interv, 29 Apr 64 and Groves Comments, X, 16.

tions with contractors. The Quartermaster Corps had approached these matters one way; the Engineers, another. Somervell had prepared his progress reports with an eye to official and public reaction. The emphasis was on accomplishment. Progress was equated with expenditures, and wasteful projects often made a better showing than efficient ones. Other devices—for example, use of the term "beneficial occupancy"—tended to magnify what had been done. Engineer reports, prepared for budgetary purposes, were far more conservative. Despite its obvious advantages, the Somervell system had won few adherents among the Engineers, who generally regarded it as "full of gimmicks" and somewhat shady. Accustomed to having the final say in their relations with contractors, Engineer field officers were also highly critical of CQM–contractor relationships.[123] Getting along with the contractors had been a primary requirement for the Quartermaster field. Discussing this "most heinous" of Quartermaster "sins," Sturgis recalled:

> On taking over the Minden, Louisiana, Shell Loading Plant, I asked the CQM what was his most difficult problem and he quickly replied: "Obedience from the contractor. Make a decision he does not like and off he flies to Washington, not only to get your decision reversed but sometimes to get you fired." . . . Responsibility without adequate authority over the contractor . . . was by far the worst characteristic of CQM operations and was the cause of secondary failures.[124]

Needless to say, suggestions that the Engineers adopt these Quartermaster methods evoked little enthusiasm.

After several turbulent conference sessions, the division and district engineers received instructions to make certain changes.[125] Informed that "the magnitude of the program and the vital necessity for speed" demanded "maximum freedom of action," they got orders to give wider latitude to subordinate echelons. Channels of communication would be less formal. When time could be saved, area or district engineers would deal direct with Washington and the central office would by pass division or district engineers. Copies of letters and telegrams would go to intermediate echelons. As for telephone calls from OCE, it would be up to the officers who received them to keep their superiors informed. Meanwhile, area engineers would not disapprove contractors' recommendations "without reference to higher authority and the approval of the Chief of the Construction Division." Progress reporting would be on a different basis. "In the past," ran the new instructions, "incorrect reports in many instances have resulted in severe criticism of the Corps of Engineers. Reports made on a conservative basis, as normally practiced . . . , do not reflect the true status of the work and are not satisfactory."[126] However serious their mental reservations, the field officers had to comply.

On taking over the Operations Branch, Strong instituted a system for grading projects. A Class I rating meant that a job was in tiptop condition; a Class II, that progress was generally good and

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[123] (1) Ltr, Robins to Div Engrs, 13 Mar 42. 600.1 Part 12. (2) OCE Circ Ltr 1263, 21 Feb 42. (3) Ltr, Sturgis to authors, 24 Aug 63.

[124] Sturgis Comments, VI, 1.

[125] Sturgis Interv, 26 Jan 64.

[126] Ltr, Robins to Div Engrs, 13 Mar 42. 600.1 Part 12.

there was little reason for concern; a Class III, that the project was in trouble and prospects for meeting the completion date were dim. Some jobs got off to a promising start, received excellent management, ran into few snags, and remained in Class I all the way. Others, plagued by manifold ills, never rose above Class III. Ofttimes, unsatisfactory progress in a single area counted heavily against a project. For example, a lag in construction of the station hospital kept Camp Van Dorn, Mississippi, in Class III, although work in other areas was going well.[127] The grading system had a double purpose. It enabled Strong to single out projects needing help. It also served as a device for needling the divisions and districts.

More frequent inspections increased pressure on the field. Spending roughly half his time on the road, Strong visited more than 140 projects within a five-month span. Although he occasionally dropped in on jobs that were doing well, most of his trips were to trouble spots. His reports bristled with sharp criticisms. "One of our notoriously bad jobs," he said of the staging area at Seattle, Washington.[128] "A disgrace to the engineering and construction industry," he termed the Longhorn and Lake Ontario Ordnance Works.[129] "There is no telling when Camp Campbell will be built," was his comment on a cantonment in Kentucky.[130] "The worst job that has come to my attention in the whole program," was his description of the Yermo Holding and Reconsignment Point in California. He had found Yermo's commanding officer sitting in the corner of an unfinished cafeteria waiting for office space to be provided. "It seems the colonel was an old CQM," Strong noted, "and it is easy to see why his remarks about this job were not very complimentary."[131] Supplementing Strong's inspections were those of Maj. L. George Horowitz. Top man in the West Point class of 1919 and an Engineer Regular until 1922, Horowitz had returned to duty with the Operations Branch. As caustic and critical as his chief, he assumed the role of "sub-hatchetman."[132] He thus joined the host of inspectors and investigators—from OCE, WPB, Patterson's office, Somervell's headquarters, The Inspector General's Department, the using services, and congressional committees—who were traveling the construction circuit.

These Washington parachute jumpers, visiting firemen, and hatchetmen, as they were variously called, made life difficult for the officer on the job. Arriving at a project, they might spend anywhere from a few hours to several days, inquiring into details of organization, progress, design, specifications, accounting, auditing, and so forth, taking up the time of the area engineer and his staff, and occasionally demanding the presence of the district engineer as well. With preparations and the necessary followup to answer criticisms, a visit by such a personage as Madigan might disrupt a project for a week. Often, the inspectors'

[127] Memo, Daley for Strong, 21 July 42. Opns Br Files, Ground Troops Sec.

[128] Insp Rpt by Strong, 3 Oct 42. Opns Br Files, Insp Rpts, Col Strong.

[129] Tel Conv, Strong and Mr Reed, DuPont, 13 Apr 42. Opns Br Files, Contractors.

[130] Insp Rpt by Strong, 29 Mar 42. Opns Br Files, Insp Rpts, Col Strong.

[131] Insp Rpt by Strong, 28 Aug 42. Opns Br Files, Insp Rpts, Col Strong.

[132] Sturgis Interv, 26 Jan 64.

suggestions seemed wildly impractical, and their opinions, uninformed. One outspoken district engineer declared:

> Many of their procedures were against law or regulation. It was, however, no skin lost by them if a project was caught violating these orders. It was the District Engineer's neck, as these vermin disappeared on such occasions back into the woodwork. Many reports by these visiting hatchetmen were made to show how good *they* were rather than . . . to help the project.[133]

Protesting against the spate of inspections, one of Robins' officers averred: "With very few exceptions, the reports are lacking in constructive criticisms or suggestions, lead to no useful result, and, on the contrary, are the cause of delay and of annoyance and discouragement."[134] Another result was to create a false impression, to paint conditions much blacker than they were.

Spring found the Engineers making rapid gains. Production was increasing; work valued at $375 million went into place in March. More and more jobs were getting under way; between 15 and 31 March construction began on projects with a total estimated cost of $521 million. Progress was improving, as shown in *Table 15*. The number of projects not started remained constant at about 240, but as Robins pointed out, orders for 125 new projects had come through during the last two weeks of March.[135] General Reybold exhibited optimism. He had, he told division engineers, "complete confidence that the present personnel, military and civilian, . . . will surpass in performance during this war the long established record of the Corps of Engineers in getting the job done on time."[136]

Many obstacles stood in the way. Priorities were consistently low. Shortages of materials and equipment were a perpetual headache. Decisions by the using services were often slow. The Air Forces protested that overhead was too high. Supervision at the job sites was at times extremely thin, and management failures increased as the Engineers had to dip deeper into the contractor barrel. A ruling by the Comptroller General necessitated difficult adjustments in the audit machinery. The weatherman did not always co-operate. In one form or another, most of the old, familiar problems of emergency construction beset the Engineers.[137] Worst of all was the tremendous haste. With the best will in the world, it was impossible to maintain the pace and still avoid mistakes.

Nevertheless, some phases of the work were proceeding remarkably well. O'Brien's progress was especially encouraging. The huge land acquisition program for fiscal 1942—the area involved was 5.3 million acres, nearly three-quarters the size of Belgium—was encountering few snags. Slightly more than 2.5 million acres were being obtained through the transfer of public lands or through donations. With a sizable organization under his direction—several thousand persons in the

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[133] Sturgis Comments, XV, 2.

[134] Draft Memo, Constr Div for Patterson, n.d. Opns Br Files, USW.

[135] (1) Memo, Control Sec OCE for Robins, 13 Apr 42. 600.1 Part 13. (2) Memo, Robins for Somervell, c. 15 Apr 42. 600.1 (Secret File No. 1 of Two Secret Files).

[136] SWD Circ 13–1942, 4 Apr 42. Opns Br Files, SWD.

[137] (1) Opns Br Files, Control Sec, Constr Div. (2) Plank Interv, 5 Dec 50. (3) B–21378, December 20, 1941. (4) OUSW, CD Gen Directive 23, 24 Feb 42. 3820 (Nat Def) Part 13.

TABLE 15—STATUS OF PROJECTS, 15–31 MARCH 1942

Projects	15 March 1942	31 March 1942	Betterment
Actually Completed	443	493	+ 50
Ready for Use	123	99	− 24
Ahead of Schedule	86	113	+ 27
On Schedule	157	218	+ 61
Total	809	923	+114

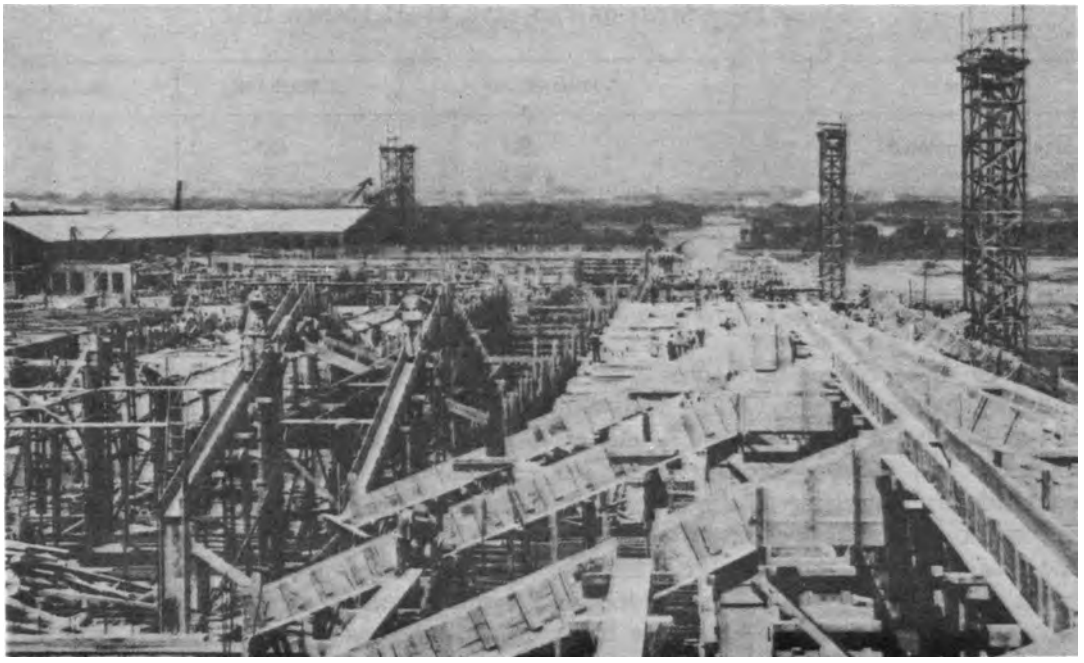
Source: Memo, Control Sec OCE for Robins, 13 Apr 42. 600.1 Part 13.

Engineer field offices and some 250 in the Real Estate Branch, OCE—and with the assistance of other federal agencies, O'Brien was moving rapidly ahead to conclude the purchase of the remaining 2.8 million acres as well as to complete the leasing of an additional 1.7 million acres and some 65 million square feet of storage and office space. Reports from the job sites provided one measure of his success. Of 978 delays reported by area engineers in May 1942, real estate accounted for but 30. There were other favorable signs. No nationwide shortage of labor had developed, strikes were few, and lumber prices were holding firm.[138] In these areas, at least, the situation appeared to be under control.

One bright spot in the program was the Pentagon project. An architectural rarity and the butt of a thousand jokes, the "monster" structure went up rapidly during the winter of 1941–42. "Concreting a 100-acre office building," one writer described the operation. Work proceeded at a record-breaking pace. Sand and gravel came from the Potomac River bottom. Early dredging of what would be a scenic lagoon enabled barges to bring the aggregate directly to the site. A plant with a daily capacity of 3,000 cubic yards fed materials into batch trucks for mixing enroute to points throughout the sprawling structure. A system of tower hoists, chutes, and buggies delivered the mix for final placement. Forms for concrete columns, walls, and floors were preassembled, marked, and used again and again. Forms for concrete facing on the interior courts were built in place, and in order to save time, new ones were provided for each section and old ones taken down and salvaged.[139] At the peak of employment, 13,000 persons manned the job. Colonel Renshaw, the project officer, contractor John T. McShain, and architect George E. Bergstrom had to cope with several crises in the early months of the war—a failure by the rolling mills to deliver steel on time, a strike of plumbers and iron workers, and last-minute decisions to increase the size of the building. Nevertheless, they managed to keep the job on schedule. By late April, they had moved 2,500,000 cubic yards of earth, poured 225,000 cubic yards of concrete, driven over 40,000 piles, and completed two sections of the building. On the 30th

[138] (1) Annual Rpt, Real Estate Br, OCE, to USW, 1941–1942. Gideon File, 6A7. (2) Rpt, Control Sec, Constr Div, 15 May 42, sub: Summary of Delaying Factors. 600.914 Part 2. (3) Constr PR's.

[139] *ENR*, June 4, 1942, pp. 80–84. See also Leisenring Interv, 5 Jun 57.



PENTAGON UNDER CONSTRUCTION

the first occupants moved in. By the end of May, 1,000,000 square feet of office space was available and the expectation was that another 500,000 would be ready in June. Completion of the building by its November deadline seemed virtually assured. As occupancy went forward, pressure on space in Washington relaxed. One beneficiary was the Construction Division, which in June joined the rest of OCE in the New War Department Building.[140]

From the vantage point of the front office, the overall outlook was increasingly encouraging. According to his own analysis, General Robins would have to achieve a work-in-place average of about $550 million per month during the last three quarters of 1942 in order to pull the program through. In addition, he would require at peak a work force of roughly a million men. After a moderate gain in April, the monthly value of work placed reached the $400 million mark in May. In June the figure shot beyond $500 million. Meanwhile, the total number of workers employed grew from 450,000 in March to over 800,000 in June. Robins knew as well as any that the Engineers could not afford to take success for granted. Too much was at stake, the outcome of battles and the lives of fighting men, to say nothing of the reputation of the Corps. Nevertheless, the signs seemed favorable.

[140] (1) WD Press Release, 29 Apr 42. EHD Files. (2) 411.5 (Pentagon Bldg). (3) Gavin Hadden, The Pentagon Project (MS), 1944, p. 8. 333.5 (Pentagon Bldg—Bulky).

Outwardly, at least, Robins was cool and confident.[141]

To Groves, fighting, as it were, in the thick of the battle, things presented a different aspect. Projects not started, projects behind, strikes, shortages, transportation tieups, problems of priorities, problems of design, contractors in trouble, area engineers unable to measure up to their jobs, administrative snarls in the divisions and districts—he had barely dealt with one crisis before he had another on his hands. At times it seemed as if the weight of the whole vast program had fallen on his shoulders. Scalding memorandums came his way from Robinson in SOS. Extremely critical of the Engineers' performance, Somervell's control officer issued repeated warnings that construction objectives might be "missed entirely."[142] Groves lived in a world of tension and anxiety, where the possibility of failure seemed by no means remote. Like the conscientious, dedicated officer he was, he left nothing undone to insure the program's success.

One of his close associates furnished a picture of Groves during this critical period. "How did he operate?" wrote Col. Fred G. Sherrill. "He usually spent six days a week in Washington, working steadily around the clock." During the week, he would determine which of all the projects under his direction most needed his personal attention. Sunday morning would find him there. Sherrill described one such visit—to the Lake Ontario Ordnance Works:

> It is a wet, rainy, cold Spring Sunday. He gets off the train in Buffalo early in the morning, eats a hasty breakfast, and drives to the project. He spends the morning going over the physical aspects of the job. . . . At noon, he repairs to the headquarters of the contractor, J. G. White Engineering Company, New York, and asks to have the contractor's representative meet him for a cup of coffee. The contractor's representative is mean and testy. He has been pushed around considerably by other representatives of the Army . . . . For an hour and a half or more, [Groves] talks quietly to the man, . . . trying to establish in the representative's mind confidence in General Groves. He succeeds, and the latter realizes that here is someone who knows more about this job . . . than all the rest of the Army's representatives put together. . . . This man commences to beam. He has found someone who talks his language. He brings out his progress reports, explains his difficulty . . . . At the end of the day, Groves takes the night train back to Washington and is in his office early Monday morning.

A month later the project was on schedule. "This man Groves," Sherrill related, "had literally and figuratively picked that project up out of the mud, put it on its feet."[143] Recalling this period of his life, Groves disclosed: "I was hoping to get to a war theater so I could find a little peace."[144]

Meanwhile, there were frequent personnel changes in the field. The casualty rate was highest among area engineers.

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[141] (1) Memo, Robins for Somervell, n.d. 600.1 (Secret File No 1 of Two Secret Files). (2) Constr PR's. (3) Hardin Interv, 29 April 64.

[142] Memo, SOS for CofEngrs, 15 Apr 42, and similar memos in file. 600.1 Part 11. See also (1) Memo, Robinson for Somervell, 14 May 42. 600.914 Part 1. (2) Memo, Robinson for Somervell, 30 Apr 42. Madigan Files, 101.6 (Gen Corresp). (3) Memo, Robinson for Col Pease, 16 May 42. Opns Br Files, Memos, AF Sec.

[143] Col. Fred G. Sherrill, The Case of General Groves (MS), 1947, pp. 3–4. Copy in EHD Files.

[144] Lt. Gen. Leslie R. Groves, "The Atom General Answers His Critics," *The Saturday Evening Post*, June 19, 1948, p. 16.

One job had four before it reached completion. Some outstanding project officers acquired a name as trouble shooters; men like Lt. Col. Harry R. Kadlec, Maj. Karl M. Pattee, and Capt. Mark C. Fox were called upon again and again to take over jobs where others had failed. Commenting on the high turnover among area engineers, Groves said:

> In the first place some failed to do as well as we thought someone else would do. In the second place they wore out physically. The hours were long and there was no rest. The responsibilities were terrific and the requirement for important decisions was constant. Another reason for the turnover being so high was the fact that an Area Engineer who had initiated the work and was responsible for the building up of the enormous organization was never as efficient at tearing it down. . . . A final reason was that once the project was within about 80 percent of final completion, it was normally operable, and the need for a hard driving Area Engineer was not so pressing.[145]

Although area officers were particularly vulnerable, district and division engineers were not immune. Groves gradually replaced most of the retired colonels recalled to duty as district engineers in 1941. And, at his prompting, General Reybold, on a day in April 1942, relieved the very senior engineers of the North Atlantic, Great Lakes, and Missouri River Divisions, replacing them with energetic younger men, Cols. Beverly C. Dunn, Ludson D. Worsham, and Lewis A. Pick. Dunn and Worsham afterward became brigadier generals and Pick, who served as Chief of Engineers from 1949–53, attained three-star rank.

The large number of jobs not started became a sore point with Groves. When reports for mid-April showed little improvement over March, he acted to break the log jam. On the 24th he selected 48 projects which were not yet under way despite the fact that their directives were all over eight weeks old. Twenty-two of the laggard jobs were in Colonel Plank's department, thirteen in Colonel Daley's, eight in Colonel Davidson's, and five in Mr. Creedon's. In a terse note to each of these men, Groves demanded to know why the jobs had not started and when work would begin. The replies came back quickly. The officers cited the usual reasons for delays: slowness in receipt and approval of plans, scarcity of qualified contractors, troubles with local commanders, and so on. They insisted that everything possible was being done to get construction rolling.[146] Creedon took a different view, putting the blame on the Engineer system. "Peacetime functioning of Army departments cannot be utilized for the War Program," he maintained. "It is a shocking perversion of logic to merely superimpose gigantic construction on a departmental organization and to expect results because the peacetime setup functioned efficiently under peacetime conditions."[147] Pressure from Groves notwithstanding, there were 300 projects not yet under way on 30 April.[148]

May was a month of countless trials and nagging uncertainties. A tightening of the lumber market; a worsening shortage of steel; warnings from contractors that equipment was becoming

[145] Groves Comments, X, 13A–13B.

[146] Memos, Groves for Plank, Daley, Davidson, and Creedon, 24 Apr 42, and replies. Opns Br Files.

[147] Memo, Creedon for Strong, 7 May 42. Opns Br Files, Munitions Plants & Depots Sec.

[148] Constr PR 50, 30 Apr 42, p. 57.



HEART MOUNTAIN RELOCATION CENTER, HEART MOUNTAIN, WYOMING, *28 August 1942.*

increasingly scarce; an attempt by the Air Forces to fix impossible deadlines on several projects; a scheduling snarl-up at the Pasco Holding and Reconsignment Point in Washington state; a delay in completing drawings for the Buckeye Ordnance Works in Ohio; the sinking of a dredge off the Hog Island, Pennsylvania, ammunition loading pier; excessive rainfall at Camp Adair, Oregon; a wildcat strike at the Lake City plant—many such problems harassed Groves daily. A $14-million overrun on the Pentagon project was an added worry.[149] Dealings with using services produced maddening frustrations. Soon after he succeeded Plank as head of Strong's air projects section, Lt. Col. Emerson C. Itschner registered dismay at the "absence of careful planning by the Army Air Forces . . . evident throughout the program." Itschner noted, "In many instances more time has been consumed in making a decision that a facility is needed than has been given to the Corps of Engineers to effectuate the construction."[150] Groves regarded Ordnance as another offender. Tracing innumerable delays to the head of its Wilmington office, he charged: "This man . . . attempted not only to make key decisions but to review personally a tremendous mass of minor matters . . . . He simply could not handle matters promptly."[151] Continuing criticism added to the strain. Robinson persisted in writing what some called

[149] (1) Opns Br Files, Insp Rpts. (2) Ltr, Renshaw to Reybold, 17 Apr 42. 600.1 (Pentagon Bldg) Part 3.

[150] Memo, Itschner for Control Br, 25 May 42. Opns Br Files, Memos–AF Sec.

[151] Groves Second Draft Comments, X, 1.

"dirty letters," larding them with phrases like "alarming condition" and "the bottleneck which now exists."[152] Was the effort succeeding or was it falling short? The answer lay buried in the sheaf of reports submitted by the field at the end of May. To analyze this information and put together the division's bimonthly report would take a week or two.

Early in June Groves flew to San Francisco to confront a fresh emergency. In February the President had decided to evacuate the west coast Japanese.[153] Assistant Secretary of War John J. McCloy was to oversee the undertaking. By early spring work was under way on temporary induction stations at racetracks and fairgrounds in California and on a dozen relocation centers in the Rockies and the Great Plains. Division engineers reported these projects not to OCE, but to General DeWitt and his Western Defense Command. Construction presented some obstacles: housing had to be designed for family units; Japanese physique and customs had to be taken into account; and a number of the sites were remote. Nevertheless, work proceeded generally on schedule. By May internees were moving through the induction centers and several relocation centers were open. The remaining centers were expected to be ready in June, July, and August. Then, suddenly, in early June, orders came for nine more relocation centers and General DeWitt demanded that the program have high priority. Alarmed, Groves rushed to California and worked out an agreement: DeWitt withdrew his request for priority, and Groves, in turn, promised that the relocation centers would be ready for occupancy sixty days after layouts received approval and would reach completion one month later.[154] Explaining the purpose of the agreement to General Tyler, Groves said: "We're very anxious not to let our haste to get these facilities done interfere with our general program any more than we can help it. In other words we not only want to get done in 60–90 days, we don't want to get done a minute sooner."[155] Knowledge that the bargain would be hard to keep added to Groves' other worries. "On this Jap thing," he told Colonel Scott, "if you will make every effort to get it finished—because there is nothing that is going to cost us more embarrassment than that."[156]

During the first weeks in June, Groves launched one of the Corps' most difficult wartime undertakings: construction of a supersecret $100-million plant for manufacturing RDX, an explosive several times more powerful than TNT. Although discovered in 1899, RDX had never been produced commercially in the United States. In 1941, at the urging of the British, President Roosevelt had approved construction of the $40-million Wabash Ordnance Works at Newport, Indiana. Based on British models which

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[152] Memo, Robinson for Somervell, 14 May 42. 600.914 ser 1–34.

[153] For a detailed discussion see Stetson Conn, Rose C. Engelman, and Byron Fairchild, *Guarding the United States and Its Outposts*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1964), ch. V.

[154] (1) 685 Part 1. (2) 652 I. (3) Tel Conv, Groves and Park, NPD, 2 Jun 42. Opns Br Files, NPD. (4) Constr PR's.

[155] Tel Conv, Groves and Tyler, UMVD, 18 Jun 42. Opns Br Files, UMVD.

[156] Tel Conv, Groves and Scott, SWD, 15 Aug 42. Opns Br Files, SWD.

employed the traditional batch method of making explosives, Wabash was originally designed to turn out ten tons of RDX per day. Begun soon after Pearl Harbor and slated for completion in eighteen months, the project was 10 percent ahead of schedule in May 1942. Meanwhile, plans had gone forward for a second plant with seventeen times the capacity of Wabash near Kingsport, Tennessee. Based on a recently developed and largely untried assembly-line process, the new Holston Ordnance Works posed treacherous problems of layout and design. A poor site (the Engineers had opposed its selection) and a tight completion schedule (partial production was to begin in the spring of 1943) made the job even tougher. Vetoing a suggestion that the Tennessee Eastman Corporation, which had pioneered the process, design and build the plant, Groves chose the top industrial engineering firm of Fraser-Brace as architect-engineer-manager and the highly respected Charles T. Main, Inc., as principal subcontractor. To administer the work, he established the separate Kingsport District headed by Maj. Elvin R. Gates, who had earned an outstanding reputation at Elwood and several other plants.[157] "It is brand new, you know," an Ordnance officer told Groves; "nobody has ever tried this thing before."[158] Groves needed no reminder that Holston would bear close watching.

Monday, 15 June, was a full day for the Deputy Chief of Construction. General Robins was in St. Louis for a conference with the division engineers. On Groves' desk that morning was the newly published progress report for 31 May, showing over 200 projects behind schedule and 200 more not yet under way. The main item on his agenda for the day was an appearance with General Reybold before the House Appropriations Subcommittee. The session was long and arduous. Congressman Engel took a prominent part in the proceedings, hammering the witnesses with questions as to costs, contracting policies, and the overrun on the Pentagon. Groves, who was much closer to the work than Reybold, bore the brunt of the inquiry.[159] Returning to the office, the two men discussed construction progress and a highly critical letter which had just come from Somervell. Afterward Groves related: "My attitude at the time was very definite—I believe it was Reybold's also—that the Division Engineers needed to be stirred up, and that it would be quite helpful if the Chief showed that he was, as I was, personally dissatisfied with their performance."[160] At 6:05 that evening, Groves picked up the telephone and called the Missouri River Division's St. Louis office. Summoning a secretary, he dictated a scorching message from Reybold, together with instructions that General Robins deliver it in person to the division engineers the next day. The Chief had not minced his words. Terming the latest progress report "definitely unsatisfactory," he called for "prompt and drastic steps to reduce the number of

[157] (1) Robert O. Bengis, Super Explosive Program RDX and its Compositions, A, B, and C (November 1945), I, 1–91. Ord Hist File. (2) *ENR*, June 25, 1946, pp. 64–69. (3) 635 (Wabash R OW). (4) 635 (Holston OW). (5) 600.03 (Holston OW).

[158] Tel Conv, Groves and Maj Kelly, Ord, 5 May 42. Opns Br Files Holtson OW.

[159] H Subcomm of the Comm on Appns, 77th Cong, 2d sess, *Hearings on Military Establishment Appropriation Bill for 1943*, pp. 210–236.

[160] Groves Comments, X, 15–16.

jobs not started and those behind schedule." Attributing delays to "a management failure" in the districts and divisions, he demanded to know which jobs would not be under way by 30 June and why. "The country is at war," the Chief declared. "We have decentralized power and responsibility to the Division Engineers and I expect them to meet their responsibility."[161]

On the morning of the 16th, Groves summoned Creedon, Daley, Davidson, and Itschner to his office. Sitting in on the meeting was General Reybold. It was Engineer Day, the 167th anniversary of the founding of the Corps. But the purpose of the gathering was not to celebrate; it was, as Reybold put it, to "blow these [projects] loose." Groves led the discussion. Referring to the lengthy list of jobs not started and jobs behind, he warned, "This means we will be skinned again on our next progress report." He went on to thrash out the details of troubles at some 40 key projects. Everyone agreed there should be no tampering with deadlines. Completion dates were "sacred," they chorused; "you lose control of your job if you keep moving them back." Nevertheless, Groves felt something could be done in the way of reporting better progress. Projects already occupied and in use were shown behind schedule. He ordered all jobs which were 90 percent complete wiped from the books. General Reybold was for cracking down on the field. "We ought to hammer them hard," he said.[162]

The attitude of OCE offended many division and district engineers. Amid all the criticism and ferment, they were giving the program everything they had. Some openly displayed their resentment. Returning from a visit to the North Pacific, one officer reported: "Colonel Park feels very strongly that the 'skinning' letters from the Office, Chief of Engineers, are definitely lowering the morale of his division, and that his men, who are working to the limit of endurance, are being distracted from construction by fear of the progress reports and the resulting letters from Washington."[163] Colonel Stratton expressed the general feeling: "For every 'needler' there were hundreds, if not thousands, working their hearts out to meet the stated objectives, many of which approached the irrational because they defied the realities."[164] Hardin, who had once served in the same regiment as Groves, explained his old comrade's approach: "A lot of it was to get a reaction and results that might not otherwise be fulfilled. It was a tool which he was accustomed to using from his younger days as a troop commander."[165] Groves himself confirmed this view. "Certainly," he mused, "even the greatest racehorses have to have the whip applied in the home stretch. This was our way of applying the whip and it was successful."[166]

By late June it was clear that the race would soon be won. Reporting by telephone on the 21st and 22d, the division engineers assured General Robins that

[161] Tel Conv, Groves and MRD office, 15 Jun 42. Opns Br Files, Rpts—Jobs not started before 6-30-42.

[162] Notes of Meeting, Reybold, Groves, *et al.*, 16 Jun 42. Same file.

[163] Memo, Itschner for Strong, 22 Jul 42. Opns Br Files, Memos—AF Sec.

[164] Ltr, Stratton to OCMH, 1 Mar 55.

[165] Hardin Interv, 29 Apr 64.

[166] Groves Comments, X, 17.

all but a few major projects would be under way before the month was out. Five divisions expected to have perfectly clean slates. Of the other eight, only Southwestern, where Colonel Scott was awaiting real estate directives for ten airfield sites, would have any backlog to speak of.[167] The progress report for 15 June inspired considerable optimism. The number of jobs not started had dropped about 25 percent and the number on or ahead of schedule had increased roughly 10 percent. After looking over this latest report, Somervell sent Reybold a congratulatory message. "Apparently," he wrote, "some of your personal efforts are beginning to have effect."[168] Passing this note on to Robins, the Chief commented: "The attached memorandum from the Commanding General, SOS, is gratifying to say the least. I am sure, however, that any personal efforts on my part cannot compare with the efforts made by you, Groves, Strong, and your other assistants." Even greater accomplishments, he predicted, soon would crown these efforts.[169]

Writing to Somervell on 2 July, General Reybold referred to "the magnitude of the program, the necessity of maintaining constant vigilance, and the urgency of trying to perform what sometimes seems like the impossible." Nevertheless, he asserted, "During the past few months there has been, and there is being, generated in the war construction program a momentum which will insure its being carried to successful conclusion."[170] The force of that momentum would soon be effectual.

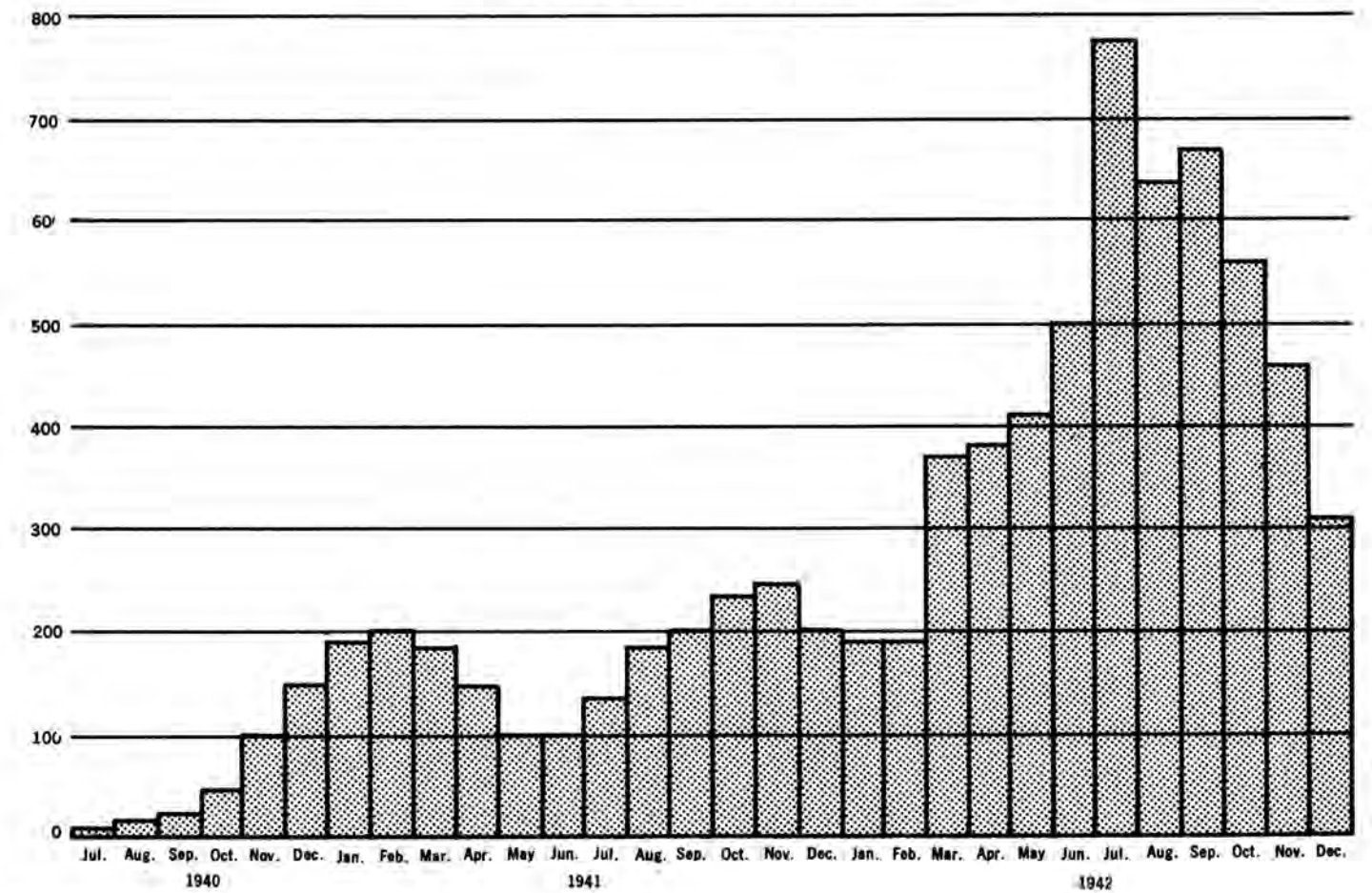
Peak Construction

All the driving and hard work achieved their purpose. In July production hit an all-time high, as a million-man work force boosted the monthly value of construction placed to $720 million—a figure larger than the total for all military projects from 1920 through 1938. "A splendid accomplishment," General Reybold telegraphed the division engineers.[171] Although July was the peak month, the level of production continued high through the autumn of 1942. (*Chart 18*) For August the value of work placed was $646 million—"a wonderful record," Strong declared.[172] The total for September was $651 million—Somervell extended warm congratulations.[173] As the blazing pace continued, the construction program neared its goal.

At the project level, work proceeded well. The percentage of jobs behind declined steadily. The progress report for September listed 950 active jobs, only 64 of which were lagging—about the same number as in February when the program had been roughly one-fifth its current size. The October report was even better—only 63 behind out of a total of 1,176. As the trend continued, emphasis shifted from shortcomings to

[167] Opns Br Files, Rpts—Jobs not started before 6-30-42.
[168] Memo, Somervell for Reybold, 30 Jun 42. 600.914 Part 1.
[169] Memo, Reybold for Robins, 3 Jul 42. 600.914 Part 1.
[170] Memo, Reybold for Somervell, 2 Jul 42. 600.914 Part 1.
[171] Telg, Reybold to Div Engrs, 14 Aug 42. 600.1 Part 14.
[172] Tel Conv, Strong and Col Elliott, 2 Sep 42. Opns Br Files, Insp & Prog Rpts.
[173] Minutes of SOS Staff Conf, 20 Oct 42. ASF, Staff Confs.

Chart 18—Value of Work in Place, Monthly Additions
July 1940–December 1942



Source: Constr Div PR, 31 Dec 42, p. 4.

accomplishments. In the last quarter of 1942, the Corps completed or readied for use nearly 900 major projects—an all-time record.[174]

During 1942 the Engineer-contractor team completed 2,091 jobs with a total estimated cost of $4,937,617,000. In use by the end of that year were 482 Air Force facilities—schools, depots, tactical stations, training bases, and auxiliary fields; 389 Ground Force facilities—camps and cantonments, reception and replacement training centers, general hospitals, internment camps, and overseas discharge and replacement depots; 164 storage and shipping facilities—ammunition and supply depots, docks and terminals, and ports of embarkation; 149 industrial facilities—Ordnance, Chemical Warfare, and aircraft assembly plants; plus hundreds of miscellaneous installations. Total housing capacity was 4,370,445 men; beds available in general and station hospitals totaled 179,457; and available depot storage space amounted to 205,791,162 square feet.[175]

Although more construction would be necessary before the war ended, the program was over the hump. Mobilization was nearing completion and the Army was moving overseas. The vast network of newly built installations was, in Reybold's words, "a tremendous and lasting monument to the construction industry.[176]" It was also a monument to the men who had organized and directed the undertaking.

Questioned as to how the Engineers accomplished what they did—asked, as it were, for the secret of the Corps' success—Reybold replied: "We knew how to organize, who to put in charge." The Engineer Department was set up to handle a big emergency program. General Robins was an extremely able officer. The civilian employees were "top notch." The division and district engineers were right on the job. And, Reybold added in his brusque way, "That fellow Groves was flying around all the time, right down their necks." In the Chief's opinion, all concerned had performed magnificently.[177]

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[174] (1) Constr PR 58, 31 Oct 42, p. 2. (2) Constr PR 60, 31 Dec 42, p. 2.

[175] (1) ASF, *Statistical Review, World War II*, p. 85. (2) Constr PR 60, 31 Dec 42, pp. 13–23.

[176] *The Constructor*, August 1943, p. 25.

[177] Reybold Interv, 12 Mar 59.

CHAPTER XVI

The Materials Battle

Addressing a group of industrialists in March 1942, one of Reybold's top officers declared: "We must win the Battle of Materials just as surely as General MacArthur must win the Battle of the South Pacific. Ours here at home will also be a tough battle."[1] To those responsible for construction, materials presented the greatest single challenge of the war. Throughout 1941 markets had grown progressively tighter. After the outbreak of hostilities, the demand for steel, copper, rubber, and other construction staples far outstripped supply. Sinkings by enemy submarines curtailed imports of certain commodities, such as Turkish chrome, while enemy occupation cut off access to other materials, for example, Manila hemp. Wartime strains on transportation produced local scarcities—asphalt along the Atlantic seaboard and cement in the Great Plains. Shortages of skilled workers and machine tools limited the output of many products, including construction equipment. The situation worsened steadily, as scarcities developed in materials used as substitutes and in substitutes for substitutes. It required a major effort, considerable ingenuity, and dogged determination to cope with the problems of supply.

Reduce to bare essentials. Substitute. Improvise. Comb the country for materials. Get the job done with the means at hand. These were orders of the wartime day. To most civilian construction men—to contractors, architects, and engineers who normally observed rigid building codes, who designed for price, quality, safety, and convenience, and who rarely, if ever, had to do without—these words had an unfamiliar ring. Military engineers knew the language well. In the words of Col. Raymond F. Fowler, chief of the Supply Division, OCE, "The very basis of military engineering is the ability to make out with the means available." He went on to explain:

> When the military engineer up near the front has a bridge to build, he does not expect to find on the site a complete bill of materials. He does not expect to produce a structure with the fine lines and other characteristics of a peacetime job. He does expect to get the bridge built—and to get it built on time.[2]

In the homefront crisis, as on so many battlefronts, techniques of combat engineering served to good advantage.

Bare Essentials

Underscoring the gravity of the materials crisis in the initial months of the war were reports of ominous reverses

[1] Address by Col Raymond F. Fowler, Chief, Supply Div, OCE, before Producers' Council Club of Washington, D.C., 27 Mar 42. EHD Files.

[2] *Ibid.*

and plans for early offensives. The crippling of the Pacific fleet (8 battleships, 3 light cruisers, 3 destroyers, and 4 other naval vessels were sunk or severely damaged at Pearl Harbor); heavy losses of merchant shipping (sinkings by enemy submarines outran new launchings); and Japanese occupation of Manila, invasion of the Dutch East Indies, and capture of Singapore (countries rich in vital raw materials were falling into enemy hands)—these setbacks focused concern on steel production and stockpiles of strategic materials. Churchill's statement, "All our future plans depended on a vast flow of American supplies of all kinds";[3] the mutual assistance pledge by United Nations members, whereby each agreed "to employ its full resources, military or economic," against the Axis powers;[4] and Allied determination to contain the Japanese and strike against the Germans in 1942—all served to emphasize the scale and urgency of the United States logistical commitment. Only by most careful husbandry of essential materials could this commitment possibly be met.

In the weeks that followed the outbreak of war, General Robins considered ways to cut requirements for scarce commodities. A flood of suggestions claimed his attention. Somervell put forward a plan for depots and piers of timber and frame construction. Madigan conceived the idea of taking over resort hotels. Patterson recommended converting abandoned mills and factories into war plants. Colonel Leavey advocated a radical change in igloo design. Colonel Stratton stressed the advantages of switching from mobilization-type to theater-of-operations type housing. He also canvassed the possibilities of wood trusses and considered making greater use of masonry. Various other schemes for substitutions, simplified designs, and fuller use of existing facilities came under discussion. Even double bunking in barracks, a measure Surgeons General had consistently opposed, received some thought. Immense efforts were necessary to translate proposals into actions: conducting tests, running checks, redrawing plans, and winning approvals.[5]

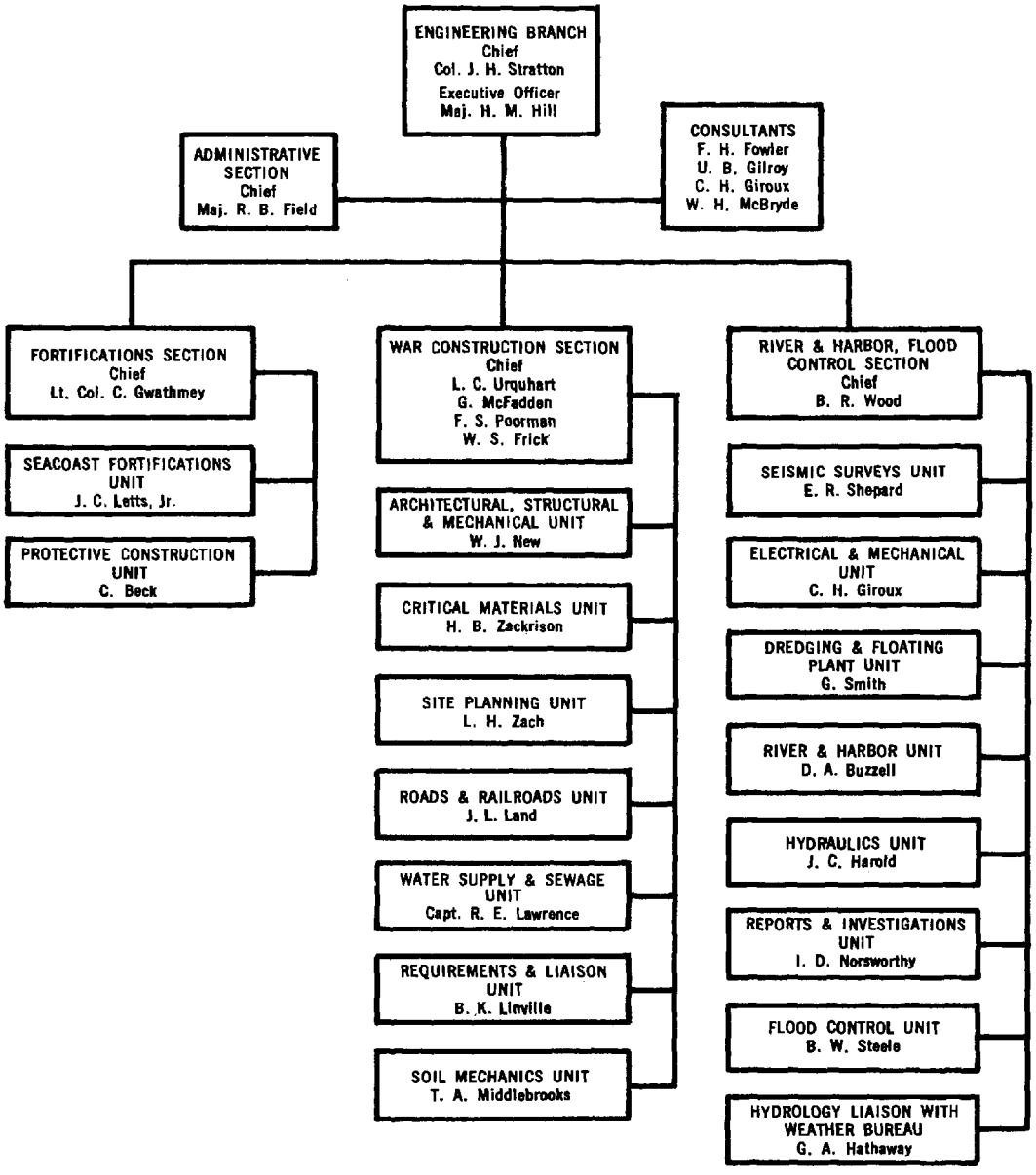
Spearheading the drive to conserve building materials was the Engineering Branch. (*Chart 19*) Combining the heavy construction knowledge of the Corps of Engineers and the building construction experience of the Quartermaster Corps, the organization possessed the skill and versatility the situation demanded. The chief, Colonel Stratton, was, as one of his civilian assistants put it, "an Engineer who was an engineer." In the campaign to save materials, he was able to provide vigorous leadership and sound technical guidance. His executive officer, Maj. Hibbert M. Hill, had a broad engineering background: service with the U. S. Coast and Geodetic Survey, the Engineer Department, and the Northern States Power Company, and four years as instructor at the University of Minnesota. "Unassuming," an associate described him, "but one of the smartest men

[3] Winston S. Churchill, *The Second World War*, vol. III, *The Grand Alliance* (Boston: Houghton Mifflin Company, 1951), p. 641.

[4] *Public Papers and Addresses of Franklin D. Roosevelt*, XI, 3–5.

[5] (1) Memo, Somervell for Reybold, 23 Dec 41. G–4/33890. (2) Memo, Patterson for Reybold, 15 Jan 42. Ord 675/28172–Misc. (3) Memo, Leavey for Wesson, 10 Dec 41. 633 I. (4) Memo, Stratton for Fortifications Sec, Engrg Br, 31 Dec 41. McFadden Reading File. (5) 400.8 Part 1.

CHART 19—ORGANIZATION OF ENGINEERING BRANCH, CONSTRUCTION DIVISION, OCE
SPRING 1942



Source: Orgn Chart, Engrg Br, Constr Div, OCE, 6 Jun 42. EHD Files.

I've ever known."[6] While Urquhart and the other section chiefs made signal contributions, the heaviest burden fell on Harry B. Zackrison, whose job it was to co-ordinate all conservation activities within the construction program. His duties included liaison with WPB and ANMB. He also assisted the section heads in revising specifications and preparing instructions for the field and cleared all policy statements that touched on critical materials. In effect, he functioned as the Corps' materials czar. Missionary spirit and unflagging zeal characterized his efforts. The killing pace he maintained—a 12- to 18-hour day, 7 days a week—sent the trim six-footer's weight plunging from 165 to 109.[7]

Steel—above all, plate steel for ships—was of first importance. On 11 January Zackrison took off with a Presidential air priority to deliver a confidential message to division engineers. The frightful losses inflicted on the fleet at Pearl Harbor were still top secret and would remain so until the end of the war. Enemy submarines were taking a terrible toll in the Atlantic. Face to face with division engineers, Zackrison laid it on the line: steel was a question of national survival; utmost economy in using it was an absolute necessity. His reception in some quarters was cool at first; several senior officers failed to hide their pique at having a young civilian instruct them in their duties. But his earnest pleas at length brought them around. It was a grueling trip: 11 divisions in 7 days,



GENERAL STRATTON. (*Photograph taken in 1944.*)

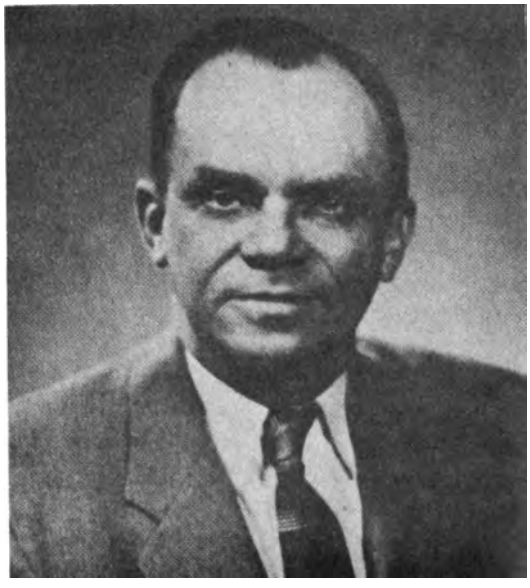
wretched accommodations, a lost suitcase, and an uncomfortably close call (only a last-minute change in plans prevented Zackrison from taking the plane that carried actress Carole Lombard to her death). Nevertheless, the same day he returned, the first of a series of orders aimed at conserving steel—it specified wood trusses for all but the largest warehouses and hangars—went to the field. On the depot storage program alone, the anticipated saving was 200,000 tons of steel, enough to build 7,500 medium tanks.[8]

Though steel was the sternest challenge, it was by no means the only one. Rubber, tin, aluminum, nickel, chromium, copper, zinc, lead, iron, and hemp—all were commonly used in construction and all were critical. To ease

[6] Zackrison Interv, 19 Feb 65.

[7] (1) Memo, Stratton for All Sec's, Engrg Br, 3 Feb 42. McFadden Reading File. (2) *Cast Iron Pipe News*, December 1960–January 1961, p. 15. (3) WD Commendation of Exceptional Civilian Service: Harry B. Zackrison. (4) Zackrison Interv, 19 Feb 65.

[8] (1) Zackrison Interv, 19 Feb 65. (2) OCE Circ Ltr 1092, 19 Jan 42. (3) *ENR*, April 2, 1942, p. 6.



HARRY B. ZACKRISON

the strain on supplies, General Robins decreed "the least possible use of these materials." His orders were, if a suitable alternate can be found, use it. Cost and durability would be secondary considerations.[9] Finding suitable alternates was no simple task. To be sure, some moves were obvious, such as using porcelain door knobs instead of brass. But often the trick was in substituting a scarce material for one even more scarce: copper for aluminum, steel for copper, iron for steel, and so on. There was no magic formula, Zackrison observed; rather the secret lay in "keeping everlastingly at the matter in small details as well as large"—in combing the specifications, cudgeling one's brains for fresh ideas, inducing manufacturers to change their products, and persuading users to sacrifice comfort, convenience, and efficiency.[10] Difficulties notwithstanding, hosts of ideas proved practicable: plastic screens instead of copper, asphalt or fiber filler instead of rubber in expansion joints, and cotton braid impregnated with paraffin instead of jute for caulking sewage and water pipes—to mention a few. Because the program was so vast, small changes promised big results; for example, a switch from cast iron to vitreous china grease traps promised to save well over 800 tons of much needed metal. Gaging early progress was a circular issued in February 1942, a 45-page document which listed more than 300 substitutes.[11] And further sweeping conservation measures were in the works.

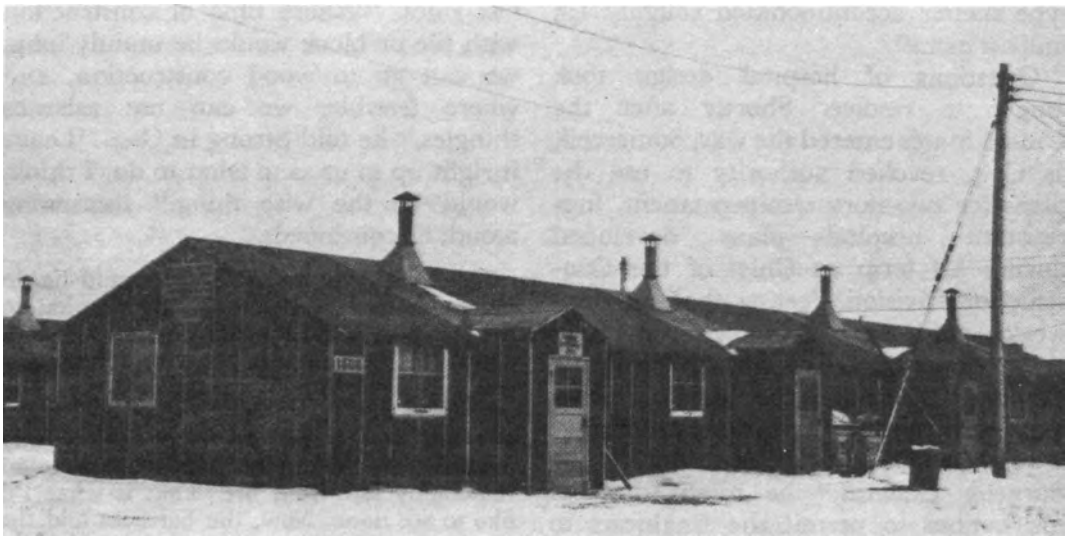
By late January 1942, Colonel Stratton was ready to implement a major change in construction policy, adoption of TO-type drawings for use in the United States. At the time of Pearl Harbor, plans for shelter in overseas theaters were on file in OCE. Developed with funds furnished by the New York City WPA during Somervell's term as administrator and designed primarily to reduce cargo tonnage, these structures were little more than shells without floors or utilities. To use the plans as they were would have serious repercussions. Earthen floors and pit latrines clearly would not do for stateside soldiers, who, as General Reybold was fond of saying, had to be met at the railroad station with coffee and doughnuts.[12] Convinced, nevertheless, that TO standards and criteria were the answer to troop housing problems, Stratton decided to modify the plans.

[9] OCE Circ Ltr 1245, 21 Feb 42.

[10] Address by H. B. Zackrison before Meeting of ASCE, Niagara Falls, NY, 14 Oct 42. EHD Files.

[11] OCE Circ Ltr 1245.

[12] (1) 600.12A Parts 1–3. (2) 600.12 Part 6. (3) Reybold Interv, 12 Mar 59.



BACHELOR OFFICERS' QUARTERS (*Theater-of-Operations type*), *Sioux Falls Army Air Force Base, South Dakota.*

Describing his procedure, he wrote:

To effect the rapid completion of the revised Theater of Operations designs, we designated various District Engineers throughout the country to undertake specific parts of the redesign program. These men did a tremendous job both with respect to the quality of work and speed of accomplishment. As each District completed designs of buildings and facilities under its assignment, the designs were reproduced and distributed to all other Districts and Divisions. By this procedure scarcely a step was lost in programming the new type of construction to replace the mobilization type which the war effort could no longer afford.[13]

The revised plans featured wood floors, running water, and potbellied stoves. Latrines were in separate buildings. Before the end of January complete sets of the blueprints were in district and division hands. On 6 February Somervell adopted the TO drawings for all new camps and stations, most of which would be in use for only a year or two.[14]

The new structures were a far cry from the comfortable mobilization types. Drab, light-frame buildings (the 32-man barracks was a simple one-story affair), the TO's carried an exterior finish of 15-pound felt with wood lathing on wall sheathing. In appearance they were not unlike tar paper shacks. "A sorry thing," one officer called them, with "a safety factor of one."[15] But however much they suffered by comparison with the 700 and 800 series, their adoption resulted in tremendous savings: 39 percent on iron, 42 percent on lumber, 47 percent on steel, 56 percent on lead, 59 percent on copper, 61 percent on cement, and 66 percent on tin. During the war, TO-

[13] Ltr, Stratton to OCMH, 1 Mar 55. EHD Files.

[14] (1) OCE Circ Ltrs 1156 and 1141, 30 Jan 42 and 4 Feb 42. (2) WD Ltr AG 600.12 (2-5-42) MO-D-M, 6 Feb 42. QM 600.1 1942-43.

[15] Dreyer Interv, 27 Feb 59.

type shelter accommodated roughly 1.5 million men.[16]

Questions of hospital design took longer to resolve. Shortly after the United States entered the war, Somervell, as G–4, revoked authority to use the plans for two-story semipermanent, fire-resistant hospitals—plans developed during his term as Chief of the Construction Division. Feeling that masonry work would move too slowly, he issued an order on 29 December, directing the Engineers to employ mobilization drawings for one-story wooden hospitals.[17] Two days later, at the insistence of The Surgeon General,[18] he modified these instructions to permit the Engineers to accept alternate bids and build fire-resistant hospitals "whenever loss of time or material increase in cost is not involved."[19] There would be more see-sawing back and forth before the issue was finally settled.

Groves was dismayed by Somervell's decision. "Terrible," he complained. "An alternate always gets you into trouble." If masonry got the nod, the old argument "wood is cheaper" would arise immediately. If the decision went the other way, the Engineers would "have to go over to The Surgeon General and argue out on price with him." Although willing to "bend over backwards" to satisfy the medics, Groves disliked being hamstrung by hard and fast rules. "Where time of construction with tile or block would be unduly long, we can go to wood construction, and where feasible, we can use asbestos shingles," he told Strong in G–4. "Leave it right up to us as to what to do, I think, would be the wise thing." Reasoning aloud, he continued:

> Of course, the real solution should be, in my opinion, to do part of the hospital in tile and part of it in wood. Cut the tile work down to a minimum where you find that you can; for example, take the surgery and the clinics and the administration building—put those in tile and you've gone a long way toward keeping the heart of your hospital reasonably safe from fire. That is what I'd like to see done. Now, the barracks and the storehouses I'd like to see left in wood. I do not object to wooden wards, but I'd just as soon have, say, one or two wards in tile right alongside the surgery where you could put your really bad cases and not have to worry about evacuating them so fast.

Feeling he was on the right track, Groves decided to follow through.[20]

On 14 January 1942, after reaching an understanding with Surgeon General Magee, Robins made a proposal to G–4. He had three recommendations: first, that general hospitals, which would be in use for some time after the war, be of semipermanent design; second, that, except at TO cantonments, station hospitals also be semipermanent, unless the Engineers, after surveying local materials and labor markets, decided otherwise; and, third, that hospitals at TO cantonments be mobilization type. Justifying the proposal for widespread use of tile and block, Robins stated:

> The semipermanent type of hospital should in the normal case cost approximately 17

[16] (1) Min, Engr Production Conf, 28 Sep 42, pp. 9–10. 337 (Engrs, Corps of). (2) Data compiled from *WD Quarterly Inventory: Owned, Sponsored and Leased Facilities*, 30 Sep 45.

[17] WD Ltr AG 632 (12–27–41) MO–D to the CofEngrs, 29 Dec 41. 632 Part 1.

[18] Memo, Magee for Somervell, 31 Dec 41. 632 Part 1.

[19] D/F, Somervell for Reybold, 31 Dec 41. G–4/31741–1.

[20] Tel Conv, Groves and Strong, 31 Dec 41. Opns Br Files, G–4.

TABLE 16—HOSPITAL COST ESTIMATES

	Cantonment	Combination	Semipermanent
Totals	$3,064,812	$3,791,405	$4,448,901
Buildings	2,300,000	3,231,581	3,967,064
Utilities	690,000	485,000	417,000
Telephone	33,687	28,231	12,775
Equipment	41,125	46,593	52,062

Source: Memo, Daley for Groves, 30 Jan 42. Opns Br Files, Hospitals.

percent more than the cantonment type hospital. Opposed to this increase in cost are greater suitability for the intended purpose, greater ease of maintenance and administration, and greater resistance to fire hazard. These factors are believed to outweigh the increased cost.

Pressing for a prompt decision, he reminded Somervell that deliveries of boilers, hot water tanks, and other critical items of installed equipment would govern hospital completion dates. Because equipment for the two types of hospital differed in size and quantity, the Corps could place no orders until Somervell made a ruling. Somervell approved Robins' suggestions the following day.[21]

Any who thought the issue closed had soon to think again. Estimates for masonry hospitals far exceeded expectations. According to Alfred S. Kurtz, chief of Urquhart's estimating group, the combination hospital proposed by Colonel Groves would cost 24 percent more, and the all-masonry hospital 45 percent more, than the cantonment type.[22] Late in January Kurtz drew up estimates based on a 1,750-bed capacity.[23] (*Table 16*) Early in February Groves told Col. John R. Hall of The Surgeon General's office: "About the semipermanent hospitals—you know we are up the spout on those, . . . and the trouble is they are just going to cost so much more than the wooden ones that the Staff, and particularly General Moore, won't stand for it." He advised Hall, "It is up to you people to get the pressure."[24] The Surgeon General applied pressure, much of it on the Engineers, challenging Kurtz's figures, and, after Somervell approved the TO drawings, trying to prevent the Engineers from using them for barracks and quarters for Medical Corps units at hospitals—but without success. Meanwhile, Robins co-operated with Magee by pushing ahead with plans for five general hospitals of masonry design and five semipermanent station hospitals at advance planned cantonments.[25] An order prohibiting this type of construction seemed bound to come. The question was how soon.

Lowering standards for munitions plants was not a step to be taken lightly. As has been shown, until Pearl Harbor the Army had built Ordnance and

[21] Memo, Robins for Somervell, 14 Jan 42, and approval thereon. G–4/31741–1.

[22] Memo, Stratton for Daley, 30 Jan 42. Opns Br Files, Ground Trps Sec.

[23] Memo, Daley for Groves, 30 Jan 42. Opns Br Files, Hospitals.

[24] Tel Conv, Groves and Hall, 2 Feb 42. Opns Br Files, Hospitals.

[25] (1) Smith, *Hospitalization and Evacuation*, pp. 68–69. (2) 632 II and III.



CORBETTA BEEHIVE MAGAZINE UNDER CONSTRUCTION

Chemical Warfare facilities largely of durable materials and had exercised great care to minimize the dangers of explosion. But once the country was at war, the need for conserving materials prompted consideration of drastic changes in design. Early in 1942 DuPont advised General Campbell that it could develop a plan for stripped-down TNT plants. Although these plants would be more expensive to operate and maintain, DuPont was confident they would be satisfactory in every other way. The West Virginia Ordnance Works, one of the first plants built on the new model, included such features as process buildings with asbestos siding; wooden shops, dormitories, and administration buildings; utilities with five- to ten-year life; concrete water tanks; barbed wire fencing; and duckboard sidewalks. West Virginia took 7 months to build as compared with 21 months for some of the earlier TNT plants. The DuPont typical became the wartime standard for explosives projects and started a trend which accelerated as shortages became more and more acute.[26]

Another early development in the munitions field was an elliptical dome-shaped magazine. Colonel Vandervoort thought up the idea and persuaded the Corbetta Construction Company of New York City to develop plans based on his concept. Shortly before Pearl Harbor,

[26] (1) Memo, Groves for Robins, 2 Jan 42. Madigan Files, Ord–TNT. (2) Compl Rpt, West Virginia OW, 30 Jun 43. (3) Antes Interv, 3 Jun 58.

Corbetta sent completed drawings to Robins, waiving any royalties on the patent. The advantages of the new design were inescapable. While providing equivalent storage at about the same cost, the dome-shaped magazine took half the steel, one-third the copper, and two-thirds the concrete required by the standard cylindrical igloo. At an 800-magazine depot, it would save 3,000 tons of steel, 135,000 pounds of copper, and 50,000 cubic yards of concrete.[27] Used extensively during the war, it was known as the Corbetta beehive. Louis P. Corbetta acknowledged Vandervoort's contribution. "Since most of the savings realized are inherent in the very shape visualized by Lt. Col. Vandervoort," he said, "it is patent that credit for originating the beehive must be chalked up to him rather than to anyone else."[28] The Corbetta brothers also deserved high praise for their generous co-operation with the War Department.

War, someone once said, is a field day for inventors. Proof of this statement was evident at virtually every project, as the drive to conserve critical materials spurred developments holding promise for the future. Plastics were finding innumerable applications. Prefabricated housing was coming into its own. Laminated wood arches were making an appearance. Fireproof wall board, such as masonite, was in great demand. New and cheaper types of wire insulation were becoming standard. Needless refinements were vanishing from toilets and lavatories, and widespread use of vitrified china fixtures was taking them out of the luxury class. Asbestos-cement pipe was replacing metal in water mains, and asphalt-protected metal flashings were replacing copper, zinc, and lead. Peacetime construction had often been unnecessarily costly and many accessories had been overly elaborate. Wartime shortages fostered revolutionary changes in design.[29] Looking ahead to the postwar period, the editor of the *Engineering News-Record* commented in February 1942: "Recent successes attending the use of so-called substitutes for materials that are no longer abundantly available suggest that some of the new designs may turn out to be more than just temporary expedients. . . . They may be new applications that are here to stay."[30]

During the early months of 1942, Zackrison's activities expanded steadily. Along with leading independent engineers and experts of the National Bureau of Standards, he sat on three WPB committees charged with developing emergency codes for steel, reinforced concrete, and timber structures; he headed the first and second of these groups. With Colonel Stratton's help, he created an apparatus to promote savings of critical materials by the Engineer field. Each division engineer appointed a civilian conservation officer for his division and, if the workload warranted, for his districts as well. These men reported directly to Zackrison. More and more of Zackrison's time was taken up by meetings in Patterson's office, by consultations with WPB officials, and after the establishment of SOS, by dis-

[27] (1) F. R. MacLeay, "Concrete Beehive For Munitions Storage," *ENR*, March 26, 1942, pp. 74–76. (2) 633 I.

[28] *ENR*, April 9, 1942, pp. 60–61.

[29] (1) Herbert L. Whittemore, "Materials Shortages —Redesign and Substitutes," *ENR*, January 15, 1942, pp. 114–117. (2) Information Memo, Constr Div for *The Practical Builder*, 31 Aug 42. EHD Files.

[30] *ENR*, February 26, 1942, p. 45.

cussions with Brig. Gen. Lucius D. Clay, Somervell's deputy for requirements and resources, and with members of Clay's staff. Seldom, if ever, did these higher-ups issue an order affecting construction without checking with Zackrison first. In fact, he drafted many of their orders. As his responsibilities increased, he enlarged his staff from one assistant to a dozen, but even then he was hard pressed to do everything the job demanded.[31]

Another approach to conservation—more direct but frequently precarious—was to turn existing facilities to military use. Every factory, hotel, warehouse, hospital, school, and office building pressed into service was obviously that much new construction saved. Under the condemnation statutes and recently enacted requisitioning laws, the Army had ample power to take over properties it required. But in a country with strong antimilitarist traditions, mandatory powers had to be used judiciously. Adhering to long-standing Corps policies, the Engineers relied largely on negotiation, avoiding condemnation wherever possible and rarely commandeering.[32]

In January 1942, Under Secretary Patterson instituted a search for "unoccupied buildings which are capable of being used in their present state or of being readily converted" to use as munitions plants.[33] Ordnance soon turned up a number of possibilities—textile mills, candy factories, and tire and automotive plants. By March the Engineers were negotiating with the owners. Several properties, including the Kelly-Springfield plant at Cumberland, Maryland, were leased for the duration plus three to five years. Several, including those of the U. S. Rubber Company at Eau Claire, Wisconsin, and the New England Southern Company at Lowell, Massachusetts, were purchased. Both methods, purchase and lease, presented difficulties. At Eau Claire and Lowell negotiations broke down and the Engineers had to go to condemnation. At the leased plants, costly improvements were necessary.[34] Excluding machinery, overhead, and fees, Creedon "guessed" that expenditures at Cumberland would run "somewhere in the vicinity of $12 million."[35] The troubles inherent in such arrangements, the problems of eventual settlement and disposal, were obvious, but the immediate advantages were overriding. By late 1942 a half dozen converted plants would be turning out ammunition.[36]

A venture unique in War Department history was launched in February 1942, when the Air Forces decided to establish a technical training center at Miami Beach. The Engineers moved fast. At the height of the tourist season, O'Brien's men arrived to make quick appraisals of

[31] (1) 400.8 Part 1. (2) Ltr, Zackrison to Shortridge Hardesty, New York, N.Y., 27 Jan 42. 411.5. (3) Zackrison Interv, 19 Feb 65. (4) Telg, Stratton to Div Engrs, 27 Feb 42. Office Files, Specs and Est Br, Engrg Div, OCE. (5) 652 (ORD).

[32] (1) Smith, *The Army and Economic Mobilization*, pp. 221–22, 248. (2) Miller, *Pricing of Military Procurements*, pp. 102–108. (3) OCE Circ Ltr 1015, 1 Jan 42. (4) Gideon, Hist of Mil RE Program, pp. 51–54.

[33] Memo, Patterson for Reybold, 15 Jan 42. Ord 675/28172–Misc.

[34] 601.1 and 635 Allegany, Eau Claire, and Lowell OP's.

[35] Memo, Creedon for Constr Contract Bd, 25 Mar 42. 635 (Allegany OP).

[36] (1) Thomson and Mayo, *The Ordnance Department: Procurement and Supply*, pp. 200–202. (2) Constr PR's.

125 hotels and rush negotiations with the owners. By March, mass leasing was under way at the Florida resort. A wave of jubilation swept through the community, as civic and business leaders pledged 100-percent co-operation.[37] When a handful of hotel men rejected the Army's offers and the Air Forces threatened to move to St. Petersburg, community pressure forced the holdouts into line. On 29 March the Miami *Herald* announced "the good news" that "the running battle of the hotel men against the Army was closed."[38] Soon proprietors signed leases and sent guests packing to make room for the 20,000 airmen who would shortly arrive.[39]

From Miami the Army branched out into other communities. At the luxurious desert resort of Palm Springs, California, the Engineers purchased the El Mirador Hotel and converted it into a general hospital. A sanitarium at Battle Creek, Michigan, and a municipal hospital donated by the city of Temple, Texas, also became Army medical centers. The famous golfing resort at Pinehurst, North Carolina, the exclusive club at Boca Raton, Florida, and the Harrisburg Academy at Harrisburg, Pennsylvania, became air force stations. Racetracks and fairgrounds throughout California served as temporary detention camps for the west coast Japanese. Warehouses belonging to the Southern Compress Company at Savannah, Georgia, served as a supply depot. Properties the country over passed to Army control, as the search fanned out in new directions. Far-reaching though this effort was, it eased the strain but slightly, eliminating tens of new construction projects in a program comprising thousands.[40]

Through the late winter and early spring of 1942, materials shortages worsened steadily. The ANMB list of prohibited items for construction work grew ominously longer. As of 1 April, it included aluminum products of all kinds as well as cadmium, magnesium, manila hemp, mercury, nickel, sisal, and vanadium. Copper and its alloys were available for only 15 specified purposes, lead and rubber for only 6, while iron and steel were obtainable for a mere 58 out of their almost infinite uses.[41] Increasingly, the Engineers were caught in a crossfire between war production authorities, demanding more stringent economies, and contractors, protesting strongly that expensive blueprints and designs were becoming valueless because of constant revision.

Although steel capacity was expanding—in 1942 the United States would produce over 86 million net tons, just 3 million short of the total for all other countries combined—the gap between supply and demand continued to widen. By spring the shortage of plate steel was becoming desperate. Of 15,523 tons the Engineers would require in April, only 5,494 were tentatively scheduled for rolling. Appealing to Clay for help late in March Robins warned that something had to give or serious delays in construc-

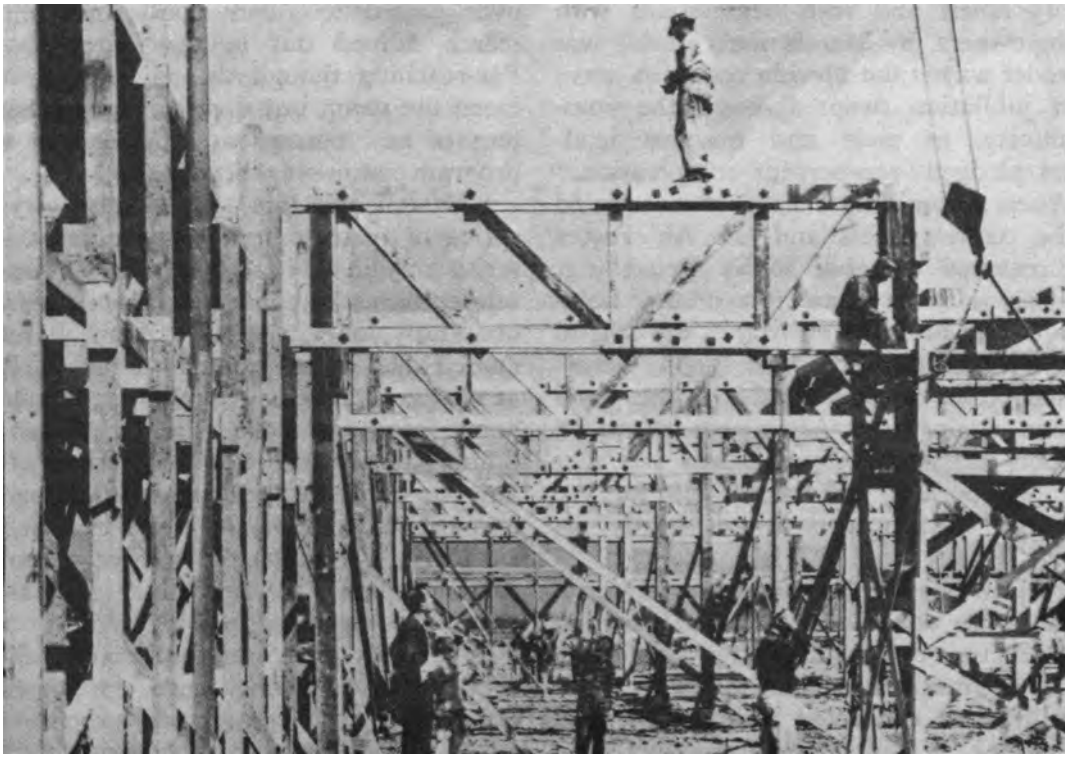
[37] (1) Craven and Cate, *Men and Planes*, pp. 152–53. (2) Truman Comm *Hearings*, Part 21, *passim*.

[38] Reprinted in Truman Comm *Hearings*, Part 21, exhibit 976, p. 9082.

[39] 601.53 (Miami Beach).

[40] Constr and Real Estate PR's.

[41] Ltr, ANMB to Supply Arms and Svcs, 1 Apr 42. Opns Br Files, Equip 1.



WOOD TRUSS CONSTRUCTION, *Pennsylvania Ordnance Works, September 1942.*

tion would occur.[42] General Clay could relieve the Corps' immediate distress, but he held out little hope for the future. On 9 April he assured Groves that the Engineers would get the 15,000 tons they had put in for, and it was even possible that he could squeeze out another 12,000 tons for them. But, he emphasized, "That squeeze is going to be at the expense of an actual weapon."[43] The next day he asked Robins to come up with a plan for further reducing plate requirements—this time to "an absolute minimum."[44]

The Engineers had come a long way already. Reporting to Clay on 18 April, Robins catalogued the substitutions made thus far: wood doors for steel doors; wood framing for steel framing; brick or concrete smokestacks for steel stacks; wood or concrete water tanks for steel tanks; and concrete or asbestos-cement pipe for steel pipe. At hospitals plate steel requirements had dropped 70 percent, and at supply depots, 95 percent. Adoption of the TO drawings had reduced the plate going into cantonments

[42] (1) Truman Comm Rpt 10, Part 3, Feb 43, pp. 1–8. (2) Memo, Robins for Somervell, 26 Mar 42. 411.5. (3) Memo, Robins for Clay, 31 Mar 42. 411.5.

[43] Tel Conv, Clay and Groves, 9 Apr 42. Opns Br Files, Equip 1.

[44] Memo, Clay for Robins, 10 Apr 42. Madigan Files, CofE—Memos, Gen.

nearly 97 percent. At a divisional cantonment the saving on water tanks alone was nearly 400,000 pounds. Even at locks, dams, and power plants economies were numerous. The Corps intended to go still further, reducing the size of hot water tanks to permit use of sheet steel, substituting cast iron for plate steel downspouts, and redesigning hospital heating systems so that cast iron boilers with low pressure steam could take the place of high pressure plate steel boilers. Urquhart was looking into the possibilities of concrete gasoline storage tanks, and Creedon was tackling the difficult problem of stripping more plate from munitions plants.[45]

Pressure to lower requirements for structural steel was also heavy. According to estimates by the Operations Branch, Corps projects would require roughly 245,000 tons of standard and wide flange shapes during the last six months of 1942. The bulk would go into Air, Ordnance, and Chemical Warfare jobs. Some 1,800 tons would be necessary to complete cantonments started under mobilization series plans. Designs at new ground force stations called for no structural steel whatever. Nevertheless, production authorities ordered further cuts. Terming the overall requirement excessive, ANMB chairman Ferdinand Eberstadt insisted on slashing it 25 percent. Only at air projects could the Engineers comply. Colonel Davidson reported that a 10-percent reduction at ports and storage depots was the best he could possibly do.[46] Agreeing to a 10-percent cut at projects under his direction, Creedon made it clear that "further economies in steel cannot be effected except by an abandonment of proposed construction."[47] The Engineers had reached the limit beyond which they could not go and still keep all their jobs moving ahead.

The call for conservation grew ever more insistent. On 16 April Somervell inaugurated a new War Department construction policy: "Because of the requirements of the overall war effort and because of the necessity for saving critical materials and reducing the time of construction, facilities provided will be only those indispensable to the war effort and will be of the simplest type." As if to spell out his meaning, he banned the building of semipermanent hospitals.[48] General Robins hailed Somervell's move as "a definite step forward."[49] What one officer described as "a regular witch hunt for critical materials" proceeded apace.[50] Fresh conservation circulars deluged the field. Sprinkler systems in warehouses were taboo. Air-conditioning was permissible only in hospitals and buildings to house delicate instruments. The design standard for water systems would be 70 gallons per man per day instead of 100. Rainspouts and gutters would be few and far between. Frame sheds at munitions plants would no longer have foundations; walls would rest on concrete slabs, rising and falling with frost motion. Revised specifications called for wood stave pipe, wooden manhole covers, wood or gypsum lath, and wood

[45] Rpt, Robins to Clay, 18 Apr 42. 411.5 I.
[46] 411.5 I.
[47] Memo, Creedon for Sherrill, 20 Jun 42. 411.5 I.
[48] WD Ltr AG 600.12 (4-15-42) MO-D-M, 16 Apr 42.
[49] Ltr, Robins to Div Engrs, 25 Apr 42. 600.1 (MAD).
[50] Address by Lt. Col. R. H. Tatlow before the Bldg Contractors' Assn of New Jersey, Newark, N. J., 16 Oct 42. EHD Files.

or cement-asbestos roof ventilators. The list continued on and on.[51]

Meeting at Kings Mills, Ohio, on 22 April 1942, Ordnance and Engineer officers took a giant step forward. Recognizing the need "to eliminate all critical materials in construction work by using substitute noncritical materials wherever possible and to limit construction to only 'bare necessities,' " they agreed to build temporary small arms ammunition plants. In order to shorten utilities lines, layouts would be more compact. Buildings would be fewer and simple wood framing would be standard. Steam lines would be above ground. Electrical wiring would be "open wire, knob and tube type, or non-metallic cable." Gone would be lightning protection and, except in danger areas, spark-proof floors. The new design entailed serious risks, but General Campbell was willing to accept them.[52]

Site planning provided a fertile field for conservation. Applying the techniques he had used so successfully during 1941, Leon H. Zach effected progressive economies and improvements in layouts for a wide variety of projects: staging areas, holding and reconsignment points, ammunition depots, WAAC training centers, prisoner of war camps, and war housing developments, as well as cantonments, hospitals, and airfields. Zach arranged blocks of buildings more compactly, reduced firebreak distances, cut the size of parade grounds, narrowed roads, shortened utility lines, and decreased overall grading—all of which added up to tremendous savings in materials.[53] Commenting on his colleague's contribution, Zackrison said: "It has been an eye-opener to all concerned . . . how effective planning of this character can be."[54]

By mid-1942, the Engineers had exhausted virtually all the avenues open to them. Stating that further major savings were possible only if The Surgeon General would drop his opposition to double bunking in barracks, Colonel Groves said for the Engineers: "We have done what we can."[55] In July, at the peak of the building program, the War Department publicly announced that cuts in construction had gone as far as they could go.[56]

Procurement Problems

Lucky Strike green had gone to war. To the man in the street, contemplating the unfamiliar wrapper of a popular cigarette, wartime shortages stood for austerity and inconvenience. No new cars or refrigerators; no more silk; ration coupons for tires, gasoline, and sugar; drives to collect scrap metal and salvage abandoned railway and streetcar tracks—Americans accustomed to an economy of plenty were undergoing a novel experience. For construction officers under pressure to meet rigorous deadlines, the unending struggle for supplies, the fight for priorities, the pleas to dealers and materialmen, the ransacking of ware-

[51] (1) Address by Zackrison, 14 Oct 42. (2) Constr Div Circ Ltrs. (3) Rpt, Principal Constr Engr, Detroit Tank Arsenal, 15 Apr 42. 600.13 Part 1. (4) TWX, Groves to Div Engrs, 30 Apr 42. Opns Br Files, Equip 2. (5) Memo, New for Zackrison, 21 May 42. Engrg Div, Spec & Est Br Files, Monthly Rpts. (6) Ltr, Strong to Div Engrs, 11 May 42. 686 (Airfields) Part 55.

[52] Memo, OCE for OCofOrd, 7 May 42. 635 Part 2.

[53] OCE, *Engineering Manual*, 1942, ch. III.

[54] Address by Zackrison, 14 Oct 42.

[55] Min, Engr Production Conf, 22 May 42. 337 (Engrs, Corps of).

[56] WD Press Release, 2 Jul 42. EHD Files.

TABLE 17—BREAKDOWN OF DELAYING FACTORS, 31 MAY–31 OCTOBER 1942

	31 May	30 Jun	31 Jul	31 Aug	30 Sep	31 Oct
Totals	978	1,150	1,121	1,273	1,347	1,050
Materials	648	762	800	932	922	732
Administrative	152	146	91	93	108	54
Weather	79	90	59	70	64	95
Labor	40	46	63	62	121	92
Equipment	32	44	52	55	45	45
Miscellaneous	27	62	56	61	87	32

Source: Summaries of Delaying Factors, prep by Opns Br, Constr Div, OCE, May–Oct 42. 600.914 Part 2.

houses, the periodic lumber buys, and the ceaseless expediting efforts were crucially important. Recalling the critical shortage of construction materials in 1942, "when inventories were exhausted and production controls not well established by the WPB," one former district engineer asserted: "This was the greatest problem facing the field."[57]

Among the delaying factors at construction jobs, shortages of materials were by far the most prevalent. Despite the many efforts to reduce consumption of scarce commodities and the wholesale substitutions and simplifications in design, shortages bulked increasingly large as impediments to progress. Reports from area engineers told a tale of deepening crisis. During the first two weeks in May 1942, the earliest period for which figures were available, difficulties in obtaining materials accounted for 384 delays out of a total of 614. Through the summer, the picture became progressively blacker, as indicated in *Table 17*. In addition to structural, plate, and reinforcing steel, the list of scarce items included motors, pumps, furnaces, pipe, rail, copper wire, hardware, nails, kitchen equipment, and, contrary to early expectations, lumber. Not until the autumn of 1942 did the situation improve.[58]

Fighting the battle of procurement were two organizations, one in Washington, the other in the field. At the time of the transfer in December 1941, the Engineers took over the central purchasing agency created by General Hartman early in the emergency, the Procurement and Expediting Section of the Operations Branch. Renamed the Materials and Equipment Section (M&E), the organization was headed until May 1942 by Maj. Howard H. Reed, a 1931 West Point graduate, who had chosen a career in Quartermaster construction. His successor, Lt. Col. Fred G. Sherrill, commissioned from civil life, was a highly successful businessman. A West Point classmate of Colonel Groves, Sherrill had resigned from the Army in 1926.[59] At local and regional levels, district and division purchasing offices normally handled direct government purchases and co-operated with contractors' purchasing departments. The men in M&E, buoyed

[57] Sturgis Comments, VI, 3 and VIII, 2.

[58] Summaries of Delaying Factors, prep by Opns Br, Constr Div, OCE, May–Oct 42. 600.914 Part 2.

[59] Memo, Robins for Mil Pers Br, OCE, 9 Apr 41. Opns Br Files, Pers.

up by past successes, felt they had the answer to war procurement problems. Among the many who shared this feeling were Patterson and Nelson. Most division and district engineers opposed central purchasing. "A brilliant idea theoretically," Sturgis contended, "but a dismal failure in the field." Maintaining that he knew no district engineer "who didn't think it was a bust," he went on to say: "No organization can fail to make mistakes; but far fewer are made by . . . subordinate field offices, which immediately confront the problem."[60]

After talking matters over with Patterson and Nelson, Robins agreed to adopt the Quartermaster system, and on 29 December 1941 he so informed the districts and divisions. Normally, M&E would purchase lumber in amounts over one million board feet. Under unusual circumstances, Robins would grant requests for authority to buy locally amounts up to 2.5 million board feet. Reed would procure centrally a long list of other items—stoves, heaters, refrigerators, pumps, nails, steel for hangars and control towers, and equipment for bakeries, laundries, and hospitals. In addition, he would co-ordinate allocations, priorities, and rolling schedules for plate steel with the Under Secretary's office. Concessions to the field were soon forthcoming. On 3 January 1942, Robins issued new instructions: there would be no centralized procurement for temporary tent camps or TO-type construction.[61]

Late in December 1941, on the eve of his departure for Great Britain, Colonel Leavey conferred with Robins on purchasing procedures. Developed within the framework of the Quartermaster construction system, Reed's organization had relied on information from the centralized Engineering Branch in deciding what to buy. As plans went forward for decentralizing engineering to the field, Leavey forecast difficulties. Districts and divisions would not ordinarily submit drawings and bills of materials to Washington for approval. How, then, was Reed to discover their requirements? General Robins thought he knew the answer.

> In the interests of simplicity . . . [Leavey explained to Groves], the entire burden of preparing requirements for central procurement should be thrown on the field. It is suggested that this be handled by the issuance to the field of a list showing the types of materials which are to be bought centrally. The District Engineer can use this, first, to announce to contractors in his requests for bids that materials of this type will be furnished by the Government . . . . It can be used, second, to prepare from the bills of materials available in the District office . . . a list to be furnished you centrally for your procurement.

This method, Robins thought, would eliminate delay. When a résumé of the General's ideas reached him, Reed must have shaken his head. Underlining the parts about relying on the field and eliminating delay, he wrote question marks beside them in the margin.[62]

Despite misgivings, Reed followed orders. Through lumber auctions early in January at Richmond, New Orleans, and Seattle, he purchased over 700 million board feet at prices generally below

[60] (1) Ltr, Sturgis to authors, 23 Oct 63. (2) Sturgis Comments, XVII, 1.

[61] OCE Circ Ltrs Constr 222 and 228, 29 Dec 41 and 3 Jan 42.

[62] Memo, Leavey for Groves, 26 Dec 41, and Reed's notations thereon. Opns Br Files, Rental Equip.

OPA ceilings.[63] Calling the transaction "the largest . . . of its kind on record for any single agency, public or private," the War Department announced:

> The lumber acquired would make up a freight train 280 miles in length, comprising 28,000 carloads, or would be sufficient for the building of a fence six feet high and 1,500 miles long. . . . The magnitude of the present purchases may be realized from the fact that the total amount of lumber bought by the Army during the last year was but 2,000,000,000 board feet.[64]

Continuing at a brisk pace, M&E rolled up impressive totals for January: nearly 4,000 boilers and water heaters; roughly 4,000 furnaces and stoves; 7,000 squares of roofing material; 240,000 kegs of nails; 10 million square feet of plywood and wallboard; and 850 million board feet of lumber—at a total cost of $35.5 million. During this same period, the Supply Division, OCE, under Colonel Fowler's direction, purchased $7.6 million worth of service equipment and other items for construction projects. Speaking before the West Coast Lumbermen's Association at Portland, Oregon, on 30 January, Colonel Styer pronounced the operation a success.[65]

Meanwhile, screams of protest were coming from the field. Deliveries were scheduled improperly. Some projects were swamped with lumber, while others had virtually none. Many lots were green or warped and many contained random lengths. Orders were frequently shipped short. "Organized delay and confusion" was Sturgis' descriptive phrase. Contractors, who believed they could do a better job themselves, laid the blame on centralized procurement. Division and district engineers joined in condemning M&E.[66] Typifying their attitude was Colonel Scott's complaint: "If they can't work out some system . . . , they ought to stop that central purchasing. It is a mess and something ought to be done about it."[67] Taking a firm line, Colonel Groves declared: "Whether we like it or not or whether the people in the field like it or not, we've got to have centralized procurement."[68] The fuss continued. On 31 January Groves telephoned Farrell, who was spending a few hours at his home in Albany: "I'm having a terrible time here. All those lumber boys that don't know how to handle central procurement, and can't make any estimates, and can't do anything else."[69]

Farrell offered a suggestion: "I think what we need is some flexibility, we want simplicity, and we want to make sure there is ample supply in ample time. I see no objection in having the contractor purchase a million, two million, two and a half million board feet on any job." Raising another point, whether a district engineer "could make these bills of materials," he told Groves, "I don't think he can."[70] Together, the two men worked out a more flexible procedure and persuaded Nelson to O.K. it. At the start of a job, the contractor would

[63] Memo, W. V. Kahler, OPM, for Madigan, 15 Jan 42. Madigan Files, Cantonments—Troop Housing, Current Data.

[64] WD Press Release, 12 Jan 42. EHD Files.

[65] (1) Constr PR 47, 15 Mar 42, p. 243. (2) OCE Press Release, 31 Jan 42. Opns Br Files, Lumber.

[66] (1) Opns Br Files, Lumber. (2) Sturgis Comments, V, 2.

[67] Tel Conv, Scott and Antes, 22 Jan 42. Opns Br Files, San Jacinto, Galveston, Tex.

[68] Tel Conv, Groves and Scott, 23 Jan 42. Opns Br Files, Lumber.

[69] Tel Conv, Groves and Farrell, 31 Jan 42. Opns Br Files, Lumber.

[70] *Ibid.*

purchase 10 percent of the project's total lumber requirement; then, M&E would buy the balance. Farrell, Reed, and other members of Groves' staff logged a lot of travel time, going to various districts and explaining central purchasing techniques. Gradually, the uproar subsided. There was still some grumbling from the field, but the worst appeared to be over.[71]

The volume of Reed's purchases dropped as local procurement offices stepped up their activities. Between 1 February and 30 April 1942, M&E acquired 860 million board feet of lumber, only slightly more than the total for the single month of January.[72] Meanwhile, district engineers increased their exertions. Sturgis' operations at Vicksburg exemplified their methods. Regarding anything received from M&E as so much "gravy," he sent agents all over the country to buy up stocks of materials, made personal appeals for help to old friends in the lumber industry, and persuaded the purchasing departments of big contractors, including the outstanding firm of J. A. Jones, to assist projects other than their own.[73] Going far beyond this, some district and area representatives attended M&E's lumber auctions to make separate, backstairs deals with vendors. "In their zeal to get on with the job for which they were responsible," Colonel Sherrill related, "they would circulate among the lumber dealers and tell what their own requirement was. Of course, when it was 'easy' business, they had no trouble finding a responsible saw mill which would fill the order."[74] Fairly widespread in the early months of the war, such dealings tended to undermine Reed's efforts.

Overshadowing the question of procurement methods were problems of priorities and allocations. With so many construction staples in short supply, the rate of progress at the job sites depended largely on priorities fixed by ANMB within broad policies laid down by the War Production Board. Under the rating pattern followed during the first six months of the war, AA was the top priority and the A–1 classification was subdivided into A–1–a, A–1–b, and so on down to A–1–j. Priorities assumed greater importance as more and more commodities came under allocation control. Beginning in November 1941 with steel plate, the list of allocated items grew to include rubber, virtually all the basic metals, and many end products, among them service equipment and heavy construction machinery.[75]

Military construction was far down the list of most urgent programs. Top priorities went to aluminum, high octane, and synthetic rubber plants and to naval vessels. The rating for warships was extended to the Navy's shore installations on the grounds that they were essential to support the fleet. Army munitions projects were rated A–1–a or A–1–b. Airfields had to get along with A–1–c priorities, and cantonments with A–1–j. Navy recruiting stations took precedence over Army Ordnance plants. So weak was the priority for camps and

[71] (1) Memo, Reed for WPB, 2 Feb 42. 411.1 Part 2. (2) TWX, Reybold to Div Engrs, 10 Feb 42. 411.1 Part 2. (3) TWX, Reybold to Div Engrs, 17 Feb 42. 411.1 Part 2. (4) Opns Br Files, Lumber.

[72] Constr PR 53, 15 Jun 42, p. 306.

[73] Sturgis Comments, V, 2 and VI, 3.

[74] Col. Fred G. Sherrill, Lumber in the War (MS), I, 8.

[75] (1) Smith, *The Army and Economic Mobilization*, p. 534 and ch. XXIV. (2) *Building the Navy's Bases*, Vol. I, pp. 89–93.

cantonments, that in April 1942 General Reybold warned ANMB: "Increasing difficulties being experienced in obtaining materials make it certain that the currently authorized troop housing program cannot be completed within the time specified with this comparatively low priority rating."[76] From the earliest days of the war, the Engineers exerted unremitting pressure for higher ratings. "We have fought and bled for priorities," General Robins said in May 1942.[77] But success nearly always took the form of spot priority assistance—special ratings for individual items at particular projects—rather than higher blanket priorities for entire programs.

Too frequently, spot priorities merely robbed Peter to pay Paul, diverting scarce supplies from one Engineer project to another. An experience related by General Sturgis was illuminating. Within the Vicksburg District were two urgent projects delayed for want of 12-inch cast iron pipe. One was an Air Forces navigation school at Monroe, Louisiana; the other, an ammonia plant at El Dorado, Arkansas. Finally, after a good deal of pressure by the Air Forces, the Monroe job received priority assistance. Because the El Dorado plant was critically important, Sturgis visited the site and spent the day on the telephone with production authorities in Washington, at length extracting a promise that he would get the pipe. He told the rest of the story in these words:

> Reaching Vicksburg that same night about 11 P.M., I went to my office to review the "hot" mail, which was left on my desk on days I was out of town. There I found two wires from the WPB.
>
> The first wire read something like this: "This confirms telephone approval of priority for 12-inch pipe for the El Dorado Ordnance Plant."
>
> The second wire read: "Priority recently granted Monroe Air Corps Base for cast iron pipe disapproved since this pipe is needed for the El Dorado Ordnance Plant."

Sadly, he concluded that the left hand knew not what the right hand did.[78]

When priorities failed, the Engineers fell back on their own devices, expediting and improvisation. In Washington and the field, construction officers kept a sharp watch for signs of trouble. At the first hint of difficulty, they swung into action. Reed's expediters crossed paths with expediters from districts and divisions. Traveling from plant to plant, from lumberyard to warehouse, these men carried a stick in one hand and held out a carrot with the other. "Waste a minute, lose a life," Sherrill summed up their philosophy. "Try to save a dollar, waste a minute, lose a life."[79] Meanwhile, the field was resorting to expedients in order to lick supply problems. Some district engineers purchased abandoned buildings and stripped them of equipment and usable materials. Some bought many items second hand. One, unable to obtain structural steel for elevated water tanks, dug a reservoir, lined it with concrete, and roofed it over to keep out dust and contamination. Another adopted a hangar design calling for glued laminated plywood arches and collapsible doors which needed no heavy structural support.[80] And so the story went: perseverance and invention.

[76] Memo, Reybold for ANMB, 16 Apr 42. 652 I.

[77] Min, Engr Production Conf, 22 May 42, p. 44. 337 (Engrs, Corps of).

[78] Sturgis Comments, XVII, 2.

[79] Sherrill, Lumber in the War, I, 4.

[80] (1) Memo, Eberstadt for Patterson and Forrestal, 1 Feb 42. USW Files, Misc and Sub, Steel. (2) Sturgis Comments, VIII, 2. (3) *ENR*, May 7, 1942, pp. 68–70.

The temptation was always strong to use materials readily at hand, however critical. Reportedly, on one occasion the Engineers succumbed. In April 1942, Rexford Newcomb, a ceramics specialist for WPB, complained to Reybold that the field was flagrantly violating an OCE order which prohibited use of metallic cable. Robins was aware of the situation but had done nothing about it; that, said Newcomb, was an example of the "complete lack of cooperation we are getting."[81] Disturbed by these allegations, the Chief investigated. From the Louisville District, Col. Henry Hutchings, Jr., reported that one project under his control had used metallic cable. The contract for electrical work at Camp Atterbury, Indiana, had gone into effect 17 days before the OCE order appeared. In the interests of speed, Hutchings had let the contract stand.[82] Other district engineers pleaded not guilty. Satisfied the Corps was in the clear, Reybold denied Newcomb's charges. "This is the first time this Department has been accused of failure to cooperate with the War Production Board," he told Nelson.[83] In a conciliatory vein, Nelson replied: "We are well aware of the general effectiveness of the restrictions imposed by the Corps of Engineers on the use of critical materials."[84] Unfortunately, the matter did not rest there. A few months later, the Washington *Daily News* carried an account of the affair that repeated Newcomb's allegations almost word for word.[85]

Second only to problems of materials were problems of construction machinery. As head of the Mechanical Equipment Unit, Maj. Robert L. Richardson faced a challenge only slightly less formidable than the one that confronted Major Reed. Shortages of cranes, shovels, dozers, draglines, and the like, already serious in 1941, turned critical after Pearl Harbor, as combat and lend-lease claimed a major share of industrial output. A year or more of multiple shifts, bad weather and good, had taken a terrible toll of equipment. The existing plant was generally in poor repair and contractors were clamoring for replacements. Resistance to third-party leases, which contained recapture clauses, was increasingly strenuous. Shortages of tires and gasoline were added complications. As the war continued, the situation was likely to deteriorate still further.

Prospects for obtaining new equipment worsened steadily. An order placed by the Ordnance Department in December 1941 for 4,000 D–6's and D–7's would claim the output of all crawler tractor plants for a six-month period. Requirements for Engineer and other service troops, for overseas bases, for the Navy, the British, the Russians, and other high-priority users imposed a crushing load on manufacturers of every type of construction machinery. By January 1942 deliveries of cranes and shovels were running about three months behind, and even to place an order required a preference rating. A plan to convert segments of the industry to tank production, though mercifully deferred, was un-

[81] Memo, Newcomb for Reybold, 16 Apr 42. 410 I.

[82] (1) Telg, Reybold to Div Engrs, 22 Apr 42. 600.1 Part 13. (2) Ltr, Reybold to Newcomb, 22 Apr 42. 410 I. (3) Ltr, Hutchings to Daley, 22 Apr 42. 652 (ORD).

[83] Ltr, Reybold to Nelson, 6 May 42. 410 I.

[84] Ltr, Nelson to Reybold, 26 May 42. 401.1 Aug 41–Feb 43.

[85] Washington *Daily News*, 3 Aug 42, pp. 2, 16.

mistakably portentous.[86] As time went on, more and more contractors found themselves in desperate straits. Describing the situation in the Los Angeles District eight weeks after Pearl Harbor, Colonel Kelton appealed to the Chief's office to "alleviate the present critical shortage of heavy construction equipment which is seriously affecting progress on existing contracts and which, it is already apparent, is adversely affecting competitive bidding on new work."[87] The pinch grew tighter. In April 1942, the *Engineering News-Record* carried the report: "Only about 15 percent of the output of the equipment manufacturers now reaches contractors or rental distributors, the rest going to equip army and navy combat units or to lend-lease."[88]

The developing equipment shortage was reflected in directives calling for the choice of sites that required little grading. "One of the greatest consumers of construction equipment," Robins reminded the field, "is the item of earth moving, which at many locations has assumed staggering proportions."[89] Unfortunate examples cited by inspectors served to emphasize the need for level, well-drained sites: for instance, at the Keystone Ordnance Works, a railroad connection required "many miles of construction, some over swamp, some through deep cuts, and part over an enormous 45-foot fill"; and at Pine Bluff Arsenal, "from one to five feet of poor top soil" had "to be mucked out to provide a solid base for roads."[90] How important the Engineers considered this aspect of wartime site selection was suggested by an incident related by General Plank. In the spring of 1942, the Air Forces picked a location along the Mississippi River, north of Memphis, for a large training installation. On reviewing the Engineer site report, Plank saw that the job would entail moving "something on the order of 3,000,000 cubic yards of earth." He continued the story:

> I said, "You simply can't get that project built. There simply isn't enough construction machinery. You can pick it, but you'll never get it done in time." And that made the Air Force so damn mad that they asked that I be relieved. O.K. You don't get bulldozers and draglines and what not by relieving me or anybody else. . . . I just had to take the position that the site itself had to be disapproved, and finally made it stick.[91]

The Corps vetoed a number of other sites for the same reason and made the vetoes stick.[92]

While they tried to pare requirements, the Engineers also sought to bring every available piece of equipment to their projects; they appealed to state, county, and municipal works departments for pavers and graders; they put pressure on contractors to "scour the backroads" for machinery; they urged farmers to lease idle tractors and trucks during the off season; and they even put plows and cultivators to use at airfield projects.[93]

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[86] (1) Memo, Richardson for Groves, 19 Dec 41. Opns Br Files, Rental Equip. (2) Madigan Files, Steam Shovel Data. (3) *ENR*, February 26, 1942, p. 35; and April 16, 1942, p. 5.

[87] Ltr, Kelton to OCE, 31 Jan 42. 400.1301 Part 4.

[88] *ENR*, April 23, 1942, p. 172.

[89] OCE Circ Ltr 1666, 2 Jun 42. See also OCE Circ Ltr 1190, 9 Feb 42.

[90] (1) Rpt of Insp by Strong, 6 Apr 42. Opns Br Files, Insp Rpts, Col Strong. (2) Memo, Davis for Strong, 22 Apr 42. Opns Br Files, Grnd Trps Sec.

[91] Plank Interv, 6 Dec 50.

[92] 686 (Airfields) Part 55.

[93] (1) TWX, Robins to Div Engrs, 11 Apr 42. 481 Part 1. (2) Ltr, Dist Engr, Seattle, Wash, to Div Engr, NPD, 4 May 42. 481 (Seattle DO) Part 1. (3) *ENR*, April 16, 1942, p. 5; and February 5, 1942, p. 3.

Armed with authority from Somervell to "transfer construction equipment from any military establishment under the jurisdiction of the War Department," General Reybold forced post commanders to send maintenance machinery, trucks, and automobiles to construction jobs.[94] Meantime, the tangle of difficulties surrounding third-party rentals was being unsnarled.

Always a sore subject with equipment owners, the recapture clause was a controversial issue in the War Department, where some viewed it as a safeguard and others, as a drawback. Deleted from the fixed-fee contract in the fall of 1941, the clause was still a standard feature of third-party rental agreements when the United States entered the war.[95] Increasing difficulty in renting from third parties and sharp rises in rental rates caused mounting concern. Judge Patterson seemed to think the remedy was at hand. Early in December 1941, he reminded Reybold that the Requisition Act was "on the books" and that the War Department was "no longer helpless in the matter."[96] But requisitioning was contrary to the Engineers' philosophy. Although they often mentioned the act as a bargaining point, they continued to do business on a voluntary basis. When Patterson insisted on retention and enforcement of the recapture provision, affairs went from bad to worse.[97]

On 10 March, at Major Richardson's prompting, General Robins appealed to Somervell for help. Setting forth the case against recapture, Robins wrote:

> As new construction equipment is now extremely difficult to obtain, the omission of the recapture clause would open new fields of rental, namely contractors without Government contracts. Contractors have been extremely reluctant to rent construction equipment whenever contracts contain the recapture clause.

Underscoring the urgency of his request, Robins pointed out that OPA would shortly establish price ceilings on third-party rentals and thus destroy whatever chance the Engineers now had of competing with the Navy, which made no provision for recapture in its agreements.[98] Somervell took the matter up with Patterson, who notified General Reybold: "The recapture clause will be required in all lease agreements as heretofore directed."[99] With customary persistence, Robins tried again. This time he went to Madigan, who soon set matters right. Patterson delegated authority to rent without recapture to Reybold, who, in turn, delegated it to the field.[100] A serious obstacle was out of the way.

With a huge inventory of recaptured equipment to control and maintain, the Engineers had a problem on their hands. Advancing a solution early in the war, Colonel Sturgis wrote the Chief: "There has evidently been a large amount of plant acquired by the United States . . . which should furnish a valuable

[94] SOS Ltr SPAD 400.22 (5-19-42), 9 May 42. Opns Br Files, SOS.

[95] See pp. 426-27, above.

[96] Memo, Patterson for Reybold, 3 Dec 41. USW Files, Misc & Sub—Equip.

[97] (1) 3820 (Nat Def) Part 12A. (2) TWX, Reybold to Div Engrs, 15 Jan 42. 400.7 Part 30. (3) 481 Part 1.

[98] Memo, Robins for Somervell, 10 Mar 42. 481 Part 1.

[99] Memo, Patterson for Reybold, 18 Mar 42. 400.13 Part 4.

[100] (1) Memo, Robins for Madigan, 27 Mar 42, and 1st Ind, 27 Mar 42, thereon. USW Files, Misc and Sub—Equip. (2) TWX, Strong to Div Engrs, 1 Apr 42. 481 Part 1. (3) TWX, Robins to Div Engrs, 12 May 42. 481 Part 1.

pool of equipment for future projects." He went on to suggest that the central office "act as a clearing house for immediate information as to availability and an authority for priority of use."[101] Reybold liked the plan. By spring each division had its own equipment pool. A network of giant repair shops was overhauling and rebuilding worn-out machinery. Special efforts were under way to procure spare parts, gasoline, and tires. Some of the best men in the equipment business were acting as consultants. And fleets of equipment were moving halfway across the country on Major Richardson's orders. Thanks largely to the pooling arrangement, relatively few projects were seriously hurt by shortages of equipment.[102]

Problems of materials continued to dwarf all others. As chief of M&E during the crucial summer of 1942, Colonel Sherrill had many woes. Nearly everything the Engineers needed was scarce. An ANMB directive creating a new AAA rating caused confusion and uncertainty. Almost hourly, calls came into M&E from projects in distress. Time and again, Sherrill bailed them out by diverting shipments from other projects, shifting orders from plant to plant, sending expediters to the scene, or wringing spot priorities from production authorities. Meanwhile, he tried to cope with general shortages of key commodities. By purchasing over a million kegs centrally, enough to meet requirements until February 1943, he overcame a scarcity of nails in the South and Southwest. By intensifying his search for abandoned tracks and obtaining a larger allocation of new rail from WPB, he eased a severe shortage of rail. When lack of steel interrupted production by the Timber Engineering Company of the vitally important connectors for wood trusses, he came to the rescue with an AA–2 priority.[103] Through it all, one concern was uppermost, a critical shortage of the basic commodity—lumber.



COLONEL SHERRILL

Lumber Crisis

On the first day of the new year, 1942, the *Engineering News-Record* carried the

[101] Ltr, Sturgis to Reybold, 18 Dec 41. 686 (Airfields) Part 46.

[102] (1) Memo, Robins for Styer, 31 Mar 42. 481 Part 1. (2) Min, Engr Production Conf, 28 Sep 42. 337 (Engrs, Corps of). (3) Memo, Richardson for Strong, 13 Jun 42. Opns Br Files, Memos—M&E Sec. (4) *ENR*, April 16, 1942, p. 5. (5) Tel Conv, Elliott and Antes, 4 Jun 42. Opns Br Files, Equip 2.

[103] (1) Opns Br, Daily Log, May–Sep 42. EHD Files. (2) Opns Br Files, Grnd Trps Sec; and Memos, ExecO, Constr Div. (3) 411.5 I.

headline: "Lumber supply adequate for war construction." A survey by the Timber Engineering Company had disclosed that "all requirements can readily be met." In February the magazine captioned an item: "War demand for lumber unlikely to cause shortage." The writer attributed to Styer the belief that "with prudent handling, . . . there should be enough lumber to meet all needs without rationing, including lend-lease shipments abroad." As late as 23 April, the *News-Record* could report that the latest WPB scarcity list made no mention of lumber.[104] Optimism was almost universal. The country's timber resources were practically limitless. During 1941, the total lumber supply, including imports, had amounted to 37 billion board feet, and domestic production had increased 14 percent over 1940. In December 1941 stocks on hand at mills and lumber yards approximated 17 billion board feet. Only the Forest Service warned of a possible shortage, and its warnings went largely unheeded.[105]

As critical as it was unforeseen, a lumber shortage developed suddenly in the spring of 1942. Early in April Major Reed detected a decided tightening of the market. The situation deteriorated rapidly as requirements shot upward not only for building construction but for airplane framing, ship decking and planking, boxes and crates, ponton stock, and lend-lease shipments as well. Worst of all, while demand rose sharply, production actually fell. Explaining the drop in industrial output, General Reybold cited a letter from "a dear old lady of the Deep South." After tracing her genealogy, the old lady offered him her favorite walnut tree. While praising her patriotism, Reybold declared: "She was under the erroneous impression that the dire need was for trees. This is not the case at all. It is the lack of manpower in the woods which causes the shortage of lumber." Contributing factors were scarcities of fuel, tires, and equipment.[106]

As the crisis deepened, Reed and his assistants fought doggedly to combat the shortage. They launched a campaign to purchase 250 to 300 million board feet from retail lumber yards. They arranged to borrow lend-lease stocks held by the British on the East Coast. Going into New England, they bought up all available hurricane lumber. Moving north of the border, they purchased all the Canadian lumber they could find. Meanwhile, they held auctions in Florida and Wisconsin, states which had not previously entered the supply picture. Little more than temporary expedients, these measures eased the pinch only briefly. At the end of April, Reed had a backlog of unplaced orders for 200 million board feet—orders the lumber industry was unable to absorb.[107]

During April the Chief's office studied proposals for increasing supplies of lumber by altering specifications. By accepting lower, rougher grades and by ordering random lengths and widths, buyers could reduce pressure on the mills. But the sacrifice in quality would be severe. Moreover, as Stratton pointed out, use of random sizes meant increased

[104] *ENR*, January 1, 1942, p. 24; February 5, 1942, p. 3; and April 23, 1942, p. 55.

[105] S Rpt 480, Part 14, 77th Cong, 2d sess (Dec 15, 1942), p. 2.

[106] Maj Gen Eugene Reybold, "They Deliver the Woods," *The Timberman*, June 1943, pp. 46, 10.

[107] Memo, Groves for Clay, 28 April 42. 411.1 Part 3.

waste.[108] The decision was not one to be taken lightly. After a good bit of soul searching, Zackrison gave the nod, and Urquhart, Stratton, Strong, and Groves in turn approved. By the first of May, new instructions were ready for the field: buy all two-by-twos and two-by-threes, all boards, all tongue and groove decking, all bridging, sills, plates, and headers in random lengths; specify sizable posts and timbers rough; and, because of its requirement for very long studs, avoid balloon construction. In general, all lumber except framing would be one grade lower than that normally specified.[109] At lumber auctions later on, Sherrill took a ribbing for buying "random, random, random." His retort was apt: "There is more to this than meets the eye. At a given moment, ten thousand people scattered throughout the country can cut 10,000 two-by-sixes, 24 feet long, in half a good deal quicker than half a dozen saw mills can cut the same 10,000 pieces in half."[110]

The Engineers took further steps to conserve lumber. Late in April Colonel Groves wired the field: "Make such modifications in structural designs of mobilization type buildings as are practicable." Narrower joists and simpler framing were examples of what he had in mind. On 13 May Colonel Stratton urged district engineers to substitute concrete floors for wood floors in warehouses, messhalls, administration buildings, and other one-story structures. A few days later, with the approval of The Surgeon General, he O.K.'d concrete floors for TO barracks. Before long, teletypes were on the way telling division engineers to build all interior partitions of wallboard.[111] More such changes followed. The purpose was always the same: to effect all possible savings of lumber through substitution and redesign.

The question naturally arose: if lumber was hard to get, why not use more structural clay? Masonry interests, long dissatisfied with their share of the program, took this opportunity to press their case. Manufacturers, individually, through their trade associations, and through their congressmen, besieged General Reybold with demands for increased use of their products. As before, the Chief offered assurances that clay products would receive every consideration, but he declined to make a basic change in policy. The old arguments against masonry still held good: too costly and too time-consuming. In many areas skilled masons were none too plentiful.[112] Moreover, as Groves explained: "With the experience that we had had with bricklayers, there was every natural reluctance to turn to masonry if its use could be avoided."[113] Since 1941 the field had had authority to substitute brick, tile, or concrete blocks for wood where the difference in cost and completion time was not excessive. In the absence of more definite instructions, district engineers had to decide for themselves what was

[108] Memo, Stratton for Strong, 8 April 42. Opns Br Files, Memos–Engrg Br.

[109] (1) Zackrison Interv, 19 Feb 65. (2) TWX, Groves to Div Engrs, 30 Apr 42. 652 (NAD). (3) OCE Circ Ltr 1556, 2 May 42.

[110] Sherrill, Lumber in the War, I, 3.

[111] (1) TWX, Groves to Div Engrs, 30 Apr 42. 652 (NAD).(2) TWX, Stratton to Div Engrs, 13 May 42. 400.8 Part 2. (3) Ltr, Hill to TSG, 20 May 42. 621 Part 1. (4) TWX, Reybold to Div Engrs, n.d. 400.8 Part 2. (5) TWX, Reybold to Div Engrs, 13 Jun 42. 411.8 Part 1.

[112] 411.8 Parts 3 and 4.

[113] Groves Comments, X, 7.

excessive. While some used masonry freely, most continued to prefer wood.

While others concentrated on conserving lumber, Groves tackled the problem from a different angle. On 28 April, at Reed's suggestion, he asked General Clay to petition the War Production Board for a freeze order, "prohibiting the sale of lumber to retailers or direct by producers to any but defense purposes."[114] On 13 May Chairman Nelson complied. A week later, the *Engineering News-Record* informed its readers: "The order applies to softwood 'construction lumber' produced by mills whose production during the past three months has averaged more than 5,000 board feet per day. Such mills are forbidden to sell except to the Army, Navy, and Maritime Commission, or their contractors."[115] Along with the order, Nelson issued instructions that lumber for all Engineer projects requiring in excess of one million board feet would be procured centrally. He coupled this action with an appeal to loggers and sawmill operators to step up production.[116]

All these measures notwithstanding, difficulties increased with the advent of summer. On 29 June Walter T. Deadrick of M&E's lumber unit informed Colonel Sherrill: "Our inability to place orders for our lumber requirements . . . has now reached a very critical point." Auctions were having disappointing results. At Portland, Oregon, the week before, bidders had walked out, leaving orders for 60 million board feet still unplaced. Since 22 June, another buy had been in progress, "days, nights, and Sundays," at the Peabody Hotel in Memphis, but M&E had yet to purchase for forty projects. Heavy buying in Wisconsin and Florida had exhausted cuttings in those states for weeks to come. Over the country as a whole, said Deadrick, production was "about 15 percent off because of a shortage of tires, labor, and supplies." He continued:

> Weather conditions have been particularly bad in all lumber producing areas this spring and summer; the demands of the boxing industry are conflicting increasingly with our program; the regulations issued by the Office of Price Administration are hampering production; the uncertainties of price ceilings and their interpretations are causing vendors to hesitate in accepting commitments; and, to a somewhat minor degree, the shortage of competent and trained help is preventing us from securing all of the lumber which might be located.[117]

At project level, the pinch was becoming tighter. The number of delays caused by lumber shortages rose steadily—from 88 in May, to 95 in June, to 101 in July.[118]

Division and district engineers showed initiative in finding lumber to keep their projects going. The work of General Hannum and Lt. Col. Robert C. Hunter, the district engineer at Sacramento, was an example. On a trip through the Sierras, they noticed a number of small sawmills deep in the woods. At Hannum's suggestion, Hunter sent men into the mountains in search of mills having no government orders. The scouts located quite a few. By contracting for their output, which averaged twenty to thirty thousand board feet per day, Hunter was able to keep most of his jobs on

[114] Memo, Groves for Clay, 28 Apr 42. 411.1 Part 3.

[115] *ENR*, May 21, 1942, p. 56. See also TWX, Reed to Div Engrs, 14 May 42.

[116] (1) OCE Circ Ltr 1587, 11 May 42. (2) *ENR*, May 14, 1942, p. 2.

[117] Memo, Deadrick for Sherrill, 29 June 42. Opns Br Files, Lumber.

[118] Summaries of Delaying Factors, May–Jul 42.

schedule. Hunter's methods were by no means unique. Engineer projects throughout the South drew heavily on the thousands of "peckerwood" or "coffee pot" mills which dotted the great pine-producing region.[119] The chief difficulty was not in locating these small mills and giving them orders. Rather it was in keeping them from going under.

At a WPB conference on 9 July, Sherrill put forward a plan to aid small producers. "East of the Plains," he said, "sixty-five percent of the lumber is produced by mills cutting 20,000 feet or less daily." High operating costs were forcing many of these operators out of business. Countrywide, labor was critical. Lumberjacks were leaving by the thousands for higher paying jobs in cities. To relieve the situation, Sherrill proposed that the government pay a bonus of two dollars for every thousand board feet of lumber cut, the bonus in no case to exceed $15,000 a year.[120] When he first heard about the plan, General Clay was heartily in favor of it, but after consulting his legal advisers, he withdrew his support. A bill to provide a bonus for mill operators would have the appearance of "discriminatory class legislation," Clay's attorneys told him, and Congress would probably reject it as such.[121]

As the lumber famine persisted, Colonel Robinson asked Somervell to take a hand. Noting that production had fallen off alarmingly, the SOS control officer told his chief on 12 August: "Bills have been introduced, orders have been issued, committees have been formed, resolutions have been passed, *but less timber is being cut.*" WPB estimates put total production for 1942 at 33 billion board feet as against requirements of 38.7 billion. Reserve stocks were 18 percent below last year's level. Log production on the West Coast was off 10 percent, and important western planing mills were closing for lack of workers. Southern pine loggers, heavily dependent on truckers, were seriously hurt by shortages of tires. Many southern mills were operating below capacity, and ceiling prices were forcing marginal producers to the wall. A bad situation was made worse by the lumbermen's inability to replace worn-out equipment or even to obtain spare parts. After reviewing various proposed remedies—bonuses, subsidies, pay boosts, additional overtime, draft deferments, hikes in ceiling prices, and priority assistance—Robinson suggested that the Army organize logging battalions and send them into the woods. Something had to be done and done fast, he warned. The shortage was jeopardizing not just the Army program but the entire war construction effort.[122]

If the Engineers had too little lumber, other war agencies had appreciably less. In a sellers' market that was increasingly congested and confused, conventional government purchasing methods were largely ineffective. The Engineers, with their auction system, enjoyed a huge advantage. By the summer of 1942, according to Colonel Sherrill, "they were getting the bulk of the lumber, and the

[119] (1) Ltr, Hannum to Robins, 19 Sep 42. 411.1 Part 3. (2) Sherrill, Lumber in the War, IV, 11–12.

[120] Memo, Sherrill for Clay, 10 Jul 42. 411.1 Part 3.

[121] (1) Opns Br, Daily Log, 13 Jul 42. (2) Memo, Legal Sec, SOS, for Clay, 31 Jul 42. 411.1 Part 3. (3) Memo, Clay for Sherrill, 6 Aug 42. 411.1 Part 3.

[122] Memo, Robinson for Somervell, 12 Aug 42. OCE, Proc Div, Lumber Br Files, Centralized Purchases.

other branches in the Army and all the bureaus in the Navy were merely following in their wake—in effect, picking up little odds and ends that dropped out of the enormous haul of the Engineers." Also trailing in the wake were the Maritime Commission, the Defense Plant Corporation, and other war agencies.[123] The Engineers came in for heavy criticism, as the impression gained that they had cornered the market.

> Because the Engineer method was efficient and functioned cooperatively with lumbermen, battling almost insuperable odds [Reybold commented], these lumbermen declined to sell their product to other agencies through the long and complicated procedures ordinarily used. The fact that other agencies could not purchase lumber was not due, then, to any monopoly the Engineers held, but solely to the lumberman's own choice of those with whom he would do business.[124]

From time to time, Sherrill extended a helping hand to other agencies, by placing orders for them at his lumber buys. But, admittedly, he did so "perhaps a little grudgingly" and only when "the purchase would not too greatly interfere with the Engineers' own requirements."[125]

An appeal from Admiral Moreell to General Somervell in mid-August 1942 dramatized the plight of the other agencies. Construction of the great floating dry docks which would play a vital role in the war at sea was just getting under way. Needed for the purpose was 25 million board feet of Douglas fir of a special grade, size, and fiber stress. The Navy asked M&E to make the purchase. This request coincided with calls for the same type of lumber from Army projects at the Oakland and Boston ports. After placing the Army's orders, Sherrill was unable to place the Navy's. "In spite of every effort, and they did make many efforts," he said, "the Engineers could not find a home among lumber producers for the three requirements within the time limits imposed." Protesting naval officers took the matter to ANMB Chairman Eberstadt, who called in Colonel Sherrill.

> This contest [Sherrill related] was so important and involved so much of what was even then felt to be of far reaching consequence that Mr. Eberstadt had practically all of the high ranking members of ANMB present. We ended up day after day, however, at the same place—nowhere. . . . Admittedly, the Navy had to have the lumber, still there was no one in the lower levels of the Corps of Engineers with authority to set aside its requirements to meet this conflicting demand of the Navy.

Finally, someone suggested that Moreell telephone Somervell—which he did. Somervell, in turn, called Reybold. Could the Corps of Engineers fill the Navy's requirement? Reybold countered with a question of his own. Would Somervell risk delaying the port projects? Somervell agreed to take the risk and Reybold turned over the lumber. The affair had made a deep impression on Eberstadt. Clearly, this was no way to win the war.[126]

Turning for advice to one of the country's top lumbermen, Eberstadt asked Frederick K. Weyerhaeuser to survey the situation and suggest a remedy. On 18 August, after a six-day in-

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[123] Sherrill, Lumber in the War, II, 4.

[124] Reybold, "They Deliver the Woods," *The Timberman*, June 1943, p. 12.

[125] Sherrill, Lumber in the War, II, 6.

[126] *Ibid.*, II, 6–8. See also Memo, Robinson for Somervell, 12 Aug 42; and Memo, Rear Adm T. J. Keleher, ANMB, for Reybold, 18 Aug 42. 411.1 Part 3.

vestigation, Weyerhaeuser submitted his report. He attributed much of the difficulty to cutthroat competition for limited supplies. "Each agency," he wrote, "has obviously regarded its own requirements as of sole importance as contrasted to the requirements of the Army and Navy as a whole." The result was "confusion and lessened production." Weyerhaeuser's solution was unprecedented—to consolidate all purchasing in a single organization. He further recommended that ANMB set up a Lumber Allocation Committee to control distribution among the branches and bureaus of the Army and Navy.[127] After reading the lumberman's report, Eberstadt fell to work. His first move was to send for Colonel Groves.

Recalling his visit to Eberstadt's office, Groves stated:

> The facts are that on one afternoon at about 2 o'clock, the Army-Navy Munitions Board asked me to meet with them and work out a procedure for the procurement of lumber. I was accompanied by Colonel Sherrill . . . and, I think, one civilian employee. The query was raised by Mr. Eberstadt as to whether the Corps of Engineers could take over all the purchasing of lumber for the Army and Navy and Maritime Commission. Mr. Eberstadt explained to me that apparently we had cornered the market and that the lumber industry was willing to sell to us and not to the others. He asked me if I felt we could do this. I assured him I thought we could handle it. He then asked me to meet with all the interested parties, including the separate bureaus of the Navy, in order to arrive at a satisfactory procedure.[128]

The ANMB Chairman had a final question: could Colonel Groves have everything lined up within 24 hours? Groves said he could. Thereupon, Eberstadt adjourned the meeting until 3 P.M. the following day.[129]

Groves had to work fast. On the way back to his office, he mapped out a course of action. Within an hour or two, a meeting was in progress with representatives from the Maritime Commission, the bureaus of the Navy, and other branches of the Army. The atmosphere, Colonel Sherrill reported, was "far from friendly":

> The bitter and intense debates of the past few weeks were still fresh in everyone's mind. Distrust was in evidence on every side. The other branches of the Army looked with just as fishy an eye at the Engineers, and anything the Engineers proposed, as did the Navy representatives. All had had their troubles with lumber. All had run afoul of the Engineers. None felt that any of the others could be trusted, least of all the Engineers.[130]

After proposing a real joint undertaking, Groves adjourned the meeting until the following morning at nine. That evening Deadrick and his staff worked late, designing what was to be the new Central Procuring Agency (CPA).[131] At the meeting next morning, Groves unveiled the plan. Discussion started off on the right note, when someone pointed out that the first to suffer under the new arrangement would be the Engineers themselves. The session was a long one.[132] But when it ended, Groves had the necessary concurrences. That afternoon he told the Board "that the matter was under complete control and that

[127] Memo, Weyerhaeuser for Eberstadt, 18 Aug 42. USW Files, 411.1 Lumber.

[128] Groves Comments, VI, 11.

[129] Sherrill, Lumber in the War, II, 9–10.

[130] *Ibid.*, II, 10–11.

[131] Draft Proposal [18 Aug 42]: Central Lumber Procurement. Opns Br Files, Lumber.

[132] Sherrill, Lumber in the War, II, 11–12.

there would be no shortage of lumber for any of the agencies from then on."[133]

On 20 August Eberstadt reported to Patterson and Forrestal. "In order to get the lumber situation in hand," he was moving to centralize procurement for the Army, Navy, and Maritime Commission in one organization—the Construction Division of the Corps of Engineers. He was also creating an ANMB Lumber Advisory Board to referee disputes among the services and to maintain liaison with the War Production Board. J. Philip Boyd of the Weyerhaeuser Company would head the advisory group. Although some details were still vague—other agencies would probably "be brought into this picture"—Eberstadt asked approval of the action taken thus far.[134] Patterson and Forrestal accepted the plan in principle, and so did Donald Nelson.[135]

Arrangements were soon complete. At the insistence of the Bureau of Yards and Docks, Eberstadt established a three-man Lumber Advisory Board to rule on questions of priority. Members were Francis H. Van Riper (Maritime Commission), Commander Oscar L. Carlson (Navy), and Colonel Sherrill (Army). Boyd was consultant to the group. On 1 September 1942 ANMB formally designated M&E as the Central Procuring Agency. Shortly, the War Shipping Administration, the Veterans' Bureau, the Defense Plant Corporation, the U.S. Coast and Geodetic Survey, and lend-lease also turned their lumber buying over to the Engineers.[136] Explaining the new setup to Colonel Farrell, Groves said: "The Navy wasn't getting anything at all. And now I think we are going to be able to supply them all right . . . . I don't anticipate any trouble, except, of course, it is a big headache." Pleased with the recent turn of events, he could not resist adding: "It was quite a compliment to us to have them come with their hat in their hand and say, 'Please, will you get our lumber for us?' "[137]

Establishment of CPA triggered another crackdown on the field. On 1 September General Reybold wired division engineers: henceforth M&E would buy all lumber. He left the field two loopholes, but they were relatively small: temporary authority for local purchases of up to one carload, and no prohibition on buying from retailers and distribution yards.[138] Division engineers reacted sharply to the Chief's message. Pointing out that small mills could not afford to send representatives to Sherrill's auctions, General Hannum made it clear that he would continue to buy from them direct.[139] Alarmed lest he lose the right to buy any lumber locally, Colonel Farrell protested to Groves: "Without that leeway, we would be completely bogged down." It was not the Chief's intention to impose unreasonable restrictions on the field.[140] Division and district engineers continued throughout

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[133] Groves Comments, VI, 12.

[134] Memo, Eberstadt for Patterson and Forrestal, 20 Aug 42. USW Files, 411.1 Lumber.

[135] (1) Memo, Patterson for Eberstadt, 22 Aug 42. Same File. (2) Opns Br Daily Log, 24 Aug 42.

[136] (1) Sherrill, Lumber in the War, II, 11–15. (2) ANMB Orgn Order 12 (Rev.), 1 Sep 42. (3) Opns Br Files, Lumber.

[137] Tel Conv, Groves and Farrell, 3 Sep 42. Opns Br Files, MAD.

[138] TWX, Reybold to Div Engrs, 1 Sep 42. 411.1 Part 3.

[139] Ltr, Hannum to Robins, 19 Sep 42. 411.1 Part 3.

[140] Tel Conv, Groves and Farrell, 3 Sep 42. Opns Br Files, MAD.

TABLE 18—LUMBER PURCHASED BY CPA, 1942–1945

Agency	FBM	Cost
Totals	25,926,537,283	$1,328,980,200
War Department	19,480,160,224	1,000,723,579
Navy Department	4,745,219,959	226,849,085
Maritime Commission	492,570,086	25,477,618
Defense Plant Corporation	78,091,412	3,926,376
War Shipping Administration	39,361,319	1,731,293
Panama Canal	38,032,223	2,301,461
Distribution Yards	556,491,383	30,526,721
Treasury–Lend-Lease	343,051,475	25,873,446
Veterans Bureau	3,935,781	195,200
Miscellaneous	149,623,421	11,375,421

Source: Sherrill, Lumber in the War, Appendix J.

the war to pick up small lots of lumber. Nevertheless, after 1 September 1942, M&E made all large purchases.

Sherrill and company "delivered the woods." Within a week after the creation of CPA, Deadrick had found homes for a number of large orders the Navy had been trying unsuccessfully to place for several months. By mid-September Sherrill could report purchases of 650 million board feet "so far this month." Meantime, he disclosed, negotiations were in progress to import lumber from Mexico and Brazil. Before the year was out, a nationwide network of distribution yards was operative and a special office at Portland, Oregon, had taken over the buying of Douglas fir for the Navy.[141] Functioning effectively throughout the war, the Central Procuring Agency compiled an impressive record. By V–J Day it had spent more than 1.3 billion dollars for almost 26 billion board feet of lumber. (*Table 18*) The retention of CPA as a permanent part of the postwar defense establishment testified to its success.

But despite centralized procurement, the critical shortage persisted. Lumber became increasingly scarce as the war continued. From the fall of 1942 on, Sherrill had to face a steadily widening gap between supply and demand. He could purchase no more lumber than the industry produced; and production did not catch up with requirements while the war lasted.

The Last Ounce

The battle for building materials reached its climax in the summer and fall of 1942. As more and more war plants went into production, as buildups accelerated in Great Britain and Australia, as preparations went forward for large-scale offensives, the war entered a new phase. As far as construction was concerned, the term "critical materials" was outmoded, for, as Zackrison as-

[141] (1) Opns Br Daily Log, 7 and 18 Sep 42. (2) Ltr, Robins to Hannum, 2 Oct 42. 411.1 Part 3. (3) OCE Annual Rpt, 1943, pp. 44–45.

serted, the problem was no longer "one of *critical materials* but rather the conservation of *all materials*."[142] Under the spur of necessity, General Robins ordered drastic steps to reduce the strain on supplies: lowering safety factors; taking over hundreds of hotels and apartment houses; making greater use of masonry; and, over the objections of The Surgeon General, double bunking barracks. All these measures had serious drawbacks. Their adoption was proof of the Corps' determination "to squeeze the last possible ounce of precious war materiel off the construction program."[143]

The collapse of several structures at Fort MacArthur, California, when 14-inch railway guns fired test volleys there in the spring of 1942, underscored the danger of lowering safety factors. Dating from an earlier period, the buildings at MacArthur were a good deal sturdier than most of the new ones that were going up. To disregard this warning took considerable courage. But after wrestling with the problem and talking it over with Major Hill, Zackrison came to the conclusion—safety factors would have to be lower. At his insistence, designers increased stresses, spaced studs and rafters farther apart, and specified shorter, lighter members. The gamble was successful. The structures, unsubstantial though they were, held up for the duration of the war.[144]

More widely discussed than Zackrison's decision was a change in the policy on brick and tile. As the lumber crisis worsened, pressure for heavier reliance on masonry intensified. In July Madigan suggested to General Clay that it might be desirable to substitute "alternate materials" for wood.[145] A month later John L. Haynes of WPB reminded General Robins that production of brick and tile was "considerably in excess of demand."[146] Meanwhile, manufacturers of clay products, stepping up their campaign for a larger share in the Army program, hurled wholesale charges of discrimination at the Engineers.[147] An inquiry by Senator Walter F. George on behalf of the Standard Brick and Tile Corporation of Macon, Georgia, helped bring matters to a head. Predicting that their plant would soon have "to close down on account of the competition . . . with an inferior product (lumber)," Standard told the Senator that 450 men would be thrown out of work, "notwithstanding that lumber is scarce and very high and burned clay products have been abundant and selling at much lower prices."[148] In mid-August General Robins unveiled plans to "expand utilization of masonry construction."[149] How far he intended to go in this direction was not immediately clear.

Late in August Groves took up the question. Calling in Colonel Daley, he asked for a résumé of the Corps' experience with masonry on ground forces projects. At the same time, he asked Colonel Stratton to comment from an

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[142] Address by Zackrison, 14 Oct 42.

[143] Address by Col Fowler, 27 Mar 42.

[144] (1) Tel Conv, Groves and George, 29 May 42. Opns Br Files, MD–Dists. (2) Zackrison Interv, 27 Apr 65. (3) OCE, *Engineering Manual*, 1942, ch. XI.

[145] Memo, Madigan for Clay, 14 Jul 42. Madigan Files, SOS, Misc Memos.

[146] Memo, Haynes for Robins, 10 Aug 42. 411.8 Part 4.

[147] 411.8 Parts 3 and 4.

[148] Ltr, Standard Brick and Tile Corp., Macon, Georgia, to Senator George, 19 Aug 42. Incl with Ltr, George to Reybold, 25 Aug 42. 411.8 Part 4.

[149] Ltr, Robins to Haynes, 19 Aug 42. Same File.

engineering standpoint. On 1 September both officers replied. Daley listed seven hospitals built of brick, one of cinder block, one of concrete block, and one of tile. At three of these jobs, a shortage of skilled masons had delayed the work. At one, the area engineer had had to switch to wood for quarters and warehouses in order to meet completion deadlines. Daley could furnish little data on costs. Only at the Woodrow Wilson General Hospital at Staunton, Virginia, had the Corps called for alternate bids. There, the price of brick with tile backup was 17 percent more than wood. At the Des Moines General Hospital, the area engineer estimated the cost of masonry at about 10 percent above wood, but Daley thought 15 percent was more like it. In his report for Groves, Stratton said he thought it entirely feasible to substitute masonry for wood on all one-story structures. It would be expensive, however, with the cost differential probably ranging as high as 30 percent. Stratton was against using masonry for two-story buildings. Prices, he felt, would be too far out of line.[150]

After mulling over these reports, Groves made up his mind. On 15 September, at his direction, Stratton issued new instructions to the field. District engineers would accept alternate bids for masonry under the following conditions: labor and materials were at hand, no delay would result, and the cost differential would not exceed 15 percent. Although this policy opened the way for greater use of brick and tile, it was a good deal less than masonry interests had hoped for. Continued agitation plus the persistent shortage of lumber caused the Engineers to hike the differential, eventually, to 25 percent. Unquestionably, the cost of using masonry was high. But, as Zackrison emphasized, it was materials not dollars that really counted.[151]

By assembling the world's largest chain of hotels, the Engineers saved not only materials but time and money as well. Miami had shown what could be done. Although commanders there were having some headaches (maintaining discipline in a vacation atmosphere was not the least of their troubles), the Army pushed ahead with plans to expand the program. During the summer and fall of 1942, O'Brien took possession of several hundred hotels—47 in Atlantic City, 48 in Daytona Beach, 58 in St. Petersburg, and 200 more in Miami. Negotiations were, for the most part, swift. Owners evicted guests, packed draperies, rolled up oriental rugs, crated objects of art, and turned over their hotels. Airmen moved into such swank hostelries as the Shelburne, the President, and the Marlborough-Blenheim in Atlantic City. The WAAC took over Daytona Beach. The Greenbrier at White Sulphur Springs and the Breakers at Palm Beach became general hospitals. By early 1943, 536 leases were on the books and 14 hotels belonged to the government.[152] O'Brien could well boast that the Corps of En-

[150] (1) Memo, Daley for Groves, 1 Sep 42. Opns Br Files, Gr Tps Sec. (2) Memo, Stratton for Groves, 1 Sep 42. Opns Br Files, Engrg Br.

[151] (1) Ltr, Stratton to Div Engrs, 15 Sep 42. 686 Part 2. (2) 411.8 Part 4. (3) USW Files, 411.1 Lumber. (4) OCE Circ Ltr 3541, 10 Feb 45. (5) Zackrison Interv, 27 Apr 65.

[152] (1) 601.53 (Miami Beach); (Atlantic City); (Daytona Beach); and (St. Petersburg). (2) Col Walter E. Lorence, Logistics in World War II: Engineer Phase (MS), Part III. EHD Files. (3) Memo, O'Brien for OUSW, 25 Oct 42. 601.1.

gineers had put the Statlers "in the shade."[153]

The largest of O'Brien's hotel transactions involved the Stevens in Chicago. The biggest hotel in the world, the 3,000-room, 22-story Stevens had been built in 1927 at a cost of $27 million. In June 1942, when General Arnold asked Groves and O'Brien to buy the huge hotel, they demurred, arguing that the price would be too high and eventual disposal would be too difficult. But when Arnold insisted he had to have the Stevens, they agreed to lease it. Negotiations soon bogged down. The owners' demands appeared excessive—an annual rental of around $1 million and $5 million more for rehabilitation and new advertising upon termination of the lease. Going to condemnation, O'Brien took possession on 1 August. Some 9,700 air trainees moved in a short time later. While the case was awaiting trial, word came that the owners would sell if the price was right. They finally accepted $5.6 million.[154] Whether, as Senator Byrd implied, the Army had bought a white elephant, or whether, as Patterson asserted, the purchase was "a sound one," only time would tell.[155]

For many GI's, hotels served as training centers and hospitals. At peak the capacity of these establishments was 160,000 men. Representing an investment of $14 to $15 million, properties purchased by the government included, besides the Stevens, the Biltmore at Miami Beach, the Don-Ce-Sar at St. Petersburg, the Forest Hills at Augusta, Georgia, and the Eastman at Hot Springs, Arkansas. The yearly rent bill on leased properties was $12.5 million. The annual cost per man was $170, including maintenance. Cantonments for 160,000 men would have cost upwards of $100 million. The cost of building Camp Polk had been $1,263 per man—or $253 per year over a five-year period. Substantial though the saving in dollars was, savings in time and materials were far more significant. Commending the Army for its resourcefulness, the House Military Affairs Committee pointed out that using hotels had saved from 4 to 6 months' time plus immeasurable quantities of materials.[156]

An avenue to greater savings had long been closed. In the spring of 1917, faced with short mobilization deadlines and tight construction budgets, the Cantonment Division had planned to halve the peacetime space allowance—60 square feet of floor and 720 cubic feet of air space per man—by installing double-decker bunks in barracks. Interposing immediate objections, Surgeon General of the Army William C. Gorgas had convened a board of eminent physicians, including Dr. Victor C. Vaughn of Michigan University and Dr. William H. Welch of Johns Hopkins. Emphasizing the dangers of overcrowding, the board warned that the space allowance was "altogether too small." Respiratory diseases would be "practically uncontrolla-

[153] Rpt by O'Brien, 1943, sub: Status of RE Program. RE Br Files, Misc Rpts.

[154] (1) Ltr, Ernest J. Stevens to Stimson, 21 Dec 42, and related docs. 601.1 (Stevens Hotel) I. (2) Ltr, AAF to CofEngrs, 5 Jun 42. 601.53 III. (3) Memo, AAF for Somervell, 19 Jun 42. RE Br Files, Memos for Gen Arnold. (4) 601.53 (Chicago, Ill.) (Misc.) I.

[155] (1) Ltr, Byrd to Stimson, 15 Dec 42. 601.1 (Stevens Hotel) I. (2) Ltr, Patterson to Byrd, 16 Dec 42. 601.1 (Stevens Hotel) I.

[156] (1) Lorence, Logistics in World War II, Part III. (2) Memo, O'Brien for Amberg, 2 Nov 44. 601.1 Part 11. (3) *Business Week*, October 9, 1943, p. 28. (4) Washington *Times-Herald*, July 29, 1943, p. A2.



AIRMEN EXERCISING ON GROUNDS OF STEVENS HOTEL

TABLE 19—VARIATIONS IN BARRACKS CAPACITY

Type of Barracks			Capacity		
Series	Heat	Lavatories	Normal	50–450	40–375
TO	Stoves	No	32	40	50
700	Stoves	No	45	63	74
700	Furnace	Yes	63	76	91
800	Furnace	Yes	74	85	105

Source: Memo, Robins for Somervell, 4 Jul 42. 621 Part 1.

ble" if men were housed "too close together." Prison inmates and flop-house denizens had more space than Littell planned to give the boys in uniform. In conclusion, the board stated, "We believe that no sanitary advice is sound which does not provide for at least 500 cubic feet of air space per man."[157] Secretary Baker approved the report of the medical men and directed Littell to use it as a guide. After the war, Army Regulations prohibited overcrowding, forbade double bunking, and prescribed an allowance of 60–720 per man, except in emergencies, when the minimum would be 50–500.[158]

From the start of the rearmament program, construction officers had advocated double bunking and reductions in space allowances—steps strongly opposed by Surgeon General Magee. In the summer of 1940, when Hartman suggested temporary double decking, Magee entered an "emphatic protest against any such practice." He warned: "From the standpoint of health such crowding of men, particularly recruits, is dangerous."[159] This warning blocked the move. A year later, when Somervell tried to invoke the emergency clause in the Army Regulations, Magee counseled against it. "Double-bunking," he averred, "should never be resorted to and is prohibited by regulation."[160] Until the fall of 1942, the Surgeon's view prevailed.

In the spring and summer of 1942, as materials shortages became increasingly desperate, the Engineers pressed hard for reductions in space allowances. At a high-level conference in May, Groves introduced the subject:

> We can decrease our efforts . . . by the double bunking of our men in barracks. I realize that this is very objectionable from the standpoint of the Medical Department perhaps, though it would be less costly in life to the United States if we double-bunked the men in barracks and diverted that effort to a more useful field. I personally lived in a double-bunk room quite a while, and I did not find it objectionable. What the medical conditions will be here I am not prepared to discuss.[161]

[157] Medical Board Rpt, 14 Jun 17. SGO 621–1 (Bks for EM).

[158] (1) Memo, Actg CofS for TQMG, 14 Jun 17. AG 2595123. (2) AR 40–205 15 Dec 24, par. 19.

[159] Ltr, SGO to TAG, 6 Aug 40. SGO 427.4.

[160] 1st Ind, SGO to TQMG, 22 Sep 41, on Ltr, AAF to SGO, TQMG, and CofEngrs, 10 Sep 41. QM 621 (63–Man Bks).

[161] Min, Engr Production Conf, 22 May 42. 337 (Engrs, Corps of).



DOUBLE-DECKER BUNKS IN PERMANENT BARRACKS, *March Field, California.*

Six weeks later General Robins asked Somervell to cut allowances to 50 square feet of floor and 450 cubic feet of air space, and, as a temporary measure, to sanction further reductions to 40–375. Robins furnished data showing how much the capacity of various barracks would increase.[162] (*Table 19*) Somervell referred Robins' letter to The Surgeon General, who promptly protested: "The housing requirements as laid down . . . have been carefully arrived at by scientific observation and experience. These requirements are essential if high rates for infectious diseases are to be prevented." General Magee "urgently recommended that no change be made . . . except where this expedient must be taken by a field commander to meet a temporary situation."[163]

The Engineers persisted. After discussions with Somervell, Groves investigated the possibility of double bunking barracks at staging areas. On 22 August he reported that the overall

[162] Memo, Robins for Somervell, 4 Jul 42. 621 Part 1.

[163] 1st Ind, 11 Jul 42, on Memo, SOS for TSG, 8 Jul 42. SGO 621–1 (Double Bunking).

capacity of camps serving the New York, Boston, and Hampton Roads ports of embarkation could be augmented from 117,486 to either 143,753 or 233,172, depending on which formula was applied. To avoid additional construction, he recommended the 50–450 formula rather than the 40–375. But Somervell wanted to go all the way. Rejecting Groves' proposal, he asked the Chief of Engineers to study the matter personally.[164] "This was rather typical of Somervell," Groves asserted. "Whenever he found that he and I were not in agreement on a matter such as this, he would ask Reybold to study it personally, fully aware that Reybold would always go along with him."[165] On 8 September Reybold expressed his agreement with Somervell's view. Ten days later Somervell cut the space allowance at staging areas to 40–375.[166]

Meanwhile, the Engineers pushed on toward their goal of double bunking the entire military establishment. In a memorandum to Somervell, which he prepared for Reybold's signature in mid-September, Groves urged an across-the-board reduction to 50 square feet per man. At major ground troop stations alone, he claimed, the change would make room for nearly 400,000 additional men. Messing, recreational, and administrative facilities would pose no problems; hospitals could add wings or expand into converted quarters; and even water and sewer lines could probably carry the load. Once again, Somervell went further than Groves had recommended. On 21 October, with General Marshall's approval, he slashed space allowances to 40 square feet at all Army installations, except replacement training centers, reception centers, and schools, where 50 square feet would be the minimum. He suspended the conflicting paragraph of the Army Regulations and on 31 December 1942 published a new regulation, incorporating the change. At a stroke, Somervell had increased housing capacity nearly 50 percent.[167] As General Magee had feared, the respiratory disease rate rose sharply, reaching a peak in January 1943, and thereafter "diminishing slowly but progressively." According to Magee, the reduction in space allowances, though not the only factor, was "one of the most important elements in the whole situation."[168]

At a conference held at the New War Department Building on 28 September 1942, General Robins and his staff heard Colonel Hardin summarize their efforts to save materials. Before a large and distinguished audience (among those present were Patterson, Knudsen, Eberstadt, Clay, and Harrison), Hardin spoke of simplifying designs, finding substitutes for scarce commodities, pooling supplies and equipment, procuring materials necessary to carry on the

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[164] (1) Memo, Groves for Somervell, 22 Aug 42. 600.1 Part 14. (2) Memo, Somervell for Reybold, 26 Aug 42. 600.1 Part 14.

[165] Groves Second Draft Comments, XVII, 1.

[166] (1) Memo, Reybold for Somervell, 8 Sep 42. 600.1 Part 14. (2) Memo, SOS for CofEngrs, SGO, . . . 18 Sep 42. 600.1 Part 14.

[167] (1) Memo, Reybold for Somervell, 21 Sep 42. 600.1 Part 14. (2) Groves Comments, XIII, 3. (3) WD Ltr AG 600.12 (9-21-42) OB-S-SPRMC-M, 21 Oct 42, sub: Reduced Space Allowances at Posts, Camps, and/or Air Force Stations. (4) AR 40-205, 31 Dec 42, par. 10.

[168] 1st Memo Ind, 22 Mar 43 on Memo, ASF to SGO, 14 Feb 43. AG 600.12.

work, taking over civilian properties, and making more intensive use of the military plant.[169] As they listened to the presentation, the veterans of the materials battle could feel reasonably certain they had done all they could. There was little else anyone could do, short of cutting the size of the program.

[169] Min, Engr Production Conf, 28 Sep 42. 337 (Engrs, Corps of).

CHAPTER XVII

Wartime Contracts

War imposed tremendous burdens on the American construction industry. Between December 1941 and August 1945, the Corps of Engineers called upon private architect-engineers and constructors to undertake emergency contracts totaling $8.5 billion—one third of all new construction performed in the United States during that period.[1] Wartime demands taxed the nation's building capacity to the utmost. As more and more firms accepted urgent work and as tight labor and materials markets and rigid government controls added to construction risks, contractors became increasingly difficult to obtain. Only by offering more liberal terms and by tapping industry's reserve capacity could the Engineers assemble the technical and managerial talent they needed to get the job done. In meeting his wartime responsibilities as Chief, General Reybold sought contracting methods that were at once effective and expedient.

During Reybold's administration, decentralization was greater than before. Division and district offices, experienced in awarding advertised and small negotiated agreements, ought, he felt, to handle all but the largest contracts. When, on 17 December 1941, Patterson authorized him to negotiate contracts of $5 million and under without approval and to decentralize procurement to the "greatest extent compatible with efficiency and proper safeguarding of the public interest,"[2] Reybold, extending the authority of the field, empowered division engineers to approve negotiated contracts of $5 million or less and district and area engineers to negotiate contracts in amounts up to $2 million and $1 million, respectively. A few months later, he increased the ceiling for districts and areas to $3 million. During March 1942, he enlarged the duties of district offices to include selection of contractors for negotiated agreements. Adopting procedures similar to those used by the Construction Advisory Committee and the Contract Board, districts began collecting data on contractors.[3] Recalling how he went about the task of selection, one district engineer said:

> I set up standards for making recommendations based on size of firm; availability of heavy equipment and its condition; financial situation; previous experience; adequate key personnel, etc. These standards were weighted as they were made and 1st choice was given to the firm with the highest score.

[1] (1) ASF, *Statistical Review: World War II*, p. 84, Appendix C. (2) *Historical Statistics of the United States, 1789–1945*, p. 168. The $8.5-billion total does not include Manhattan District contracts, discussed in ch. XX, below. Nor does it include approximately $550 million in war-related civil projects.

[2] TWX, Patterson to Reybold, 17 Dec 41. 3820 (Natl Def) Part 12.

[3] (1) OCE Circ Ltr Adm 45, 22 Dec 41. (2) Bruner, Outline of Authorizations, 30 Oct 46. (3) OCE Circ Ltrs Constr 226 and 346, 2 Jan and 7 Mar 42.

With the heavy political pressure behind various firms, we found it highly advisable to keep these records on file.[4]

Decentralization enabled General Robins to consolidate contracting groups within the Construction Division. On 15 March 1942, he abolished the Construction Advisory Committee and the Contract Board, and assigned their duties to the new Construction Contract Board, composed of Lt. Col. William M. McKee (chairman), Harry W. Loving, Richard H. Tatlow III, Forrest S. Harvey, and Alonzo J. Hammond, all of whom had expertise in choosing contractors or negotiating contracts. The new board helped district engineers with selection but otherwise confined its activities to contracts involving $5 million or more and to agreements for industrial design and construction.[5]

While "delegating down" selection and award to Robins and the field, Reybold kept a firm hand on policy.[6] Thoroughly pragmatic, he professed a strong preference for fixed-price contracts. In fact, he termed them not only "more economical" but also "more expeditious," and he issued instructions to make awards on a fixed-fee basis only when a fixed-price letting was "impossible."[7] His motive was partly political. As Groves explained: "Lump sum contracts were not more expeditious, nor were they more economical at the time. . . . His directive, however, was sound because of the tremendous political capital which was being made by Senator Truman and others with their erroneous charges about fixed fees."[8] There was another factor the Chief had to weigh. Cost-plus-a-fixed-fee contracts required detailed supervision. To accomplish all or most of the huge wartime program by fixed-fee was administratively impossible.

Cost-Plus-A-Fixed-Fee

By 1942 many were ready to call a halt to fixed-fee contracting. Unfavorable and often one-sided publicity had, by this time, rendered cost-plus-a-fixed-fee synonymous in the American mind with favoritism, extravagance, and waste. Small contractors and specialty groups opposed the fixed-fee system on the grounds that it favored big business.[9] Congressional investigators, putting much of the blame for the high cost of defense construction on fixed-fee contracts, recommended banning them "except in unique cases."[10] On 1 January 1942 the *Engineering News-Record* divulged that Judge Patterson wanted "most, if not all, military construction done under lump sum or unit price contracts." Rumor had it that "fear of Congressional investigations" was "back of this attitude."[11] The Army, to a considerable extent, could now satisfy demands of fixed-fee opponents. Improved planning techniques, more liberal pro-

[4] Ltr, Sturgis to authors, 23 Oct 63.

[5] (1) OCE Circ Ltr 1331, 7 Mar 42. (2) WD Press Release, 7 Mar 42: New Constr Contract Bd. EHD Files. (3) Memo, Hq, SOS, for Reybold, 8 May 42. OCE Legal Div Library, Instrs Re FF Contracts, Book 1.

[6] Reybold Interv, 12 Mar 59.

[7] (1) 1st Ind, 19 Aug 42, on Memo, Hq, AAF, for Reybold, 17 Aug 42. 686 (Airfields) Part 58. (2) Ltr, Reybold to Amberg, 9 Mar 42. 333.1 Part 3.

[8] Groves Comments, XI, 1.

[9] Ltr, Chairman James E. Murray, S Small Business Comm to Amberg, 5 Feb 42. 333.1 (Small Business Firms on Constr Contracts).

[10] H Comm on Mil Affs, 77th Cong, 2d sess, H Rpt 2272, p. 6.

[11] *ENR*, January 1, 1942, p. 11.

curement regulations, and new contracting methods assured wider use of fixed-price agreements. But if the need for fixed-fee contracts had abated, the time had not yet come for a complete return to fixed-price.

The Corps of Engineers made frequent use of fixed-fee contracts during the early months of the war. Munitions plants accounted for the bulk of fixed-fee work, but a few camps, staging areas, depots, and airfields also were built by that method. With industrial projects, the Army had neither the time nor the information necessary for planning. Several other factors contributed to the use of fixed-fee contracts during this period. First, many companies, already overextended, turned down agreements involving great risk or requiring large amounts of capital. Second, using arms and services exerted pressure in favor of the faster method. Third, the need for reducing a backlog of unawarded contracts provided impetus toward fixed-fee contracting.[12]

Doing part of the work by fixed-fee could speed up whole projects. Fixed-price directives often gave the field little more than a week to prepare plans and specifications and advertise for bids. Since it usually took 3 to 4 weeks to survey a site and analyze topographic and geologic data, invitations were frequently so incomplete and full of errors that most prospective bidders backed away. Those who did bid asked prices that were sky high. A practical solution to this problem combined fixed-fee and fixed-price. Colonel Sturgis told how he used this approach:

> In May 1942, lump sum pressure became very heavy on the field. At this time I received a directive for a regulating depot in northern Louisiana for urgent completion to prevent a gigantic railroad jam in the very busy port of New Orleans. This site was located in a wet forest and was none too good. Therefore, I tried another contract approach. This involved a CPFF contract for roads, drainage, and utilities. In the meantime (about 6 weeks), high quality specs were drawn and invitations to bid for lump sum contracts were advertised. Surprisingly low bids resulted for the remainder of the above-ground work, including warehouses, engine "roundhouse," barracks for the operating personnel, and so forth. I believe that this resulted mainly from the CPFF contract having first removed the risks by construction of those features (roads, utilities, etc.) which were the most uncertain, as well as the careful and complete plans and specs upon which the contractor, in his bid, could depend.

Sturgis regarded the success of this method as "a very valuable 'lesson learned' for the future."[13]

During the period of most intensive building activity, from 1 December 1941 to 1 September 1942, the Engineers negotiated fixed-fee contracts totaling almost $800 million.[14] In selecting fixed-fee contractors, Colonel Groves placed a premium on experience. He considered architect-engineers who were "highly qualified specialists in their respective fields, . . . the only companies capable of completing the necessary complicated designs on time."[15]

[12] (1) Somervell's Testimony, 11 Feb 42. In H Comm on Appns, 77th Cong, 2d sess, *Hearings on Supplemental National Defense Appropriation Bill for 1942*, p. 17. (2) Ltr, Arnold to Reybold, 17 Aug 42. 686 (Airfields) Part 58. (3) Memo, OCE for SOS, 27 Nov 42. 400.13 Part 4. (4) Memo, Control Br, SOS, for Somervell, 14 May 42. 600.914 Part 1.

[13] Sturgis Comments on Purchase Procedure, Incl with Ltr to authors, 23 Oct 63.

[14] Constr PR 56, 31 Aug 42, p. 296.

[15] Ltr, Groves to Architect-Engrs Assn, NYC, 6 Feb 42. 163 (Natl Def) Part 2.

Builders who had creditably completed one emergency job held an advantage in securing another. As a result, firms that had defense experience got preference over firms that, before the emergency, might have seemed better qualified.

Robins and Groves needed every qualified contractor they could get. The Army alone was awarding contracts, both fixed-fee and fixed-price, at a monthly rate of $400 million. The Navy and other federal agencies meanwhile claimed a large share of available talent.[16] Yet many high-caliber engineering and construction firms were not participating fully and some were not participating at all. "This," Groves explained, "was due to the Administration policy, which was in accord with Congressional desires that this work be carried on by organizations geographically located in the area of the work. The result was that many large and competent firms in New York and other big cities were not used to their capacity."[17] At the same time, a host of small constructors and specialty firms, capable of doing good work on a limited scale, were unable to find a place in the program. The plight of these "little men" was a matter of concern on Capitol Hill.

Groves thought he saw a way out of this dilemma. In the fall of 1941 Somervell had the idea of splitting projects into small fixed-price contracts and letting Constructing Quartermasters act as managers. The scheme had the disadvantage of placing too much responsibility on the CQM; but, even so, Somervell insisted on trying it out at a few jobs. After Pearl Harbor, when Groves found it impossible to speed work under this setup, he arranged to complete the projects under construction-manager contracts.

> This system [as he described it] was based on having competent construction organizations manage the actual construction, but they were required to contract, preferably on fixed unit price or fixed lump sum bids, for as much work as possible. They could also let some of the work, such as piping, on a fixed-fee basis. They could also work on cost basis themselves. Their total fee was set in accordance with the anticipated management effort. If the work which had originally been estimated to be let out on a fixed-price basis to another contractor was actually performed by the construction manager's organization, there was no increase in fee allowed.[18]

One construction-manager project was the Ozark Ordnance Works, an ammonium nitrate plant at El Dorado, Arkansas. The contractor, the H. B. Deal Construction Company of St. Louis, did a first-rate job. Another such project was the Cornhusker bomb loading plant at Grand Island, Nebraska, carried through successfully by the Gordon Hamilton Construction Company of Kansas City, Missouri, and several associates.[19] "Actually," Groves stated, "I believe this was the most satisfactory of all arrangements."[20] But, its merits notwithstanding, the construction-manager setup failed to win acceptance. In its stead, Patterson adopted another agree-

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[16] (1) Constr PR 56, 31 Aug 42, p. 296. (2) Testimony of James V. Forrestal, 8 Mar 44. In S Comm on Mil Affs, 78th Cong, 2d sess, *Hearings* on S Jt Res 80, Part 9, p. 716.

[17] Groves Comments, XI, 1.

[18] Groves Comments, XI, 4.

[19] (1) Ltr, Truman to Somervell, 22 Oct 41. QM 095 (H. B Deal & Co.) 1941. (2) 635 (Ozark OW). (3) 635 (Cornhusker OP) I.

[20] Groves Comments, XI, 4.

ment—the architect-engineer-manager (AEM)—a contract Groves aptly called "Mr. Madigan's dream child."[21]

Drawing on his experience with similar agreements in New York, Madigan in December 1941 began trying out the AEM contract on War Department projects. As one Engineer described it, the contract provided for "assignment of a number of relatively small contracts to be managed and supervised by the Architect-Engineer as 'Manager.' "[22] Except for work done faster or better by the architect-engineer-manager's own forces or by subcontract, all construction went forward under separate government fixed-price agreements. The principal contractor furnished "all architect-engineering and other services incident to design, inspection, and supervision of the project."[23] He also helped to place the separate fixed-price contracts. "In other words," Groves explained, "the services furnished by the principal contractor included all of the studies, recommendations, and decisions, subject to approval of the government, connected with the placing of what were essentially subcontracts."[24] Fees under AEM contracts approximated the total that would have been due on separate architect-engineer and construction contracts. Once determined, fees remained fixed, regardless of the extent of work subsequently performed by subcontractors or by small concerns under fixed-price contract to the government. By February 1942, Madigan had perfected the AEM to the point where Patterson was willing to approve it for general use.[25]

Its proponents felt the AEM offered decided advantages over other fixed-fee agreements. It promoted fixed-price contracting and made possible wider participation by small business. It broke down resistance to the use of specialty firms, since the principal contractor's fee bore no relationship to the amount of work sublet. It saved money and time, since the architect-engineer-manager could take off materials and place orders in advance. By substituting government contracts for subcontracts, it gave the Army better control over selection of contractors.[26] "It brings to the job," Madigan asserted, "a type of experienced management and supervision not possible under any other system."[27] But the greatest advantage of all was political. With the climate of congressional opinion in mind, Madigan termed the AEM "so right for us."[28]

Many considered the AEM anything but right. At the first hint that the Army might use it, the *Engineering News-Record* ran a blazing editorial:

> Such procedure runs the risk of being slow and inefficient, for only a relatively few architect-engineer groups are experienced in directing construction operations. This is properly the function of the general contractor who is skilled in the organization and administration of large-scale field activities.
>
> But there are other reasons why the pro-

[21] Tel Conv, Groves and Area Engr, W. Va. OW, 5 Mar 42. Opns Br Files, W. Va. OW.

[22] Ltr, Gesler to Amberg, 18 Mar 42. 333.1 (Cong Investigations).

[23] WD, CPFF Form 12, 26 Jun 42, art. II, pars. 5 and 1.

[24] Groves Comments, XI, 5.

[25] (1) OCE, Contract Negotiation Manual (Rev), 15 Aug 44, vol. I, ch. II, sec 2–10, case C (6). (2) Truman Comm *Hearings*, Part 20, app., exhibit 867, p. 8435. (3) *ENR*, February 19, 1942, p. 1.

[26] (1) Incl, 24 Feb 42, with Memo, Groves for Amberg, 26 Feb 42. 333.1 (Cong Investigations). (2) Ltr, Gesler to Amberg, 18 Mar 42.

[27] Memo, Madigan for Amberg, 23 Feb 42. Madigan Files, AEM Data.

[28] Madigan Interv, 18 Jun 56.

posal is fallacious and unrealistic. . . . if a big job is broken up into little pieces for bidding purposes the economy of large-scale operations will be lost. Worst of all, the job will be chaos. Each individual contractor would, of necessity, carry out his part of the work to suit his own needs, not those of the entire project.

The *News-Record* concluded that "the only sensible way" to accomplish the program was under tested forms of contracts.[29] Another AEM opponent, who claimed to speak for "practically all the engineers both in the civil and military service of the War Department," put his case this way:

> The use of this contract in an emergency is basically unsound, it is cumbersome, . . . and virtually unworkable. . . . Any anticipated savings in either time or money under a makeshift contract set-up of this character could be found only in a fool's paradise, and the first to oppose the plan were the architect-engineer-managers themselves who were offered contracts on the basis described. The period of negotiation on one of the early contracts awarded under this plan was thirteen weeks and one day.[30]

Groves, after observing the workings of the AEM on wartime projects and comparing it with the construction-manager form, had this to say: "The AEM type of contract . . . combined the engineer with the contractor and this I never thought to be too sound, as it eliminated the necessary cross check, not only by the engineer but also by the construction manager; the latter was needed to insist upon designs more economical both in time and money."[31]

When, soon after the opposition surfaced, a young reporter from the *News-Record* came to Madigan's office seeking an interview, Madigan showed him the door. "No comment," he recalled saying, "and I don't want you coming in here." But after telling the cub how stupid he considered his boss' editorial, Madigan simmered down and talked. Big construction firms all subcontract, he explained. Otherwise, they could not carry the overhead. The best ones sublet to anyone who can do work cheaper than they themselves can do it. That, he said, was how the construction industry had been run for the last hundred years. The young man was converted.[32] His write-up in the 19 February issue was sympathetic to Madigan's point of view.[33] Three weeks later the editor of the influential trade journal modified his stand. At the time of the first editorial he had not understood that "a contractor or 'manager' " would be part of the AEM team. "The new architect-engineer-manager form of contract for Army construction, as worked out by M. J. Madigan," he now declared, " . . . is an instrument of great promise. . . . It is an ingenious plan and a constructive one." Furthermore, he concluded, "It must be made to work by all parties concerned, for there is no time now for further experimentation."[34]

The Engineers made most frequent use of the AEM setup on munitions projects. The Badger Ordnance Works at Baraboo, Wisconsin, furnished an example of how the contract worked. Mason & Hanger of New York, formerly contractors at the New River and Louisiana Ordnance Plants, began work under an AEM agreement in February

[29] *ENR*, January 1, 1942, p. 11.
[30] Incl, 28 Jan 42, with Memo, Madigan for Amberg, 23 Feb 42. Madigan Files, AEM Data.
[31] Groves Comments, XI, 4.
[32] Madigan Interv, 18 Jun 56.
[33] *ENR*, February 19, 1942, p. 1.
[34] *ENR*, March 12, 1942, p. 87.

1942. The Hercules Powder Company held the operating contract. Hercules prepared designs for all manufacturing units, comprising about 65 percent of the project; Mason & Hanger drew plans for the remaining facilities including warehouses, shops, roads, railroads, and utilities. Using the plans and specifications prepared by the architect-engineer-manager, the area engineer, Maj. Wayne O. Houck, let separate fixed-price contracts in amounts of $500,000 or less. Mason & Hanger built roads, temporary water and sewer facilities, power lines, shops, and warehouses and began construction of manufacturing units by force account. Moreover, they supervised all construction, furnished building materials for all work at the project, installed operating machinery, and maintained roads and utilities. The *Engineering News-Record* reported that close co-operation between Mason & Hanger, Hercules, and Major Houck had made for excellent progress at the Baraboo job.[35]

A shortage of contractors who, like Mason & Hanger, could act as combined architect-engineers, managers, and constructors prevented the Corps from using the agreement widely. A single organization familiar with large-scale engineering and construction operations could best carry out an AEM contract. Only such titans as the Austin Company, E. B. Badger, Fraser-Brace, the Chemical Construction Corporation, and DuPont could assume the entire responsibility of an AEM. Between them, these six concerns held nineteen AEM contracts totaling almost half a billion dollars. Additional architect-engineer-managers came from the ranks of seasoned joint venturers; for instance, General Robins combined H. K. Ferguson and the Oman Construction Company, firms that had worked together at the Wolf Creek plant and the Milan Ordnance Depot, for the Gulf Ordnance Plant. Most often the Construction Contract Board created management teams by "shotgun marriages" of reputable architect-engineers and constructors who had not previously acted in concert. This last expedient afforded the only means of obtaining architect-engineer-managers in any quantity. But since it entailed the risk of giving important projects to several contractors who might not be able to co-operate, the Engineers used it sparingly. Thus, while the AEM contract made work for some smaller units of industry, it afforded at best only a partial solution to the problem of maximum utilization.[36]

Fixed-fee contractors, including architect-engineer-managers, completed wartime projects costing more than $4.5 billion. At the peak of construction in 1942, 400 fixed-fee contracts accounted for almost one-quarter of the value of all contracts on the books; thereafter, the proportion of fixed-fee work declined steadily. Some 120 fixed-fee contracts were outstanding on 31 August 1943. Five months later, the number had dropped to approximately 80. As the volume of construction diminished and as expansion and alteration made up an increasing share of the program, the Engineers let only a negligible number

[35] (1) 635 (Badger OW) I. (2) H. W. Richardson, "How an AEM Contract Works," *ENR*, July 30, 1942, pp. 75–78.

[36] (1) OCE, Military Constr Contracts, Part II, sec 1. (2) Testimony of W. S. Broderick, Broderick and Gordon, 9 Jun 43. In Truman Comm *Hearings*, Part 20, pp. 8288–8291.

of new fixed-fee contracts. In January 1945, nine out of ten current fixed-fee contracts were supplements to original contracts of this type.[37]

Curtailment of fixed-fee contracting convinced congressional critics that it was entirely unnecessary. On 14 January 1943 Representative Louis L. Ludlow keynoted the renewed attack in a statement to the House. "There is no doubt," he said, "that millions upon millions of dollars can be saved by relegating that form of contract to oblivion, where it belongs."[38] The wave of opposition reached its crest on 21 September 1943, when Senator Homer Ferguson introduced a resolution to prohibit further use of the fixed-fee contract.[39]

While "recognizing the shortcomings of the cost-plus-a-fixed-fee contract," the Engineers wished to have the right to use whatever form of agreement would best serve the Army's needs.[40] So did Under Secretary Patterson. Commenting on the Ferguson resolution, he warned that "if use of the fixed-fee contract were substantially restricted, it would deprive us of necessary sources of war production or would require the making of fixed-price contracts on artificial and unsound bases."[41] The Navy Department and the Maritime Commission joined the fight against restrictive legislation.[42]

Senator Ferguson's resolution failed. Nevertheless, the ground swell of congressional opposition that culminated in his proposal helped to hasten the adoption of a more popular contracting system.

Modified Fixed-Price

The Corps of Engineers did a much larger proportion of emergency construction by fixed-price contracts than had the Quartermaster Corps—50 percent as opposed to 20.[43] According to Groves, "The primary reason for this was that higher level decisions were being made more promptly, and that, as the war proceeded, the construction organization became more accustomed to the problems they faced. The War Department was no longer feeling its way."[44] But the change was not owing to the War Department alone. Congress, by authorizing a new federal code for wartime contracts, removed many of the legal obstacles to fixed-price contracting.

Advance planning had been the first step toward a return to fixed-price contracts. Thanks to Somervell's foresight, The Quartermaster General could, at the time of the transfer, hand over to General Robins layouts for sixteen camps designed to house 629,000 men. The Engineers succeeded in letting all but one of these projects on a fixed-price

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[37] (1) OCE, Military Constr Contracts, Part II, sec 2. (2) Constr PR 56, 31 Aug 42, p. 296. (3) 161 Part 5. (4) Statement of USW Patterson, 7 Mar 44. In S Comm on Mil Affairs, 78th Cong, 2d sess, *Hearings* on S Joint Res 80, Part 9, p. 670. (5) Daily Log, Proc Div, Adm Br, OCE, 30 Jun 45. OCE, Proc Div, Daily Log.

[38] 89 *Cong. Rec.* A121.

[39] *S Joint Res 80*, 78th Cong, 1st sess.

[40] Draft of Ltr (prep by OCE) Stimson to Chairman Robert R. Reynolds, S Comm on Mil Affs, 19 Nov 43. 161 Part 5.

[41] Statement of USW Patterson, 7 Mar 44. In S Comm on Mil Affs, 78th Cong, 2d sess, *Hearings* on S Joint Res 80, Part 8, p. 671.

[42] S Comm on Mil Affs, 78th Cong, 2d sess, *Hearings* on S Joint Res 80, pp. 654–56.

[43] (1) OCE, Mil Constr Contracts, Part II, sec 2. (2) Constr Div, OQMG, Contracts Awarded or Approved, 12 Nov 41, XIII.

[44] Groves Second Draft Comments, XIX, 4.

basis. Encouraged by these results, Reybold recommended and Somervell approved a continuation of advance planning for camps and airfields. Projects advance planned by the Corps of Engineers and subsequently built under fixed-price contracts included Camps Ellis, McCain, Howze, and Van Dorn.[45] Attesting to the success of this method, General Reybold wrote: "Advance planning . . . has contributed in high degree to a reduction of the impact of the 1942 program on the national construction capacity."[46] As far as it went, this statement was true, Groves felt, but he differed sharply with Reybold on the fixed-price versus fixed-fee issue. "There is no question in my mind," he said, "but what these fixed-price jobs were more expensive in many instances than would have been fixed-fee work. Many disadvantages of fixed-price work are not easily apparent to those . . . not responsible for performance. They were very apparent to me throughout the whole progress of the work."[47]

Plans alone did not assure a fixed-price agreement. The Engineers also had to find contractors able and willing to do the work for a reasonable sum, and in this they encountered increasing difficulty. From experience they knew that a single contract offered the "greatest speed in construction and ease of administration."[48] But by 1942 most individual firms or experienced combinations capable of handling entire projects were swamped with work. Reduced competition among the remaining ones accelerated the already pronounced trend toward excessive bids. Moreover, many contractors quite capable of tackling $5-million jobs lacked the capital and experience for $25-million single contracts.[49]

Seeking both to stimulate competition and to bring more construction firms into the program, Robins and Groves began to break large projects into smaller bidding units or "increments." These breakdowns might follow one of two patterns. The first, used to some extent by Somervell in 1941, split a project into subprojects according to the character of work involved—buildings, utilities, grading, and so forth. The second divided it geographically; each bid included all the work in an area, with the possible exception of utilities. The first kind of breakdown enabled the government to employ experts in various fields of construction, to use unit price more extensively, and, thus, to save money. It nevertheless proved too slow for urgent projects.[50] "The potentialities for interference between various subcontractors are enormous," Colonel Groves observed.[51] The area breakdown, while more expensive, proved faster and therefore more satisfactory in wartime.

During the first two months of the war, General Robins let the field decide in each case whether it was "more ad-

[45] (1) Constr PR's 47 and 51, 15 Mar and 30 Apr 42. (2) Ltr, Somervell to Arnold, 13 Jun 42. 686 (Airfields) Part 56. (3) WD Ltr AG 601.1 (12-13-41) MC-D to TQMG, 15 Dec 41. 652 II. (4) OCE, Mil Constr Contracts, Part II, sec. 2.

[46] Memo, Reybold for Somervell, 9 Jul 42. 600.1 Part 13.

[47] Groves Comments, XI, 6-7.

[48] Memo, Reybold for Somervell, 9 Jul 42. 600.1 Part 13.

[49] Ltr, Leavey to SWD, 20 Dec 41. 652 (Camp Swift).

[50] (1) Memo, Div Engr, SAD, for Robins, 15 Dec 41. 652 (SAD). (2) Ltr, Leavey to Div Engr, SAD, 22 Dec 41. 652 (Camp Rucker) I.

[51] Memo, Groves for Robins, 20 Dec 41. 652 (SAD).

visable to advertise the project as a single unit or to break it up into its component parts."[52] Those who chose the first course had trouble obtaining even the feeblest competition. To illustrate, two combinations bid on Camp Gruber, Oklahoma. The low bid exceeded the Engineer estimate of $24 million by $4 million, and the high, by $10 million. Breakdowns, on the other hand, produced a fairly large number of bids and more reasonable prices. Therefore, on 11 February 1942, General Robins told the field to split up all sizable cantonment projects and permit contractors to bid on as many increments as they wished. By making the ceiling on increments identical with the divisions' $5-million contracting authority, he further decentralized awards. Robins' order brought more contractors into the camp-cantonment program.[53]

Even when plans were available and bids were incremental, standard fixed-price contracts were too slow, inflexible, and risky for a period of emergency. With the declaration of war, prospects for ordinary fixed-price bids had turned from bad to worse. Dresser estimated that contingency items accounted for 25–33 percent of bid prices in the first quarter of 1942.[54] More than ever, contractors feared unexpected delays that might make them liable for damages and unanticipated costs that might put them in the red. Some worried about uninsured losses from enemy attack.

Every change produced by the war effort makes the continuation of normal methods of construction more difficult and more nearly impossible [Groves noted in February 1942]. In the matter of procurement alone, the steady increase in the number of materials which are difficult to obtain and the steadily increasing number of items whose distribution must be controlled by the Government makes contract work today . . . a very different operation from that to which the country and the industry have been accustomed in the past.[55]

These obstacles might have proved insuperable had Congress not passed the War Powers Act of December 18, 1941, under which the President could authorize any government department to make, modify, or amend contracts "without regard to the provisions of the law" when "such action would facilitate the prosecution of the war." Congress placed but two limitations on the powers of the President; it prohibited percentage contracts and forbade violation of the laws regulating profits.[56] On 27 December 1941, Roosevelt delegated his authority under the act to Secretary Stimson.[57] To induce contractors to take fixed-price jobs, the government had to assure them that if they did not make a profit they would at least break even. War Powers legislation enabled the Engineers to offer this assurance.

Immediately after Pearl Harbor, field offices in areas of possible enemy attack had trouble obtaining satisfactory bids. Banks and other lending institutions refused to stake contractors in potential danger zones. Subcontractors and suppliers were hesitant about dealing with fixed-price contractors. The few firms

[52] Ltr, Leavey to SAD, 20 Dec 41. 652 (Camp Pickett).

[53] (1) 652 (Camp Gruber) I. (2) 685 (Camp Atterbury). (3) TWX, OCE to NPD, 11 Feb 42. 652 (Portland DO).

[54] (1) Smith, *The Army and Economic Mobilization*, pp. 287–88. (2) Dresser Interv, 2 Apr 57.

[55] Memo, Groves for Amberg, 26 Feb 42. 333.1 Cong Investigations Folder: General Rpt of Improvements on Constr Procedures.

[56] 55 *Stat.* 839.

[57] OCE Circ Ltr 1048, 12 Jan 42, and Incl, 30 Dec 41.

that did compete for prime contracts included enormous contingency items in their bids. The cause of this predicament was unmistakable: destruction by the enemy was a noninsurable risk, and fixed-price agreements, unlike fixed-fee, gave contractors no protection against uninsured losses. In the War Powers authority to modify contracts, General Reybold found a means of reassuring bidders. His adoption of a fixed-price clause guaranteeing reimbursement for enemy-inflicted damages permitted contractors to resume their normal relationships with creditors and subcontractors and to lower their bids. The clause served until March 1942, when Congress set up the War Damage Corporation, with which contractors could insure themselves against loss or damage resulting from enemy operations.[58]

The Chief soon turned the War Powers authority to a broader purpose—that of suspending penalties for delayed performance. Contractors beset by priorities regulations, transportation tie-ups, and labor shortages despaired of meeting completion dates. Yet their contracts made them liable for liquidated damages, an amount assessed for each day of delay in lieu of actual damages, as required by law. Seeking to remove his contractors from this untenable position, Reybold on 9 July 1942 deleted the liquidated damages provision from all construction contracts.[59] This proved to be only a half-measure, for by well-established principles of law, a contractor who failed to finish on time was liable for damages even though his contract was silent on the point.[60]

By extending contractors' performance time, Reybold gave them more positive relief. Extensions had previously been possible under the Delays-Damages clause, which permitted the contracting officer to grant additional time when delays resulted from "unforeseeable causes beyond the control and without the fault or negligence of the contractor."[61] The somewhat ambiguous language of this provision might rob a contractor of an extension to which he was, in all fairness, entitled. Besides, it led to endless squabbles with the General Accounting Office. To eliminate any question of legality and to cut through administrative red tape, Reybold decided to bypass the Delays-Damages provision and grant extensions pursuant to the War Powers Act, amending contracts to extend performance time whenever a contractor had "attempted, in good faith, to complete his War contract within the time specified."[62] Some Engineers felt his policy was too liberal.[63] Be that as it may, generous use of War Powers extensions lightened administrative work and won greater co-operation from industry.

Just as the War Powers Act made possible extensions of time, so it opened a way to correct mistakes that crept into hurriedly written agreements—mistakes

[58] (1) Ltr, Reybold to Representative R. E. Thomason, 31 Dec 41. 600.1 Part 11. (2) Memo, Reybold for Somervell, 16 Jun 42. 161 I. (3) TWX, OCE to Div Engrs, 2 Jan 42. 3820 (Natl Def) Part 12. (4) 56 *Stat.* 175. (5) OCE Circ Ltr 1962, 19 Aug 42.

[59] OCE Circ Ltr 1805, 9 Jul 42.

[60] OCE Circ Ltr 2347, 1 Apr 43.

[61] U.S. Standard Form 23, Art 9, 14 Sep 40 (Rev.), sub: Contract (Constr).

[62] Lt. Col. Josef Diamond, Comments on Contracts and Claims, 28 Mar 44. 616 Part 6. Cited hereinafter as Diamond, Contracts and Claims.

[63] Ltr, MRC to Dist Engrs at Memphis, Vicksburg, and New Orleans, 13 Apr 45. 161 (LMVD).

that ofttimes meant the difference between profit and loss. Before the war, the General Accounting Office had authority to remedy mutual mistakes or those made by the government, but neither the Comptroller General nor the courts could cancel out a contractor's error. After passage of the War Powers Act, the War Department could amend contracts "to correct not only mutual mistakes, but also unilateral mistakes, that is, mistakes made by the contractor alone." The Engineers made frequent use of this authority to release contractors from erroneous bids and to avoid involved dealings with the General Accounting Office.[64]

The War Powers authority also enabled the Engineers to subsidize contractors who were in financial trouble. Caught between rising costs and his commitment to perform at a fixed price, a contractor might do one of two things: default or risk bankruptcy. Either course was bad from the government's point of view. The first interrupted construction and the second reduced the already scant supply of builders. As a matter of self-interest, the Engineers adjusted contract prices upward whenever losses threatened. At worst, contractors came out even.[65]

An important result of the War Powers Act was a lump sum contract that approached the fixed-fee in flexibility and absence of risk but did not come under the law that held fixed-fee profits to 6 percent. More liberal provisions induced more contractors to accept military jobs and carry them through. New companies and marginal producers, too inexperienced for fixed-fee work and too weak for regular fixed-price contracts, entered the field. Default became a thing of the past. Reduced contingency items reflected the extent to which the Army assumed contracting risks. More costly than its prototype, the new agreement nevertheless supplied incentives that brought the building industry to peak production. It also helped to mollify critics of cost-plus-a-fixed-fee contracts.

Competition and Negotiation

If the Engineers wished to allay hardships, they also wished to hold down contract prices. The question was how to do it. General Robins sought the answer in a continuation of the quasi-competitive system of award used during the defense period. On 5 January 1942 he announced that the Corps would open fixed-price contracts to public competition "unless to do so would jeopardize the interest of the United States." Award would ordinarily go to the lowest qualified bidder; but if no bid was reasonable, negotiators would go to work. When haste precluded public advertisement, the Corps would solicit bids from a number of prequalified firms and negotiate with the low bidder.[66]

Two months after Robins' announcement, the War Production Board prescribed a different procedure. On 2 March 1942 Donald Nelson discarded formal advertisement in favor of negotiation. Emphasizing the need for speed

[64] Diamond, Contracts and Claims.

[65] (1) *Ibid.* (2) Testimony of Gen Somervell, 22 Jun 43. In S Comm on Appns, 78th Cong, 1st sess, *Hearings on Military Establishment Appropriation Bill for 1944*, p. 33.

[66] OCE, Memo for the Information of Architect-Engineers and Contractors, 5 Jan 42. EHD Files.

and selectivity, he asked negotiators to apply the following principles:

> Primary emphasis shall be upon securing delivery in the time required by the war program.
>
> Contracts shall be placed so as to conserve, for the more difficult war production problems, the facilities of concerns best able, by reason of engineering, managerial, and physical resources, to handle them.
>
> Contracts shall be placed with concerns needing to acquire the least amounts of additional machinery and equipment for performance of the contracts.

Consideration of price came last. "Where consistent with the required speed," they were to solicit informal quotations and give preference to low offerers.[67]

Nelson made this radical departure from traditional government procedure for two reasons. First, he believed that "the right price was far less important than speeding up production." Negotiation offered a means not only of expediting awards but also of choosing fast performers. Second, the wartime program required the services of virtually all contractors, including high-cost producers. Competitive conditions permitted the most efficient firms to undercut the rest and take whatever jobs they wanted. Negotiation, on the other hand, enabled the government to allocate contractors according to the size, complexity, and importance of the job, and thus to save the best firms for the most exacting work.[68]

The Engineers refused to accept mandatory negotiation of construction contracts as a necessary measure. They preferred to let contracting officers choose the method of award that seemed best in each case. Robins at first disregarded Nelson's order, assuming that it applied only to supply contracts, but, on 9 April 1942, Somervell directed that construction, too, would henceforth be negotiated.[69] At the outset, the Engineers thought Somervell's directive a mistake, and they continued to think so. Colonel Kelton expressed the general attitude of Engineer officers in 1944, when he stated: "Headquarters, Army Service Forces, . . . has always been impressed primarily with considerations affecting supply. . . . The result is not always happy because construction often has peculiar circumstances and conditions which render the application of Procurement Regulations, drafted with prime consideration of supply, inapplicable or contrary to the Government interest."[70]

Reluctantly, the Engineers suspended formal advertisement and substituted a system of competitive negotiation, under which they solicited quotations from lists of selected bidders, whose qualifications they had checked beforehand. As many as thirty or thirty-five got invitations to bid. Others who could qualify were admitted upon request. In order to protect the government during negotiations, contracting officers opened the bids privately instead of publicly as before. While the low bidder usually had the inside track, if he was overloaded or

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[67] 7 *F.R.* 1732 (4 March 1942).

[68] Nelson, *Arsenal of Democracy*, pp. 368–69. Copyright 1946 by Harcourt Brace Jovanovich, Inc.

[69] (1) Ltr, Constr Div to M. E. Greenberg Co., Minneapolis, Minn., 7 Mar 42. 163 Airfields. (2) Ltr, Itschner to CAA, 11 Nov 42. 161 (Airfields) Part 1. (3) SOS, PB General Directive 34, 9 Apr 42. OCE, Legal Div Lib, "Directives 1942."

[70] Ltr, Kelton to Reybold, 23 Mar 44. 161 (PD) Part 2.

needed for a tougher job, the Engineers might bargain with another firm.[71]

Suspension of formal advertisement had an immediate effect on bonding policies. Before the emergency, the law required government contractors to furnish bid, performance, and payment bonds.[72] These bonds provided a check on irresponsible bidders, protected the United States against default, and guaranteed payment of contractors' obligations. Contractors passed the expense of bonding on to the government in their contract prices. As early as April 1941, Congress sanctioned the waiver of bonds on fixed-price contracts.[73] As long as open competitive bidding was the rule, Patterson refused to exercise this authority but the negotiation order reversed his attitude. Bid bonds had no application outside the competitive system, and careful prenegotiation checks of contractors' qualifications reduced the need for performance and payment bonds. On 28 May 1942, Somervell directed the chiefs of supply services to waive performance and payment bonds when the contractor was "capable and experienced" and financially sound.[74] Accordingly, General Reybold told divisions and districts to discontinue bid bonds entirely and to waive performance and payment bonds where such action would facilitate the war effort. Waiver made possible savings in time, money, and administrative effort and paved the way for use of small firms unable to meet requirements of surety companies. Bonds became the exception rather than the rule.[75]

Mandatory negotiation roused fierce opposition, and one of the earliest attacks centered on the new bonding policy. A riot of protest greeted the announcement that bonds would be waived. Surety companies, whose business was mainly with government contractors, petitioned for reinstatement of bonding requirements. They questioned if the Army could assess contractors' financial responsibility as well as experienced underwriters, and they recommended bonding as the best means of weeding out contractors who might default. More objections came from materialmen and equipment dealers, who for many years had depended on bonding companies to establish their customers' credit. Prevented by ceiling prices from recouping losses on one transaction by higher profits on another, they refused to supply contractors not covered by payment bonds.[76] Faced with a boycott, Somervell on 28 August 1942 modified his earlier directive by instructing the services to require payment bonds except from blue-chip companies.[77] But not until the construction program was almost over did the Army reinstate the requirement for performance bonds.[78]

More formidable opposition to negotiation soon developed. Under the old system of public advertisement, contractors obtained most of their informa-

[71] (1) OCE Circ Ltr 1559, 4 May 42. (2) Ltr, Reybold to Pres., MRC, 15 May 45. 161 (MRC) Part 1.

[72] (1) 20 *Stat.* 36. (2) 22 *Stat.* 487. (3) 49 *Stat.* 793.

[73] 55 *Stat.* 147.

[74] SOS, PR 19-T, May 28, 1942.

[75] OCE Circ Ltr 1786, 4 Jul 42.

[76] (1) Ltr, Dist Engr, Atlanta, Ga., to the Div Engr, SAD, 10 Aug 42, and 1st Ind, SAD to OCE, 13 Aug 42. 188 (Atlanta DO) Part 1. (2) Resolution, Building Material Dealers' Credit Assoc., Portland, Ore., 5 Aug 42. 168 (Portland DO).

[77] (1) TWX, OCE to SAD, 10 Sep 42. 168 (Atlanta DO) Part 1. (2) OCE Circ Ltr 2046, 19 Sep 42.

[78] Diamond, Contracts and Claims.

tion on job possibilities from notices in trade journals and from plan rooms operated by the AGC and construction news services; public openings guaranteed impartial award and gave contractors an opportunity to compare their quotations with competitors'. Mandatory negotiation stopped federal advertising and made plan rooms unnecessary as a means of government contact with prospective contractors. General Reybold pointed out that "a public bid opening would seriously hamper, if not entirely defeat, whatever opportunity the contracting officer might have . . . to reach a fair price with the apparent low offerer."[79] Thus, the wartime system of award cut contractors off from information they considered essential to the conduct of their business and deprived trade publications of a major source of revenue.[80]

The AGC and the trade press campaigned against this threat to their common interests. Construction journals ran articles implying that the Corps juggled proposals in order to give contracts to favored firms. Local AGC chapters pressed district engineers to relax the secrecy surrounding negotiations and asked Congressmen to intervene. The 1943 AGC convention adopted a resolution favoring a return to open competitive bidding and petitioned Nelson to withdraw his order. This situation not only subjected the Engineers to unfavorable publicity, but it also hurt their relations with the construction industry.[81]

Expressing a desire to go along with the industry, Robins promised to resume public competition "as soon as the conditions permit." But, he explained, "Under War Production Board Regulations . . . we cannot go into formal advertising."[82] Throughout the Corps, pressure was mounting in favor of a change. By 1944, many felt that mandatory negotiation was indefensible. Robins' special assistant, Douglas I. McKay, summed up the case for a change:

> The time has come to revert generally to formality in respect to the opening of bids. . . . Else, bidders will be discouraged, and their responsiveness to our invitations will decline. Also, it will be increasingly difficult to know or gage the fair market value of work awarded . . . and finally, I believe that public reaction to continuance of the informal system of quoting (where it can be avoided without substantial and obvious detriment to the Government's interests) will be adverse and will lead to suspicions of impropriety or worse no matter how unjust those suspicions may actually be.[83]

Toward the end of March 1944, although Nelson's order was still in force, General Robins summoned division en-

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[79] (1) Ltr, Reybold to Senator David I. Walsh, 11 Jul 45. 163 Part 15.

[80] (1) Ltr, Memphis Chapter, AGC, Memphis, Tenn., to Representative Clifford Davis, 25 Mar 44. 161 Part 6. (2) Memo, Antes for Robins, 24 Mar 44. 163 (NED). (3) Memo, Reybold for Somervell, 20 Jul 45. 163 Part 15.

[81] (1) Ltr, Constr Div, OCE, to Div Engr, UMVD, 21 Aug 42. 333.1 (St. Louis DO). (2) Memo, Antes for Kuldell, 24 Mar 44. 163 (NED). (3) Notice, Ark. Chapter, AGC, Little Rock, Ark., to Members and Assoc Members of Chapter, 11 Jun 45. 163 Part 15. (4) Ltr, Memphis Chapter, AGC, Memphis, Tenn., to Rep Clifford Davis, 25 Mar 44. 161 Part 6. (5) Memo, Adm Div, OCE, for Chief, Purchases Div, ASF, 27 Jul 43. 161 Part 4.

[82] Robins' Testimony, 7 Jun 42. In H Comm on Appns, 78th Cong, 1st sess, *Hearings on Military Establishment Appropriation Bill for 1944*, p. 332.

[83] Memo, McKay for Robins, 27 Mar 44. 163 (NED).

gineers to Washington for consultation. The result was a decision to discontinue the procedures that had caused so much complaint and ill-will. Robins directed the field to resume formal openings and to award "consistently to the lowest responsible bidder."[84] Formal advertisement was still forbidden, but plan rooms began to operate freely again. Contractors easily obtained advance notice of new jobs, and since the Engineers permitted any qualified firm to bid, selective lists became more or less meaningless. Thus, the Corps to all intents and purposes reverted to open competitive bidding.[85]

This system operated to the satisfaction of both Engineers and industry for more than a year. Then, in May 1945, WPB reissued its original directive, which, in fact, it had never rescinded, and Nelson insisted that the Engineers comply. Forced to repudiate previous instructions to the field, General Reybold hastily issued a "reaffirmation" of Nelson's principles to the districts and divisions. Furnishing information to plan rooms stopped, and private openings resumed. Reybold publicly justified this move as a war measure, but his statements did not go over with contractors, who had openly competed for construction work during 14 months of war.[86]

Industry bitterly opposed this latest attempt to enforce Nelson's negotiation order. Trade unions and associations of suppliers joined contractors in a feverish campaign. *Dodge Reports* urged subscribers to write their Congressmen. Petitions, resolutions, and letters of protest flooded the Capitol and the Pentagon.[87] The labor press heaped abuse on the Engineers. One hostile paper accused the Corps of holding "star chamber sessions" to consider bids and thereby opening "the door to all sorts of chicanery and manipulation."[88] Alarmed, General Reybold on 20 July informed Somervell that the Engineers had to reverse course. Somervell raised no objection. New instructions to the field restored public openings and made plans available to any interested party.[89] Thus, by the end of the war, the Corps had, with the one exception of public advertisement, already reinstituted peacetime methods of award.

Renegotiation

Critical shortages, inflationary pressures, crash schedules, and all-out production—under such circumstances neither competition nor negotiation could be wholly effective. Agreements, whether fixed-fee or fixed-price, had to take into account the same emergency conditions. Irrespective of contract forms and methods of award, the price of war work ran high. The fifteen billion dollars expended by the War Department for defense and war construction had two

[84] Ltr, Robins to Div Engrs, 28 Mar 44. OCE, Proc Div Files.

[85] (1) Ltr, Reybold to Pres, MRC, 15 May 45. 161 (MRC) Part 1. (2) Ltr, Dallas Chapter, AGC to Robins, 6 Jun 45. 163 Part 15. (3) Ltr, Dist Engr, Little Rock, Ark., to Reybold, 4 Jun 45. 161 (Little Rock DO).

[86] (1) 10 *F. R.* 5512 (12 May 1945). (2) Ltr, Reybold to Pres, MRC, 15 May 45. 161 (MRC) Part 1. (3) Ltr, Reybold to Div Engrs, 8 Jun 45. 161 Part 9.

[87] 163 Part 15.

[88] Incl, with Ltr, Paul Smith Constr Co, Tampa, Fla., to Reybold, 17 Jul 45. 163 Part 15.

[89] (1) Memo, Reybold for Bragdon, 20 Aug 45. 163 Part 15. (2) Memo, Reybold for Somervell, 20 Jul 45. 163 Part 15. (3) Ltr, Reybold to Div Engrs, 21 Jul 45. OCE, Proc Div Files.

components—profit and cost. Cost was by far the more important from a budgetary standpoint. Nevertheless, throughout the war public attention focused on profits.

The problem was not new. Virtually every war in history had had its profiteers, and the most recent, World War I, had produced its crop of war millionaires. From time to time since the 1918 Armistice, Congress had considered the question of war profits. The munitions industry investigations of the 1930's gave rise to sentiment in favor of taking the profit out of war. Efforts to restrict earnings on military contracts resulted in the Vinson-Trammell Act of 1934, which limited profits on naval vessels and aircraft to 10 percent of the contract price, and in the Act of April 3, 1939, which extended the Vinson-Trammell law to army aircraft. With the defense program, Congress set profit ceilings for various types of contracts, including those already covered and fixed-fee construction agreements. Passage of the excess profits tax on 8 October 1940, however, was its first move toward uniform control of emergency profits.[90]

After Pearl Harbor the problem assumed more serious proportions as wartime demands broadened opportunities for unconscionable gains. The War Department began to study ways of limiting contractual earnings. Under Secretary Patterson thought the ideal solution lay in close pricing, but unpredictable costs made this almost impossible. Early in 1942 the Engineers pioneered in profit control, by experimenting with renegotiation clauses. Upon the organization of the Services of Supply in March, General Somervell set up a cost analysis section to look into earnings by war contractors.[91]

Meanwhile, Congress was talking of tighter limitations. Several bills to restrict contractual earnings failed during the winter of 1941–42. Stimson, Somervell, and Robins opposed these measures, maintaining that the excess profits tax gave the government ample protection and that any further limitation on profits would make contractors less willing to accept work.[92] Representative Francis Case finally forced the issue when, on 28 March 1942, he succeeded in amending an appropriation bill to include a flat 6-percent limitation on contractual profits.[93] Opposing this measure as unworkable and unwise, the War and Navy Departments pointed out that a flat 6-percent limitation was grossly unfair—6 percent on a $50,000,000 contract was a handsome profit, while the same percentage on a $100,000 job was peanuts; and they questioned if there were enough accountants in the country to check profits on all federal contracts. Underlying their objections was the belief that statutory limitation of profits was

[90] (1) Robert P. Patterson, "Renegotiation," *Dun's Review*, January 1943, p. 8. (2) 48 *Stat.* 505. (3) 53 *Stat.* 560. (4) 54 *Stat.* 677. (5) 54 *Stat.* 1003. (6) Smith, *The Army and Economic Mobilization*, p. 351.

[91] (1) Patterson's Testimony, 19 Mar 42. In H Comm on Naval Affs, 77th Cong, 2d sess, *Hearings on Profits on Naval Contracts*, pp. 2479–82. (2) Memo, SOS for Reybold, 3 Jul 42. 161 Part 1. (3) Memo, OCE for SOS, 19 May 42. 600.93 (Airfields) Part 5. (4) Somervell's Testimony, 31 Mar 42. In S Comm on Appns, 77th Cong, 2d sess, *Hearings on Sixth Supplemental National Defense Appropriation Bill for 1942*, pp. 24–25.

[92] (1) QM 600.1 (Contracts–Misc) IV. (2) Memo, Somervell for Stimson, 24 Oct 41. QM 161 1941. (3) Ltr, Stimson to Chairman, H Ways and Means Comm, 19 Jan 42. 161 I.

[93] S Subcomm of the Comm on Appns, 77th Cong, 2d sess, *Hearings* on H R 6868, Part 2, p. 22.

penny-wise and pound-foolish.[94] As Navy Under Secretary Forrestal explained, because the government relied on the profit motive to promote efficiency, unnecessary costs would "be even more harmful than undue profits."[95] Despite these arguments, Congress insisted on a safeguard "to prevent the home front from becoming a happy hunting ground for war profiteers."[96] The Senate Appropriations Committee, with help of the Army, Navy, Maritime Commission, and WPB, hastily worked out a compromise measure, providing for renegotiation of war contracts.[97]

The first Renegotiation Act, approved on 28 April 1942, directed the Secretaries of War and Navy and the Chairman of the Maritime Commission to insert a renegotiation clause in all contracts and subcontracts amounting to $100,000 or more and to recover excessive profits by one or a combination of the following methods: reducing the contract price, withholding payments due the contractor, or requiring the contractor to make restitution. The act provided for renegotiation of each individual contract and thus gave contractors no opportunity to recoup losses on one contract by high profits on another. With official prompting, Congress on 21 October 1942 amended the renegotiation law. All firms whose government contracts totaled $100,000 during a fiscal year became liable for renegotiation. The revised legislation made possible renegotiation on an overall basis, that is, on the basis of the contractor's net earnings on all federal business during one fiscal year. Congress further authorized government agencies to exempt contracts from renegotiation if provisions were otherwise adequate to prevent excessive profits.[98]

The Renegotiation Act made possible two methods of limiting profits. The more obvious one was to recapture profits already earned. The other, close pricing, impressed contracting agencies as the more important and, in light of the excess profits tax, as the chief justification for the act.[99] Renegotiation placed the government in a stronger bargaining position at the time of original negotiations and made contractors more willing to adjust their prices downward during performance. The Engineers adopted the policy that, whenever possible, "excessive profits should be eliminated through price reductions rather than by subsequent refunds after they . . . had been realized."[100] But in actual practice, recapture proved more feasible than close pricing. "Through force of circumstances," Patterson explained in mid-1943, "we do not get around to deal with contractors until after the profits have been realized."[101]

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[94] (1) Patterson's Testimony, 19 Mar 42. In H Comm on Naval Affs, 77th Cong, 2d sess, *Hearings to Permit the Performance of Essential Labor on Naval Contracts*, pp. 2474–75. (2) Knox' Testimony, 13 Apr 42. In H Comm on Naval Affs, 77th Cong, 2d sess, *Hearings on Sundry Legislation Affecting the Naval Establishment 1942*, pp. 2991–92.

[95] (1) Forrestal's Testimony, 19 Mar 42. In H Comm on Naval Affs, 77th Cong, 2d sess, *Hearings on Sundry Legislation Affecting the Naval Establishment 1942*, p. 2495.

[96] H Comm on Naval Affs, 78th Cong, 1st sess, *Hearings* on H R 30, II, p. 404.

[97] Testimony of Representative Francis Case, 3 Apr 42. In S Comm on Appns, 77th Cong, 2d sess, *Hearings* on H R 6868, Part 2, pp. 211–12.

[98] (1) 56 *Stat.* 245. (2) 56 *Stat.* 982. (3) Smith, *The Army and Economic Mobilization*, pp. 354–56.

[99] Miller, *Pricing of Military Procurements*, p. 174.

[100] OCE Circ Ltr 2678, 13 Jan 44.

[101] Patterson's Testimony, 29 Jun 43. In H Comm on Naval Affs, 78th Cong, 1st sess, *Hearings* on H Res 30, V, p. 908.

Renegotiation proceedings might follow one of three patterns: renegotiating contractors on an overall basis; considering several contracts as a group; or considering contracts individually. The War, Navy, and Treasury Departments and the Maritime Commission agreed to use a company's overall federal business for a given fiscal year as the basis of renegotiation and to assign each company to the department for which it had done the most work.[102] Patterson adopted a slightly different procedure for certain construction and architect-engineer contracts. When most of a company's war work was "covered by a few individual contracts," and if this company had no business with other government departments, the Under Secretary permitted the Engineers to renegotiate single contracts or to treat several as a unit.[103] He made a second exception of joint venture contracts, directing Reybold to consider them as units rather than as parts of the overall business of the participating firms.[104] As it turned out, the Corps renegotiated construction agreements mostly on individual-contract and joint venture- or group-contract bases.[105]

Three days before the passage of the first renegotiation act, Patterson organized the War Department Price Adjustment Board, with Maurice Karker as chairman. On 30 June 1942 the Under Secretary designated the board as the co-ordinating agency for War Department renegotiation and assigned it these duties: establishing policies and procedures; assigning cases to the supply services for renegotiation; reviewing renegotiation settlements; and, in some instances, conducting renegotiation itself. The main work of renegotiation he delegated to the supply services.[106] On 3 July 1942, Somervell told Reybold to establish "such Price Adjustment Sections as may be necessary to renegotiate contracts with such contractors and subcontractors as may be assigned . . . by the War Department Price Adjustment Board."[107]

The Chief created two Price Adjustment Boards, one for supply and one for construction and architect-engineering. He called upon veteran negotiator Harry W. Loving to head the latter group. He also set up a Cost Analysis Section in the Administrative Division to supply the boards with the "factual basis for conducting renegotiation."[108] When it appeared that the Engineers would have more construction cases than the Washington office could handle, General Robins decentralized part of the work. Formation of a Price Adjustment Board in each division during October 1942 completed the Corps renegotiation structure.[109]

To acquaint contractors with renegotiation, Loving scheduled meetings in

[102] *Joint Statement by the War, Navy, and Treasury Departments and the Maritime Commission: Principles, Policies, and Interpretations under Section 403 of the Sixth Supplemental National Defense Appropriation Act, 1942* (Washington, 31 Mar 42), p. 7. Cited hereinafter as *Joint Statement WD, ND, TD, and MC.*

[103] Memo, SOS for Reybold, 16 Sep 42. 161 Part 1.

[104] Memo, Patterson for Reybold, 8 Aug 42. 161 Part 1.

[105] Memo, Loving for WDPAB, 26 Apr 44. 161 Part 6.

[106] Memo, Patterson for Somervell, 30 Jun 42. 161 Part 1.

[107] Memo, Somervell for Reybold, 3 Jul 42. 020 (PAB).

[108] (1) OCE Circ Ltr 1927, 10 Aug 42. (2) WD Press Release, 11 Aug 42.

[109] (1) Ltr, Robins to MRD, 21 Aug 42. 167 (MRD). (2) OCE, Circ Ltr 2039, 10 Oct 42.

San Francisco, Dallas, Atlanta, Chicago, New York, and other cities where Robins had established Division Price Adjustment Boards. Division engineers issued public invitations, and local chapters of the AGC and AIA notified their members. Attendance, Loving estimated, "ranged from about 250 to more than 600 contractors, architects, engineers, and supply contractors who evidenced considerable interest in this controversial legislation." Commenting on the value of these get-togethers, he wrote:

> At each meeting I attempted to explain the reason for the legislation and general provisions of the Renegotiation Law and principles to be followed . . . in our dealings with firms or individuals assigned to the Chief of Engineers for statutory renegotiation. . . . In my opinion these meetings tended to dispel the fear of contractors and resulted in a greater degree of cooperation than might have resulted had we not attempted to explain the law and our philosophy and manner in which we would administer the law.[110]

Neither Loving nor anyone else could overcome industry's opposition to the renegotiation statute, which most contractors regarded as a scheme to strip them of their earnings and to leave them practically broke. But Loving was able to offer assurance that the Corps would make every effort to be fair.[111]

The Army's price adjustment organization worked from the top down. The services reported cases showing or likely to show excessive profits to Chairman Karker of the War Department Price Adjustment Board. Karker checked to see if the company in question had held contracts with other government departments. If it had, the War Department Board, in co-operation with similar boards in the other departments, decided which agency had primary interest in the case. Karker turned each case assigned to the Army over to the service with which the contractor had done the largest volume of business, or in the case of construction contracts to the Corps of Engineers. At first, the Loving Board handled larger and more complicated cases, and referred simpler ones, those to be renegotiated on an individual contract basis, to the divisions. But as time went on, Loving began giving many of the tougher overall renegotiations to the divisions as well.[112] "As a matter of fact," he pointed out, "at the height of the program, we assigned many cases to Division Price Adjustment Boards without knowing at the time the assignment was made whether the contractor would be renegotiated on an individual contract or overall basis."[113] More and more of the work load shifted to the field. Before long the divisions were renegotiating 90 percent of the cases assigned to the Engineers.[114]

All Engineer Price Adjustment Boards followed the same general procedure. A contractor selected for renegotiation had to turn in balance sheets dating back a number of years. If his figures seemed questionable, his accounts received a de-

[110] Comments of Harry W. Loving on MS, 1955. Cited hereinafter as Loving Comments.

[111] (1) Interv with Herbert E. Foreman, 26 Jan 62. (2) Speech by H. W. Loving at Adolphus Hotel, Dallas, Tex., 14 Dec 42. Loving Papers.

[112] (1) Memo, Constr Div, OCE, for WDPAB, 10 Aug 42. 161 Part 1. (2) Pamphlet, WDPAB (Rev.), 20 Nov 42, sub: Principles, Policy, and Procedure to be Followed in Renegotiation. EHD Files. (3) OCE Circ Ltr 2089, 10 Oct 42.

[113] Loving Comments.

[114] (1) Memo, Loving for Reybold, 5 May 43. 161 Part 3. (2) Ltr, Reybold to GLD, 10 Sep 43. 161 (GLD) Part 1.

tailed audit. Company records plus information gleaned from other sources guided the Engineers in arriving at a tentative basis of settlement. When a board found no evidence of excessive profits, it dropped the case; otherwise, it called the contractor into conference. Two or three meetings usually produced a voluntary settlement, but when a contractor balked, the board set the amount he had to refund by unilateral decision. The Engineers might force recalcitrant contractors to relinquish excessive profits by withholding payments still due them. Settlements concluded on a group or individual contract basis went to Reybold for approval; those involving overall profits, to Patterson.[115]

Renegotiation went slowly at first. By May 1943, the Engineers had settled less than 20 percent of the cases assigned to them; and to make matters worse, assignments more than doubled during June. Renegotiation gained momentum throughout the summer, but efforts to eliminate the staggering backlog failed. A number of factors contributed to the lag in price adjustment work. The Engineers could not obtain enough qualified personnel; untried procedures frequently proved inadequate or unduly complicated; contractors often refused to co-operate; and the Karker Board failed to furnish criteria for construction contracts.[116] In time, Loving and his associates developed workable rules and published a renegotiation manual.[117] Congress at length adopted legislation which smoothed away other difficulties. But some troubles disappeared only when the volume of construction declined and fewer renegotiation cases clogged the price adjustment system.

Perhaps the most persistent problem was that of personnel. The Engineers sought men with broad experience and uncommon ability for price adjustment jobs—attorneys, businessmen, accountants, and former comptrollers of large corporations.[118] General Robins wanted men possessing "judgment, analytical ability, tact, firmness, patience and personality."[119] Persons with the requisite qualifications might earn as much as $50,000 per year in private industry; yet, top price adjustment jobs carried a salary of $5,600. Many prominent men nevertheless agreed to serve as civilian price adjusters; others accepted the few commissions Loving was able to offer. Still, renegotiation suffered throughout from a chronic manpower shortage.[120]

Karker's mode of operation placed an unnecessary burden on the Engineers' slim renegotiation staffs. His War Department Board assigned cases without first making sure that profits were excessive. Almost three-quarters of the cases forwarded to the Engineers re-

[115] (1) WDPAB Instructions, PAB–2, 20 Nov 42. EHD Files. (2) Ltr, Loving to GLD, 6 Nov 42. 161 (GLD) Part 1. (3) Incl with Memo, WDPAB for OCE, 15 Sep 43. 161 Part 5. (4) Memo, Purchases Div, SOS, for Reybold, 16 Sep 42. 161 Part 1.

[116] (1) Memo, Robins for Patterson, 8 May 43. 161 Part 3. (2) Ltr, Adm Div, OCE, to MAD, 5 Jul 43. 161 (MAD). (3) Memo, Loving for WDPAB, 18 Sep 43. 161 Part 5.

[117] Loving Comments.

[118] Ltr, OCE, Adm Div to NAD, 27 Apr 43. 210.3 (Engrs, Off, Chief of) Part 1.

[119] Memo, Robins for Patterson, 8 May 43. 161 Part 3.

[120] (1) H Comm on Naval Affairs, 78th Cong, 1st sess, *Hearings* on H Res 30, Vol II, Jun 1943, pp. 1231–36. (2) Testimony of Maurice Karker, Chairman, WDPAB, 23 Jun 43. S Comm on Appns, 78th Cong, 1st sess, *Hearings* on H R 2996, p. 134. (3) Memo, Price Adj Sec, OCE, for Mil Personnel Br, Adm Div, 19 May 43. 210.3 (Engrs, Off, Chief of) Part 1.

vealed no outsize earnings, and the time, money, and effort that went into investigations were wasted. By demanding numerous detailed reports, Karker further reduced the effectiveness of the Engineer effort.[121] Perhaps a partial explanation of the Karker Board's performance was to be found in one construction man's description of its personnel: "young attorneys who had been somebody's assistant."[122] Like Loving, Karker had trouble finding assistants who were equal to renegotiation tasks.

Contractors often added to the strain. Many unintentionally delayed proceedings by furnishing incomplete information. Hope that Congress might repeal or amend the renegotiation statute caused others to drag their feet. A firm might postpone its renegotiation conference by failing to supply the required information and then stall proceedings indefinitely with endless questions and needless debate.[123] Loving later said of this situation:

> It is true that many contractors resisted renegotiation in the beginning and that a few resisted to the bitter end. On the other hand, persistence on our part and a change in personnel conducting renegotiation finally resulted in a meeting of minds as to extent of refund that should be made. As I recall . . . in the latter part of 1944, there were less than 60 cases where we were unable to reach a settlement and which we had to refer to higher authority for resolution.[124]

New regulations and an amended renegotiation law facilitated price adjustment. Decentralization reduced the number of reports to Karker. The Renegotiation Act of 1944 swept away many remaining obstacles: it appreciably cut the caseload by excluding contractors whose business with the government was less than $500,000 a year and by permitting exemption of certain fixed-price contracts; and it expedited renegotiation by requiring contractors to file reports on their wartime business.[125]

Absence of a yardstick for measuring excessive profits was the most formidable obstacle to renegotiation of construction contracts. Criteria adopted by Congress and the heads of government departments were aimed at manufacturers rather than at builders.[126] Failure to define fair profits on construction work caused serious complications, for it left the Price Adjustment Boards without a guide to use in selecting cases for renegotiation, in fixing a reasonable profit, and in justifying their decisions, and it prevented contractors from figuring in advance how much profit they would be able to retain.[127] Loving attributed two "major troubles" of price adjustment to lack of criteria: first, a fear on the part of contractors that they and their competitors would receive unequal treatment caused "procrastination, extended argument, and post-renegotiation criticism"; and, second, occasional disap-

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[121] (1) Ltr, Loving to GLD, 10 Nov 43. 161 (GLD) Part 2. (2) 1st Ind, 11 Jan 44, on Memo, Renegotiation Div, ASF, for Reybold, 3 Jan 44. 161 Part 6. (3) Memo, Loving for WDPAB, 18 Sep 43. 161 Part 5.

[122] Foreman Interv, 26 Jan 62.

[123] (1) Ltr, Loving to GLD, 3 May 43. 161 (GLD) Part 1. (2) WD Press Release, 26 Jul 43. EHD Files.

[124] Loving Comments.

[125] (1) Memo, OCE for Dir of Purchases, ASF, 29 Apr 43. 161 Part 3. (2) Memo, USW for Chiefs of Supply Services, 8 May 43. 161 Part 3. (3) 58 *Stat.* 78. (4) OCE Circ Ltr 3314, 16 Sep 44.

[126] (1) 58 *Stat.* 78. (2) *Joint Statement WD, ND, TD, and MC*, pp. 7–8.

[127] (1) Memo, Contracts and Claims Br, Adm Div, OCE, for Proc and Distrib Div, SOS, 16 May 42. 161 (Sacramento DO). (2) Ltr, MtD to OCE, 2 Nov 42. 161 (MtD) 5/42–12/42.

proval by reviewing authorities of settlements, made "in light of existing generalities as to 'excessive profits,' " created confusion and delay and required negotiators to begin all over again.[128]

Left largely to their own devices, the Engineers gradually evolved workable formulas for construction contracts. They recognized that the difference between reasonable and excessive profits would vary widely, depending on the character and size of the project; on the time, capital, and equipment required; on the risk and the amount of subcontracting involved; and on the contractor's performance record. The fee or profit on fixed-fee contracts derived from these very factors, with the obvious exception of the performance record. The Engineers therefore adopted the attitude that if the fee matched the War Department schedule, and if the contractor had performed satisfactorily, the contract would not be renegotiated. They maintained:

> The contractor who by reason of having a highly efficient organization, and by superior management was able to keep his nonreimbursable expenses at a comparatively low point and thereby conserved a higher proportion of his fee as profit, should not be penalized by having his profit considered as excessive, because it was higher than that of other contractors with similar contracts, especially since in all probability the very elements of high efficiency and superior management which resulted in those higher profits had resulted in . . . reduced costs, higher quality of workmanship, and earlier beneficial use.[129]

This standard applied to fixed-fee architect-engineer as well as construction contracts.

The problem of fixed-price profits was less easy to solve. Here, the Engineers had no existing standard of reasonable earnings as they had in the schedules of allowable fixed fees; their task was to create one. To help with this job, Loving called on experts in government, industry, and the professions. He asked division and district engineers, members of OCE, and a number of independent contractors what they thought would constitute a reasonable, and what an excessive, profit under emergency conditions. He conferred with representatives of the American Society of Civil Engineers and the American Institute of Architects on the question of architect-engineer profits and queried professionals about their prewar earnings. On the basis of this information, he drew four schedules showing the range of allowable profits for architect-engineer, building, utility, and heavy construction contracts. These schedules were merely guides; the allowable profit depended upon the "facts and circumstances" of each case. Although costs, hazards, capital investment, and equipment all entered into their decisions, Price Adjustment Boards gave particular weight to contractors' efficiency and the amount of work sublet.[130]

By late 1944, when ill health forced Loving to resign, the hardest part of the job was over, and the Engineer machinery was functioning smoothly. Contractors had already refunded many millions and the total would continue to rise. Presenting Loving with the

[128] Ltr, Loving to Dir Purchases, ASF, 17 Apr 43. 161 Part 3.

[129] OCE, Dir of Readjustment, Price Adj Div, History of Renegotiation of War Contracts under the Renegotiation Acts of 1942 and 1943, 31 May 46, pp. 30, 33, 40, and 34. 161 Bulky.

[130] *Ibid.*, pp. 30–33 and 42.

emblem for Exceptional Civilian Service, General Reybold praised his work in formulating workable price adjustment procedures and his success in carrying out "an extensive national program to obtain understanding and acceptance of the Renegotiation Act by the construction industry."[131] Succeeding Loving in turn were Lt. Col. Carl M. Sciple, Col. John B. Heroman, Jr., and Forrest S. Harvey, all of whom served with distinction.

By May 1946 the Engineers had recaptured $114,296,000 in construction profits. For every dollar recovered, they paid out two cents in overhead. Renegotiation of almost 10,000 cases had revealed 1,187 instances of excessive profits on fixed-price contracts and five on fixed-fee. The fixed-fee contracts, amounting to a total of $249,285,000, had originally shown profits of $5,351,000. Renegotiation recovered $879,000. The fixed-price contractors selected for renegotiation had earned $304,787,000 on contracts totaling $2,120,518,000. Renegotiation cut their profits by $113,317,000.[132]

Price adjustment revealed a wide difference between levels of profit on fixed-fee and fixed-price jobs. In cases showing excess profits, fixed-price earnings were 14.4 percent of total contract prices before renegotiation; fixed-fee were 2.5 percent. Price adjustment reduced these figures to 9.63 percent and 1.80 percent, respectively. Cases cleared by the Price Adjustment Boards, in other words, those which showed no excessive profits, were perhaps more typical. Here, fixed-fee contracts yielded earnings of 1.76 percent; fixed-price, earnings of 5.65 percent.[133]

At the same time that it reduced the overall cost of construction, renegotiation narrowed the differential between fixed-price and fixed-fee profits. With the wartime scarcity of construction talent and the extreme pressure for getting projects promptly under way, lump sum contractors could sometimes make a killing. The pay for fixed-fee work was low even by peacetime standards. Yet, by and large, it was the fixed-fee contractors who carried the heavier burdens and achieved the greater speed. Furthermore, contrary to a widely held belief, the cost of fixed-fee construction was generally no higher, and in many cases was lower, than the cost of comparable lump sum work. Viewed in this light, the controversial renegotiation program seemed equitable.

[131] WD Press Release, n.d., sub: Civilian Award to Harry W. Loving. Loving Papers.

[132] OCE, History of Renegotiation, pp. 52 and 55.

[133] *Ibid.*, pp. 52–53.

CHAPTER XVIII

Cutback and Continuation

From its peak in 1942, construction activity declined rapidly. As emphasis shifted from facilities to production, and as the spotlight swung from homefront preparations to combat in war theaters, construction workers moved on to factories and fighting fronts, construction officers moved overseas, and contractors turned to such unfamiliar tasks as maintaining railroads, manufacturing landing mats, fabricating ship steel, and logging. Cranes and bulldozers went to troops and to lend-lease; vast quantities of lumber went for crates and boxes; and steel went into vessels, tanks, and guns. To be sure, construction continued until V–J Day and beyond, but in greatly decreased volume. The first major program to be undertaken in World War II, construction was also the first to be curtailed.

Curtailment

The resources of the United States, however vast, were not unlimited. The energies of her people, great though they might be, were not inexhaustible. During 1942 the nation spent nearly $17.8 billion for construction, maintenance, and improvements. This total accounted for approximately 11 percent of the gross national product.[1] Was all this construction requisite for victory? Could the economy stand the strain? How could the effort be reduced and where? These questions, looming ever larger in the months following Pearl Harbor, were among the most vexed issues of the war.

As procurement goals soared skyward in the early months of 1942, production authorities grew apprehensive. To continue recklessly heaping requirements on top of one another would invite disaster. Action was imperative to hold things within bounds. There was general agreement that construction offered an important source of savings in manpower and materials, but opinions differed sharply as to just where these savings should be made. Generals and admirals insisted that war-related projects get sole consideration and that other projects be lopped off. Illustrative of their attitude was a suggestion for a moratorium on school construction: would it not be better, the argument ran, to defer children's education than to lengthen the war?[2] WPB Chairman Donald Nelson expressed a different view, when he wrote:

> If they got complete authority over the disposition of the nation's resources they would inevitably produce disorder, and eventually balk their own efforts by undercutting the economy in such a way that it could not meet their demands. Nor is this the whole story. In their drive to give military

[1] *Historical Statistics of the United States, 1789–1945*, pp. 168 and 12.

[2] Transcript, Engineers Production Conference, 22 May 42, p. 61. 337 (Engrs, Corps of).

requirements the precedence over all others they would be bound to take actions which would have serious effects on our democratic institutions.[3]

At the forefront of the drive to halt civilian projects was the Corps of Engineers. Hard pressed to meet military requirements, construction officers deplored the draining away of resources by "nonessential" jobs. Stating the Corps position, Colonel Groves declared: "The program as a whole is just too big for accomplishment . . . . It is too big because of four things lacking, labor, materials, equipment, and management." Projects having little or nothing to do with the war—"everything that every community wanted that they could tie into the war effort by any stretch of the imagination"—continued to proliferate. Road building was going strong; a $1.1-billion public highway program was taking more than 350,000 tons of steel at a time when the Engineers were economizing on steel "to the point where it hurts and hurts and hurts." Another cause for concern was the growing demand for civilian war housing; if the trend continued, more than 500,000 family units and 600,000 dormitory accommodations would ultimately be provided. Many programs undertaken in the name of "civilian health and safety" should, in Groves' opinion, be either cut down or cut out. He appealed for "greater effort . . . to eliminate all work not indispensable to the war." Meanwhile, General Robins went on record: "We do not mind doing what we have to do. We do not ask for heaven but just a little lessening of the burden."[4]

From the Engineer viewpoint, efforts to ease the burden were too feeble and too late. The War Production Board, like its predecessor agencies, seemed unable or unwilling to choke off nonessential work. Priorities control was largely ineffective; jobs somehow managed to struggle along with little or no priority assistance. Not until March 1942 did production authorities try a fresh approach. On the 17th WPB Chairman Nelson decreed: "No new construction, except strictly military construction projects, shall be undertaken unless approved by the War Production Board as essential to the war effort or to public health or safety."[5] Accordingly, on 9 April, he issued a limitation order setting cost ceilings on jobs which could be started without WPB permission: $500 for residential projects; $1,000 for agricultural; and $5,000 for recreational, institutional, and industrial. He placed no restrictions on work for mining and oil producing industries. As materials became increasingly scarce, WPB lowered the ceilings for various classes of work.[6] As a result of the limitation order, civilian construction declined steeply but, the Engineers believed, not steeply enough.

When the order came out, moves were under way to trim fat from war requirements. On 13 March Col. Joseph L. Philips and Cmdr. Horatio G. Sickel, joint heads of the ANMB Priorities Division, issued a call for action. Huge facilities programs were being launched "without sufficient thought as to the consequences," they told the board's

[3] Nelson, *Arsenal of Democracy*, pp. 359–60.

[4] Transcript, Engineers Production Conference, 22 May 42, pp. 46–51, 60, and 42.

[5] CPA, *Minutes of the War Production Board, January 20, 1942, to October 9, 1945* (Washington, 1946), p. 30. Cited hereinafter as *Minutes of the WPB.*

[6] CPA, *Industrial Mobilization for War*, Part 1, p. 396.

executive committee; and they warned that resources might not stretch to meet military demands for both new capacity and finished goods.[7] Four days later Nelson received a similar warning. In a detailed analysis of the munitions and construction program, two of his assistants, Robert R. Nathan and Stacy May, set forth some sobering statistics. Outlays of $40 billion in 1942 and $60 billion in 1943 would be in line with the production goals set by the President in January 1942. Recently, however, the armed forces and others had raised requirements to $62 billion in 1942 and $110 billion in 1943. These new objectives seemed "wholly impossible." Unless shooting for the stars gave way to realistic planning, the day would come when plants would suspend production for lack of raw materials and equipment would stand idle for want of parts. One area where cuts could and should be made was war construction. Echoing the concern of Philips and Sickel, Nathan and May urged their chief to act promptly.[8]

Responding to the danger signals flashed by his assistants, Nelson arranged for members of his staff to confer with Army and Navy representatives. A meeting held on 10 April 1942 resulted in the choice of Nathan, Philips, and Sickel as an informal committee to study ways of scaling down the program. Although the three men were in general agreement, their findings were not unanimous. In a majority report on 6 May, Nathan and Sickel recommended appointment of a powerful five-man board (with one Army, one Navy, and three WPB members) to screen construction projects and pass upon all plans and specifications. Until the board was functioning, they wanted a moratorium on most new construction. Allegedly on orders from the War Department, Colonel Philips filed a dissenting report in which he objected to any moratorium on war-related projects and to any review by outsiders of military plans and decisions.[9]

When Nelson approved the majority report, Patterson refused to go along. In a sharply worded protest to the WPB Chairman, the Under Secretary warned that the proposed board "could well be an important contributory cause for losing the war." Calling the whole idea "inadmissible," he contended: "If the War Production Board is to select items of equipment, it, in effect, governs the entire strategy of the war. . . . Such a conception is little short of fantastic." Patterson declined to submit engineering data for approval by WPB. "Only a moment's reflection," he wrote, "is required to understand that a month's delay would be necessary to secure approval of plans and specifications for a job in the western part of the United States." He further declined to appoint an Army board member. "The War Department," he stated, "does not possess such a superman, as referred to in the report, who could be familiar with architecture and engineering, shop produc-

[7] Memo, Philips and Sickel for ANMB Ex Comm, 13 Mar 42. WPB–PD File, 221.2 (Plant Expansion Projects) 1942.

[8] Memo, Nathan and May for Nelson, 17 Mar 42. WPB–PD File, 072.1015, Planning Comm Doc 35.

[9] (1) CPA, *Minutes of the Planning Committee of the War Production Board* (Washington, 1946), pp. 44 and 48–51. (2) Smith, *The Army and Economic Mobilization*, pp. 452–54. (3) Memo, Nathan and Sickel for Nelson, 6 May 42. (4) Memo, Philips for Nelson, 6 May 42. Last two in WPB–PD File, 221.2 (Plant Expansion Projects) 1942.

tion, raw materials, and other matters which would be necessary for him to make an intelligent decision."[10] Confronted with Patterson's opposition, Nelson backed down.

In lieu of the board proposed by Nathan and Sickel, he created the Committee on Facilities and Construction, under the chairmanship of William H. Harrison, his director of production. To serve with Harrison, he named Rear Adm. Howard L. Vickery of the Maritime Commission; Admiral Moreell, together with two civilian Navy officials; and, for the Army, Generals Knudsen, Campbell, and Echols and Mr. Madigan.[11] The committee's task, as Patterson understood it, was "to review the present facilities program and to devise a workable scheme for passing on new facilities."[12] In his instructions to Harrison, Nelson cited a recent letter from the President, restating his January goals. "Other facilities necessary in our war effort," Roosevelt had written, "but not essential to this program must be deferred until their construction can be undertaken without detriment to the program."[13] According to Nelson's interpretation, the President's meaning was "that no projects be undertaken which do not clearly contribute to the production of finished munitions by the middle of 1943."[14] How the preponderantly military Harrison committee would approach the problem was soon apparent.

On 20 May 1942, 9 days after the committee's formation, Chairman Harrison unveiled the "Directive for Wartime Construction," a policy statement afterward described as "one of the most important . . . issued during the war."[15] Written by Harrison, and signed by Stimson, Knox, and Nelson, the directive laid down principles which would henceforth govern all construction coming under the Army, the Navy, and WPB. No project was to start unless one of these agencies certified that it was urgently necessary to the war effort. Even then the sponsor would have to show that he had made every possible economy in design and that sufficient labor, materials, equipment, power, transportation, and housing were available. Enforcement was left to the agencies themselves.[16] Presenting the directive to General Reybold, Madigan emphasized "how fast we operate" and "what kind of service we can give the Corps of Engineers."[17] The speed was impressive and the service, beneficial. By the fall of 1942, Colonel Hardin could report that the directive had "done great things in providing the materials . . . to carry on our necessary work, kept the program down, . . . expedited construction, conserved materials, and reduced costs."[18]

During the summer of 1942, under the guidance of the Harrison committee, the armed services restudied their fa-

[10] Ltr, Patterson to Nelson, 8 May 42. USW Files, Misc & Sub, Constr.

[11] *Minutes of the WPB*, p. 86.

[12] Ltr, Patterson to Nelson, c. 10 May 42. Anderson Files, Folder 1: New Facilities.

[13] Ltr, Roosevelt to Nelson, 1 May 42. WPB–PD File, 212 (Production Objectives) 1940–42.

[14] Memo, Nelson for Harrison, 11 May 42. WPB–PD File, 221.31 (Facilities Expansion Program—Administration).

[15] McGrane, *The Facilities and Construction Program*, p. 83.

[16] Incl, 20 May 42, with WD Ltr AG 600.12 (5–30–42) MO-SPAD-M, 1 Jun 42.

[17] Transcript, Engineers Production Conference, 22 May 42, p. 63.

[18] Transcript, Engineers Production Conference, 28 Sep 42, p. 10.

cilities and construction needs. The Army lowered its objectives considerably, deleting dozens of lines from the Ordnance plant construction program, suspending virtually all work on seacoast defenses, eliminating most family units from the civilian war housing program, and curtailing private plant expansions sponsored by the War Department. In addition, the Chief of Engineers deferred river and harbor improvements estimated to cost more than $50 million. All told, the War Department saving was about $1 billion. Cutbacks by the Navy, principally by the Bureau of Ships, matched those by the Army almost dollar for dollar.[19]

This record notwithstanding, the committee failed to win Nelson's confidence. "Naturally," Groves observed, "the more Harrison learned of the problems of the military, the more difficult it was for him not to support them; and, in the same way, the more he learned of the WPB recommendations, the more difficult it became not to slice them."[20] Compared with reductions in military programs, cuts sustained by WPB were modest. Deferred as a result of the Harrison review were WPB-sponsored projects estimated to cost approximately $400 million—about one-fifth of the Army-Navy total. Nevertheless, as the committee threw out power-generating facilities, transmission lines, and plants for producing coke, pig ingots, and semi-finished goods, Nelson came to regard it as a tool of the military. Harrison's appointment as a brigadier general in July 1942 helped weaken Nelson's faith in his impartiality. By late summer, the WPB Chairman had concluded that sterner measures would be necessary to force the military into line.[21]

Early in September Nelson stripped the power to assign priorities from the Army and Navy Munitions Board. Henceforth WPB would review requests for priority and a complete bill of materials would have to accompany every application.[22] Anguished cries from military spokesmen greeted this move. Typical of the Engineer reaction was Colonel Sherrill's outburst:

> The power to decide whether a priority rating is to be issued carries with it the decision whether the project will be constructed. . . . This power will in some cases carry with it indirectly decisions on military strategy. It is conceivable that delay in starting and completing certain projects may decide the outcome of a battle or delay military plans due to lack of certain materials. . . .
>
> The Army and Navy are entrusted with the fate of the nation and the lives of its men. If the War Production Board fails, the war is not lost, but if the Army and Navy fail, the war is lost. Therefore, in the construction program why add to our difficult battle against time.[23]

In a memorandum for General Clay, Groves took the same stand. Objecting to "direct control of design and specifications by the War Production Board," he pointed out: "The question of what agency shall make the determination of the need for munitions is involved to a degree."[24] Protests by the Engineers,

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[19] (1) Thomson and Mayo, *Procurement and Supply*, p. 63. (2) 635 Part 2. (3) Constr PR's. (4) 800.52 1942–45. (5) Memo, Ross for Dickinson, 13 Nov 42. WPB–PD File, 221.2.

[20] Groves Comments, XIII, 11.

[21] (1) Memo, Ross for Dickinson, 13 Nov 42. (2) CPA, *Industrial Mobilization for War*, p. 392.

[22] CPA, *Industrial Mobilization for War*, p. 259.

[23] Memo, Sherrill for Groves, 9 Sep 42. 161 (Pref Ratings) II.

[24] Memo, Groves for Clay, 12 Oct 42. 410 I.

SOS, and ANMB had no effect. Nelson held to his decision.[25]

On 21 September he took another step toward curbing war construction. With the consent of the Army, the Navy, and the Maritime Commission, he abolished the Harrison committee and, in its place, set up the Facility Clearance Board. Clothed with authority to screen industrial projects estimated to cost $1 million or more, the new board was headed by Ferdinand Eberstadt, who had resigned as chairman of ANMB to become WPB Vice Chairman on Program Determination. Col. Gordon E. Textor, an Engineer officer on loan to WPB, would be acting chairman in Eberstadt's absence. The membership, drawn originally from the armed services and the Maritime Commission, soon broadened to include additional representatives from WPB. In October Nelson extended the board's authority to all classes of construction and lowered the monetary ceiling to $500,000.[26] No longer would military men screen military projects. The system proposed by Nathan and Sickel in the spring of 1942 was an accomplished fact.

While Nelson was tightening his control over military construction, Patterson was preparing a counterassault. Late in August he asked the Chief of Engineers to find out how much civilian construction was under way throughout the country. Within a month Reybold had the answer—$3.1 billion worth: $1.4 billion by the federal government; $1 billion by states, counties, and municipalities; and $700 million by private enterprise. On 29 September Patterson made his move. Citing Reybold's figures, he advised Nelson: "I am firmly of the opinion that a great part of this work can be deferred without impairment of the war effort and without injury to the health and safety of the community involved."[27] Replying for WPB, Eberstadt agreed that a great deal of unnecessary construction was in progress and that it ought to stop.[28] The ax-wielding assignment would be carried out by a new body, the Facility Review Committee, representing WPB, the Army, the Navy, and the Maritime Commission. Engineer officers took a prominent part in the work of the committee. Col. Thomas F. Farrell served as chairman and Lt. Col. Richard H. Tatlow, as War Department member.[29]

Meantime, the long-simmering conflict over broad production goals was coming to a boil. By the fall of 1942 total military requirements for 1943 had climbed to $115 billion.[30] Basing his opinion on WPB studies, Chairman Nelson said this objective was far too ambitious. Although military leaders conceded that he might be right, they refused to lower their sights. There was, they argued, no harm in trying. Nelson emphatically disagreed.

> Setting up a production program which goes substantially beyond the limits of feasibility [he explained] does not merely mean that the economy will be subjected to a

[25] WPB–PD File, 411.33 (Constr Progr–Mil) Feb 42–Oct 46.

[26] (1) Joint Dir, WPB, WD, ND, and Maritime Com, 21 Sep 42. WPB–PD File, 071.5001 (Fac Clearance Bd, WPB). (2) WPB Gen Adm Order 2–61, 17 Oct 42.

[27] Memo, Patterson for Nelson, 29 Sep 42, and Incls thereto. USW Files, Misc & Sub, Constr beg Dec.

[28] Ltr, Eberstadt to Patterson, 7 Oct 42. Same file.

[29] WPB Gen Adm Order 2–61, 17 Oct 42.

[30] CPA, *Industrial Mobilization for War*, pp. 284–85.

greater strain than it can bear; it means also that military requirements and strategic plans themselves will be involved in a confused and incalculable production tangle, and that the very ends which the oversized program sought to achieve are likely to be defeated.[31]

Impelled by this logic, he decided to force a showdown.

At a conference on 6 October, Nathan presented the case for cutting back requirements. Questioning whether any economy could devote more than half of its productive capacity to war, he pointed out that the proposed program for 1943 "would absorb not less than 75 percent of the national product." According to Nathan's Planning Committee, "an outside and all-out and stimulating objective" for the coming year would be $75 billion for munitions and construction and $18 billion for other war expenditures.[32] Raising the cry of civilian interference in military strategy, Somervell opposed a cut. In his opinion, WPB was unduly pessimistic; if materials were carefully allocated, there was no reason to believe that the $115-billion goal was unattainable. Nevertheless, it was Somervell who pointed the way to a solution. At the next meeting of WPB, on 13 October, he suggested that Nelson tell the Joint Chiefs of Staff the program was too big and leave it up to them to decide where to cut. Nelson agreed to this proposal. On the 19th he referred the problem to the Joint Chiefs and asked for a decision within one month.[33]

The next day he applied the brakes to construction. Declaring that decisive action could no longer be deferred, he pointed out that building work programed through 1943 would absorb between one-fifth and one-quarter of the war effort. Construction on so vast a scale would cut deeply into production of military and essential civilian goods. Even "most essential" synthetic rubber, high-octane gasoline, aluminum, steel, and aircraft programs would suffer. With most basic needs already taken care of, the time had clearly come for phasing out construction. Accordingly, he was making drastic cuts in the programs of the Tennessee Valley Authority, the Federal Works Agency, and the Interior Department. At the same time, he was asking the Secretaries of War, Navy, Commerce, and Agriculture and the Chairman of the Maritime Commission for lists of projects which could "be arrested or abandoned without seriously affecting the war effort." In issuing this so-called "stop order," Nelson made it plain that he meant business.[34]

Despite strenuous protests from cabinet officers, agency heads, congressmen, and other interested parties, Nelson made his order stick. By mid-December 1942 the Facility Review Committee had choked off projects estimated to cost $600 million. Three months later the total had risen to $1.3 billion. Slashes in programs of the Federal Works Agency, the War Production Board, the Tennessee Valley Authority, and the Interior Department and in the civil works construction of the Corps of Engineers accounted for most of this total. Although the record of the Facility Clearance Board was less impressive—projects

[31] Nelson, *Arsenal of Democracy*, pp. 379–80.

[32] *Minutes of the WPB*, pp. 139–40.

[33] (1) *Ibid.*, pp. 141 and 144–45. (2) Millett, *The Army Service Forces*, pp. 215–17. (3) Memo, Nelson for JCS, 19 Oct 42. WPB–PD File, 212 (Production Programs—Objectives).

[34] Ltrs filed in WPB–PD File, 411.3.

totaling only $76.2 million received its veto—the board, by its very existence, discouraged would-be sponsors of questionable projects. From $13.4 billion in 1942, expenditures for new construction in the United States dropped in 1943 to $7.7 billion. Projects unrelated to the war accounted for most, though by no means all, of this reduction.[35]

Late in November 1942 the Joint Chiefs of Staff announced a reduction in the munitions and construction goal for 1943— from $93 billion to $80 billion. Among the scaled-down items was construction for the Army, which was shaved 31 percent, from $3.2 billion to $2.2 billion. This curtailment, purportedly, effected "all possible economies."[36] Subsequent revisions of the army supply program cut construction objectives even further. From the end of 1942 until V–J Day, the total approved cost of the Army construction program increased by only $1.8 billion. By early 1943 the flow of new directives had slowed almost to a trickle.[37]

Topping Out

As construction moved overseas, as major efforts went toward securing worldwide supply lines and providing forward bases for global offensives, the buildup in the United States entered its final phase. On the first anniversary of Pearl Harbor, the war construction program amounted to approximately $10.3 billion and was 85 percent complete. A year later the figures were $10.8 billion and 98 percent. The monthly value of work placed declined steadily and so did total employment. New projects were fewer and generally smaller than before.[38] The undertaking launched in 1940 by The Quartermaster General was drawing to a close. In his role as Chief of Construction, General Robins faced a twofold task—winding up the emergency program and adapting his organization to radically altered conditions.

The roster of key construction officers reflected the transition from homefront preparations to offensive warfare. Overseas duty claimed most of the physically fit Regulars on Robins' staff, among them Colonels Hardin and Strong. A secret mission of highest priority claimed Colonel Groves, and Colonel Lewis answered a summons from the Air Transport Command. To assist him in directing the still sizable program, Robins was fortunate in having Colonel Farrell and Colonel Antes, both of whom had worked closely with Groves. To take charge of Repairs and Utilities, he was able to obtain Col. Rudolph C. Kuldell, a 1912 West Point graduate who had resigned from the Corps in 1920 to engage in private business. To head up Rivers, Harbors, and Flood Control, he called on Col. George R. Goethals, son of the great general and a retired Engineer officer. Former civilian employees now in uniform helped fill the urgent need for officers. And, flouting the words of the old barracks ballad, "no promotion this side of the ocean," a few young Regulars

[35] (1) McGrane, *The Facilities and Construction Program*, pp. 118–19, 140. (2) *Historical Statistics of the United States, 1789–1945*, p. 168.

[36] Incl with Memo, JCS for WPB, 27 Nov 42. WPB–PD File, 212 (Production Programs—Objectives). See also Millett, *The Army Service Forces*, pp. 219–20; and Smith, *The Army and Economic Mobilization*, p. 156.

[37] ASF, *Statistical Review, World War II*, p. 11.

[38] Constr PR's, Dec 42, pp. 2–7; and Dec 43, pp. 5–10.

remained at their desks. Touched by the dedication of these young officers, Reybold reflected: "They really sacrificed to stay with the job."[39]

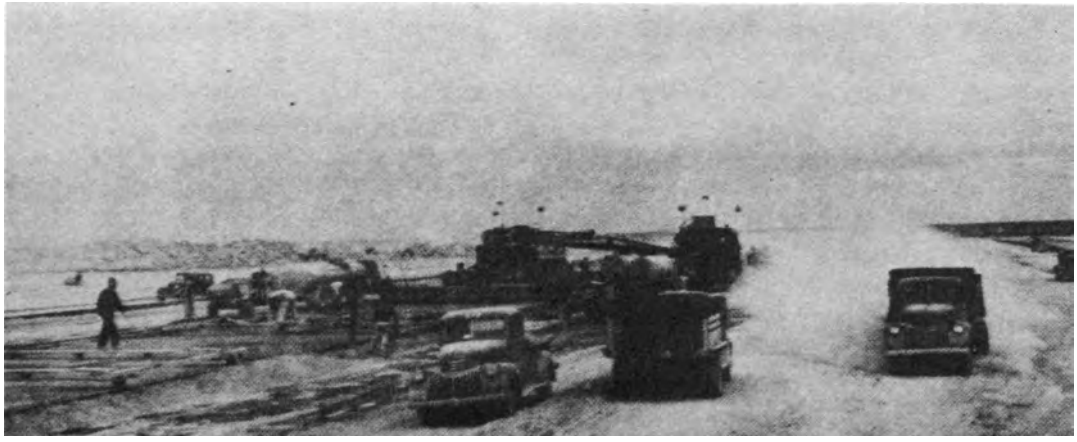
Within the districts and divisions, leadership was passing to the Engineer home guard. A study of the Pacific Division in December 1942 was revealing. Responsible for all construction west of the continental divide, General Hannum depended heavily on senior Regulars. Overseeing division suboffices at Salt Lake City and San Francisco were Col. Edward M. George, 62, and Col. John R. D. Matheson, 55, who kept going despite poor health. Holding other key positions in the organization were Colonels Richard Park, 60, Elmer G. Thomas, 62, Clay Anderson, 63, and Herbert J. Wild, 67. Backing up these men were a few troop-age Regulars awaiting orders overseas, several former Engineer officers recalled to active duty, and a score of Reservists. This pattern was repeated throughout the Engineer Department. Replacing Scott as head of the Southwestern Division was Col. Robert R. Neyland, Jr., a 1916 West Point graduate who had resigned from the Corps in 1936 to coach football at the University of Tennessee. Releasing younger men for combat were Col. Jarvis J. Bain, who stayed on beyond retirement at Memphis, and John H. Peil, a long-time employee of the Rock Island District, who was commissioned a lieutenant colonel. Many others rallied to the cry of "Essayons" (the motto of the Corps), among them Col. Rufus W. Putnam, namesake and descendant of a Revolutionary Chief Engineer, and Brig. Gen. Charles Keller, who at 75 was the oldest active officer in the U.S. Army.

Despite a high turnover in key personnel, the organization proved effective. In the first nine months of 1943 construction valued at $1.7 billion went into place and nearly 12,000 projects reached completion. Although most of the completed jobs were minor ones costing less than $500,000, approximately 900 were major undertakings, ranging in cost from $500,000 to more than $100 million. Headliners included Camp Shanks, New Jersey, a $40-million staging area for the New York Port of Embarkation; the $60-million Pentagon Building with its extensive system of roads and parking lots; the Sunflower Ordnance Works, a $130-million TNT plant at Eudora, Kansas; and scores of other multimillion-dollar installations. Among the significant achievements of this period were the Cleveland Aircraft Assembly Plant, which included the largest all-timber building in the world, and a plant for centrifugal casting of gun barrels at Watertown Arsenal, the first of its kind. A noteworthy technical breakthrough was the successful paving of concrete runways in near-zero weather.[40]

For sheer physical difficulty, few engineering feats could match the building of the Mountain Home Air Base in southwestern Idaho. Scheduled originally for the spring of 1943, the start of this project was advanced to December 1942, when the crash of a B–17 demonstrated

[39] Reybold Interv, 12 Mar 59.

[40] (1) Constr PR's. (2) *ENR*, March 11, 1943, p. 86; and April 22, 1943, pp. 67–70. (3) ASF, *Annual Report for the Fiscal Year 1943* (Washington, 1943), p. 181.

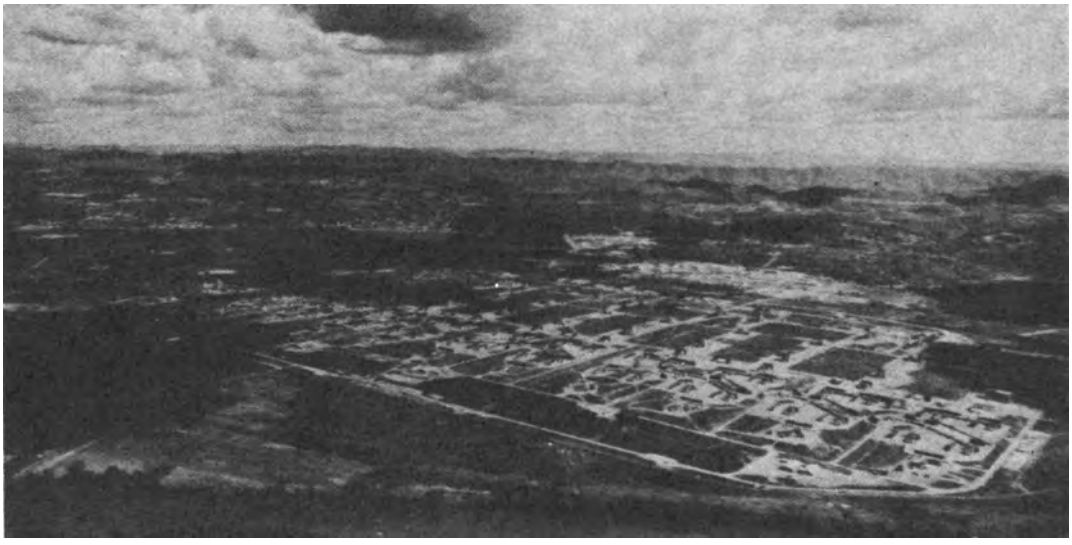


WINTER CONSTRUCTION AT MOUNTAIN HOME AIR BASE, IDAHO

the urgent need for an emergency landing field in the Boise area. Transferring a huge fleet of equipment from the recently completed bomber base at Pocatello and throwing onto the job a crack local highway contractor, J. A. Terteling & Sons, the Portland District Engineer, Col. Donald J. Leehey, set a target date of 15 March for the principal runways. Stratton rushed the latest information on winter construction to the area engineer, Maj. Oliver A. Lewis. Battling snow, sleet, and high winds, the contractor's forces began dozing out the 10,000-foot airstrips. Thick blankets of straw and sand protected the subgrade. With the thermometer hovering around 10°, paving went forward. Heated aggregate, liberal use of calcium chloride, insulated tank trucks, tarpaulins, straw, and salamanders—Terteling used every known means to prevent damage by freezing. With these techniques, he finished the job on time. Awarding the Army and Navy "E" to the contractor, an officer of the Second Air Force questioned whether there was another bomber field in the world with runways so long and so sturdily built.[41]

The startup at the Holston Ordnance Works in the spring of 1943 symbolized a notable achievement. With two widely separated manufacturing areas (one for raw materials and one for explosives), dozens of major buildings (most of brick and reinforced concrete and some 8 stories tall), a vast transportation network (31 miles of railroads, 59 miles of roads, and 4 massive bridges), and outsized utilities systems (capacity for 2 million pounds of steam per hour and nearly 500 million gallons of water per day), the plant was a tremendous undertaking. Problems were many: a dearth of design information, an element of friction between the architect-engineer-manager and the principal subcontractor, the district engineer's seeming reluctance to crack the whip, a weak priority rating, a scarcity of equipment, and a persistent shortage of labor. Both

[41] (1) 686 and 686.61 (Mountain Home Airfield). (2) *The Constructor*, October 1943, p. 39.

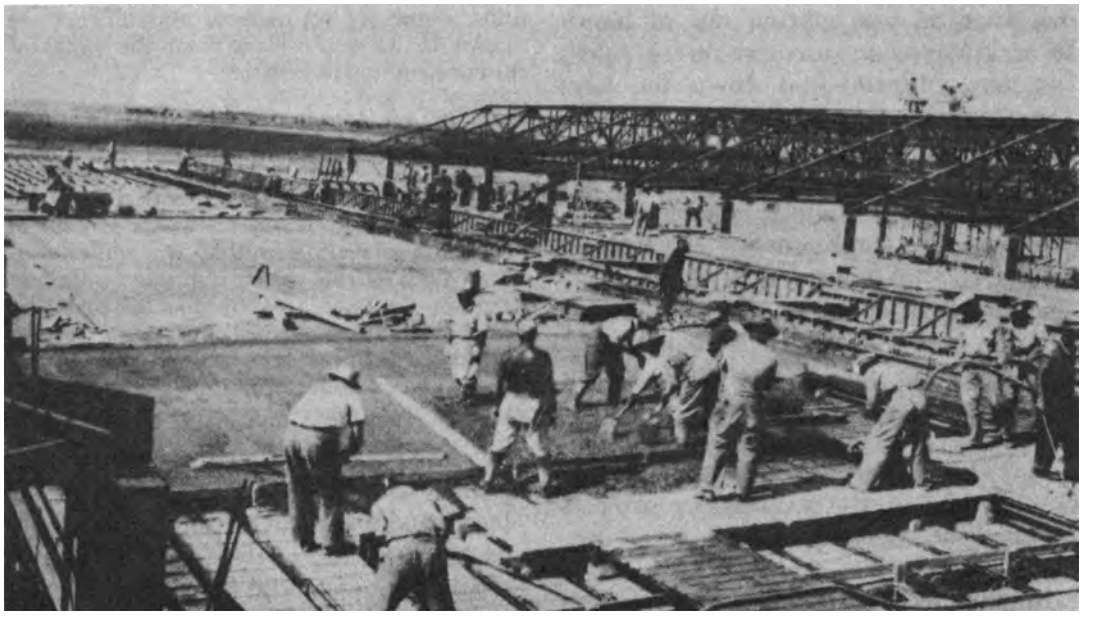


HOLSTON ORDNANCE WORKS, TENNSSEEE

Creedon and his successor, Otto F. Sieder, kept the job under close scrutiny. So did Colonel Hall, the division engineer. With help from Washington and Columbus, the project straightened out. Progress, poor at first, steadily improved. Completed line by line in the spring of 1943, the plant was producing at full design capacity—170 tons of RDX daily—by July. In another five months, this capacity more than doubled. Depth charges and blockbuster bombs containing superexplosives from the Holston plant were crucially important in sweeping Hitler's U-boats from the Atlantic and in pulverizing German war industries.[42]

General Robins took special pride in two record-breaking projects, the bomber modification centers at Tulsa and Oklahoma City. Comprising huge hangar-like fireproof structures of concrete and steel, these new plants bore $4-million price tags and carried "immediate" completion dates. When the directives reached him late in April 1943, the Tulsa District Engineer, Col. Francis J. Wilson, was battling floods along the Arkansas River. With rail traffic at a standstill, he flew in company officials and began negotiations. Within 24 hours, he had signed contracts for the architect-engineering—with two St. Louis firms, J. Gordon Turnbull and Sverdrup & Parcel, for the Tulsa plant, and with the Austin Company of Cleveland for the Oklahoma City job. Before the month was out, structural steel was on order and grading had begun. By late May the principal construction contractors were

[42] (1) 635 (Holston OW). (2) Memo, W. E. O'Brien for Groves, 13 Aug 42. Opns Br Files, Holston OW. (3) Insp Rpt by Col Strong, 21 Oct 42. Opns Br Files, Insp Rpts, Col Strong. (4) Memos, Sieder for Strong, 14 Jan and 27 Feb 43. Opns Br Files, Memos —Mun Plant Sec. (5) *ENR*, July 25, 1946, pp. 64–69.



WORK IN PROGRESS ON TULSA BOMBER MODIFICATION CENTER, OKLAHOMA

at work—the Corbetta Company of New York at Tulsa and the local firm of Charles M. Dunning at Oklahoma City. Describing the race for completion, General Robins wrote:

> Progress on both jobs proceeded at about the same rate, neither job getting more than a few days ahead of the other. . . . The methods of attack used by the two contractors on the erection of the buildings, however, were quite different. The Corbetta Company chose to erect free-standing concrete columns and to start the roof steel almost immediately, while the Dunning Company chose to erect the concrete center portion first, letting the roof steel wait until that part of the work was complete.

By a narrow margin, Corbetta finished first. At sundown on the evening of 31 July, a squadron of heavy bombers landed at the airport adjoining the Tulsa plant. The following morning the first plane rolled along behind its tractor into the newly completed building. Commending both contractors, Robins pointed out that construction which normally would take a year had taken less than 100 days.[43]

While jobs like these were becoming increasingly rare, hosts of smaller ventures were getting under way. From 4,400 in December 1942, the total number of projects costing less than $500,000 rose to 11,400 in June 1943. Although much of this construction answered real needs, for example, WAAC housing and POW compounds, much of it stemmed from the desire of post commanders to embellish their installations. Moreover, many permanent improvements and not a few frills were masquerading as necessary maintenance. By the spring of 1943,

[43] Maj. Gen. Thomas M. Robins, "Two Modification Centers Requested—Immediately," *Civil Engineering*, November 1943, pp. 529–32.

the situation was getting out of hand. In an Army-wide directive on 15 April, Secretary Stimson laid down the law: "Spartan simplicity must be observed. Nothing will be done merely because it contributes to beauty, convenience, comfort, or prestige. Property should be kept in serviceable condition but not beyond that level."[44] Attempting to plug an oft-used loophole, Somervell defined maintenance as "work which is regular and recurring and which is continuous in the sense that it is not terminable on the completion of a specific project."[45] Largely as a result of this crackdown the number of new starts on minor projects dropped 66 percent during the latter half of 1943.

Statements by the Chief of Engineers mirrored the decline of stateside construction. Speaking to officer candidates at Fort Belvoir in April 1943, General Reybold said:

> The mission of the Army's Corps of Engineers is developing with the progress of our attack. We are finishing up the biggest job of emergency construction the United States has ever seen. Now we're moving on to a job of construction overseas. . . . We've got a date with a certain paperhanger; and an Engineer keeps his appointments.[46]

Addressing a meeting of the major construction trade associations in New York City early in June, he stated:

> The scene is shifting from areas of preparation here at home to the actual theaters of war, where there lies ahead a tremendous task for construction workers. Most of the construction activities and responsibilities are being transferred to foreign shores, and most of the work must be done with troop units whose skilled workers and officers are drawn in large numbers from the ranks of the construction industry.[47]

And in an article for the July issue of *The Constructor*, he explained:

> The volume of war construction at home this year will reach but about 30 percent of last year's total of more than five billion dollars. Much of this year's building is already in place. Outside of a number of prisoner-of-war internment camps and a few general hospitals and other relatively small projects, little war construction is in view for the remainder of the year.[48]

Construction budgets, employment figures, and monthly totals of work placed told a similar story. In June 1943, when he appeared before the House and Senate Appropriations Committees to defend the Engineer budget for the coming fiscal year, Reybold requested no new construction money. Instead he asked for authority to carry over $530 million from the previous fiscal year and to use it in winding up the program. The same act that granted this authority provided $580 million for maintaining the nearly completed military plant.[49] The downward trend was depicted graphically in General Robins' reports. During the calendar year 1943, both the monthly value of work placed and the total field employment fell approximately 80 percent. (*Charts 20 and 21*)

Changes in OCE attended this shrinkage. During the first five months of 1943, the strength of the Construction Division

[44] WD Memo W100-10-43, 15 Apr 43.

[45] ASF Memo S100-9-43, 8 Jun 43.

[46] Quoted in *The Military Engineer*, May 1943, p. 246.

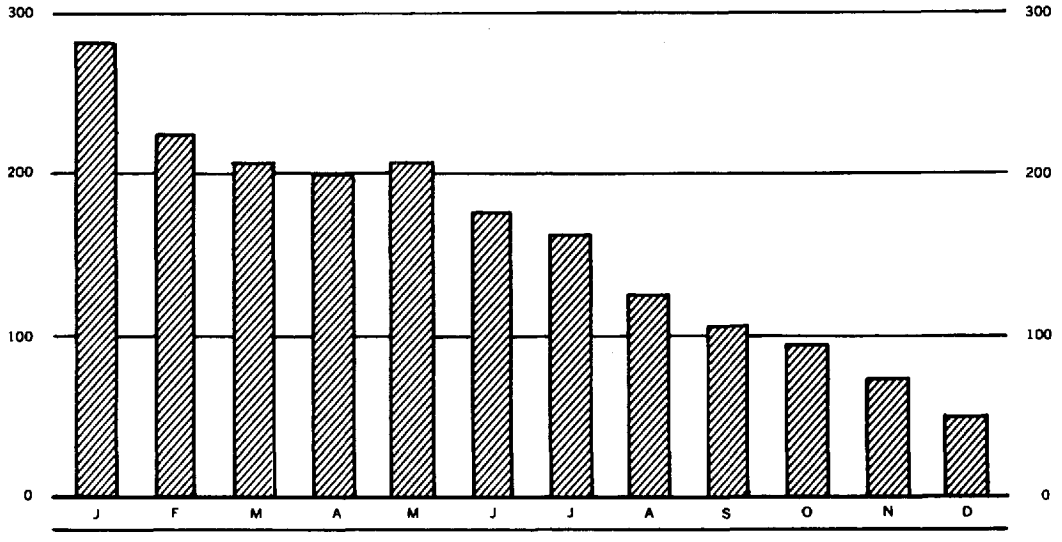
[47] Quoted in *The Constructor*, June 1943, p. 27.

[48] Maj. Gen. Eugene Reybold, "Construction Gets Its Passport," *The Constructor*, July 1943, p. 103.

[49] (1) H Subcomm of the Comm on Appns, 78th Cong, 1st sess, *Hearing on Military Establishment Appropriation Bill for 1944*, 7 Jun 43, p. 330. (2) S Subcomm of the Comm on Appns, 78th Cong, 1st sess, *Hearings* on H R 2996, 24 Jun 43, pp. 148-49. (3) 57 *Stat.* 347.

Chart 20—Dollar Value of Work Placed During 1943

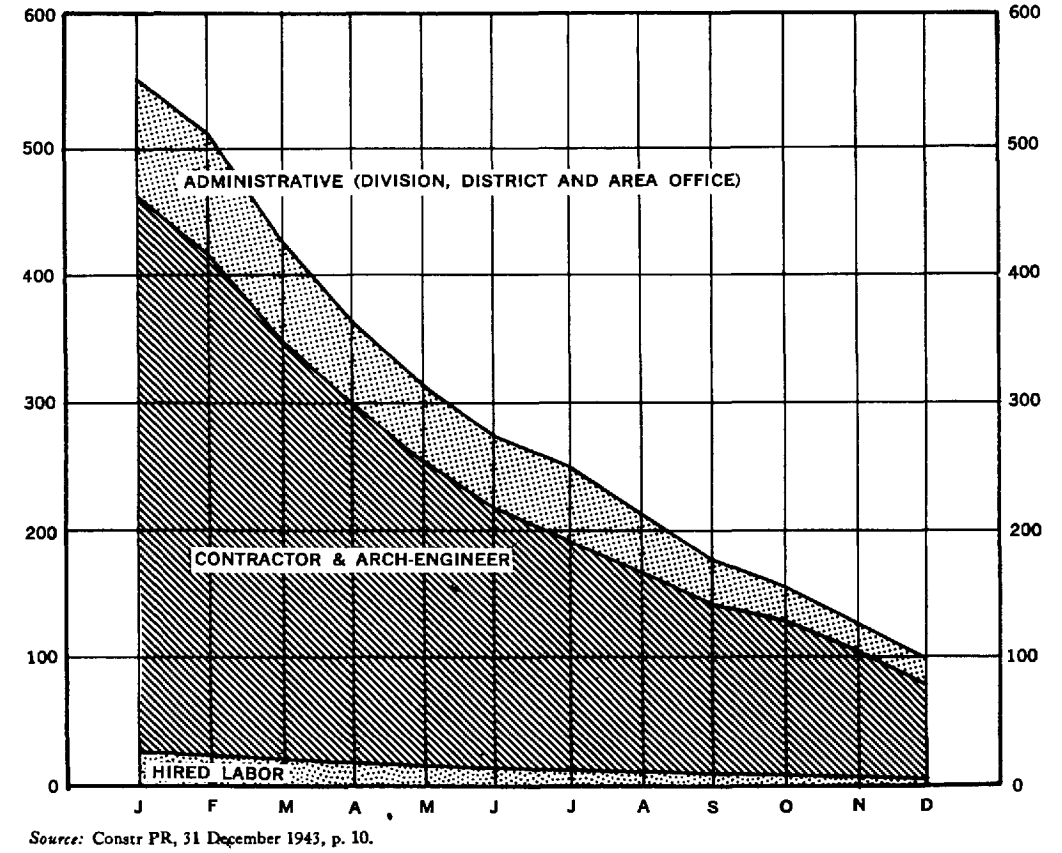
(In Millions by Month)



Source: Constr PR, 31 Dec 43, p. 5.

Chart 21—Field Employment During 1943

(In Thousands by Month)



Source: Constr PR, 31 December 1943, p. 10.

dropped from 1,712 to 1,010. Early in April, Robins discontinued the Operations Branch and set up the following branches in its place: Fortifications, under Colonel Burton; Materials and Equipment, under Colonel Sherrill; Military Construction, under Colonel Person; Munitions Plants, under Mr. Sieder; Rivers and Harbors, under Colonel Goethals; and Safety, under Mr. Blanchard. A month later, when Burton took over as district engineer at Philadelphia, Fortifications merged with Military Construction. A more sweeping change occurred late in May when Robins lifted the Engineering Branch out of the Construction Division and set it up as an independent division, responsible for research and development as well as for construction engineering.[50] Behind these adjustments lay the narrowing scope of the building program. The next reorganization would take place in a somewhat different context.

In the spring of 1943, General Reybold launched a nationwide campaign to enlist construction workers for overseas service with Engineer units. Accompanied much of the way by President Oscar B. Coblentz and Managing Director Herbert E. Foreman of the AGC, he visited New York, Boston, Chicago, Dallas, Los Angeles, San Francisco, Portland, and Salt Lake City to address the following appeal to "the men who want to help engineer the forthcoming victory—the men who want to help get this war over as soon as possible":

> Airdromes must be built all over the world, streams bridged to bear the advancing arms and armies of Democracy, roads constructed, water facilities provided, storage and repair depots raised, and harbors deepened, minefields and entanglements cleared for the advance of our troops, obstacles set up in the path of the enemy—a thousand jobs that call for the type of specialists who have been employed in the construction industry.[51]

With the thousands of "tough, trained construction men" and skilled equipment operators who responded to this call, the Corps was able to increase the work power of every Engineer battalion.[52] Meantime, Reybold's journey had another, unlooked for, result. Discovering on visits to division and district offices that service commanders were encroaching on his jurisdiction, the Chief took prompt action.

In a monitory message to division engineers, he stressed loyalty to the Corps. As construction diminished and work in the field offices slackened, district engineers were taking on more jobs for the service commands. Lines of demarcation between engineer divisions and directorates of Real Estate, Repairs and Utilities were becoming less distinct. Still rankling over a recent loss of authority (the power to assign post engineers now belonged to service commanders) and highly suspicious of Somervell's intentions (the recent change in name from Services of Supply to Army Service Forces—what did that portend?), Reybold issued a ukase against "entangling agreements" and "informal arrangements cutting across command channels." Faced with a choice of demobilizing or joining forces with the

[50] (1) Constr PR's, Dec 1942, p. 8; and May 1943, p. 26. (2) OCE Memo 290, 7 Apr 43. 020 (Engrs, Off, Chief of) Part 1. (3) OCE Memo 302, 11 May 43. Same loc as (2). (4) OCE GO 13, 21 May 43.

[51] Quoted in *The Constructor*, June 1943, p. 27. See also *Ibid.*, August 1943, pp. 25, 42–43.

[52] Maj. Gen. Eugene Reybold, "Construction at War," *The Constructor*, March 1944, p. 38.

service commands, the Engineer Department would demobilize.[53]

Late in July, at a conference in Chicago marking the first anniversary of the service commands, Reybold reached an impasse with "Somervell and his tribe."[54] In a curtain-raising speech which set the tone of the meeting, General Robinson inveighed against the attitude of "some technical services" that "they cannot discharge the responsibility for their functions without direct supervision of all their so-called personnel in the field." Service commanders were more specific. Referring to the recent ban against "informal arrangements," one of them complained: "We had a very fine system . . . . On instructions of the Chief of Engineers, this was discontinued." Confronted by his critics, Reybold refused to budge. When one commander asked him point-blank, "Should division engineers and their activities be placed directly under the jurisdiction of service commanders?" his answer was a categorical "no"; he reminded his questioner that the Engineer field had "many things to do aside from the military." Noting this disagreement, Somervell declared:

> General Eisenhower and General MacArthur and a good many other people have been given complete responsibility for all activities that transpire within the territorial limits of their command; and that being the case, there is no justifiable reason why the same principle should not apply in the service commands. . . .
>
> It is to be remembered that in each one of these service commands there is far more activity now than there was in the whole War Department before the war. . . . So why the service command should not be a little War Department, self-contained, carrying out all the functions in those service commands that we in turn are responsible for . . . is still pretty difficult to answer in the negative.

The threat was clear. If Somervell's plan went through, the Corps of Engineers and the other technical services would cease to exist.[55]

Immediately upon his return to Washington, General Reybold set about erecting roadblocks. By early August his staff had completed a detailed analysis of the conference minutes and had prepared an elaborate defense of the Engineer position. A 40-page communiqué was soon in the hands of every key official in the Corps.[56] Before the end of the month, Reybold had adopted a plan to transfer procurement of supplies and equipment for Engineer troops from regional purchasing offices to the "river and harbor divisions." This move would not only strengthen the Engineer Department but would also place Engineer procurement beyond Somervell's control, since civil works was entirely outside his jurisdiction.[57] To penetrate the secrecy imposed by Somervell on ASF planners required some undercover work. But Reybold and his fellow service chiefs kept abreast of what was going on.

Amid rumors that General Marshall would be "kicked upstairs" to take command in Europe and that General Somervell would become Chief of Staff, the service chiefs leaked the reorganization scheme to Congress. Remarks in-

[53] Ltr, Reybold to Div Engrs, 16 Jun 43. EHD Files.

[54] Reybold Interv, 12 Mar 59.

[55] Transcript, Conf of CG's, Svc Comd's, at Chicago, Ill., 22–24 Jul 43, pp. 98, 47, 303, 383.

[56] Ltr, Control Br, OCE to Div, Br, and Sec Chiefs, OCE, and Div and Dist Engrs, 2 Aug 43. EHD Files.

[57] OCE Circ Ltr 2516, 24 Aug 43.

serted in the *Record* on 22 September by Representative Paul W. Shafer produced a furious to-do. Condemning "those in Government today who would play politics with the War Department," the Michigan Republican revealed: "I have seen a blueprint of a plan which would presumably streamline the War Department, but in reality its intent is to convert that great department into a New Deal political organization."[58] Under sensational headlines, details of the impending "domestic *coup d' etat*" appeared in the press. According to a front-page article in the Washington *Times-Herald*, the plan, cooked up by a White House "cabal," was designed to give Somervell "personal control" of the Army's production funds and to build him up as a "running mate for Mr. Roosevelt on a fourth term ticket to offset the possible Republican nomination of General Douglas MacArthur." General Marshall, an implacable foe of politics in the Army, had to be gotten out of Washington. Explaining the mechanics of the scheme, the article continued:

> The *coup d'etat* is to be accomplished by abolishing all production activities by the seven highly skilled technical supply services and transferring their $22,000,000,000 purchasing power to the Army Service Forces, which Somervell now heads. All these technical services are now grouped under Somervell, but he has no control over their expenditures, contract negotiations, or production schedules.[59]

Recognizing the value of corps traditions and loyalties, satisfied that production was going well under the existing system, and unwilling to stir up "a hornet's nest right in the middle of a war," Secretary Stimson vetoed the plan to abolish the technical services.[60] Commenting on the affair, General Gregory later said of Somervell: "If he hadn't been so much of a slicker, he could have succeeded General Marshall. You know you can kind of out-slicker yourself if you go too far with that kind of stuff."[61]

Having survived the attempted takeover, the Engineer Department had to cut expenses. Neither the transfer of military purchases to division offices nor a modest increase in civil works approved by Congress in mid-1943 could offset the sharp decline in military construction. From 7.4 percent in January 1943 administrative field overhead rose alarmingly to 14 percent by the end of the year. Recommending that General Robins abolish some districts and confine others to civil works, Colonel Antes cited the example of the Wright Field office, an organization with 579 employees and only 3 projects. After consulting division engineers, Robins adopted a plan for gradually eliminating such temporary wartime districts as Wright Field and for reducing to approximately twenty the number of permanent districts directing military construction. Put into effect during 1944, this plan enabled the Engineers to cut

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[58] 89 *Cong. Rec.* A3987.

[59] William K. Hutchinson, "Army Shake-up Plot Perils 16 Commands," written for the International News Service as it appeared in the Washington *Times-Herald*, September 25, 1943. Reprinted in 89 *Cong. Rec.* A4001–02. See also Millett, *The Army Service Forces*, pp. 408–11.

[60] Henry L. Stimson and McGeorge Bundy, *On Active Service in Peace and War* (New York: Harper & Brothers, 1947), p. 452.

[61] Verbatim Rpt, Meeting with Gregory and Hastings, p. 29.

the size of their administrative force by almost 50 percent.[62]

As the field organization shrank, more responsibility shifted to temporary officers. To be sure, only top Engineer professionals were division engineers. Exemplifying the type of man selected for these posts was Brig. Gen. Roscoe C. Crawford, a former commandant of the Engineer School. Crawford took over the Missouri River Division early in 1944, after Pick departed for the China-Burma-India Theater. In this period, however, the majority of district engineers were of a different breed. By 1944 Reservists, most of them long-time employees of the Corps, headed three-fifths of the districts. According to Reybold, there was one difficulty with these uniformed civilians: many had been under officers so long that they were hesitant about making decisions. Nevertheless, the Chief observed, most rose to the occasion and did "a bang up job."[63] As insurance against failures in the districts, he relied on a small group of troubleshooting Regulars, former Quartermaster officers who were experts in contract construction but lacked experience with troops and Engineer veterans who were unequal to the rigors of service overseas.

In the Washington headquarters, construction was further de-emphasized. On 1 December 1943, General Reybold streamlined his organization to insure maximum support for the fighting forces. Moved up to the newly created post of Deputy Chief, General Robins focused his attention on the more than half a million Engineer troops serving around the world. Reporting directly to him were the two Assistant Chiefs of Engineers—for War Planning and for Military Supply. The position of Chief of Construction disappeared from the charts, and the Construction Division split into three independent divisions: Military Construction, under Colonel Kuldell; Civil Works, under Colonel Goethals; and Real Estate, under Colonel O'Brien.[64] (*Chart 22*) Although they came under Robins' supervision, these divisions required but little of his time. For the duration, their work would be of secondary concern.

Writing to a Los Angeles businessman early in 1944, Colonel Antes stated:

> As long as the war continues, a certain amount of routine war construction is anticipated. . . . However, the trend is definitely downward, the dollar value of new work authorized during December 1943 having been only 12 percent of that authorized during January 1943. This downward trend will be accelerated as the military program proceeds; and, barring serious military reverses, the prospects are that new war construction in 1944 will show a steady decline from even the present levels.[65]

This forecast proved accurate.

Late Programs

As the United States entered its third year of war, homefront preparations were virtually complete and in the

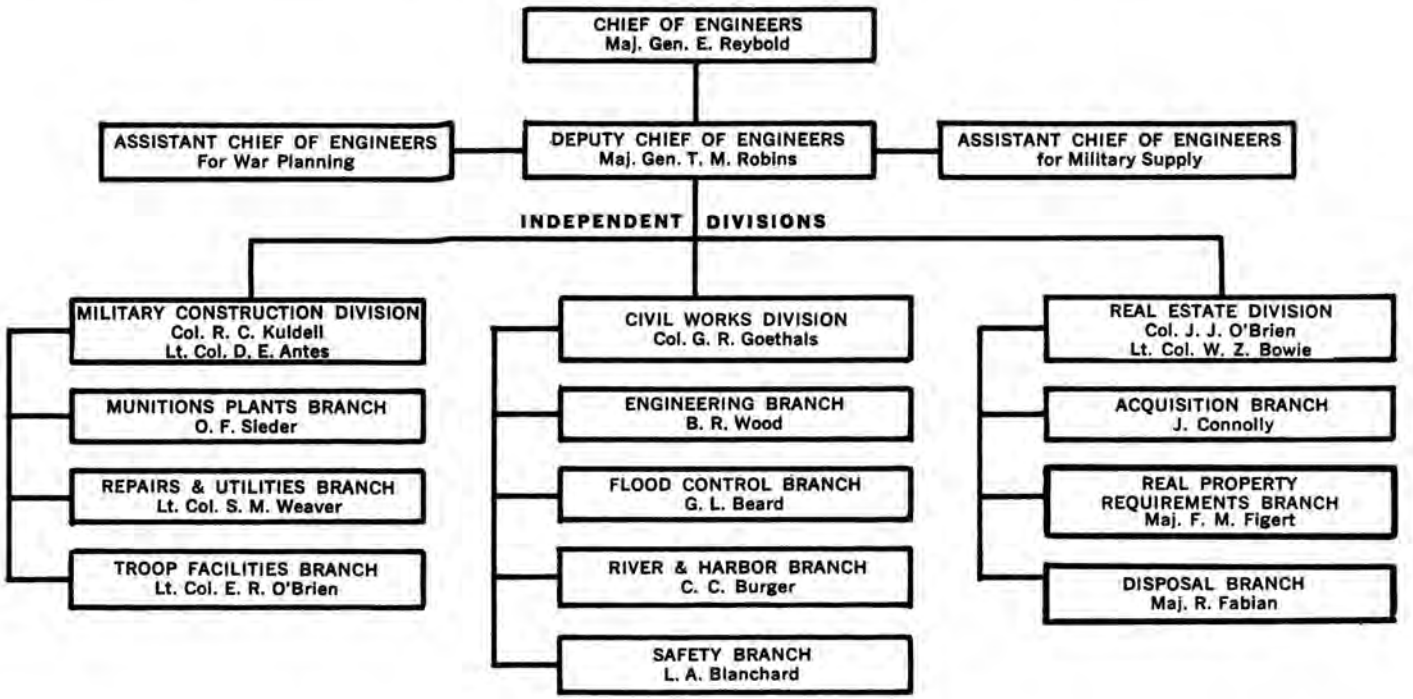
[62] (1) Memo, Antes for Kuldell, 19 Jan 44. EHD Files. (2) Ltr, Robins to Div Engrs, 7 Apr 44. 323.3. (3) 323.4 Nov 42–May 44. (4) OCE Circ Ltr 3203, 31 Jul 44. (5) Annual Rpts of Mil Activities, OCE, 1 Jul 43–30 Jun 44, p. 95; and 1 Jul 44–30 Jun 45, p. 126.

[63] Reybold Interv, 12 Mar 59.

[64] (1) OCE Memo 395, 24 Nov 43. (2) Blanche D. Coll, Jean E. Keith, and Herbert H. Rosenthal, *The Corps of Engineers: Troops and Equipment*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1957), pp. 216–19.

[65] Ltr, Antes to C.O. Ducker, 11 Jan 44. EHD Files.

CHART 22—ORGANIZATION OF MILITARY CONSTRUCTION, CIVIL WORKS, AND REAL ESTATE DIVISIONS, OCE
DECEMBER 1943



Source: OCE Orgn Charts, 15 Dec 43. EHD Files.

theaters crucial offensives were at hand. Since July 1940, the Quartermaster Corps and the Corps of Engineers had constructed an $11-billion military plant in this country, providing more than 1,800 command installations (training centers, airbases, supply depots, staging areas, ports of embarkation, general hospitals, harbor defenses, and POW camps) and 2,200 industrial facilities (manufacturing plants, proving grounds, shops, and laboratories).[66] From the great base in the United States, American armies were advancing toward a decisive test of strength with the Axis forces. With the coming invasion of Europe in mind, General Reybold spoke for the Engineer Department:

> Home front problems become small . . . . As our men go forth to the toughest and bitterest task in our history, ... our dominating, driving determination is to back the fighting front, to speed the hour of triumph, to reduce the awful toll of war—and to preserve and strengthen the liberties and freedoms for which American men at this moment are dying.[67]

Mindful that unnecessary homefront projects were still afoot, General Robins imposed restraint by centralizing approvals in Washington. On 2 December 1943 he withdrew the division engineers' authority to approve minor jobs. Following Robins' lead, Somervell soon established even stricter controls: all projects costing more than $1,000 needed certification by the Chief of Engineers and clearance from the Commanding General, ASF; all those costing $10,000 or more had to have the Chief of Staff's approval.[68] When field commanders protested that requests bogged down in the seemingly endless channels of the War Department, Somervell told them: "I have attempted to interpose all the red tape possible—and that is a lot." He went on to explain:

> I cannot stand up before the country and before Congress and justify the expenditure of millions of dollars for construction work which is desirable but which does not have anything to do with winning the war; and so I have adopted what is admittedly a very cumbersome, fabian policy of delay in the hope that eventually you will get tired of asking for new construction and quit . . . . There will be no question of delay if the matter is really necessary. Where it is a question of putting a fur lining in the swimming pool, we are certainly going to take a long time before we do it.[69]

The policy succeeded. During the last 20 months of the war, excluding secret projects, expenditures for construction came to only $843 million, a sum not appreciably greater than the value of work placed in the single month of July 1942.

By early 1944 construction activity had sunk to about the level recorded for October 1940, a level not substantially exceeded during the remaining months of war. (*Chart 23*) At the beginning of 1944 Colonel Kuldell carried on his books unfinished construction amounting to $143 million. (*Table 20*) Of 2,108 uncompleted jobs, only 142 would cost $50,000 or more.[70] During the first quarter of 1944, construction authorizations averaged $26 million per month.

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[66] WD, *Quarterly Inventory: Owned, Sponsored and Leased Facilities*, 31 Mar 44, pp. 3–4.

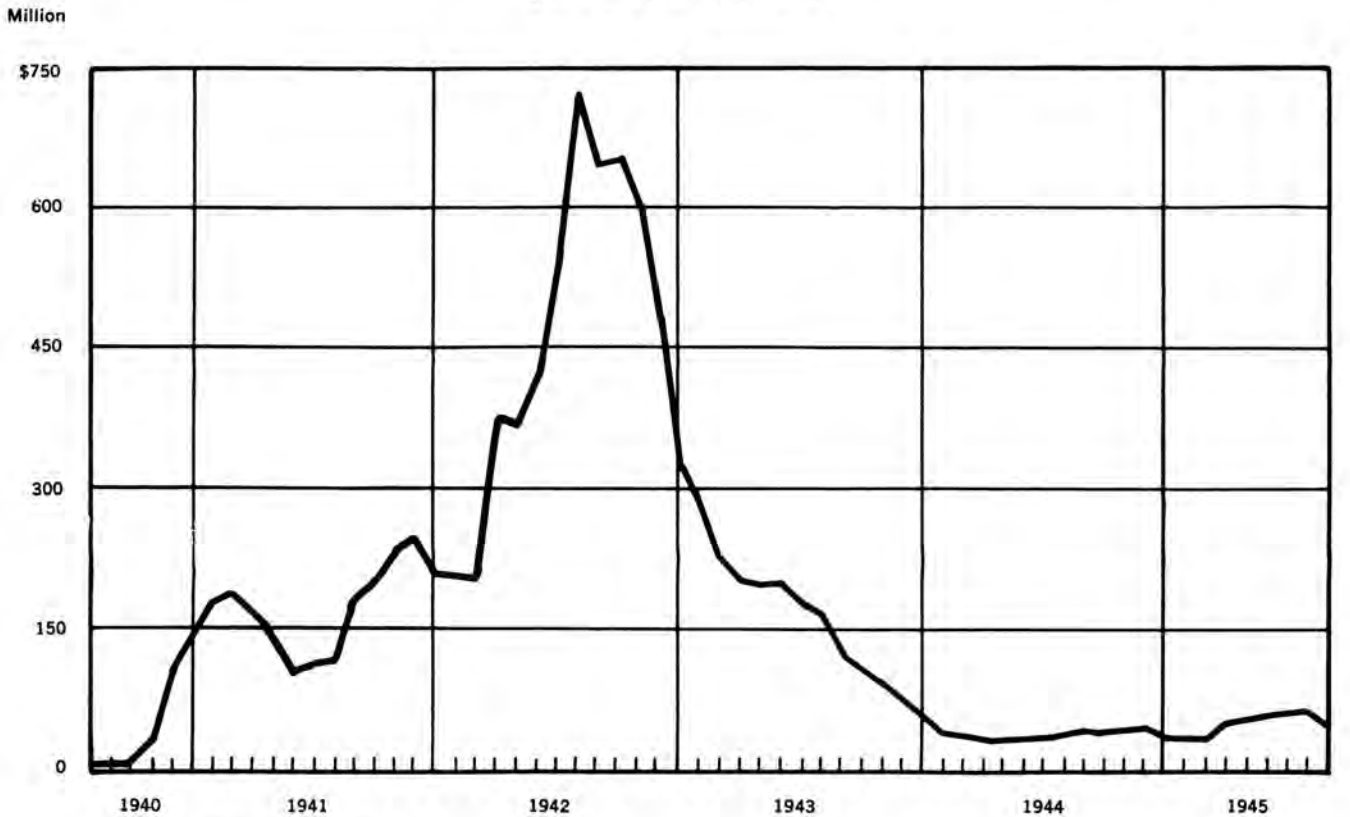
[67] Maj. Gen. Eugene Reybold, "Construction at War," *The Constructor*, March 1944, p. 58.

[68] (1) OCE Circ Ltr 2626, 2 Dec 43. (2) ASF Circs 78, 18 Mar 44; 178, 13 Jun 44; and 271, 23 Aug 44.

[69] Transcript, Service Command Conf, at Ft. Leonard Wood, Mo., 27–29 Jul 44, p. 67.

[70] Constr PR, 31 Dec 43, pp. 5–6.

CHART 23—VALUE OF WORK PLACED ON WAR CONSTRUCTION PROGRAM, CONTINENTAL UNITED STATES
JUNE 1940–AUGUST 1945



Source: ASF, *Statistical Review: World War II*, p. 12.

TABLE 20—UNFINISHED CONSTRUCTION, JANUARY 1944

Type of Facility	Amount of Work Remaining
Total	$143,039,000
Air Force	71,719,000
Ground Force	17,436,000
Industrial	26,271,000
Storage & Shipping	16,468,000
Miscellaneous	11,145,000

Source: Constr PR, 31 Dec 43, p. 5.

Most of the new projects were extensions to runways, conversions of barracks for the Women's Army Corps, minor alterations at munitions plants, and additional warehousing and open storage. By far the largest project undertaken in this period was a $10.2-million intertransit air depot at Alameda, California—a vast complex of railroads, sidings, warehouses, wharves, and deepwater docks—which was to serve as a principal supply point for the final offensives against Japan. Also worthy of mention were 1,400 flexible gunnery training devices, known as Poorman trainers, to be installed at 48 airfields. Invented by Maj. Fred S. Poorman of the Engineering Division, OCE, these trainers increased gunnery accuracy from 30 to 75 percent.[71]

No less marked than the shrinkage in construction was the altered character of O'Brien's real estate operations. As the induction rate slowed and overseas deployment accelerated, the demand for troop housing diminished. As the possibility of enemy attacks became increasingly remote, defensive installations seemed less needful. As food shortages threatened the home front, more land had to go under cultivation. Late in 1943, Under Secretary Patterson told Reybold: "The acquisition phase of the War Department's land program has now been accomplished." Patterson asked the Engineers to "scrutinize present utilization of our military installations to determine which properties, if any, may be excess or surplus to present needs, and, where indicated, return such properties to private ownership or occupation."[72] By early 1944 the Real Estate Division was disposing of surplus holdings. Roughly 165,000 acres of idle agricultural land owned by the War Department were going under lease to farmers. Dozens of tactical airfields, antiaircraft artillery sites, harbor defenses, and other protective installations—including even Fort Brady, Michigan, which guarded the vital locks at Sault Sainte Marie—were changing hands. Several military reservations, the largest of which was a 17,000-acre tract near Toccoa, Georgia, were up for sale or transfer. Many of the hotels leased in 1942 had already reverted to their owners; and the Corps had auctioned off the

[71] (1) Constr PR's, Jan–Mar 44. (2) 614 Part 2.

[72] Memo, Patterson for Reybold, 4 Nov 43. RE Div Files, Gen Corresp—W. Z. Bowie, 1944.

Stevens Hotel in Chicago for $5.3 million, only $300,000 less than the purchase price—a small markdown, considering that the Air Forces had occupied the building for more than a year. Except those serving as hospitals, the remaining hotels were soon to be let go.[73]

Cancellation of the hotel leases evoked angry protests from owners. Military tenants had left once proud properties in sad condition. Plaster had been damaged, woodwork marred, windows cracked, and mirrors shattered. Repeated scrubbings with GI soap had ruined hardwood floors. Looters had smashed in doors and plundered storerooms. Evidence of hard usage and of vandalism was widespread. Dissatisfied with restoration settlements offered them by the Engineers, owners appealed to the Truman Committee. At hearings in Miami during January 1944, witnesses aired their grievances against the Corps. After pressing claims for additional damages, they charged that the original leases were grossly unfair and had been obtained by intimidation and deception.[74] Published in March 1944, the committee report contained the first serious criticism of the Corps' wartime activities. "The manner in which the hotel acquisition program was carried out," the report concluded, "resulted in many injustices which the War Department has shown little inclination to correct."[75] This judgment did not go unchallenged. Expressing "substantial disagreement" with the committee's findings, the president of the National Association of Building Owners and Managers went on record: "Not only has the work of the Real Estate Branch been conducted efficiently and with dispatch, under the pressure of insistent war needs, . . . but this has been done in a spirit of fairness and consideration for those whom this program has necessarily inconvenienced."[76]

Scarcely had the Miami hearings ended before demands arose for a full-scale inquiry into another matter. Early in February the Philadelphia *Inquirer* headlined the news: "Congressmen Seek Probe of Pentagon Cost." Calling the building "Somervell's Folly," and alluding to "fabulous spending, waste, and skullduggery," members of the House Ways and Means and Appropriations Committees rallied behind Congressman Engel, who was winding up a five-month personal investigation of "the city with the roof on top."[77] In a speech before the House on 29 February 1944, Engel fixed the total outlay for the project at roughly $86 million, $51 million more than originally appropriated, and he taxed responsible officials with "an utter disregard . . . for the wishes of Congress." In a second speech one week later, he replied to a recent War Department statement that the Pentagon would pay for itself in 8 to 14 years by marshaling figures to show that in 50 years operating deficits would run the cost to the taxpayers to nearly $250 million.[78] Among the military, Engel's allegations produced some consternation. Breaking faith with Congress was an unpardonable offense.

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[73] (1) Constr PR, 31 Mar 44, p. 39ff. (2) RE Div Files, Leasing. (3) 601.1 (Stevens Hotel) II.

[74] Truman Comm *Hearings*, Part 21, *passim*.

[75] S Rpt 10, Part 16, 78th Cong, 2d sess, p. 132.

[76] Ltr, Pres, Natl Assn of Building Owners and Managers, to Truman, 10 Mar 44. 601.1 Part 10.

[77] Philadelphia *Inquirer*, February 7, 1944, p. 1.

[78] 90 *Cong. Rec.* 2102–10 and 2289–92.

Forewarned of Engel's attack, the Engineers made defensive preparations. Colonel Renshaw, the former project engineer, returned from the Philadelphia District. Mr. Hadden, long a member of General Groves' cabinet, went to work on the case. From his secret headquarters on the fifth floor of the New War Building, Groves helped mastermind the strategy. Meanwhile, Somervell armed friendly congressmen with facts and figures. When Mr. Engel took the floor, the defense was ready.[79] Placing the cost of the Pentagon at $63 million, a War Department spokesman announced:

> The cost of a battleship doesn't include harbor installations. Engel has included highways that were planned in 1934, when no one had dreamed of a Pentagon. He's included sewage and drainage systems used by other buildings. The original estimate did not include a fifth floor, built as a war necessity, or 40,000 caissons, necessary because the building site was changed from high to low ground after the original plans were drawn.
>
> The Pentagon, built faster than any building in the world, has helped us toward victory by providing operating efficiency. Costs of building were increased by the exigencies of war.[80]

Congress seemed willing to let it go at that. Light applause from the Republican side of the House was the only congressional response to Engel's counterblast. Public interest flickered briefly and died.[81] In an article entitled "Engel and the Monster," *Newsweek* on 20 March reported that the Pentagon probe was over.[82]

By early 1944, most construction-minded congressmen had less interest in the past than in the future. Plans for postwar public works were under scrutiny on Capitol Hill, and special committees of the House and Senate were considering various blueprints for long-term national development. The Corps of Engineers was compiling a backlog of potential river, harbor, and flood control projects. In Colonel Goethal's office, the work of building a "reserve shelf" of useful undertakings was making rapid headway. Looking forward to the time when the Corps could again build "for the benefit of mankind," General Reybold reported in March 1944:

> For additional navigation improvements, advance planning has been done on projects that constitute a potential billion dollar program, and the program could be quickly expanded to two billion dollars. The potential flood control program involves an expenditure of over two and a half billion dollars. This work, like many other things, must now await victory over the Axis. But we are making progress toward that goal—substantial progress.[83]

Obscured by visions of peaceful endeavors, war construction continued. Totaling approximately $100 million, directives issued in the spring of 1944 covered 650 new projects, almost all of them minor. Called from Atlanta shortly after D-day to replace Kuldell as Chief of Military Construction, Brig. Gen. John S. Bragdon assumed direction of a program amounting to only $160 mil-

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[79] 600.1 (Pentagon Bldg) Part 3.

[80] *Newsweek*, March 20, 1944, p. 57.

[81] (1) Memo, Hadden for Record, 1 Mar 44. 600.1 (Pentagon Bldg) Part 3. (2) Washington *Times-Herald*, March 1, 1944, p. 2. (3) Washington *Evening Star*, February 29, 1944, pp. A1 and A4. (4) Washington *Post*, March 1, 1944, p. 3. (5) New York *Times*, March 1, 1944, p. 7.

[82] *Newsweek*, March 20, 1944, p. 57.

[83] Maj. Gen. Eugene Reybold, "Construction at War," *The Constructor*, March 1944, p. 58.

lion. Barely more than 100 major jobs were under way at the time; noteworthy among them were a large climatic hangar at Eglin Field, Florida, designed to test aircraft under extreme temperatures; a research center for biological warfare at Camp Detrick, Maryland; two huge postal concentration centers to handle the flood of mail moving through the New York and San Francisco ports; and three sizable industrial plants—one for making phosgene, at Monsanto, Tennessee, one for manufacturing stick powder, at the Badger Ordnance Works in Wisconsin, and one for forging 155-mm. shells, at Fontana, California.[84] Although the volume of construction would remain small, Bragdon's was to be a challenging assignment.

A shortage of heavy ammunition provided the first and greatest test of his leadership. Believing that the war in Europe would be mobile and that the jungles of the Pacific area would restrict the use of big guns, military planners had slashed shell requirements in November 1942 and again in February 1943. By late 1943 the output of ammunition was more than meeting the demands of theater commanders. As stocks accumulated, the Chief of Ordnance took steps to reduce production and by the end of the year had shut down a score of plants, dismantling some, placing some in standby status, and converting some to other use. Early in 1944, the situation changed.

> It became evident [Somervell reported] that heavy artillery was destined to play a far larger role than had been anticipated. Effective use of the 155-mm. gun in the North African campaign and in the Pacific against the Japanese increased the demands for this weapon from theater commanders. Experience on the Italian front during the winter of 1943–44 showed that expenditures of heavy artillery ammunition had been underestimated.

In an effort to meet this emergency, General Campbell stepped up production, cut training allocations, stripped his depots bare, and borrowed from the Navy. But these measures proved inadequate. After the Normandy landings, shortages of large artillery and mortar shells threatened to blunt the Allied drive across France. Clearly, additional capacity was necessary.[85]

By mid-1944 the Engineers had a crash program on their hands. At a briefing for the new chief of Military Construction on 21 July, Sieder gave a rundown of the projects: seven facilities for forging and machining shells; sizable additions to the Badger, Radford, and Sunflower powder works; enlargement of the Alabama and Kankakee TNT plants; and expansion of two dozen shell, bomb, and bag loaders. To cost roughly $100 million, this work carried an end-of-the-year completion date. During the next several months, the size of the program more than doubled, as Bragdon got orders to build more shell casing factories, to reactivate standby plants, and to add or convert lines at project after project. How much of this capacity would be available before Germany surrendered? How much would be needful in the war against Japan? Dubious about launching so large an effort so late in the European war, Somervell ruled that most of the muni-

[84] Constr PR's, Apr–Jun 44.

[85] ASF, *Annual Report for the Fiscal Year 1944* (Washington: 1944), pp. 8–10. For a detailed account of the heavy ammunition crisis, see Thomson and Mayo, *Procurement and Supply*, pp. 144–50.

tions jobs would stop dead when American armies crossed the Rhine. Until then, Bragdon and Sieder were to go all-out.[86]

Cutting corners saved time. Disregarding policy, Bragdon awarded fixed-fee contracts for four-fifths of the projects and at ten of the largest jobs permitted architect-engineer-managers to do all work with their own forces. Despite objections from finance officers, Sieder commenced construction before funds were available from Ordnance. Pleading necessity, he called attention to a recent directive for reactivating a partially dismantled TNT plant. The project involved replacement of machinery and equipment, restoration of buildings, and renovation of corroded piping. "The cost of this work," said Sieder, "obviously could not be determined until after detailed investigations were made in the field. Meanwhile, however, it was perfectly advisable to purchase materials and start work on the rehabilitation." Had he waited for a detailed estimate and a formal allotment of Ordnance funds, several weeks would have been lost.[87] If such methods raised eyebrows, they also produced results. By October work was under way at nearly three dozen projects and several new lines were already producing.[88]

By 1944 shortages of labor were the chief impediment to construction progress. The materials pinch had eased by then and manpower had become the number one homefront problem. As appeals for help came in from the field, Robins went to work. He enlisted aid in rounding up mechanics from the Building Trades Department of the AFL; he established trailer camps at remote locations to provide worker housing; and he paid transportation costs from points of recruitment to project sites. Meanwhile, a step proposed by Sieder and acceded to by Ordnance—the cancellation of automatic sprinkler systems—eliminated requirements for several thousand critically scarce pipefitters. When the situation continued serious, General Robins asked Somervell to place the plant program on the urgency list. Robins pointed out that the list included all items the plants manufactured but, illogically, not the plants themselves. Although Somervell refused to go all the way, he did consent to list the five most troublesome projects—Gopher, Badger, Indiana, Cornhusker, and Susquehanna. Believing that the other jobs could probably get along all right, Robins let the matter rest.[89]

In the midst of their drive to expand industrial capacity, the Engineers received another big assignment—to provide more bases for B–29's. Reaching quantity production during 1944, the long-range "Superfortress" was destined for a decisive role in the war against Japan. Beginning in October 1944, the directives accumulated: for

[86] (1) Memo, Sieder for Bragdon, 21 Jul 44. Munitions Plants Br Files, 1944 (Gen). (2) Constr PR's, Aug–Sep 44. (3) Min, ASF Staff Conf, 26 Sep 44. 337 (ASF Staff Confs).

[87] Memo, Sieder for Bragdon, 7 Oct 44. Munitions Plants Br Files, 1944 (Gen).

[88] (1) Constr PR, Oct 44, pp. 15–20. (2) Memo, Bragdon for OCofOrd, Ammo Div, 26 Oct 44. 635 Part 4. (3) Memo, OCofOrd, Ammo Div, for Bragdon, 27 Oct 44. 635 Part 4.

[89] (1) Memo, Sieder for Bragdon, 25 Nov 44. Munitions Plants Br Files, 1944 (Gen). (2) Ltr, Reybold to Div Engrs, 18 Dec 44. 671.3 Part 3. (3) Memo, Robins for ASF, 13 Oct 44. 600.1 (Labor) Part 5. (4) Memo, Labor Rel Br for Barker, 8 Jan 45. Labor Rel Br Files, General.

longer, stronger landing strips at 19 Army airfields; for 25 large hangars at 18 locations; and for taxiways, hardstands, and similar facilities capable of bearing 120,000-pound gross loads. Estimated to cost in the neighborhood of $25 million, the program was well under way by early winter. The toughest problems encountered in construction were technical ones, having to do with pavement design. Nevertheless, the B–29 projects increased the strain both on tight labor markets and on the Engineer organization.[90]

Another program, which took shape around the turn of the year, increased the strain still further. As the number of casualties mounted, the President expressed concern over the welfare of the sick and wounded who would soon be returning to the United States. Early in December 1944 he reminded Stimson that these men deserved "the ultimate" in institutional care. Late in January 1945 the Chief of Engineers began a $54-million program of hospital construction: expansion of 48 general hospitals to provide 43,500 more beds and conversion of 12 station hospitals to accommodate 49,800 convalescent patients. The plans included physiotherapy clinics, libraries, chapels, guesthouses, swimming pools, gymnasiums, bowling alleys, and virtually all types of outdoor recreational facilities. By Washington's Birthday, General Bragdon could report that 48 of the new projects were under construction and that the remaining ones would start within 10 days. He promised that all the new facilities would be ready for use on or before 30 June.[91]

Meanwhile, the number of munitions projects had climbed to more than 100 and the total price of the industrial program was close to $400 million. During the fall of 1944, American forces in Europe experienced increasingly desperate shortages of heavy ammunition. After repeated cabled appeals for more large-caliber shells, General Eisenhower dispatched a mission late in November to present his needs to the War Department. Eisenhower's calls for help caused grave concern in Washington. A personal inspection of the European Theater early in January convinced Somervell that there were "not enough 'A's' in all the alphabets in the United States" to write the priority Ike should have.[92] Shortly after Somervell's return, the Engineers received hurry-up orders for additional plant expansions having a total estimated cost of $164 million.[93]

So acute was the manpower shortage when these directives hit that some military planners toyed with proposals for a work-or-fight law. Reviewing the situation early in 1945, Maj. William A. Mowery of Colonel Barker's staff wrote:

> Manpower . . . in construction is tight and it will get tighter. . . . All concerned in our construction program must keep in mind that, in contrast to the early days of the construction program, we can no longer round up large numbers of work-

[90] (1) Annual Rpt of Mil Activities, OCE, 1 Jul 44–30 Jun 45, p. 74. (2) 600.1 Part 15. (3) 686 Part 3. For a discussion of the technical problems involved, see ch. XIX, below.

[91] (1) Memo, ASF for Reybold, 22 Jan 45. 683 Part 1. (2) Ltr, Actg TSG to Somervell, 24 Jan 45. 631 Part 5. (3) Annual Rpt of Mil Activities, OCE, 1 Jul 44–30 Jun 45, p. 76. (4) 1st Ind, 22 Feb 45, on Memo, ASF for Reybold, 7 Feb 45. Same loc as (1).

[92] Roland G. Ruppenthal, *Logistical Support of the Armies*, Vol. II, UNITED STATES ARMY IN WORLD WAR II (Washington, 1959), pp. 263–71.

[93] Constr PR's, Jan–Feb 1945.

men overnight. It is now a long, tedious process of recruitment . . . . Construction contractors never before encountered such problems and many of them haven't the slightest idea what to do about them.

The Corps had to take the initiative.[94] General Robins appealed again, this time successfully, to have the entire program placed on the urgency list.[95] At the same time, he issued orders requiring closer co-operation with the War Manpower Commission and the U.S. Employment Service. His orders to the field read:

In the past, many construction contractors have relied entirely upon their own resources and, in the case of union contractors, upon the labor organizations to supply their manpower needs. This practice has resulted in a disregard of the War Manpower Commission and other agencies charged with the responsibility for proper utilization of available manpower. Not infrequently, these agencies are called upon only after other methods have proven inadequate and after the projects involved have fallen behind schedule. Such haphazard methods can no longer suffice, particularly in view of the increasingly acute nationwide labor shortage and the more stringent manpower controls which are being established for all war industry.[96]

To deal with a critical shortage of common labor, he obtained authority to employ 1,500 furloughed soldiers and 2,000 German POW's. Although most projects could have used more men, few experienced delays. On 1 March all but one were on schedule.[97]

The spring and summer of 1945 witnessed rapid changes in the construction mission. With the Rhine crossings in March and the opening of the drive across Germany, the munitions program underwent sharp curtailment. Work continued on a few large plants needed for the war in the Pacific. With the German surrender on 8 May, the Army began to call for redeployment training centers at 12 large camps; for disciplinary barracks on either coast; and for a large redistribution station in Texas. A plan of Somervell's—for prettying up separation centers "to give the enlisted men a final good impression of the Army"[98]—went into operation late in June. Meanwhile, preparations for the scheduled invasion of Japan in November 1945—expansion of West Coast depots, improvements to Pacific ports, and construction of a huge base for the Air Transport Command at Fairfield-Suisun, California—proceeded rapidly. The dramatic events of early August cut these preparations short.

The war was over. But the engineering story behind the final victory was not yet fully told.

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[94] Memo, Mowery for Barker, 5 Jan 45. Labor Rel Br Files, Kankakee OW.

[95] (1) Memo, Robins for Madigan, 5 Jan 45. Same File. (2) CPA, *Industrial Mobilization for War*, pp. 873–74.

[96] OCE Circ Ltr 3471, 5 Jan 45.

[97] (1) Annual Rpt of Mil Activities, OCE, 1 Jul 44–30 Jun 45, pp. 109–10. (2) Memo, Mowery for ASF, 3 Mar 45. Labor Rel Br Files, Hq, ASF.

[98] Memo, Somervell for Reybold, 3 Jun 45. 685 Part 2.

CHAPTER XIX

Airfields for Very Heavy Bombers

On 15 June 1944 a large flight of Superfortresses took off from fields in China to carry out a devastating raid on southwestern Kyushu. That same day two Marine divisions invaded Saipan in the Marianas, some 1,500 air miles south of Tokyo. With these operations the United States inaugurated a new strategy in the war against Japan—a strategy based on bombing by B–29's of Nippon's industrial cities. Planes of a revolutionary type, the B–29's had a gross weight of 140,000 pounds when fully loaded, and an effective range of 3,250 miles. Their appearance in the skies above Japan climaxed years of effort by aircraft designers and manufacturers, by air force training centers, and, last but not least, by airfield engineers.[1] The importance of construction engineering in the development of air power was emphatically confirmed in a statement by General Arnold: "Air bases are a determining factor in the success of air operations. The two-legged stool of men and planes would topple over without this equally important third leg."[2] Designing bases for very long-range bombers was among the most difficult technical missions accomplished by the Corps of Engineers in World War II.

The Technological Barrier

Experience with the first long-range bomber, the XB–19, suggested the magnitude of the engineering problem. Built at Santa Monica, California, by the Douglas Aircraft Company in the spring of 1941, the big ship had a maximum gross weight of 160,000 pounds, the equivalent of two railroad boxcars loaded to capacity. When it emerged from the Douglas hangar at Clover Field on 6 May, the newly assembled plane broke through the apron to a depth of about one foot. Towed with considerable difficulty to one of the airport's asphalt runways, it caused noticeable damage as it taxied over the surface. Not until 27 June, when a recently laid concrete strip was ready for use, did the XB–19 take off on its maiden flight to March Field.[3] On hand to observe the landing were members of Colonel Kelton's Los Angeles District staff. Reporting the plane's arrival, Kelton wrote to General Schley:

No marking or imprint was evident at the point of landing, but as the ship lost speed a faint depression and hairline cracks appeared, increasing in severity as the speed was further

[1] Wesley F. Craven and James L. Cate (eds.), *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945, The Army Air Forces in World War II*, Vol. V (Chicago: U of Chicago Press, 1953), pp. 3, 6–9. Cited hereinafter as Craven and Cate, *Matterhorn to Nagasaki*. See also Craven and Cate, *Men and Planes*, pp. 208–11.

[2] Maj. Gen. Henry H. Arnold, "The Air Forces and Military Engineers," *The Military Engineer*, December 1941, p. 548.

[3] 2d Ind, Kelton to Reybold, 26 Mar 42, on Ltr, OCE to SPD, 21 Oct 41. 686.61 1941–45.

reduced. At the point where the ship turned to cross the oil-earth landing mat onto the apron, the depressions were at least one inch in depth and the cracks quite large.

Pointing out that the plane was lightly loaded and conditions were ideal—the weather was dry and the ground water level, low—Kelton warned that worse breaks were likely to occur. After heavy rains, "extreme damage" could result from landings by fully loaded B–19's.[4]

A technological barrier had been reached. Superbombers required superairports for which there were few engineering guidelines. The huge four-engine planes, with their exceptionally heavy loads, great landing speeds, pounding vibrations, and violent propeller blasts called for revolutionary methods of design. Runways would have to be longer and wider, pavements stronger, and grades gentler than before. Drainage would be more complex and dust control more needful. Theory would have to extend far beyond the limits of experience. Research would have to be energetically prosecuted. Discussing the challenge that had faced the Engineers, a spokesman for the Air Forces said in 1945:

> Only a short time ago the experienced airport engineer found no particular problem in the design of a runway pavement. His specialized knowledge was supported by the experience of hundreds of able highway engineers and by years of accumulation of data resulting from traffic tests and scientific research. Today the problem is vastly different. Loads applied to pavements on military airfields have no precedent in either airport or highway engineering.[5]

And although pavement design was the central problem, many peripheral problems, some of them highly critical, also needed solutions.

While Kelton and his officers kept track of the XB–19 and noted its effect on pavements in the Los Angeles area, the Chief of the Air Corps was insisting on runways of the heaviest construction. In June 1941 General Brett demanded that all new military airstrips be of portland cement concrete with beam strength characteristics. Mentioning the rapidly increasing weight of bombers and forecasting "continuous operations both day and night under a forced training program," he submitted his runway specifications to General Schley: adequate bearing capacity under very heavy loads; high skid resistance; good visibility for night landings; and easy maintenance. In Brett's opinion, only the best rigid pavements would be satisfactory. Opposing the view that concrete takes too long and costs too much, he counseled a more imaginative approach. First-rate rigid pavements would hold up even on weak subgrades, he argued; cutting down on grading and compaction would save time. Cost was a secondary concern. From the Air Corps standpoint, concrete runways were "well worth the expense."[6]

The Engineers considered these standards visionary and wholly unacceptable. Attributing Brett's proposals to Colonel Kennedy and his Buildings and Grounds Division, Plank afterward stated: "They wanted to introduce artificial concepts into engineering such as 'no runway will be built except out of concrete with portland cement.' But

[4] Ltr, Kelton to Schley, 29 Aug 41. 686.61 Part 2.

[5] Brig. Gen. James R. Newman, Jr., in "Military Airfields, A Symposium," *Transactions of the American Society of Civil Engineers*, 1945, p. 734. Cited hereinafter as *Trans. ASCE.*

[6] 1st Ind, 20 Jun 41, on Ltr, Schley to Brett 18 Jun 41. AAF 611 "C" 1 Jun 41–31 Jan 42.

there are other ways to build runways, and we, the Engineers, would not go for that kind of thing."[7] While disclaiming any intention of providing runways that were "not entirely satisfactory" to the Air Corps, Colonel Hardin argued that ground conditions at each site ought to determine the type of construction. Moreover, he pointed out, competition between asphalt and cement would serve the public interest. In an appeal to G–4 on 25 July, he asked that engineering decisions be left to the Engineers. Stating that asphalt pavements could be designed to carry even the heaviest planes, he insisted that surface textures could be altered to increase frictional resistance and surface colors, lightened to enhance visibility. And, he contended, high-type asphalt runways could be maintained almost as cheaply as concrete.[8] Deciding in favor of the constructing agency, the G–4, General Reybold, handed down the ruling: airmen would state their functional requirements and Engineers would take it from there.[9]

As outlined by General Brett on 8 August 1941, the functional requirements were rigorous indeed. Runways were to have the following characteristics: inherent strength to carry wheel loads up to 100,000 pounds; a stress load value of 500 pounds per square inch under impact; safeguards against "any weakness caused by infiltration of water into the subgrade"; high skid resistance in wet weather and high visibility at night; low crown, to reduce the hazard of ground looping, and low rolling friction; freedom from loose particles; durability; and no maintenance except repairs of bomb damage. In short, airstrips were to be safe for all-weather operations, 24 hours a day, by B–19's.[10] General Schley proposed to meet the Air Corps requirements, but to do so in accordance with principles of sound engineering and scrupulous economy.

When Schley retired as Chief of Engineers on 1 October 1941, a broadly conceived investigative effort was under way. Formulated by the Engineering Section, OCE, under William H. McAlpine, this effort had a five-fold purpose: insure adequately designed airports; eliminate wide variation in designs; limit the use of unproved theories; maintain competition between materials; and lay the basis for further development of pavement criteria through behavioral studies. The overall objective was to write a new chapter in civil engineering. Assigned to this mission was a sizable team of investigators. The Corps' civil works experience came into play, as experts in hydraulics, hydrometeorology, earthworks, and foundations attacked airfield problems. Assisting Kemp and McFadden in Washington were two of the Corps' foremost technologists, hydraulic engineer Gail A. Hathaway and soils engineer Thomas A. Middlebrooks. Undertaking a series of special studies was the research staff of the Waterways Experiment Station (WES) at Vicksburg, Mississippi, headed by Gerard H. Matthes. Conducting tests and experiments were district offices throughout the country. Because the civil organization could not provide all the needed skills, McAlpine brought in specialists from outside; among these

[7] Plank Interv, 5 Dec 50.

[8] Memo, Hardin for Reybold, 25 Jul 41. AG 658 (11–1–40).

[9] WD Ltr AG 658 (6–18–41) MO–D, 4 Aug 41.

[10] 1st Ind, Brett to Schley, 8 Aug 41, on (9) above.

recruits were James L. Land, a mainstay of the Alabama State Highways Department since 1910, and Walter C. Ricketts, a chemical engineer who had worked for the Asphalt Institute. A number of prominent consultants also joined in the endeavor. Continuing his predecessor's policy, the new Chief, General Reybold, gave the program vigorous support.

During the autumn of 1941, research went forward on many fronts. Aware that drainage was critically important and that broad pavements and nearly level grades would complicate this aspect of airport engineering, McAlpine told Hathaway to develop criteria for handling surface runoff and asked WES researcher Audley A. Maxwell to push investigations of subsurface pipe. Knowing that thousands of acres would have to be carpeted with grass, he consulted experts in turf culture and set out to mechanize planting. At his request, Dr. John Monteith, Jr., agronomist for the U.S. Golf Association, furnished advice on seeding, sodding, and fertilizing, and farm equipment manufacturers developed a special grass planting machine for use at airports. Seizing the earliest opportunity for tests with a very heavy plane, McAlpine asked Colonel Kelton for detailed reports on pavement performance under the XB-19. The Chief provided money for analyzing subgrades and base courses and for evaluating runway strengths at every field visited by the experimental bomber. Meantime, placing greatest emphasis on problems of greatest difficulty, McAlpine stepped up efforts to formulate criteria for adequately designed pavements.[11]

Highway practice was the starting point. A science of great antiquity, roadbuilding had made rapid strides since 1900. With the advent of the motor car in the first years of the century, gravel and macadam surfaces designed for horse-drawn vehicles and for the myriad bicycles of the Nineties proved inadequate. The decade 1904–1914 witnessed construction of more than 10,000 miles of bituminous roads. As trucks began to claim a share of the nation's transport, demands arose for rigid pavements. Between 1909 and 1925, the total mileage of concrete highways in the United States increased from 5 to more than 30,000. These developments spurred research. State highway departments and leading universities co-operated in studies of pavement design.[12] The federal government took a hand, promoting investigative programs through the Bureau of Public Roads, established in 1916, and the Highway Research Board, set up under the National Academy of Sciences in 1920. The Portland Cement Association, organized in 1916, and the Asphalt Institute, founded three years later, sponsored systematic inquiries into techniques of highway engineering. Because their problems were similar—a single-engine trainer had about the same wheel load as a heavy commercial truck—early airport designers employed the methods of highway engineers. But with the coming of very heavy bombers, military engineers had to re-examine these methods and to pioneer a new technology.

In line with Brett's strong preference for concrete, the Engineers gave close attention to rigid pavements. After talk-

[11] (1) 686 (Airfields) Parts 40–45. (2) 618.34. (3) Ltr, Hardin to Kelton, 21 Oct 41. 686.61 1941–45.

[12] Kenneth B. Woods and John E. Baerwald, "Roads and Streets," *Encyclopedia Britannica* (1959 ed.), XIX, 344–46.

ing matters over with his staff, chief engineer McAlpine outlined the problem. Would principles used in building concrete roads hold good for concrete runways, taxiways, and aprons? Would conventional methods of slab design and standard formulas for pavement thicknesses be applicable? More specifically and most important, would the classic analysis of Harald M. Westergaard, Harvard's Dean of Graduate Engineering, provide a rationale, a theoretical "handle," for designing heavy duty airfield pavements? A set of formulas for determining stresses produced in slabs by rolling loads, the Westergaard analysis took into account subgrade reactions, concrete strengths, and tire contact areas. Publishing his theory first in 1926, when trucks were the yardstick, Westergaard had extended it in 1939 to cover the heavier wheel loads and larger tire imprints of big commercial planes.[13] Essentially a theorist, a man who did his work sitting at his desk, Dean Westergaard was concerned more with the validity of his analysis than with its application. Explaining his attitude, he told one engineer: "I have developed a theory and it is mathematically sound, but whether it fits the facts of nature is up to you to prove."[14] To verify Westergaard's theory by experiment was McAlpine's primary goal.

Quite logically, he decided to center the investigation in Colonel Hall's Ohio River Division, where an extensive program of flood control begun in the 1930's had developed unique technical capabilities. Organized in 1934 as part of the Muskingum River project were two laboratories whose contributions gained quick recognition. Pioneer work in the use of air entraining agents, curing membranes, and portland cement substitutes was done by the Concrete Laboratory under Bartlett G. Long. A versatile construction man, trained in architecture and experienced in hydraulics and hydrology, Long had a small but highly competent staff of chemists and civil engineers. Important advances in foundation engineering were scored by the Soil Mechanics Laboratory. The first of its kind in the United States, this laboratory was headed by Robert R. Philippe, an alumnus of MIT, who had studied under Karl Terzaghi, the father of soil mechanics. Philippe's talented young deputy, Frank M. Mellinger, held engineering degrees from Princeton and Carnegie Tech. Nearing completion in the Cincinnati suburb of Mariemont was a large modern structure designed to house both laboratories. Only a few miles away, at the division's downtown headquarters, Evan P. Bone, a specialist in Westergaard's analysis, stood ready to aid in research on airfield pavements. Moreover, the big air force installation at Wright Field, with its own scientific staff and its own Engineer district, seemed an ideal place to conduct experiments. Prepared in collaboration with Philippe and Long, McAlpine's investigative plan called for large-scale tests at Wright and for control tests at Langley Field, Virginia.[15]

[13] (1) H. M. Westergaard, "Stresses in Concrete Pavements Computed by Theoretical Analysis," *Public Roads*, April 1926, pp. 25–35. (2) H. M. Westergaard, "Stresses in Concrete Runways of Airports," *Proceedings of the Highway Research Board*, 1939, pp. 197–202. Cited hereinafter as *HRB Proc.*

[14] Interv with Robert R. Philippe, 22 Sep 66.

[15] (1) Frank M. Mellinger, "The Ohio River Division Laboratories," *The Military Engineer*, May–June 1956, pp. 196–99. (2) Ltr, Hall to Schley, 30 Aug 41, and Inds thereon. AAF 611 "D."

In September 1941 teams of investigators and truckloads of instruments converged on the test sites. The Waterways Experiment Station sent crews of skilled technicians. The Portland Cement Association sent observers. A trio of consultants came from leading universities: Professor Kenneth B. Woods, a distinguished authority on highway engineering, from Purdue; Dr. Nathan M. Newmark, a structural engineer and researcher in applied mechanics, from Illinois; and Dr. Frank Baron, a disciple of Dean Westergaard, from Yale. An impressive array of equipment was on hand: accelerometers, geophones, strain gages, and specially built pressure cells had come from Vicksburg; thermohms, extensometers, bearing plates, hydraulic jacks, cranes, trucks, and miscellaneous tools, from various other elements of the Corps; a phototheodolite, from the Civil Aeronautics Authority; and a drop test rig and a late model bomber, from the Air Corps. Plans received a final check. Early in October, tests began.[16]

"To measure the reactions of a pavement under a set of idealized conditions as assumed by Westergaard's theory" was the first order of business.[17] At Wright Field the district engineer, Lt. Col. James B. Newman, Jr., directed a series of experiments on a 7-inch reinforced concrete apron, constructed 12 years earlier on a clay subgrade. Newman's men first loaded a frame of steel I-beams with 60 one-ton concrete blocks. Then, using a hydraulic jack and a bearing plate, they applied this load in successive increments until the pavement failed. They tested centers, edges, and corners of slabs in this way and measured vertical deflections at various distances from the loads. Lt. Col. Robert R. Neyland, Jr., the Norfolk District Engineer, followed a similar procedure at Langley Field, where a 6-inch concrete apron had been laid on a sandy silt subgrade some years before. Samples taken from the pavements went to the Concrete Laboratory for analysis. Meanwhile, drop tests and experiments with planes landing on lime-coated runways were yielding more accurate information about tire imprints.[18] As they correlated results from field and laboratory tests, researchers saw that they had hold of a "very, very wonderful handle."[19] Theoretical values obtained by the Westergaard method were virtually the same as values obtained from actual tests.

By late 1941 a convenient tool was in the hands of project engineers at work on the new Lockbourne Army Air Base, near Columbus, Ohio. Early in October, before field experiments were fully under way, Evan Bone began a series of intricate calculations. Using Westergaard's equations, he developed a family of curves, entirely theoretical in origin. Then, as data became available from the tests at Wright and Langley, he proceeded to refine these curves. "Theoretical analysis adjusted by experience" was Philippe's description of the finished product. After finding the modulus of

[16] (1) Robert R. Philippe, "Structural Behavior of Concrete Airfield Pavements—The Test Program," *HRB Proc.*, 1944, pp. 25–28. (2) OCE, Résumé of Investigations and Development of Pavement Design Procedures and Temporary Landing Surfaces, 1 Nov 44, app. A, pp. 8–9. Cited hereinafter as Résumé of Investigations.

[17] Philippe, *op. cit.*, p. 25.

[18] (1) Rpt, Wright Field DO, Feb 44, sub: Airfield Pavement Evaluation, Wright Field, Dayton, O. 686.61 (Wright Fld). (2) Résumé of Investigations, app. A, pp. 8–9. (3) 686.61 (Langley Fld).

[19] Philippe Interv, 22 Sep 66.

soil reaction, k (the technical term for the rigidity of the subgrade), an engineer could readily determine from Bone's curves the required pavement thickness for any wheel load up to 60,000 pounds. The curves were soon in use throughout the Corps. But official blessing awaited fuller proof. Only after further tests with different sets of variables would the curves find a place in the *Engineering Manual.*[20]

Perhaps the most remarkable discovery made in this early period had to do with the landing impact of aircraft. In the past engineers had designed commercial runways to withstand heavy jolts when planes touched down. "Wheel load times an impact factor of 1.25 or 1.50" had been the general rule. But early observations of the XB–19 brought this method into question. Landing at March Field in June 1941, the superbomber caused no damage to the pavement. Only when the ship slowed down did cracks appear. At other airfields in the Los Angeles area the story was the same. Reasoning that net forces were at work, engineers theorized that the buoyancy or wing lift of rapidly moving planes markedly reduced the stress on runways. Colonel Hall's soils engineers tested this theory at Dayton Municipal Airport on 8 October 1941 using a B–26 Martin Marauder. With Philippe in the bombardier's seat, the pilot made repeated near-crash landings on a concrete strip. Accelerometer readings, photographs by high-speed cameras, and measurements of tire imprints furnished ample proof: the greater the speed, the lighter the load on paved surfaces.[21] The evidence left little room for doubt. Yet airmen and plane designers were slow to embrace the concept.

Concurrent with tests on rigid pavements were tests on flexibles. A pliable material with virtually no tensile strength, asphalt offered far greater difficulties than concrete. Bituminous surfaces do not support superimposed loads but simply transmit the loads to the subgrade. On unstable foundations, these surfaces deteriorate rapidly, rutting, bulging, and weaving under traffic. Hence, with asphalt pavements, the bearing capacity of the soil, its deflection tolerance or resistance to deformation, is a make-or-break proposition. Among highway engineers, there was little agreement as to how flexible pavements ought to be designed. Various methods were in vogue, all of them empirical and none of them proved for wheel loads beyond 12,000 pounds.[22] Because the problem was primarily one of soils, McAlpine turned it over to his soils experts, Thomas A. Middlebrooks and George E. Bertram. Both veteran flood control engineers, these men possessed a wealth of practical experience with earthworks and foundations. Moreover, both were solidly grounded in the theory of soil mechanics. Middlebrooks had done graduate work in the new science under Terzaghi at MIT; Bertram, under Dr. Arthur Casagrande at Harvard.

Their early efforts were exploratory.

[20] (1) Final Rpt, ORD Labs, Jan 1946, sub: Investigation of Concrete Pavements on Different Subgrades, pp. 15 and 23–25. (2) Philippe Interv, 22 Sep 66.

[21] (1) Manual, OCE, Engrg Sec, Sep 1941, *Design of Airport Runways*, pp. 13–14. (2) Philippe, *op. cit.*, pp. 25–26, 28, and 33. (3) Philippe Interv, 22 Sep 66. (4) Final Rpt, ORD, "Dynamic Loading of Concrete Test Slabs, Wright Field Slab Tests," Aug 1943.

[22] T. A. Middlebrooks, "Design of Flexible Pavement Foundations," *Roads and Streets*, March 1943, p. 45.

After a precursive look at the methods of state roads departments, their first surmise was that load bearing tests might be the answer. Widely used in highway work, these tests were also applied by designers of earth dams and embankments. Going out into the field, Middlebrooks and Bertram launched a series of experiments with bearing plates. Initial trials were at Williamsburg, Virginia, on flexible sections in the State Highway system. The two researchers tried out plates of different sizes, different rates of loading, and different ways of interpreting results. Then, learning that heavy commercial planes were breaking up asphalt pavements at Tri-Cities Airport near Bristol, Tennessee, Bertram went there to find out why. Within a short time, he and Middlebrooks knew what they were up against. The problem was much tougher than they had anticipated.[23]

In a paper presented to the Highway Research Board in December 1941, summarizing their findings, they reported two important discoveries. First, allowable deflection for asphalt bomber strips would be far smaller than for asphalt roads. Their experiments had shown this deflection to be not 0.5 inch, as specified by the Asphalt Institute, but a mere 0.2 inch. And this figure applied only to static loads. "It must be recognized," the writers pointed out, "that for a large number of repetitions the allowable deflection will approach 0.1 inch." Second, load bearing tests had proved unsatisfactory. So far they had failed to give a realistic picture of a soil's capacity to resist displacement. They would not measure the effects of repetitive loads and they would not measure shear. Nor would they show what would happen when the soil beneath a pavement became saturated.[24] In time perhaps they could be made to work, but there was no time. With Land, Middlebrooks and Bertram were investigating other methods favored by various states—California, North Dakota, Kansas, and several others. But their "ideas were not formulated sufficiently to fix on a method of design." Recalling where they stood on the eve of Pearl Harbor, Bertram said, "We were rather groping at the time."[25]

By early December 1941 further, more sophisticated tests were in preparation. At Langley Field, Colonel Neyland was readying fourteen experimental asphalt sections of varying thicknesses on various types of base courses. At Wright Field, the new district engineer, Lt. Col. Henry F. Hannis, was pouring nine specially designed concrete slabs, some on natural subgrades and some on gravel. Several eminent professors were collaborating on theoretical phases of the work. Top civilian engineers of the Louisville and Pittsburgh Districts were standing by to help conduct the tests. A large rubber-tired Tournapull was on the way to Langley, where it would simulate rolling pressures of heavy bombers; and the XB-19 was soon to fly from the West Coast to take part in the Wright Field experiments.[26]

Shortly after Pearl Harbor, Colonel

[23] (1) *Ibid.* (2) Interv with George E. Bertram, 30 Sep 66.

[24] Thomas A. Middlebrooks and George E. Bertram, "Field Investigations for Flexible Pavement Design," *HRB Proc.*, 1941, pp. 137–41.

[25] Bertram Interv, 30 Sep 66.

[26] 686.61 (Langley Field, Va.) and (Wright Field. Ohio).

Kennedy proposed that this program be suspended. On 19 December he told Hardin that the war would not wait for the Engineers to conclude exhaustive investigations. Sufficient information for designing concrete pavements—the only type the airmen wanted—could be had from the National Advisory Committee for Aeronautics, the Public Roads Administration, and the Portland Cement Association, Kennedy maintained; what Hardin ought to do was assemble this material, digest it, and put it in usable form. Questioning the value of the recent impact study, Kennedy pointed out that XB–19 landing gears were designed to withstand loads equivalent to four and one-half times the gravitational constant. Runways, he asserted, would have to withstand similar impact loads. Calculations could be made by simple arithmetic: a 60,000-pound wheel load would land with the force of 270,000 pounds. An impact factor of 1.25 or 1.50 was not too large, as the Engineers contended, but far too small.[27] Asked about Kennedy's theories some years later, Philippe gestured toward a 9-foot ceiling and laughed: "Why, for the heaviest planes of World War II, you'd need a slab as thick as this room."[28]

The reply to Kennedy came not from the Engineers but from the Air Forces. Early in January 1942 General Arnold's A–4 reminded the Chief of the Air Corps that the Chief of Engineers was responsible for designing military airfields. The G–4 of the Army had so ruled, and the ruling would not be questioned. Hardin and his associates had already pulled together all available information on concrete pavements. A review of this material clearly showed the need for further tests. Moreover, the A–4 continued, landing gears and airfield pavements were entirely different matters; there could be "no direct parallel" between them.[29] At this point, the two services called a truce: Col. Walter J. Reed succeeded Kennedy as Chief of the Buildings and Grounds Division; Lt. Col. James B. Newman, Jr., the former Wright Field District Engineer, became Reed's deputy; and General Robins sat down with senior air officers to hammer out a working agreement.

Announced on 18 January 1942, the agreement envisioned fleets of superbombers in the skies by 1944. Because the B–19 had proved a disappointment (its engines were unequal to its great weight), General Arnold was pinning his hopes on a plane which had yet to be tested, the B–29. Under development by the Boeing Aircraft Company, this ship was more streamlined and more powerful than the Douglas model. With the B–29 in mind, Arnold and Robins reached an understanding that wheel loads of 60,000 pounds would govern airfield construction until 1944, when a much heavier bomber, the B–36, might go into production. Pending completion of comprehensive studies, the Engineers would continue to allow 25 percent for landing impact on all runways.[30] As equitable as it was authoritative, this agreement signaled an end to dissension and confusion.

Harmonious relationships with the Air Forces were all to the good, but the

[27] 2d Ind, Kennedy to Hardin, 19 Dec 41 on Ltr, OCAC to Reybold, 29 Sep 41. AAF 611 "D."
[28] Philippe Interv, 22 Sep 66.
[29] Memo, A–4, AAF, for CofAC, 3 Jan 42. AAF 611 "D."
[30] 1st Ind, 18 Jan 42, on Ltr, Robins to CofAC, 3 Jan 42. AAF 611 "D."

big problems were scientific, not administrative. There was no way to ease the strain on researchers striving desperately to score a technological breakthrough.

Breakthrough and Advance, 1942–1944

In the weeks following Pearl Harbor, as efforts to reinforce Hawaii and to develop a life line to Australia threw a crushing load on West Coast airfields, the urgent character of the research task was emphatically affirmed. On General Arnold's orders every available B–17 was to move to the Pacific war zone as soon as possible. Before long, dozens of the big Flying Fortresses, most of them straight from the factory, were converging on the Sacramento Air Depot to be readied for combat. Airstrips in the area took a pounding. At Mather and McClellan Fields, near Sacramento, construction crews worked around the clock, patching damaged pavements with blacktop by night and putting in new concrete runways by day. At Hamilton Field, near San Francisco, the staging point for planes enroute to the Pacific, concrete slabs laid some years earlier on a fill of bay mud started to disintegrate.[31] These difficulties warned of large-scale trouble ahead, for the B–17's weighed only half as much as the very heavy Superforts of the future.

Plans for strategic air offensives underscored the gravity of the Engineers' assignment. Convinced that bombardment was the "main job" of the air force, General Arnold resolved to carry the war to the enemy by attacking key targets deep in hostile territory. Large formations, daylight raids, and precision bombing were important features of his program. High-altitude, long-range aircraft were essential weapons.[32] By early 1942 assaults on Germany by British- and Egyptian-based B–29's were part of the Allied design for victory in Europe. Superfortress strikes against Japan were left to the more distant future, when the defeat of Hitler was assured and a foothold in the western Pacific was regained. Earmarked for quantity production before it was airborne, the B–29 came to be known as "the three-billion-dollar gamble."[33] In opting for the untested model, Arnold wagered heavily on Boeing's ability to deliver an airworthy ship. He also counted on the Engineers to provide serviceable training fields and operational bases.

When Lt. Col. James H. Stratton reported for duty in December 1941, the Chief's office was in a bind. Beginning his new assignment as head of the Engineering Branch, Stratton found only fragmentary data on airport design. Hathaway had outlined a scientific method for predicting maximum rainfall and computing peak runoff for any area, and a preliminary bulletin on the required hydraulics capacity of storm drains had gone to the field. The Waterways Experiment Station had tested subsurface pipes of various types and a table prescribing minimum required

[31] (1) Wesley F. Craven and James L. Cate (eds.), *Plans and Early Operations, January 1939 to August 1942, The Army Air Forces in World War II*, Vol. I, (Chicago: U. of Chicago Press, 1948), pp. 193 and 332. (2) USEO, Sacramento, Calif., Rpt on Evaluation of Carrying Capacities of Airfield Pavements, Sacramento Air Depot, Dec 1943. (3) OCE, Airfield Pavement Failure Reports, Dec 1943. (4) Interv with O. James Porter, 16 Sep 66.

[32] Arnold, *Global Mission*, pp. 290–91 and 316.

[33] Craven and Cate, *Matterhorn to Nagasaki*, pp. 6–11.

earth cover for sizes up to 24 inches in diameter was in the hands of division and district engineers. A digest of facts on turfing, prepared by Dr. Monteith, was ready for publication. Results of the early Wright Field experiments were making the rounds.[34] But general solutions to fundamental problems were not yet in sight. Deeply concerned, Stratton gave close attention to the investigative effort.

A product of the career development program adopted by the Corps in the 1920's, the 43-year-old West Pointer was grounded in both military leadership and engineering science. After completing his formal education at the Engineer School and at Rensselaer Poly, he had served for a decade with troops in the United States and Panama. Assigned to civil duty in 1933, he played an important part in two of the great dam and reservoir projects launched under the New Deal. At Conchas Dam in northeastern New Mexico—a huge gravity concrete structure extended by earth dikes to a width of several miles—he headed the technical force. At John Martin Dam in southeastern Colorado—a large concrete and earthfill barrier across the Arkansas River—he headed the project as district engineer. A paper presented to the Boston Society of Civil Engineers in the fall of 1938 displayed his familiarity with soils engineering, concrete construction, and hydrometeorology—all subjects of concern to airfield designers. At Lubbock Field, Texas, in 1941, he confounded skeptical airmen by developing a structurally adequate bomber runway of asphaltic concrete on a compacted caliche base.[35] An experienced commander and a trained engineer, respected alike by brother officers and fellow civil engineers, he seemed ideally suited for the superairport mission.

Immersing himself in the details of flexible pavement research, he quickly learned where matters stood. Kemp gave him a rundown on the Langley Field endeavor: experimental sections, designed with the help of the Asphalt Institute, were nearing completion; tests would soon commence. But Kemp was pessimistic about the outcome, for he questioned the institute's claim that thick bituminous surfaces provided measurable beam strength. In briefing their new chief, Middlebrooks and Bertram pointed to a possible solution. Their study of state highway practices had led them to conclude that the California method, strongly backed by Land, held considerable promise. Middlebrooks was in correspondence with Thomas E. Stanton, Materials and Research Engineer of the California Division of Highways; and Bertram had been to Sacramento to confer with the originator of the method, O. James Porter, Stanton's assistant. There was still some hope of finding a theoretical handle, but, the two men warned Stratton, that hope was dim.[36]

[34] (1) Engr Bulletin, Constr 7, 1941. 686 (Airfields) Part 17. (2) OCE Circ Ltr, Constr 204, 12 Dec 41. (3) John Monteith, Jr., "Turf for Airfields and Other Defense Projects," *Turf Culture*, March 1942, pp. 193–239. (4) Rpt, ORD, "Investigation of Concrete Pavement on Different Subgrades," 16 Dec 41.

[35] (1) James H. Stratton, "The Engineering Features of the Conchas Dam Project," *Journal of the Boston Society of Civil Engineers*, 1938, pp. 497–516. (2) 686 (Lubbock Field) Part 1.

[36] (1) Min, Conf in Engrg Br, 5 Jan 42. Engrg Div, Airfields Br, Office Files. (2) Memo, Kemp for New, 15 Sep 41. McFadden Reading File, 1941. (3) Bertram Interv, 30 Sep 66.

The Langley tests were decisive. On Washington's Birthday the Virginia airbase was bustling with activity. Robert F. Jackson was there from the Louisville District to direct the experiments. Frederick C. Field was there as an observer for the Asphalt Institute; and Bertram was there from Washington as Stratton's representative. Men of the 21st Engineers filled a 12-cubic-foot scraper to struck capacity with tamped earth. Unequally distributed, the load exerted weights of 13,000 pounds on the front wheels and 20,000 on the rear. Coupling the scraper to a six-ton truck, the troops pulled it to the test site and began making passes over the asphalt surfaces. That day and the next the trials continued. After 25 passes, 6 of the 14 test sections had begun to rut; after 50 passes, 10 of the sections had failed and the rest had developed a definite weave. Designed supposedly for wheel loads of 60,000 pounds, the Langley pavements rapidly deteriorated under loads of 20,000 pounds.[37] On reading Bertram's report of the experiment, Stratton decided to stop theorizing and to send for Jim Porter at once.

On his way east, Porter thought the problem through. He had known for some time what the Army was up against. For almost a year he had been working informally with Col. Robert C. Hunter of the Sacramento District and Lt. Col. John O. Colonna, the Fourth Air Force engineer, on plans for California flight strips. Since Bertram's recent visit, he had had the broad picture in mind. The news from Langley came as no surprise to him. An independent and creative thinker, a man whose policy it was always to question other people's theories and to try to see what others might have missed, he thought he knew the secret of flexible design. As a junior engineer for the California Division of Highways in the late 1920's, he had investigated pavement failures throughout the state. Most of the trouble stemmed from porous, loosely compacted soil, which took up moisture, became plastic, and remolded as wheels rolled over the pavement. Porter thought of the untouched lodes of disintegrated granite in the mountains of California and the large deposits of gravel in the river valleys. Compacted fills of these materials topped by thin wearing courses seemed to him the common-sense prescription for inexpensive, durable roads. He devised a simple procedure, the California Bearing Ratio (CBR) test, for measuring the shear resistance of base and subbase materials. Experience proved his test could be relied upon. He also helped to originate a superior method of compaction control, the modified density test associated with the name of Ralph R. Proctor. In time Porter was able to develop curves showing the relationship between bearing ratios and pavement thicknesses for wheel loads up to 12,000 pounds and to correlate these curves with field performance.[38] During the trip to Washington, he decided to offer Stratton a "package" plan—compaction method, CBR test, and curves for heavy wheel loads derived from traffic tests.

[37] (1) Rpt of G. E. Bertram on Service Behavior Tests at Langley Fld, Va., 23 Feb 42, and related documents in file: 686.61 (Langley Fld, Va.). (2) Ltr, Stratton to authors, 28 Dec 67.

[38] (1) Porter Interv, 16 Sep 66. (2) Interv with Col. John O. Colonna, 23 Sep 66. (3) O. J. Porter, "The Preparation of Subgrades," *HRB Proc.*, 1938, pp. 324–31. (4) O. J. Porter, "Development of the Original Method for Highway Design," *Trans. ASCE.* 1950, pp. 461–67.

Within an hour or two after his arrival, Porter was deep in conversation with Middlebrooks and Bertram. They found that their ideas were far apart. When the discussion stretched on fruitlessly for several days, Stratton sent for Dr. Casagrande. A world renowned figure in the field of soil mechanics and foundation engineering, the Harvard professor modestly described his role as that of "a catalyst." Stratton, more accurately, called him "the heart and soul of our inquiry into the use of CBR." After lengthy talks with Middlebrooks and Porter, Casagrande suggested a procedure. Extrapolating Porter's curves was the first order of business. Each man went off to work alone. Using different methods, they plotted tentative curves for wheel loads up to 70,000 pounds. Comparing notes the next morning, they found that their results were close. But as Porter later put it, they were not yet ready "to spread the curves around." That afternoon, they began blocking out a series of tests for checking their extrapolations. Details were soon complete. Before the week was out, Stratton had agreed to the plan. Porter was soon back in Sacramento, but not for long. According to his wife's count, he was away from home on missions for the Corps for 300 days out of the next 365.[39]

In adopting CBR, Colonel Stratton assumed a calculated risk. Extrapolation is always something of a gamble, and in this instance the odds were long and the stakes were high. Likened by one humorist to lines drawn "in a dark room"[40] the tentative design curves were little better than educated guesses. The interval they bridged was vast and the concept they embodied was crude. (*Chart 24*) Used successfully on California highways for more than a decade, CBR had never been tested on airports. Still, there appeared to be no safer course. Professor Casagrande "would not endorse a notion unless he was reasonably sure of his grounds." Of that Stratton was certain. Moreover, his own experience with airfields in the Southwest gave him confidence "that we were on the right track."[41] With several hundred new air stations already on order and directives for hundreds more in prospect, he could not afford to shilly-shally. Deciding for the California method, he plunged resolutely ahead.

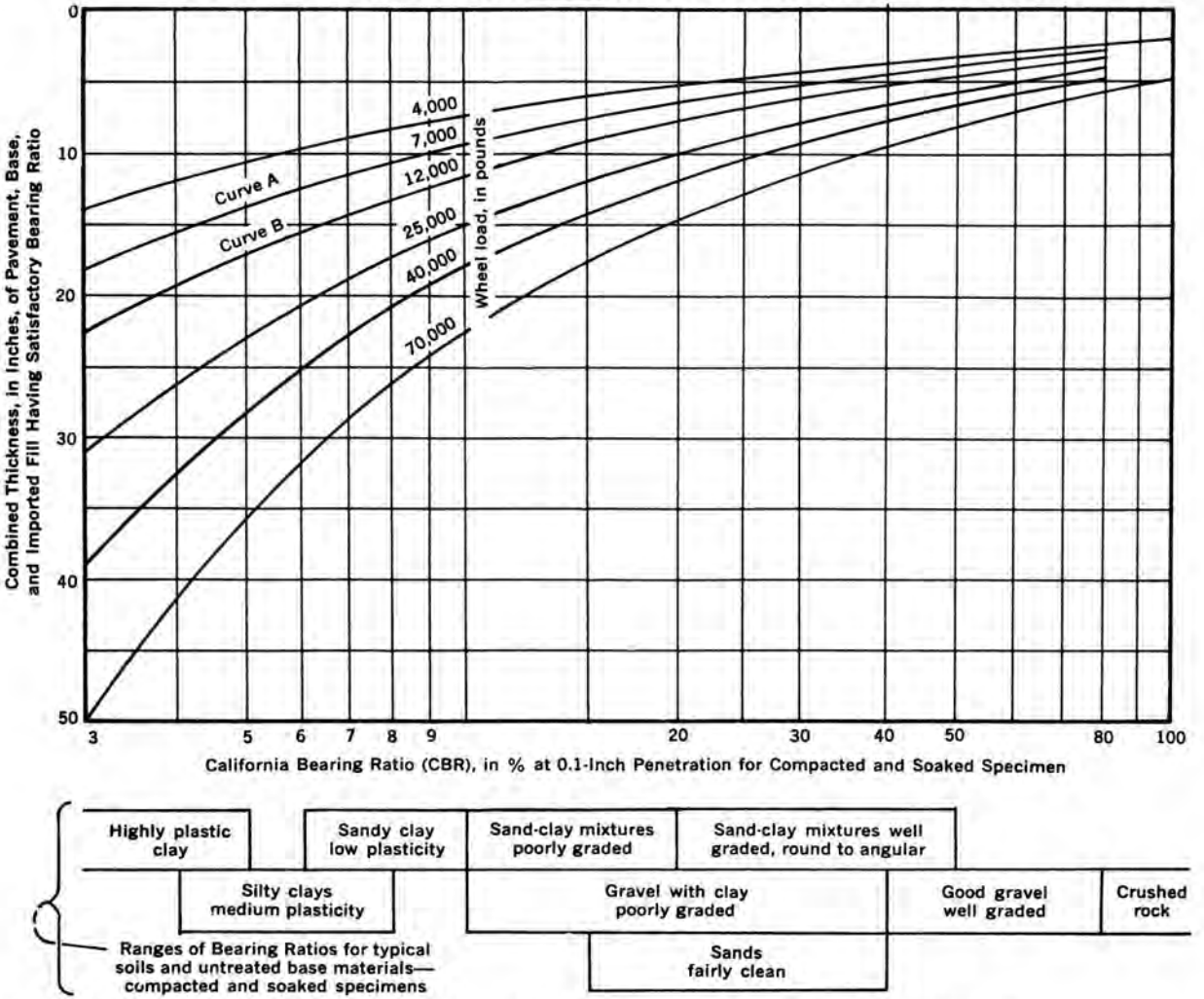
The test program was labeled "crash." Early in March 1942, Stratton issued rush orders to five division engineers. Four were to investigate prewar commercial runways which had been down long enough for subsoil moisture to equalize. Colonel Bragdon in the South Atlantic was to choose an airstrip built on sandy clay, a fairly good subsoil; Colonel Scott in the Southwestern, one on lean black clay, a rather poor foundation; Colonel Elliott in the Upper Mississippi Valley, one on Fargo clay, a highly plastic material; and Colonel Besson in the Missouri River, one on a porous subgrade subject to frost action. Tournapulls with wheel loads of 12,500 to 50,000 pounds would be towed over the pavements until failure occurred or 10,000 runs had been made. Each experiment would test one point on the

[39] (1) T. A. Middlebrooks and G. E. Bertram, "Adaptation to the Design of Airfield Pavements," *Trans. ASCE*, 1950, pp. 468–70. (2) Ltr, Stratton to authors, 28 Dec 67. (3) Ltr, Casagrande to authors, 3 Jan 68. (4) Porter Interv, 16 Sep 66.

[40] Interv with Thomas B. Pringle, 6 Sep 66.

[41] Ltr, Stratton to authors, 28 Dec 67.

Chart 24—Tentative Design Curves for Flexible Airfield Pavements



Source: T. A. Middlebrooks and G. E. Bertram, "Adaptation to the Design of Airfield Pavements," *Trans., ASCE*, Vol. 115 (1950), p. 470.

extrapolated curves. Broader in scope and critically important was the task given Colonel Hannum in the South Pacific Division. At Stockton air base, near Sacramento, Porter would conduct a crucial test. Stockton's original runway, built by the city in 1936, had failed during the winter of 1940–41 under the weight of light Army trainers. An abandoned taxiway nearby, constructed at the same time and along the same lines—the subgrade was adobe, the base course was six inches of compacted sandy loam, and the surface was a seal coat of emulsified asphalt—remained intact. The plan was to make tests on the taxiway and on a special, Porter-designed section to be built atop it. The purpose was to validate a wide range of points on the tentative curves and to verify premises on allowable deflection and effects of repetitive loads. Hannum was to see to it that Porter lacked nothing in the way of support. Stratton's appeals to the five divisions for "expeditious action" were couched in terms of urgency.[42]

Strenuous endeavors produced quick results. In almost no time, Stratton had telegrams reporting the progress of tests on commercial runways at Dothan, Alabama; Corpus Christi, Texas; Fargo, North Dakota; and Lewistown, Montana. Soon communiqués were coming in from Middlebrooks, who functioned as traveling co-ordinator for this phase of the program.[43] Meantime, at Stockton, Porter and company set a blazing pace. On 10 March Bertram arrived in Sacramento and gave the signal to begin. Next morning, bright and early, a crew was out taking borings at the site. By the 13th deflection gages were in place and Porter was taking readings as a light training plane idled its engine, revved up, and taxied over the pavement. By the 20th the surface had developed hairline cracks and Porter had seen enough to know that the pavement was incapable of withstanding deflections of 0.1 inch or even of 0.05. Construction of the test track started the following day. Built to Porter's specifications (a thoroughly compacted base course of sand and gravel, increasing gradually in thickness from 6 inches to 4 feet, was topped by 3 inches of asphaltic concrete), the section was complete on the 24th. Tests proceeded rapidly, first with Tournapulls exerting wheel loads of 5,000, 10,000, 25,000, and 40,000 pounds and then with a B–24 Liberator bomber, provided by Colonel Colonna. By early April the experiment had shown that the extrapolated curves were fairly accurate and that allowable deflection was in hundredths rather than in tenths of an inch. Further confirmation came from Dothan, Corpus Christi, Fargo, and Lewistown.[44] Asked later if Stockton and the other tests produced any surprises, Porter smiled and said, "Not for me they didn't, but for thousands of engineers they did."[45]

On a Monday morning early in April, Porter faced a skeptical group, the senior

[42] (1) Ltrs, Stratton to Div Engrs, SAD, 5 Mar 42; and SWD, UMVD, and MRD, 7 Mar 42. All in 400.112 (Airfields) 1942. (2) Ltr, Stratton to Div Engr, SPD, 4 Mar 42 and Incl thereto. 400.112 (Airfields) 1942. (3) O. J. Porter, "Test Section, No. 1, Stockton Field, California," *Trans. ASCE*, 1950, pp. 485–94.

[43] 400.112 (Airfields) 20 Nov 42.

[44] (1) Résumé of Investigations, app. A, pp. 1–3. (2) J. F. Redus, Jr., "Other Accelerated Traffic Tests," *Trans. ASCE*, 1950, pp. 520–25. (3) USEO, Sacramento, Calif., Report on Stockton Test Section, 20 Sep 42. Porter Papers.

[45] Porter Interv, 16 Sep 66.

soils men of the engineer divisions who had come to Sacramento for a 5-day course in the California method. After giving them an illustrated talk on highway failures, he showed them through his laboratory. That afternoon the class looked on as he demonstrated the CBR test. He wet a sample of soil, compacted it in a cylindrical mold, forced a piston into the soil, and measured the load required. Expressed as a percentage of the load required to penetrate crushed stone, this measurement was the CBR value of the compacted sample. Next, he placed the specimen in a tank of water to soak for four days, explaining that the saturated sample would simulate the worst condition that could develop under a pavement. A second penetration test would give its bearing value. Practice sessions in the laboratory, lectures on soil sampling and boring techniques, a tour of the Stockton test site, and a buffet supper at Porter's ranch were packed into the next three days. At a meeting Thursday evening, the students challenged the professor. The discussion went on far into the night and continued the following day. Styling himself the "principal objector," Philippe afterward explained his stand. "Engineering starts with theory," he declared, and the California method had no foundation whatever in theory. "You stuck a plunger in a hunk of soil," he said of the bearing test. In reply to his critics Porter pointed out, "We are not contending that this tentative design is accurate, but that it is the simplest and most practical method now available." Middlebrooks, who had flown out from Washington to help wind up the course, took the same line as Porter. Relaying Stratton's orders, he told the men to return to their divisions and teach their district soils groups the California method.[46]

The news from Sacramento created quite a stir in professional circles. Passed by word of mouth, reports of the meeting produced raised eyebrows and sharp demurrers. Professors, researchers, and state highway officials were frankly dubious. Most foundations experts took a "wait-and-see" attitude. The Air Corps' Buildings and Grounds Division was "inclined to be skeptical,"[47] and the Navy's Bureau of Yards and Docks was openly opposed.[48] Critical remarks were aimed at Porter, who heard himself described as "that guy who wants a base course halfway up the door."[49] Some engineers likened his method to the technique of the ancients, who determined the weight a bridge could bear by loading it to failure. Probably the most strenuous objections came from the Asphalt Institute. At several conferences with Middlebrooks and Bertram, institute representatives argued unsuccessfully for thicker asphalt pavements and thinner base courses than Porter prescribed.[50] All those who challenged the Corps' approach received the assurance: "It has never been the policy of the Engineer Department to standardize to the extent that research and development would be stifled and

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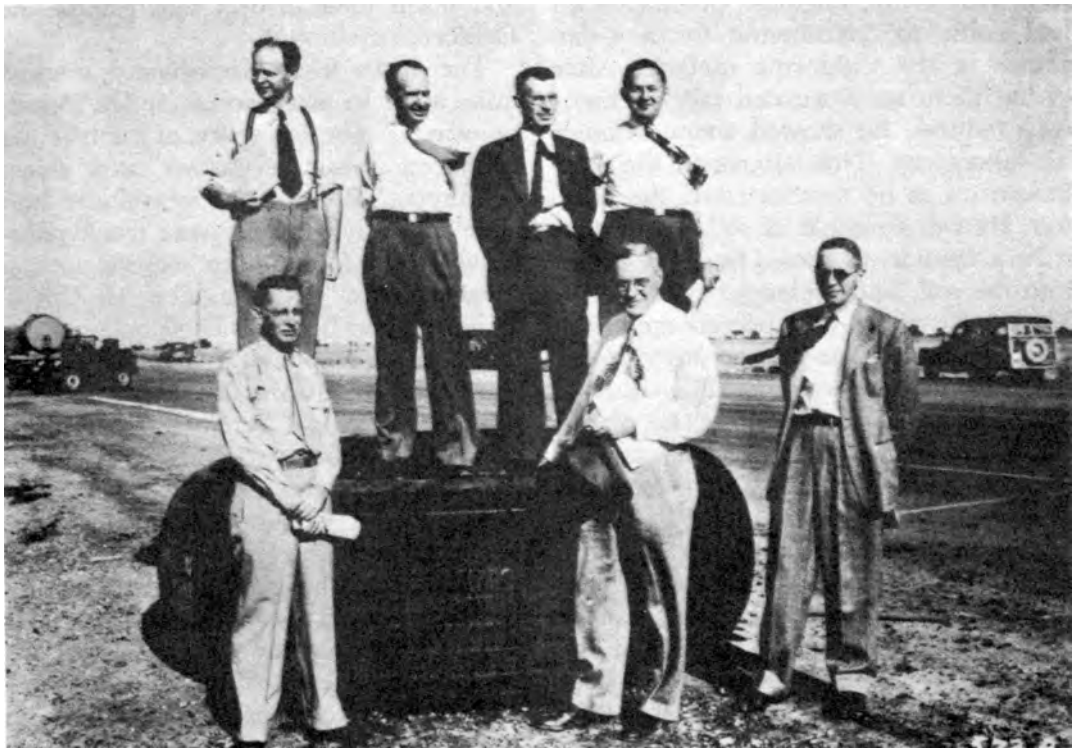
[46] (1) Verbatim Rpt, USEO, Sacramento, Calif., Lecture Course on California Method, 6–10 April 1942. (2) Philippe Interv, 22 Sep 66.

[47] *Trans. ASCE*, 1945, p. 735.

[48] *HRB Proc.*, 1944, pp. 68–70; and 1945, pp. 462–63.

[49] Porter Interv, 16 Sep 66.

[50] (1) Norman W. McLeod, "The Rational Design of Bituminous Paving Mixtures," *HRB Proc.*, 1949, pp. 107 and 158–59. (2) *HRB Proc.*, 1942, pp. 138–43. (3) Ltrs, Prévost Hubbard to Stratton, 5 May and 3 Jun 42. 686.61 (Langley Fld).



CONFERENCE AT STOCKTON TEST TRACK, CALIFORNIA. *Front row (left to right): Col. Henry C. Wolfe, Harald M. Westergaard, Philip C. Rutledge. Back row (left to right): Arthur Casagrande, Thomas A. Middlebrooks, James L. Land, O. James Porter.*

we don't want to do that now."[51] Research contracts with Harvard and MIT testified to the Corps' interest in developing a rationale.[52] But to evolve a theory might take years. CBR was available and workable, and Stratton intended to use it. Tests at Stockton would continue, and a chapter on flexible design soon to appear in the *Engineering Manual* would set the Corps' seal of approval on the California method.

While he pushed research on flexible pavements, Stratton tried to invigorate the whole investigative effort. During the spring of 1942, he reshuffled his organization, reinforced his staff, and called in distinguished advisers. McFadden replaced Kemp, who was anxious to return to his post with the D.C. government. Lines of responsibility, heretofore vague, were sharply defined. All paving, drainage, and turfing problems were assigned to a runways unit under Land; and all foundations engineering, to a soil mechanics unit under Middlebrooks, who along with Bertram formally transferred from civil works to

[51] Verbatim Rpt, USEO, Sacramento, Calif., Lecture Course on California Method, 6–10 April 1942, p. 122.

[52] Contract W1104–Eng. 352, 8 Feb 42 (appr. 23 Apr 42). (2) Contract W1104–Eng. 368, 1 Mar 42 (appr. 13 May 42).

military construction. More experts were recruited. Thomas B. Pringle, a graduate of Virginia Polytechnic Institute who had recently formulized a 20-year highway development program for the state of West Virginia, became McFadden's right-hand man. Dr. Monteith and another skilled agronomist, Dr. Frederick V. Grau, also accepted full-time positions with the Corps. Taking advantage of the decline in civil projects, Stratton brought two experienced soils men, Reuben M. Haines and D. Dana Leslie, from the New England Division to help lighten the load on Middlebrooks and Bertram. Appeals for top-flight consultants were answered by Dean Westergaard and Dr. Casagrande, who, with Mr. Porter, agreed to serve as McFadden's advisory council. A high level of technical proficiency seemed assured. Colonel Stratton, as one of his brother officers remarked, had "assembled a bunch of damn good engineers."[53]

Mindful of the stern necessity for speed, Stratton tried to vault technical hurdles several at a time. During the first half of 1942, he expanded the scope of his inquiries and stepped up the pace. Pressing the attack on runway problems, he ordered fresh investigations: deflection tests on an asphalt pavement at Bradley Field, Connecticut; accelerated traffic tests on a concrete apron at Godman Field, Kentucky, and on a concrete turnaround button at Northern Field, Camp Forrest, Tennessee; and elaborate experiments on specially designed sections to be built in Virginia and Louisiana.[54] Making use of his new consultants, he sent Westergaard to Cincinnati to collaborate with Philippe and Bone and set Casagrande to work on a soils classification system for the Corps. Casagrande also took on a most important pedagogical mission, establishing a special school at Harvard for teaching soil mechanics to Engineer officers.[55] Hailing the completion of Maxwell's WES investigation, "the most comprehensive ever made on the load carrying capacity of drain pipe," Stratton arranged for further tests on pipe at fields under construction.[56] At the suggestion of highway engineers in the Southwest, he asked the Tulsa District to evaluate rock asphalt as a surfacing material.[57] Meanwhile, he reminded all researchers of the primary goal—to get reliable criteria in the hands of project engineers and Engineer troop commanders at the earliest possible moment.

Week after work-crammed week, the hard-won facts accumulated. From bearing tests at Bradley and Wright Fields (the static loads applied ranged from 20 to 112.5 tons) and from traffic tests at Godman, Forrest, and Stockton (Tournapulls with wheel loads up to 53,000 pounds made a total of 33,000 passes at these three sites) came an impressive mass of data. From the Tulsa District, where Lt. Col. Bruce D. Rindlaub was co-ordinating experiments in eight states; from Harvard, where Professor Casagrande was reviewing the physical properties of soils; and from other sources throughout the country—federal agen-

[53] Plank Interv, 5 Dec 50.

[54] (1) USEO, Providence, R. I., Rpt of Pavement Bearing Tests at Bradley Fld, Windsor Locks, Conn., 12 Sep 42. (2) Résumé of Investigations, app. A, pp. 9 and 3-4.

[55] (1) Philippe Interv, 22 Sep 66. (2) Ltr, Stratton to Div Engr, MAD, 6 Oct 42. 600.95 (Airfields). (3) 352.11 (Army Soils Control School).

[56] Ltr, Reybold, to R. A. Foley, 20 Feb 42. 686 (Airfields) Part 52.

[57] Ltr, USEO, Tulsa, Okla., to Reybold, 29 Oct 42. 400.112 (Airfields) 20 Nov 42.

cies, industrial research laboratories, state highway departments, and individual experts—came a wealth of useful information. Further confirmation of Westergaard's basic analysis and a revised set of concrete thickness curves were major results of rigid pavement investigations. A new concept of pavement section design was another: because troughing disturbed subgrades and bases, the thickened edges favored by highway engineers were limited to longitudinal expansion joints and free sides; and because keyed joints were seldom properly installed, they were ruled out almost entirely. Fresh light on the problem of critical deflection and a clearer understanding of the effects of repetitive loads were significant gains in the flexible area. The question of landing impact was settled once and for all, when observations of the XB–19 verified the winglift theory. Meteorological studies, analyses of materials strengths, appraisals of compaction methods, reports on curing techniques, guidelines for classifying soils, and pointers on establishing and maintaining turf—contributions in many fields increased the fund of knowledge. A flurry of preliminary bulletins and circulars issued in the spring of 1942 quickened the already brisk demand for comprehensive manuals.[58]

A heavy task, the manual writing moved ahead with impressive speed. Under great pressure, three teams of experts toiled to digest a mountain of information and put it into usable form. One group, composed of Middlebrooks, Haines, Pringle, and Ricketts, tackled the complexities of pavement design; a second, consisting of Albert L. Cochran and Howard M. Williams, Hathaway's chief assistants, focused on drainage; and a third, made up of Monteith and Grau, dealt with turf and other vegetation. The writers sweated over their assignments. "It was a big job," Hathaway recalled.[59] Pringle, a driving force in the whole endeavor, put in sixty hours a week or more at his desk and worked at home nights and Sundays. Colonel Stratton and his executive, Major Hill, also did a lot of homework, reviewing and editing draft manuscripts in their quarters after hours. These efforts were highly productive. Under ordinary circumstances, preparing a technical manual is a slow, deliberate process. Spurred by the war emergency, Stratton and his associates turned out ten publications in as many months. Together with special pamphlets on wearing courses, bituminous mixes, and concrete paving, they issued four basic texts—three new chapters in the *Engineering Manual* and a comprehensive handbook for Aviation Engineer Battalions.[60]

Of the supplements to the *Engineering Manual*, the chapter on airfield drainage was the most nearly definitive. Hailed as "a major contribution from the

[58] (1) USEO, Providence, R. I., Rpt of Pavement Bearing Tests at Bradley Field, Windsor Locks, Conn., 12 Sep 42. OCE (MC), Civ Engrg Br Files. (2) Robert R. Philippe, "Structural Behavior of Concrete Pavements—The Test Program," *HRB Proc.*, 1944, pp. 25–35. (3) USEO, Sacramento, Calif., Rpt on Stockton Test Section, 20 Sep 42. Porter Papers. (4) Ltr, USEO, Tulsa, Okla., to Reybold, 29 Oct 42. 400.112 (Airfields) Nov 42. (5) 1st Ind, 10 Mar 42, on Ltr, USEO, Los Angeles, Calif., to Reybold, 31 Jan 42. 686 (Airfields) Part 49A.

[59] Interv with Gail A. Hathaway, 17 Jun 66. See also Pringle Interv, 14 Feb 67; and Interv with Albert L. Cochran, 21 Feb 67.

[60] (1) *Engineering Manual*, chs. XX and XXI (1942) and XXII (1943). (2) OCE, Constr Div, Guide Specs Pamphlets, Sep 42–Jan 43. EHD Files. (3) TM 5–255 Aviation Engineers, 31 Dec 42 (Tentative).

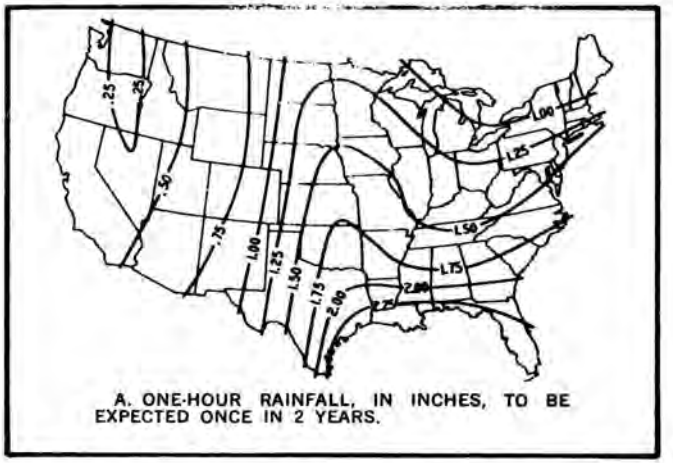
science of hydrology to the advancement of both civil and military aviation," it adapted a sizable body of specialized knowledge to a new purpose.[61] Drawing on an extensive technical literature, including the notable works of Robert E. Horton, Wesley W. Horner, and David L. Yarnell, utilizing a mass of observational data collected by the Weather Bureau and by Hathaway himself, and applying the Corps' long experience with flood control and river basin planning, the chapter introduced airport engineers to isohyetal maps, rainfall intensity-duration curves, design storm criteria, overland flow formulas, and infiltration theories. Ponding basins, small temporary reservoirs which would modulate surface runoff during torrential showers, were a striking innovation. Following Cochran and Williams' instructions, an engineer would first select a design storm—a 2-year storm for an emergency landing strip or a 10-year storm for a major bomber base. (*Chart 25*) He would next compute infiltration losses, peak runoff, capacities of ponding basins, and capacities of drains. Only then would he design his storm drain system. Unless the site was boggy or the ground water table reached above the frost line, he would probably dispense with costly subsurface drains.[62] So complete was the manual and so clear the text that even a novice could proceed with confidence. So reliable was the information and so solid the work that the chapter stood, unchanged, for the duration of the war and for many years thereafter.

The new chapter on airfield pavements was less authoritative. A signal achievement, the first important treatise of its kind, it nevertheless displayed certain weaknesses. Frost action, still largely unexplored, received only one page. The discussion of paving materials, based partly on studies in progress, was somewhat rudimentary. The section on rigid pavements, although it represented a major contribution to engineering science, left a number of problems unsolved, among them stress transfer and base course design. The section on flexible pavements bore the marks of expedience: the paragraphs on test procedures and equipment were extracts from Porter's writings; the prescribed method of compaction control was a hastily modified version of standard highway practice (plans for adopting the Proctor method had foundered because most Corps laboratories lacked necessary equipment); and the design curves for base and pavement thicknesses were labeled tentative.[63] As the chapter came into use, an unexpected hitch developed. In Colonel Hill's descriptive phrase, the CBR test "developed bugs, if not disease."[64]

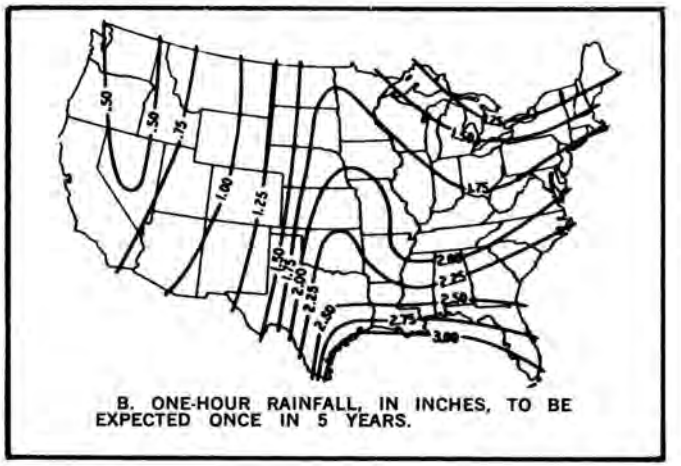
McFadden's telephone rang repeatedly, as project engineers called in questions and complaints about the *Manual*. One man reported fantastic results from his running of the CBR test; another claimed he could get no results at all; a third discovered that instruments furnished by the Chief's office were calibrated improperly. Many field men experienced maddening frustrations as they did their "damndest" to make CBR work

[61] David S. Jenkins, in "Military Airfields, A Symposium," *Trans. ASCE*, 1945, 743.
[62] *Engineering Manual*, ch. XXI (1942).
[63] *Engineering Manual*, ch. XX (1942).
[64] Verbatim Rpt, Engineering Conference on Paving, Dallas, Tex., 25 and 26 Mar 43. 600.95.

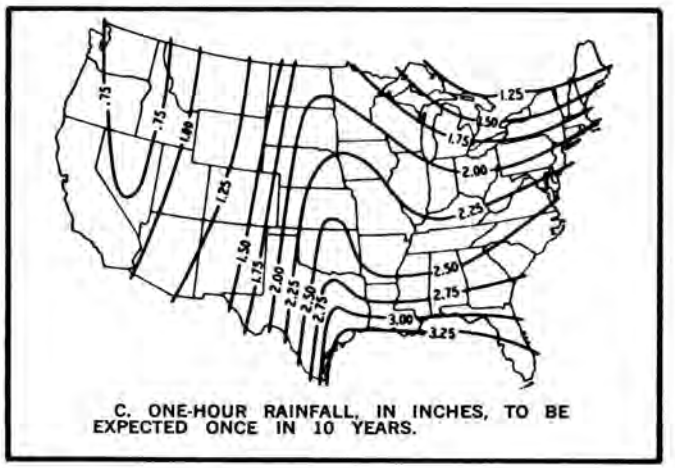
Chart 25—Design Storm Index



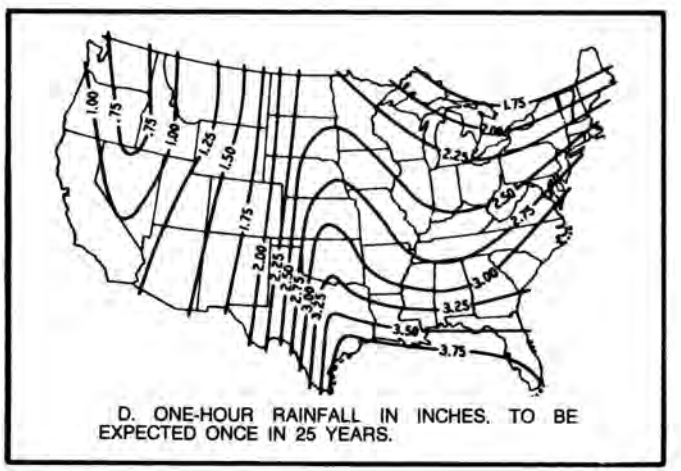
A. ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 2 YEARS.



B. ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 5 YEARS.



C. ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 10 YEARS.



D. ONE-HOUR RAINFALL IN INCHES. TO BE EXPECTED ONCE IN 25 YEARS.

Source: Reproduced from Miscl. Pub. No. 204, U.S. Department of Agriculture, "Rainfall Intensity—Frequency Data," by David L. Yarnell, pages 41, 42, and 43.

on sandy or gravelly soils. A few questioned the curves for concrete thicknesses and called for fuller information on base course design. A request from one project or another for a visit by "Dad" Middlebrooks was an almost daily occurrence.[65] Stemming from confusion, from the bewilderment caused by sudden innovations, most of these troubles soon cleared up. But some, which flowed from fundamental problems, were not easy to overcome.

To improve the method for designing flexible pavements was Stratton's cardinal goal. Even before Porter ran his quick, rough tests at Stockton, plans were under way for more elaborate studies. In March 1942 Stratton picked two airfields, Langley in Virginia and Barksdale in Louisiana, as sites for traffic tests on specially built sections. Within six months he hoped to have the answers to several key questions. Were the tentative CBR curves right for black plastic clays, characteristic of the southern states? Would the California method work on hard-to-drain sandy silts, which were apt to become quick under stress? And, highly important, what standards should govern compaction?[66] When completion of the test tracks lagged as war construction took priority over experimentation, Stratton asked Engineer districts to investigate all failures and furnish empirical data which would serve as a check on the extrapolated curves.[67] When defects showed up in the CBR test, he directed the Waterways Experiment Station to make a step-by-step analysis of the procedure, a job WES director Matthes turned over to his Soils Division chief, Willard J. Turnbull.[68] When Stratton heard that the flexible curves were conservative for pavements on sand, he launched investigations at Eglin Field, not far from Pensacola, Florida, and at Grenier Field in the Merrimack River Valley of New Hampshire.[69] Meanwhile, mindful that cement was scarce in some localities and steel was short the nation over, he limited research on rigid pavements. Although he approved inclusion of two slabs in the Barksdale track, he postponed further large-scale tests on concrete.[70]

Flexible, not rigid, pavements were the agonizing problem. Criticism of CBR, harsh to begin with, grew more vehement as time went on. The strength of the opposition became apparent at a meeting of the Highway Research Board at St. Louis in December 1942. The reading of papers by Middlebrooks and Porter touched off a lively discussion, as commentators challenged concepts contained in the *Engineering Manual*. One man termed CBR half-baked and misleading; another called the thickness curves unrealistic; while a third warned that construction costs would be prohibitive. A group from the Asphalt Institute reportedly held an all-night strategy session at which they debated, and finally agreed to table, a motion to condemn the Corps procedure. Much of

[65] Airfields Br, Reading File, II, 1942. See also 611 (Airfields) Part 2 and 686.61 (Airfields) Part 1.

[66] (1) 686.61 (Langley Fld, Va.). (2) 400.112 (Airflds) 1942.

[67] Ltr, Stratton to Div Engrs, 31 Aug 42. 611 (Airflds) Part 2.

[68] 1st Ind, 17 Sep 42, on Ltr, WES to OCE, 7 Sep 42. Airflds Br, Reading File, II, 1942.

[69] (1) Ltr, Stratton to Bragdon, 23 Nov 42. 600.95 Part 2. (2) Résumé of Investigations, app. A, pp. 4–5.

[70] (1) 1st Ind, 16 Jul 42, on Ltr, Stratton to Hall, 4 Jun 42. 411.8 (Airflds) Part 1. (2) 2d Ind, 7 Oct 42, on Ltr, Stratton to Hall, 20 Aug 42. 411.8 (ORD).

the opposition to Porter's ideas stemmed from misunderstanding: some engineers seemed to think that he was recommending a five-foot-thick base of crushed stone.[71] And much of it was highly subjective: after all, the Asphalt Institute was interested in selling asphalt, and here came a man who said: "Put a thin coat of asphalt on top of this 'stuff' and you've got it made."[72] Still there was a good chance that Porter could be wrong. Until the question was finally settled, flexible pavements would be Stratton's chief concern.

To many a hard-pressed project engineer, the deliberations of the Highway Research Board were academic. Demands by air commanders for utmost speed, exerted with ever greater urgency as long-delayed expansion plans matured, created an unhappy situation. In the fall of 1942, near the end of the construction season, directives appeared for more than a hundred major air projects to be operational as soon as possible. Largest and most challenging of the new undertakings were several dozen bases for heavy bombardment training. Concentrated in the region of the Second Air Force, the northern Great Plains and the Pacific northwest, these bases ranged in size from a $1.7-million unit training center at Redmond, Oregon, to the huge $15-million airdrome at Mountain Home, Idaho. Protests greeted the decision to carry on construction through the harsh northern winter. Some officers suggested relocating the fields farther south, and some urged postponement until spring; but to no avail. At the Air Forces' insistence, grading and paving operations went forward in the face of snow, sleet, heavy gales, and subzero temperatures.[73] To men at the job sites, exhortations from the Chief's office to employ "sound engineering practices" often seemed unrealistic.[74] Most tried gamely to go by the *Manual*, but a number gave it up as a hopeless task. "In many cases," an observer noted, "caution was thrown to the wind."[75]

In the hope of averting gross mistakes, McFadden kept a troupe of troubleshooters on the road. So ceaseless were Porter's travels that General Hannum proposed commissioning him a colonel in the Corps, a proposal vetoed by Reybold and Stratton on the grounds that under the Army system he could be transferred "God-knows-where." The discomforts of transcontinental train trips were among Pringle's vivid memories of this period. Middlebrooks, Haines, Leslie, and Ricketts also spent considerable time trekking back and forth across the country. At many projects, all was going well. At many others, a bit of sound advice was enough to set matters right. But occasionally the travelers uncovered egregious blunders. At three satellite fields in Montana—Cut Bank, Glasgow, and Lewistown—Porter learned that frozen materials had gone into the base course fill: spring thaws would surely take these airfields out. At a job in eastern Nebraska, Pringle watched, amazed, as

[71] (1) O. J. Porter, "Foundations for Flexible Pavements," *HRB Proc.*, 1942, pp. 100–123 and T. A. Middlebrooks and G. E. Bertram, "Soil Tests For Design of Runway Pavements," *Ibid.*, pp. 144–54, and discussion thereon. (2) Porter Interv, 16 Sep 66.

[72] Philippe Interv, 22 Sep 66.

[73] 686.61 Project Files.

[74] 1st Ind, OCE to Hannum, 22 Dec 42, on Ltr, Arnold to Reybold, 21 Dec 42. 686.61 (Moses Lake AAF, Wash.).

[75] H. J. Lichtefeld and R. M. Haines, "Airfield Pavement Evaluation," *HRB Proc.*, 1944, p. 36.

a gopher emerged from the freshly poured concrete, shook itself, and walked away: clearly, base compaction left something to be desired.[76] Determined vigilance retrieved many errors but could not prevent all.

Not until 1943 did Stratton's renewed assault on problems of flexible design begin to show results. Months of careful effort went into planning the experiments. The test track at Barksdale Field, the most elaborate to date, took nearly six months to design. More months were consumed in building the sections, procuring giant Tournapulls, and putting together teams of researchers. Precise and methodical, testing proceeded at a measured pace, as the big earthmovers crawled along, making thousands of passes over the pavements at speeds of 2 to 4 miles an hour. Halts were frequent. Couplings broke repeatedly. Bad weather intervened. From time to time traffic stopped, while measurements were taken and test tracks were repaired.[77] By March 1943 test directors at Langley, Barksdale, and Eglin were coming through with their preliminary findings. Reports from minor traffic tests—at Beltsville, Maryland; Natchitoches, Louisiana; Richmond, Virginia; Santa Maria, California; and Manchester, New Hampshire—helped clarify the picture. The extrapolated curves were sufficiently close for all practical purposes. True, a few changes seemed in order—somewhat thicker bases on sandy silt and black clay and somewhat thinner ones on clean well-drained sand. But, by and large, assumptions were proving out. Moreover, the Proctor compaction method or something very like it, appeared to be essential.[78] As new facts came to light, McFadden and Pringle brought the *Engineering Manual* up to date, and then sent the mass of investigative data to Vicksburg for further study.

By spring 1943, the Waterways Experiment Station was emerging as the leading center of flexible pavement research. Since the previous fall, when military airfields had replaced earth dams and embankments as his major mission, Soils Division chief Turnbull had struggled to keep abreast of a rapidly growing work load. Going over test reports, visiting project sites, programming future investigations, and hosting several large conferences on CBR, Turnbull put in 12 to 18 hours a day. When fresh assignments loomed ahead of him, he launched a vigorous recruitment drive. Raids on the district offices at Little Rock and Vicksburg netted two foundations experts, Charles R. Foster and William H. Jervis. An experienced highway engineer, John F. Redus, Jr., answered an appeal to the Mississippi state roads department. Journeying to North Dakota, Turnbull brought back W. Keith Boyd, a pioneer in flexible pavement design, to head the research effort. Working independently,

[76] (1) McFadden Reading File. (2) 686.61 for various projects. (3) Porter Interv, 16 Sep 66. (4) Pringle Interv, 9 Sep 66.

[77] 686.61 (Barksdale Fld, La.).

[78] (1) 686.61 (Langley Fld, Va.). (2) 686.61 (Eglin Fld, Fla.). (3) Résumé of Investigations, app. A, *passim*. (4) Rpt, USEO, Little Rock, Ark., Jul 1944, sub: Barksdale Fld Service Behavior Test. OCE (MC) Civ Engrg Br. (5) Thomas A. Middlebrooks and Reuben M. Haines, "Results of Accelerated Traffic Tests of Runway Pavements," *HRB Proc.*, 1943, pp. 101–8. (6) D. Dana Leslie and Reuben M. Haines, "Accelerated Traffic Test at Langley Field, Virginia," *Ibid.*, 1944, pp. 47–54. (7) Fred A. Robeson, "Accelerated Traffic Tests at Eglin Field, Florida," *Ibid.*, 1944, pp. 55–67.

Boyd had recently completed hundreds of tests on soils under bituminous surfaces, using his own cone penetrometer to measure bearing strength. The results of his work, including extrapolated curves for single wheel loads up to 100,000 pounds, closely matched the CBR curves in the *Engineering Manual.* As his staff expanded, Turnbull asked the Chief to provide $100,000 for a building and more equipment. Granting the request in April 1943, Reybold named the new facility the Flexible Pavement Laboratory.[79]

Comfortably housed in its new brick building, the laboratory was a going concern by the late summer of 1943. With Turnbull's help, Boyd quickly filled the spaces on his organization chart. Foster became his deputy. Dr. Philip C. Rutledge, a leading authority on soil mechanics and head of the department of civil engineering at Northwestern University, became his principal consultant. Bruce G. Marshall, whose recently invented machine for measuring asphalt stability was attracting wide interest, was a valuable addition to the staff. Before long the team numbered 25 persons and one working cat, a dedicated mouser who served as mascot. During the latter part of 1943, Boyd and his colleagues launched a long-range research program, which included laboratory and field investigations of base course design, compaction methods, moisture conditions under pavements, and many varieties of asphaltic surfaces.

In mid-1943, as the flexible pavement group at Vicksburg settled down to work, rigid pavements were, belatedly, receiving close attention. In recent months, failures had occurred at 20-odd newly completed airfields. As General Robins pointedly apprised Colonel Pick, the sorriest record belonged to the Missouri River Division, which muffed eleven important jobs.[80] The runways at Cut Bank, Glasgow, and Lewistown failed so utterly when frost left the ground that the Air Forces abandoned the three bases, constructed at a total cost of $11 million. Five or six other fields in Pick's division required extensive repairs. Runner-up for Robins' booby prize was Colonel Neyland of the Southwestern Division, who had as many failures as Pick though none so serious. Most of the trouble, countrywide, was with flexible pavements; and much of it was traceable to hasty construction in wet or freezing weather.[81] Given the size of the program, the necessity for speed, and the novelty of CBR, mistakes were bound to happen. Stratton took the flexible failures more or less in stride. But half a dozen rigid failures gave him pause. Virtually no one except Philippe and his associates at Mariemont had foreseen serious trouble with concrete.

Since the summer of 1942, Philippe had been calling for a comprehensive investigation into rigid design. As he studied reports of the Wright Field tests, he grew apprehensive. Starting from the

[79] (1) Intervs with Willard J. Turnbull, 4–6 Apr 67; and Audley A. Maxwell, 6 Apr 67. (2) Ltr, WES to Reybold, 13 Mar 43, and Inds thereon. Airfields Br Reading File. (3) OCE Circ Ltr 2376, 27 Apr 43. (4) W. Keith Boyd, "An Analysis of Wheel Load Limits as Related to Design," *HRB Proc.*, 1942, pp. 185–91; and Discussion by T. A. Middlebrooks, pp. 195–96.

[80] Ltr, Robins to Pick, 7 Aug 43. 686.61 (MRD).

[81] (1) Craven and Cate, *Men and Planes*, pp. 155–56. (2) OCE, Airfield Pavement Failure Rpts, Dec 1943.

popular highway theory that no slab should be thicker than 8 inches (honeycombing and temperature warping would ruin slabs of greater thickness, this thinking ran), the Corps was relying on thin base courses to undergird rigid pavements.[82] Philippe's results indicated that such bases under concrete paid little benefit for the magnitude of loading involved. Twice he submitted research proposals to Washington, and twice he was turned down. Reflecting the position of most paving engineers, McFadden and Land dismissed Philippe's concept as a "pet idea."[83] Stratton, also skeptical, challenged the concept on technical grounds. Even to Colonel Hall's sympathetic eye, Philippe's request for $47,000 appeared inopportune. Discussing the matter with Reybold in March 1943, Hall took an equivocal stand.

> Beyond any question [he advised the Chief], the additional information secured will be worth $47,000 to the engineering profession and the aeronautical industry. Whether, in the present state of the Army's construction program, it will be worth $47,000 to the war effort is a matter which the Division Engineer does not feel justified in attempting to settle.[84]

Not until a few rigid pavements failed did the picture alter. Then, Middlebrooks, who had Robins' ear, intervened decisively. By summer Philippe had $150,000 to spend for research.[85]

As Philippe made plans for an elaborate test track at Lockbourne Field, the Engineers were winding up major air force construction in the United States. By the spring of 1943, General Robins could point to more than 1,100 military and civil airports completed under his direction. In a commendatory letter to the Chief of Engineers, General Arnold expressed his "keen appreciation" for the "fine support" given the Army Air Forces. Commenting on the vast size and complexity of the undertaking, Arnold noted that the program had "been prosecuted with outstanding efficiency and dispatch."[86] Equally gratifying to the Engineers was the boast of Maj. Gen. Davenport Johnson: "The Second Air Force has some of the finest airfields in the world."[87] From his headquarters at Spokane, Washington, Johnson would oversee the training of combat crews for very heavy bombers. After a series of reverses, the XB–29 passed its final flight tests in June 1943, and in July Boeing delivered 7 planes, the first of more than 3,700 Superforts to be produced before V–J Day. Commenced in the fall of 1943 at 4 fields near Salina, Kansas, the training of very heavy bombardment groups expanded to take in operations at 40 major airbases by the late spring of 1945.[88] The advent of the B–29, the biggest bomber employed by the United States in World War II, ushered in a new phase of air force–engineer collaboration.

Danger signals flashed by air commanders in the summer of 1943 launched the Corps on a large undertaking. Early in June, Maj. Gen. Barton K. Yount of

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[82] *Trans. ASCE*, 1945, p. 676.

[83] Memo, Land for McFadden, 19 Apr 43. McFadden Reading File, 1943.

[84] 3d Ind, 18 Mar 43, on Ltr, Stratton to Hall, 20 Aug 42. 411.8 (ORD).

[85] (1) Ltr, Stratton to Hall, 4 Jun 42, and Ind thereon. 411.8 (Airflds) Part 1. (2) Ltr, Stratton to Hall, 20 Aug 42, and Inds thereon. 411.8 (ORD).

[86] Ltr, Arnold to Reybold, 13 Jun 43. 686 Part 2.

[87] Quoted in 86, above.

[88] Craven and Cate, *Men and Planes*, pp. 208–9 and 164.

the Air Training Command complained to Arnold that fields in his command did not perform as advertised; some did better and some, worse; which could take B–29's was any man's guess.[89] Other air force generals voiced similar complaints: runways designed for Superfortresses were going to pieces under lighter planes, and pavements intended for medium bombers were standing the test of heavies. The explanation was not hard to find. As McFadden pointed out, war construction was a "hurry-up job," and "in many cases the progress chart took precedence over engineering judgment." Hence, *design strength* and *actual strength* were seldom equivalent.[90] The question was not whom to blame but how to get out of the predicament. Concerned about the Corps' good name, General Hannum gave the matter careful thought. Fully loaded, the new B–29's weighed 140,000 pounds, 20,000 more than originally anticipated. No airfield in the country was designed to withstand a gross load of more than 120,000 pounds. Moreover, inexperienced pilots were landing heavy planes on any blacktop surface that looked to be safe. Visualizing fatal crack-ups and damaged runways, Hannum urged the Chief to determine the actual load-carrying capacity of all military airfields, and, when necessary, to reinforce them.[91]

Having seen the crisis coming, Stratton's advisers were prepared to meet it. Ready with a plan for gaging actual strength of paved surfaces, Pringle quickly drafted a directive. Issued on 5 August 1943, this order set forth procedures and priorities. Using CBR for flexible and plate bearing tests for rigid pavements, each division engineer would evaluate the load-carrying capacity of pavements within his jurisdiction. How much punishment could a given airstrip take? Where could the training of B–29 groups continue year in and year out? Where could very heavy bombers land occasionally? Although fields intended for Superfortresses would come first, every military airport would eventually receive a rating based on the strength of its principal runway. Knowing that many pavements would require "beefing up," McFadden took a cue from highway engineers, who frequently used overlays (asphalt "retreads" and "second-story" slabs) to strengthen roads. Prescribing the same treatment for runways, taxiways, and aprons, he nevertheless reminded Stratton that highway experience was no sure criterion for airfield design: only through research could the Corps develop sound techniques. While McFadden blocked out an investigative program, Pringle took charge of the evaluation project. By mid-1944 the Air Forces Installations Directory listed the strength of runways at more than 600 airports, and scientists from the University of California, under contract to the Corps, were experimenting with overlays at Hamilton Field.[92]

As Superfortress groups began training

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[89] Ltr, Yount to Arnold, 3 Jun 43. 686.61 May–Jul 43.

[90] Gayle McFadden, "Evaluating the Load-Carrying Capacities of Military Airfields," *Civil Engineering*, April 1945, pp. 167–69.

[91] Ltr, Hannum to Reybold, 7 Jun 43. 686.61 (PD) Part 1.

[92] (1) Ltr, Hq, AAFTC, to Div Engr, SWD, 25 Jun 43 and Inds thereon. 686.61 (SWD). (2) Ltr, Stratton to Div Engrs, 5 Aug 43. 686.61 (ORD). (3) Memo, McFadden for Stratton, 2 Jul 43. McFadden Reading File, 1943. (4) AAF Installations Directory, 1 Jul 44. (5) 686.61 (Hamilton Fld) Part 1.

near Salina in the fall of 1943, the course of the war was shaping their strategic mission and future logistical needs. Long-awaited and eagerly sought by air commanders in all theaters, the B–29 appeared after the tide in Europe had turned. Enemy forces in North Africa had met defeat. Italy had capitulated. Hitler's invasion of Russia was ending in disaster. And Allied plans were firming up for the big cross-Channel operation in mid-1944. Meantime, the British-American bomber offensive against *Festung Europa* was gathering momentum. Bremen, Hamburg, Hannover, Frankfurt—one by one the great German cities were undergoing devastating raids. After a mass attack by B–17's on Polish and East Prussian targets in October 1943, Prime Minister Churchill confidently declared: "We shall, together, inexorably beat the life out of industrial Germany and thus hasten the day of final victory."[93] On the other side of the globe, in the far Pacific, industrial Nippon was virtually unscathed and the day of Allied victory seemed far distant. The roads to Tokyo stretched thousands of miles, through hostile seas and past concentric barriers of island strongholds or through the difficult terrain and enemy-occupied areas of the Asiatic mainland. Offensives under way in the Southwest and Central Pacific were little more than preliminary thrusts, aimed at attaining a position of readiness for the eventual full-scale assault on Japan. And much of the activity in the China-Burma-India Theater was directed toward keeping the Chinese in the war. By bringing the Japanese home islands within bombing range, the Superfortress made possible a more aggressive strategy. Committing the new weapon to the Pacific war, President Roosevelt decreed that missions would be flown first from China and later, when footholds were secured in the Western Pacific, from island bases nearer Japan.[94] In these remote and backward areas, engineers would have to provide airdromes for the giant planes.

On a sultry evening in August 1943, six men gathered at the Washington-Youree Hotel in Shreveport, Louisiana, to consider how to accomplish the task. Five of the perspiring conferees were civilians: McFadden, Middlebrooks, and Haines had come from Washington, Philippe from Mariemont, and Turnbull from Vicksburg. The sixth man was Capt. George E. Bertram, since September 1942 an officer on the staff of the Air Engineer, Brig. Gen. Stuart C. Godfrey. Disclosing plans for stationing B–29's in India and staging them from advance fields in China, Bertram previewed the tough construction job ahead. He traced the thin supply line halfway around the world and beyond the peaks of the Himalayas, and he pictured the slim local resources—coolie labor, primitive tools, and low-grade materials. At Godfrey's request, Stratton had promised to help find ways of cutting through these obstacles. A revolutionary feature of the new bomber—its dual wheel landing gear—might offer a partial solution. Adopted by Boeing at the Corps' suggestion, this wheel design would, in theory, distribute the weight more widely and thus reduce the load on airfield surfaces. Growing out of the Shreveport

[93] Quoted in Arnold, *Global Mission*, p. 484.

[94] Craven and Cate, *Matterhorn to Nagasaki*, pp. 9–26.

meeting was a fresh investigative program launched at Marietta, Georgia, in the fall of 1943. Near the big B–29 assembly plant recently completed by the Corps, Turnbull and Boyd laid out a test section composed of types of pavement never before considered for very heavy bombers—old fashioned, hand-set telford stone, water bound macadam, and sand-clay and sand-asphalt bases, surfaced with bitumen or pierced steel planking; and they made plans for experiments with single-wheel B–24's and dual-wheel B–29's. As construction crews finished work, test director John M. Griffith tackled what proved to be an ulcer-producing task: providing blueprints for the fields overseas and plotting design curves for dual wheels.[95]

Marietta exemplified the Engineer Department's deepening involvement with airdrome construction overseas. At the Waterways Experiment Station, Turnbull and his colleagues enlarged the scope of their investigations to include problems of theater engineers. Across the Mississippi River at WES's Mound (Louisiana) test site, field men conducted studies of base course requirements under landing mat and experimented with a new type of temporary surfacing—burlap, duck, or osnaburg fabric impregnated with bitumen and laid down by a novel machine called a "stamplicker." At the Flexible Pavement Laboratory, inventor Bruce G. Marshall remodeled his asphalt stability machine for use by troops in designing paving mixtures. In the Chief's office, Hathaway's group assembled data on rainfall rates in prospective battle zones, while McFadden's staff updated the manual for Aviation Engineers and prepared reports for the Joint Chiefs of Staff on the bomber base potentialities of various Pacific islands.[96] Meantime, demands from the theaters for expert soils men were answered by longtime Corps civilians, of whom perhaps the most outstanding were Spencer J. Buchanan of the Mississippi River Commission and Waldo I. Kenerson of the South Atlantic Division. Both Buchanan and Kenerson achieved distinguished records, the former in the Southwest Pacific, and the latter in China.

An important contributor to the winning of the air war was the Army Soils Control School at Harvard University. Sponsored by the Corps, the school was the brainchild of Professor Casagrande. As a consultant on airfield design during the spring of 1942, Casagrande realized that the Army needed men trained in soils engineering. His offer to establish a 6-week course for officers was snapped up by the Chief. The first class of 24 newly commissioned lieutenants reported at Harvard's Pierce Hall on Friday, 3 July. Monday morning they began a rapid but intensive survey of soil mechanics and related subjects. The faculty included the top men in the field, Casagrande and Terzaghi. The students were enthusiastic. The schedule was well planned; laboratory sessions, field trips, and lectures by outside experts supplemented classroom work. Rated a

[95] (1) Rpt of Conf by McFadden, 16 Aug 43. McFadden Reading Files. (2) Ltr, Stratton to Pres, MRC, 13 Sep 43, and Incl. 686.61 (Marietta AAP). (3) Interv with John M. Griffith, 2 May 67. (4) *ENR*, July 11, 1946, pp. 88–92.

[96] (1) Résumé of Investigations, pp. 7–8, and app. A, pp. 7–8. (2) WES, Final Rpt, Field Tests on Prefabricated Bituminous Surfacing, 20 Jul 44. (3) Turnbull Interv, 6 Apr 67. (4) Annual Rpt of the Mil Activities, OCE, 1 Jul 43–30 Jun 44, pp. 43–45.

success by all concerned, the course was given repeatedly until mid-1944. As Aviation Engineers, the 400 graduates made good use of their knowledge at airfield projects around the world.[97]

Returning in late 1943 from a tour of war theaters, General Reybold spoke with pride of the advancing fighter and bomber line. Picturing airfields of virtually every type, from turf to reinforced concrete, built by Engineer units in every quarter of the globe, he told one audience: "What we have learned in our civil works program about soil strengths . . . has contributed to feats of military engineering which have astonished the world."[98] Secrecy precluded any mention of a prodigious engineering feat soon to be attempted in the Far East. At the turn of the year, Colonel Kenerson was in Western China's Szechwan Province, designing four B–29 staging fields to be built on telford principles by a conscript workforce of 300,000 coolies. Far to the south, on the other side of the "Hump," in the plains west of Calcutta, Lt. Col. Kenneth E. Madsen was making plans for five Superfortress bases, complete with 8,500-foot concrete runways to be paved by Aviation Engineers enroute from the United States. Both officers had studied soil mechanics (Kenerson was a classmate of Philippe and West Pointer Madsen had earned an M.S. at MIT in 1939), and both had recent experience on major airfield projects (Kenerson in Brazil and Madsen in Trinidad). Their knowledge of advanced techniques (Madsen conducted load tests to determine concrete thickness requirements) and their ingenuity (lacking standard equipment, Kenerson used shell cases and C-ration coffee cans in CBR and compaction tests) increased their chances of success.[99] Breakthroughs scored by the Engineer Department in foundation and pavement design were having worldwide application.

Prize-winning papers by Stratton and Hathaway, published by the American Society of Civil Engineers in January 1944, reported the department's findings. Bracketed under the title "Military Airfields, A Symposium," these articles made nonsense of the cliché that whoever could design a road could design an airdrome.[100] "A most welcome contribution to general engineering knowledge," wrote a prominent consulting engineer. "Important and timely," a Columbia professor said. "Impressive," "thorough," and "indispensable" were among the terms employed by other expert commentators. Replying to critics of the Corps' empirical approach, one of Arnold's generals called to mind the old saying about the proof of the pudding: "Almost without exception," he stated, "the facilities have met the exacting requirements of the Army Air Forces."[101] Predicting a great spurt of progress in

[97] 352.11 (Harvard University).

[98] Address before the Mississippi Valley Flood Control Assn at New Orleans, La., 21 Dec 43. EHD Files

[99] (1) Brig. Gen. Stuart C. Godfrey, "The Airfields of the Far East," *The Military Engineer*, January 1945, pp. 17–23. (2) Col. George Mayo, "Airfields 'Custom Built' by Aviation Engineers," *Civil Engineering*, April 1945, p. 174. (3) Col. Kenneth E. Madsen, "Army Engineers and the Superfortress," *The Military Engineer*, October 1944, pp. 332–34. For a detailed account of construction of the B-29 fields in China and India, see Dod, *The War Against Japan*, pp. 428–31 and 439–47.

[100] *Proceedings of the American Society of Civil Engineers*, 1944, pp. 27–89.

[101] *Trans. ASCE*, 1945, pp. 758, 809, 737, 751, 752, 776, and 734.

civil aviation, *National Aeronautics* meantime commended the Corps' findings to "civilians planning the large commercial airports of the future—fields that must have long runways and withstand tremendous pounding from super planes."[102]

Chosen in late 1943 for a high logistical post in Eisenhower's command, Colonel Stratton left for England proud of his part in helping to pioneer a new technique of design. "As classic in its nature as it was revolutionary in concept," he said of the accomplishment.[103] Two years of concerted effort had produced significant results—fields adequate for the heaviest planes of World War II and methods for coping with much heavier planes in the future.

New Horizons

Looking toward the age of intercontinental flight when stratocruisers would replace ocean liners and bombers would span the Pacific, apostle of air power Giulio Douhet wrote in the 1920's: "Since planes of such weight probably could not land or take off except on liquid surfaces, we may have to build artificial lakes for their landing."[104] At the same time, his American disciple Billy Mitchell, viewing world geography in terms of long-range aircraft, stressed the key importance of arctic routes.[105] Fantastic though it seemed to many of their generation, the vision of these men was prophetic. By 1944 the United States was building a 10,000-mile-range bomber, air strategists were exchanging Mercator maps for polar projections, and airport designers were confronting the awesome challenge of providing surfaces for gross loads of 300,000 pounds, not only in temperate regions but in the frozen north. Solutions put forward by some distinguished engineers read almost like a page from science fiction—catapult and rocket launchers, reverse propellers or aerial tugs for landing, caterpillar treads in place of wheels, and paved tracks instead of runways. With recent experience behind them, the Corps' team of experts was able to take a more practical, down-to-earth approach.

Meeting in Washington on 6 June 1944, the day of the Normandy invasion, members of this team heard Colonel Hill explain the problem. Bigger and bigger aircraft, calling for larger, stronger pavements with more and more design unknowns—the trend had long been apparent. Talk of six-figure wheel loads had been current for some time; and plans for the first postwar superairport, Idlewild International at New York City, envisaged 10,000-foot runways capable of taking gross loads upwards of a quarter-million pounds. A recent inquiry from the Air Forces had changed prognostications to demands for prompt action: General Arnold wished to know where in the United States the XB–36 might safely land and take off. Conceived as an intercontinental bomber to be used in case Britain and Russia met defeat and American overseas bases were lost, the XB–36 had been under development since 1941. When the danger in Europe receded, interest in the plane continued keen; as a possible weapon against Japan it rated high priority. By

[102] *National Aeronautics*, March 1944, p. 41.

[103] Ltr, Stratton to OCMH, 1 March 1955.

[104] Giulio Douhet, *The Command of the Air*, tr. by Dino Ferrari (London: Faber & Faber, 1942), pp. 57–59.

[105] Edward M. Earle (ed.), *Makers of Modern Strategy: Military Thought from Machiavelli to Hitler* (Princeton: Princeton University Press, 1943), p. 500.

early 1944 Consolidated-Vultee was promising an early flight test, if a test site could be found. But the Engineers informed Arnold that the huge six-engine plane, with a gross weight of 300,000 pounds and only two main wheels, would break through any pavement in the country.[106] To design and build fields for the new bomber was the next major objective.

Cost was the great impediment. For a plane of such enormous weight, "hell for stout" construction standards—supercompaction, top quality base materials, reinforced concrete, and durable asphalt wearing courses—were a must. Compounding difficulties and pushing up requirements was the giant bomber's landing gear, with its two 110-inch wheels, which made for larger payload and longer range but also imposed extremely heavy burdens on runways. Estimates for beefing up a single airfield to take the XB–36 ran to nearly $7 million. Seeking criteria that were economically feasible as well as technically sound, the D-day conferees agreed to a plan of action. Using proved methods, they would extrapolate the CBR and Bone curves for wheel loads up to 150,000 pounds and then verify interpolations by experiment. Meantime, they would launch collateral investigations with a view to finding better ways of compacting base courses, testing for shear strength in soils, vibrating concrete, designing asphalt mixes, establishing turf, and controlling dust, and, in fact, to elevating the whole state of the art. The steepest obstacle they foresaw was budgetary. Pavements could be designed for the heaviest wheel loads but costs would be prohibitive. Convinced that planes of the future would have to be tailored to fit the fields rather than *vice versa*, that multiple wheel assemblies were the answer, they planned their research accordingly.[107]

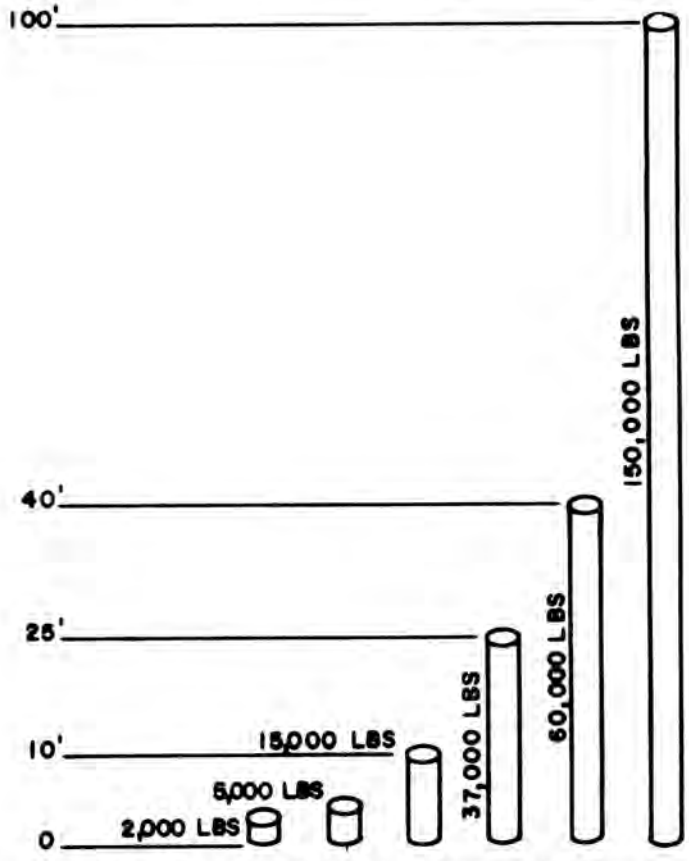
A million dollars would go into the first year's effort. At Stockton Field, the newly formed O. J. Porter Company, soon to become internationally known for its work in foundation engineering, would undertake its first job, laying a flexible section of 26 different items over several different subgrades. At Lockbourne Field, where traffic tests on the big oval concrete track were nearing completion, Philippe would build an experimental mat, containing 9 slabs varying in thickness from 12 to 24 inches, some plain, some reinforced, and some with "second story" overlays. At fields in Florida and Alabama, teams from the Savannah and Mobile Districts would prepare additional experiments with overlays. Meantime, one of the Corps' gifted civilians, William E. Sidney of the Pittsburgh District, inventor of the Sidney gate for dams, would take on the tough assignment of devising a test rig two and one-half times as heavy as the largest commercial earth mover and equipped with interchangeable single, dual, and twin tandem wheels. Until Sidney's rig was ready, research would focus on ingenious small-scale models designed by Evan Bone.[108] Likening the

[106] (1) Craven and Cate, *Men and Planes*, pp. 243–46. (2) Ltr, CG, AMC, to Arnold, 13 May 44, and Inds. 686.61 1941–45.

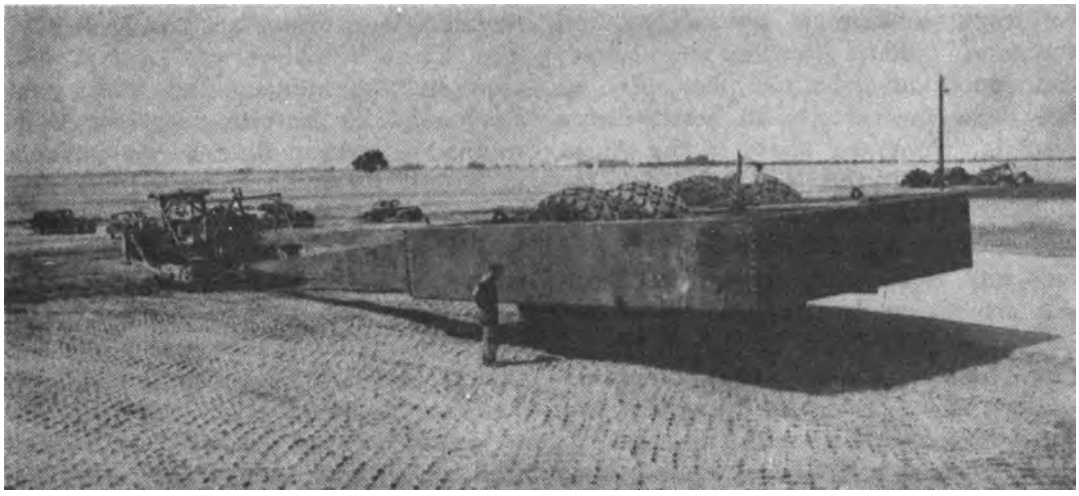
[107] (1) Min of Conf in OCE, 6 Jun 44. 686.61 Part 5. (2) 686.61 (Muroc Fld) Part 1.

[108] (1) OCE Résumé of Investigations for Development of Military Construction Design Procedures, June 1950, app., pp. 8–10, 19–21, and 23–24. Cited hereinafter as Résumé of Investigations, II. (2) 686.61 Parts 4 and 5. (3) 686.61 1941–45 (c). (4) 686.61 (ORD).

CHART 26—WHEEL LOADS AS COLUMNS OF CONCRETE, 3 FEET 8 INCHES IN DIAMETER.



Source: Ralph A. Freeman and O. James Porter, "Flexible Pavement Test Section for 300,000 Lb. Airplanes, Stockton, California," *HRB Proc*, 1945, p. 26.



240,000-POUND PNEUMATIC ROLLER

B–36 wheel load to the weight of a large locomotive carried on one tire, or to a column of concrete 3 feet 8 inches in diameter and 100 feet tall (*Chart 26*), Porter explained that researchers were centering attention "on the landing gear to be used, since the type selected would greatly affect the pavement design requirements for 300,000-lb. airplanes."[109]

Thoroughgoing and deliberate, the inquiry fanned out in many directions. Illustrative of its diversity were a 120-ton roller devised by Mr. Porter; an experimental patch of zoysia grass in Dr. Monteith's front yard; the "whiffenpoofer," a mulching machine developed by the Southwestern Division; "stabinol," a dust palliative produced by the Hercules Powder Company; a sheaf of reports evaluating drainage systems at major air bases; several comprehensive studies of high pressure tire imprints; a new set of formulas for stresses in concrete slabs; and a series of papers exploring avenues to a rational method for flexible pavement design. Each piece of the mosaic depicted progress (Porter's jumbo roller made supercompaction feasible); and each mirrored an important need (crashes by cadet pilots who tried to land on dust clouds fifty feet above the ground emphasized the value of turf, mulch, and stabinol). But no aspect of the program was more striking and significant than activity in cold regions research.[110]

Until late in World War II, the Engineers' knowledge of frozen soil was scarcely scientific. At airfield jobs in northern states where winters were severe, they employed highway methods to combat frost action, insulating subgrades with blankets of well-drained sand and gravel. The cost at a single proj-

[109] Ralph A. Freeman and O. J. Porter, "Flexible Pavement Test Section for 300,000-lb. Airplanes, Stockton, California," *HRB Proc.*, 1945, p. 24.

[110] (1) *Airports: Design, Construction, Maintenance.* Reports delivered at the Forty-Second Annual Meeting, American Road Builders Association, Chicago, Ill., Jan 16–19, 1945. (2) Résumé of Invesitgations, II, pp. 11–13, 32–33, and 36–38.

ect might amount to several hundred thousand dollars. Results were sometimes good and sometimes poor; why, no one knew for certain. In northwestern Canada, along the route of the Alcan highway, and in the Alaskan interior, the Engineers encountered a phenomenon with which few outside the Soviet Union had any experience—permanently frozen ground or "permafrost." This frozen layer underlay vast areas of the arctic and subarctic, in some places extending down as far as 1,000 feet into the earth's crust. Since time immemorial, the permafrost had maintained a delicate thermal balance with nature. But as civilization moved northward and construction machinery invaded the hyperborean wilderness, this balance was disturbed. Mudflows, landslides, cave-ins, gullies, cracks, and blisters confounded would-be builders. Early successes were achieved the hard way, by trial and error. Postponed while the Corps took central problems first, studies of frost and permafrost began in a small way during 1943, when the Missouri River Division looked into failures caused by heaving and thawing at several airfields and the Chief's office brought out a primer on permafrost, compiled from Russian sources. A year later the Engineer Department was deep in an endeavor to develop principles for building on permafrost.[111]

Pointing to the North Pole as the future center of strategy, General Arnold in the spring of 1944 labeled cold regions research "most important and urgent."[112] The Corps response was prompt and vigorous. Beginning at Dow Field near Bangor, Maine, frost investigations mushroomed to include observations and tests at ten northern air bases, experiments in the cold room at Harvard University, and complex theoretical studies—all guided by the chief of the Boston District Soils Laboratory, Harvard-trained soils engineer William L. Shannon. Beamed initially toward the Merzlotovedenie Institute at Moscow, the repository for a wealth of data gathered in Siberia since the 17th century, permafrost inquiries shifted course when plans for an Engineer mission to Russia fell through; wholesale translations of Soviet publications at the Stefansson Library in New York City, tests and measurements at three Alaskan air bases, collection of meteorological data by subarctic weather stations, geological explorations north of the Yukon, and efforts to locate permafrost by aerial photography and geophysical methods soon comprised the program. Casagrande, Rutledge, and Woods were sage advisers on cold regions undertakings. Several eminent scientists also co-operated, the most active being Dr. Siemon W. Muller, professor of geology at Stanford. Two universities participated: Purdue sifted clues to the presence or absence of permafrost and Minnesota probed into the thermal properties of soil.[113] Started on a crash basis, studies of frost and perma-

[111] (1) Memo, Middlebrooks for Stratton, 26 Oct 42. McFadden Reading File, II. (2) 686.61 (MRD). (3) Siemon W. Muller, *Permafrost or Permanently Frozen Ground and Related Engineering Problems*, Special Report, Strategic Engineering Study 62. Mil Intel Div, OCE, Washington, D.C., August 1945.

[112] Memo, Engrg & Dev Div, OCE, for Asst CofEngrs for War Planning, 22 Jun 44. McFadden Reading File, 1944.

[113] (1) Résumé of Investigations, II, pp. 40–42 and 44–47. (2) Col. Lynn C. Barnes, "Permafrost: A Challenge to Engineers," *The Military Engineer*, January 1946, pp. 9–11. (3) 686.61 Parts 4–7. (4) 686.61 1941–45. (5) 686 (Permafrost) Part 1.

frost quickly developed into long-term endeavors.

Events of the latter half of 1944 altered the character of the Corps' investigations. With the capture of the Marianas chain that summer and the construction of bases for B–29's on the islands of Saipan and Tinian that fall, pressure for the B–36 subsided and airfield designers received a breathing spell. Free to concentrate on long-range postwar objectives rather than on short-term wartime goals, General Robins converted what had been a rush program into a continuing systematic quest. Announcements came in quick succession: intensification of work at the Flexible Pavement Laboratory at WES; establishment of a Rigid Pavement Laboratory under Philippe's direction at Mariemont; creation of a Frost Effects Laboratory to be headed by Shannon at Boston; the centering of permafrost research in the St. Paul District; and formation of a board of consultants, composed of Westergaard, Casagrande, Rutledge, Porter, Middlebrooks, Land, and Fred C. Lang of the Minnesota Highway Department.[114] Under the stress of war, the Engineers had attained world leadership in airfield design, a lead they hoped to maintain for a long time to come.

In the years that followed World War II, the Engineers pressed forward, broadening the scope of their investigations and advancing the frontiers of the science they had helped to found. Their technological trailblazing opened the way for two historic developments: the spectacular growth of aviation and the evolution of America's cold-war global strategy. A great international airport like Logan at Boston, a haven for gigantic commercial planes; a huge bomber base in northern Greenland, only 12 miles from the polar icecap; concrete pavements several feet thick and free of honeycombs; and compacted subgrades so hard that only pneumatic drills could dent them—such feats of modern engineering were meaningful subjects for students of the period. Evidence of the Corps' guiding influence assumed divers forms: the multiple wheel assemblies adopted by the aircraft industry for very heavy planes; the impressive catalog of technical pamphlets published with the Chief's imprimatur; the guest books at Mariemont and Vicksburg filled with the names of hundreds of visitors, many from foreign lands, who sought authoritative counsel on pavement design; and flexible runways for million-pound supersonic transports planned on principles contained in the *Engineering Manual*. Witnessing the landing of a B–52 Stratofortress (the jet-powered replacement for the B–36) on the 16,800-foot concrete runway at Edwards Air Force Base in California, and thinking back to the planes of 1940 and the airfields of that time, few could fail to sense the magnitude of the Corps contribution to the new aviation age.

The magnitude of another contribution by the Corps' foundations and paving engineers—their contribution to victory in World War II—shone forth in the spring and summer of 1945, as massed Superfortresses devastated Japan and two heavily loaded bombers, *Enola Gay* and *Bock's Car*, brought the struggle to its epochal conclusion.

[114] (1) *ENR*, December 28, 1944, p. 35. (2) Ltr, OCE to Div Engr, MRD, 2 Feb 45. McFadden Reading File, 1945.

CHAPTER XX

Atomic Mission

At a quarter of eleven on the morning of 6 August 1945, the White House solemnly announced: "Sixteen hours ago an American airplane dropped one bomb on Hiroshima, an important Japanese Army base." More powerful than 20,000 tons of TNT, the bomb was an atomic bomb capable of wiping out whole cities.[1] The statement produced a general sensation. A wave of exultation swept the United States: the war was practically over; the boys would soon be home. In London, where the story eclipsed all other news, a reporter noted: "The world has changed overnight."[2] Aboard the cruiser *Augusta*, on his way back from the Potsdam Conference, President Truman told a throng of cheering sailors: "This is the greatest thing in history."[3] Altering the course of civilization and opening a new era in the life of mankind, the release of atomic energy was a titanic task. Its achievement was a triumph for scientists, industrialists, and engineers.

As Hiroshima lay silent beneath a pall of smoke and dust and the world marveled at the scientific feat, the public learned about the Manhattan Engineer District: its hidden cities, secret plants, and secluded laboratories; its extraordinary size and scope; and its $2-billion expenditure. Early radio broadcasts told where the powerful new explosives originated—at the Clinton Engineer Works in Tennessee and the Hanford Engineer Works in the State of Washington.[4] Newspaper tributes to the genius of the bomb's developer, Dr. J. Robert Oppenheimer, appeared side by side with tributes to the driving force of the "atom general," Maj. Gen. Leslie R. Groves of the Corps of Engineers. References to other prominent Engineer officers—Reybold, Styer, Robins, and Farrell—found their way into dispatches; and Nobel laureates in physics shared the limelight with hitherto obscure Engineer colonels.[5] The castle emblem of the Corps was coupled inseparably to the armillary symbol of the atom. Yet many people at the time failed to understand fully why the castle was so prominently displayed. In the two decades that followed, many scholars also failed.

The bomb was the product of a remarkable set of circumstances. First, and basic, was the industrial power of the nation: the huge concentrations of capital goods and the great fund of

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[1] New York *Times*, August 7, 1945, p. 4. © 1945 by The New York Times Company. Reprinted by permission.

[2] *Ibid.*, p. 3.

[3] Truman, *Memoirs*, I, p. 421.

[4] Statements by Truman and Stimson, August 6, 1945. Reprinted in New York *Times*, August 7, 1945, p. 7.

[5] (1) Baltimore *Evening Sun*, August 6, 1945, pp. 1 and 3; and August 7, 1945, p. 3. (2) New York *Times*, August 7, 1945, pp. 1–3 and 6; and August 8, 1945, pp. 2–3 and 6. (3) Albuquerque *Journal*, August 7, 1945, pp. 1–2.

technical and managerial skills capable of sustaining tremendous emergency burdens. A circumstance just as vital to the realization of the weapon was the presence in the United States of a group of brilliant scientists, a number of them refugees from Europe, working feverishly against time to beat the Germans in harnessing atomic energy. But fully as essential as any other factor was the existence of a Corps of Engineers, trained and tested in large-scale construction undertakings. It was this established, knowledgeable Engineer organization, ready and at hand as an integral part of the Army, which provided indispensable leadership and support. The devastation of Hiroshima, followed three days later by the dropping of a second atomic bomb on Nagasaki, proclaimed the success of a three-year project unique in engineering annals.



BRIG. GEN. JAMES C. MARSHALL. (*Photograph taken in 1946.*)

MED: Origins and Early Efforts

A summons from the Chief to Col. James C. Marshall, on 17 June 1942, set the project going. District engineer at Syracuse, New York, Marshall was an esteemed member of the Corps. A 1918 West Point graduate, he had had a well-rounded career: duty with troops in France and Panama; service with the New York, Puerto Rico, and Binghamton Districts; study at the Engineer School and the Command and General Staff College; four years as an instructor at the Military Academy; three years with the Engineer Board at Fort Belvoir; two years as head of the New York State Barge Canal Improvement; and a tour in the Civil Works Division, OCE. Over the years he had built a reputation as a good executive, sound engineer, and gifted organizer. A polished and gracious man known to subordinates as "Gentleman Jim," an officer who coupled firmness with tact, he was a leader rather than a driver. His record at Syracuse spoke well for his methods. Responsible for a $250-million civil-military program; including a dozen major war construction projects, he could report virtually all jobs on or ahead of schedule in June 1942. Reybold's message to him bore the stamp of urgency. Checking with key assistants and making several long-distance telephone calls, he got important matters squared away. By midnight he was enroute to Washington.[6]

Twenty-four hours later, in a room at the Willard Hotel, Marshall sat, taut

[6] (1) Col Marshall's Diary, 17 Jun 42. EHD Files. (2) Ltr, Marshall to authors, 15 Jan 68. (3) Interv with Francis R. Deland, 5 Jan 68.

and weary, puzzling over the contents of a folder labeled "S–1." He had had a strenuous day: an all-night drive to New York City; an early morning conference with Colonel Dunn, the Division Engineer; an American Airlines flight to Washington; a serious talk with General Styer at the Munitions Building; and, finally, a grave session with Robins and Groves at the Chief's office. The S–1 folder belonged to Styer, who had handed it over with the explanation that Marshall had a new job: to form an Engineer district and construct plants for atomic fission bombs. Abstruse and baffling, Styer's papers mentioned several of the country's leading scientists; revealed the enormous destructive potential of a rare uranium isotope, U–235, and of a recently discovered transuranic element, plutonium; outlined four possible methods of achieving quantity production of one or the other of these fissionable materials; and put the cost of the entire program at roughly $90,000,000. "I spent the night without sleep trying to figure out what this was all about," Marshall afterward related. "I had never heard of atomic fission, but I did know that you could not build much of a plant, much less four of them, for $90,000,000."[7]

The next day Marshall gained a clearer understanding of his mission. From talks with General Styer and Dr. Vannevar Bush, who headed the Office of Scientific Research and Development (OSRD), and from documents they showed him, he learned the outline of the story: the German discovery late in 1938 that the uranium atom could be split and the impact of this news on the world of physics; the eager activity at American universities—the spurt of theoretical speculation about chain reactions, atomic power, and atomic bombs and the unaided struggle for experimental proof; Albert Einstein's letter to Roosevelt, which brought Uncle Sam into the enterprise in the fall of 1939; and the nuclear research or S–1 program carried forward under government auspices since that time. He learned, moreover, where the program stood. By the spring of 1942, the fact was plain: atomic bombs might be possible. S–1 scientists claimed to know in principle how to make the bomb stuff; in fact it seemed that they might be able to turn the trick several ways, separating U–235 from the far more abundant isotope U–238 by electromagnetic, gaseous diffusion, or centrifugal methods, and producing plutonium by bombarding natural uranium with neutrons. So far, however, none of these processes had advanced beyond preliminary laboratory stages; none had proved superior to the rest; and none had yielded as much as a microgram, though kilograms were needed to make bombs.[8] Marshall's task was unprecedented: from laboratory instruments to huge industrial

[7] (1) Ltr, Marshall to authors, 15 Jan 68. (2) Marshall Diary, 18 Jun 42. (3) Interv with Gen James C. Marshall, 19 Apr 68.

[8] (1) Marshall Diary, 19 Jun 42. (2) Ltr, Bush to Roosevelt, 17 Jun 42, and Incl thereto. MED–HB File, Folder 6. (3) For a discussion of developments prior to mid-June 1942, see Richard G. Hewlett and Oscar E. Anderson, Jr., *A History of the U.S. Atomic Energy Commission*, vol. 1, *The New World, 1939–1946* (University Park, Pa.: Pennsylvania State U. Press, 1962), pp. 9–71, cited hereinafter as Hewlett and Anderson, *The New World*; and Henry D. Smyth, *A General Account of the Development of Methods of Using Atomic Energy for Military Purposes under the Auspices of the United States Government, 1940–1945* (Washington, 1945), pp. 2–58. Cited hereinafter as Smyth, *Atomic Energy for Military Purposes*.

plants, from invisible, barely weighable "bits of nothing" to bulk lots of material a billion times as large—no engineer in history had attempted such a scale-up. Back in 1918, when Marshall was a shavetail, the Corps had flaunted the breezy motto: "It can't be done: but here it is!—U.S. Engineers." This time, obviously, the "impossible" would take longer. But it must not take too long. What Americans could do, Germans could conceivably do also.

Sensing the urgency of the job, Marshall made every day count. During his first week as Engineer of the still nameless district, he conferred with more than a dozen people, traveled more than a thousand miles, blocked out a course of action, and started organizing. After going over Dr. Bush's somewhat nebulous construction plans for a plutonium pilot plant and experiment station near Chicago, a heavy water production unit at Trail, British Columbia, and a giant industrial complex in the Tennessee Valley, he began exploring the priorities and power angles and laying the groundwork for bringing in Stone & Webster as overall AEM. On learning that OSRD was hard up for money, he arranged to tap the Corps construction funds. At the Chief's suggestion, he opened temporary headquarters in the New War Building and commenced lining up personnel. Customarily, new districts drew their cadres from older elements of the Engineer Department; and, occasionally, a single well-established district served as sponsor for one just coming into being. Familiar with the able and experienced staff at Syracuse and knowing that the workload there soon would taper off, Marshall looked to his old bailiwick for



COLONEL NICHOLS

recruits. On the 19th he chose as his deputy the area engineer at the Pennsylvania Ordnance Works, Lt. Col. Kenneth D. Nichols, a 34-year-old West Pointer whose background included several tours at the Waterways Experiment Station, canal survey work in Nicaragua, and four years as an instructor at the Military Academy. Described by associates as a scholarly type, Nichols had studied at the Technische Hochschule in Berlin and had earned two advanced degrees, an M.C.E. from Cornell and a Ph.D. from the State University of Iowa. On a weekend trip to Syracuse, Marshall also signed up Virginia J. Olsson, his attractive and efficient secretary, Charles Vanden Bulck, his resourceful administrative assistant, and Capt. Robert C. Blair, a capable civil engineer and one of the ninety-odd Syracuse Reservists on active duty with the Corps. Looking to the

future, Marshall made plans to "rob" the district systematically later on.[9]

Manhattan, he decided, would make an ideal headquarters. At first General Reybold was utterly opposed. "We will have it right here in Foggy Bottom," he said. Determined not to place himself "under the gun" in OCE, Marshall stood his ground. The New War Building was already overcrowded, while at 270 Broadway Colonel Dunn had lots of room available. Stone & Webster's main offices were in New York and Boston. You could get to Chicago or Tennessee just as easily from New York as from Washington. Besides, if you were looking for a place to hide, what better place was there than a big city. "We had quite an argument," Marshall related; but at length, Reybold gave in.[10] The issue was settled for the time being, although not for good.

At the Carnegie Institution in Washington on 25 June, Marshall and Nichols had their first get-together with Dr. Bush's scientific colleagues, the S–1 Executive Committee, OSRD. It was an eye-opening experience. Seated at the conference table in Bush's office was a distinguished group: Dr. James B. Conant, President of Harvard, the committee chairman; Dr. Lyman J. Briggs, director of the National Bureau of Standards; Dr. Eger V. Murphree, vice president of the Standard Oil Development Company; and three of the country's scientific greats, all Nobel laureates, Dr. Arthur H. Compton of Chicago University, Dr. Ernest O. Lawrence of California, and Dr. Harold C. Urey of Columbia. Getting down to business with these men, the Engineers discovered that nobody knew "just where we were."[11] Of the four bomb stuff processes, only electromagnetic separation, Professor Lawrence's baby, was anywhere near ready even for preliminary engineering development. Supplies of uranium and other vital materials were inadequate even for research, much less for production. No one as yet had a clear concept of what Marshall was to build. Nevertheless, all the scientists save Lawrence, who wanted a location close to his Berkeley laboratory, were anxious to acquire a large tract west of Knoxville as the main manufacturing site. After two sessions with the committee, Marshall agreed to go ahead, signing up contractors, procuring supplies, acquiring land, and using every available means to move the project forward.[12]

He made a promising start. A conclave with the Chief and his principal advisers set the Corps machinery in motion. Reybold and Robins gave the signal for "all out support from the Engineer Department at Large."[13] Groves offered to assist in every way he could. Stratton made available site planner Leon Zach, power specialist Carl H. Giroux, and water supply expert Ray E. Lawrence as consultants. Colonel Gesler in the Fiscal Branch agreed to track down funds. Colonel O'Brien in Real Estate promised swift action on land acquisi-

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[9] (1) Marshall Diary, 19–24 Jun 42. (2) Ltr, Marshall to authors, 15 Jan 68. (3) Leslie R. Groves, *Now It Can Be Told: The Story of the Manhattan Project* (New York: Harper & Bros., 1962), pp. 11–12.

[10] Marshall Interv, 19 Apr 68. See also Marshall Diary, 26 Jun 42.

[11] Interv with Gen Kenneth D. Nichols, 18 Feb 64.

[12] (1) Min, Mtg of S–1 Exec Comm, 25 Jun 42. AEC Files. (2) Marshall Diary, 25 Jun 42. (3) Vincent C. Jones, Manhattan: The Army and the Atomic Bomb, draft manuscript in OCMH, ch. III, pp. 16–22.

[13] Ltr, Robins to authors, 12 Feb 64.

tion. Colonel Hall in Cincinnati and Colonel Worsham in Chicago alerted their division staffs to stand by for site directives. In Manhattan, Colonel Dunn rented space for the new district downstairs from North Atlantic Division headquarters and placed his organization at Marshall's disposal. Talks with Dr. Compton and other scientists clarified plans for leasing a thousand-acre tract in the Argonne Forest southwest of Chicago and building a plutonium pilot plant there and for subletting part of the heavy water plant at Trail to E. B. Badger & Sons of Boston. An all-day negotiating session on 29 June produced a letter contract with Stone & Webster. A visit next morning to General Clay had encouraging results: a friend and classmate of Marshall, Clay agreed to help obtain a high priority rating and to use his good offices in breaking procurement bottlenecks. At this point, Marshall and Nichols confronted a major decision—choice of the main manufacturing site. On the afternoon of the 30th, after a last-minute chat with Groves, they took the 5 o'clock train for Knoxville.[14]

Early the next morning they checked in at the Hotel Andrew Johnson, where they met four Stone & Webster men and Captain Blair. After a briefing by officials of the Tennessee Valley Authority (TVA), the party spent the better part of two days exploring the foothills of the Cumberlands west of Knoxville, looking for a spot that met their requirements: power, water, transportation, and special topography—"four isolated sites in one big isolated site," as Marshall put it.[15] Scouts for OSRD had been over the ground earlier and had sent back glowing reports. But, like all professional engineers, Marshall wished to be on the safe side. Jouncing over back country roads around Harriman, Dayton, and Athens, he ruled out several locales. One site was too rugged, another too remote, a third subject to flooding. Then, along the Clinch River southwest of the little town of Clinton and a few miles downstream from Norris Dam, he found it astride Roane and Anderson Counties—a hundred-square-mile rectangle of marginal farmland with a washboard terrain, an area of wooded ridges and lonely hollows. The population was sparse and real estate values were low. Watts Bar Reservoir was fairly close, and two railroads, the Louisville & Nashville and the Southern, ran nearby. There were some drawbacks, to be sure: outcroppings of rock foretold costly excavations; and TVA could promise adequate power only if it could procure additional hard-to-get generators. Somewhere, no doubt, there was a better location, perhaps in the Columbia River Valley near the Corps' own Bonneville Dam. Yet, on the whole, Clinton seemed a reasonably good choice.[16] Marshall headed back East, full of plans and purpose.

Nichols and Blair continued on to the Metallurgical Laboratory, the cryptically named center for plutonium studies at the University of Chicago. In two days there, they covered a lot of ground. Conferring with Dr. Compton and his

[14] (1) Marshall Diary, 26–30 Jun 42. (2) Interv with Gen James H. Stratton, 21 Feb 68.

[15] Marshall Interv, 19 Apr 68.

[16] (1) Marshall Diary, 1–3 Jul 42. (2) Hewlett and Anderson, *The New World*, pp. 76–77. (3) Arthur H. Compton, *Atomic Quest: A Personal Narrative* (New York: Oxford U. Press, 1956), pp. 154–55.

colleagues, they learned what the "Met Lab" was up against. Organized early in 1942 under Compton's direction, a team of eminent researchers was seeking a way to transmute uranium into plutonium on a large scale as quickly as humanly possible. Key to the success of this endeavor were the experiments of Enrico Fermi, the gifted Italian Nobel laureate who had fled Fascist tyranny in 1939. With uranium oxide and graphite, Fermi was struggling to build a chain reacting "pile." Theoretically, the pile would go critical when it reached a certain size, that is, it would chain react and in the process produce plutonium within the parent uranium. Chemistry would do the rest. "Any fool can separate two elements," Compton assured the Engineers.[17] But the theory of the pile still lacked a demonstration. Shortages of pure materials hampered Fermi's efforts. Moreover, he needed space; the University was crowded and, besides, the populous southside of Chicago was no place to be tinkering with chain reactions. Shouldering responsibility, Nichols marked out boundaries for the experiment station site in the Argonne Forest, arranged for Worsham to lease the land rent free from Cook County, and sketched preliminary construction plans for Stone & Webster.[18] He also took on the duty of providing wanted supplies. Most important, he got off on the right foot with Met Lab leaders. Describing what proved to be a happy and fruitful relationship, Compton later portrayed Nichols as "straightforward and courageous," "a man who really understood" the scientists' problems.[19]

Rejoining Marshall in Washington, Nichols and Blair were caught up in a surge of activity: working with Stone & Webster to tie together myriad loose ends (a detailed survey of the Tennessee site stood high on the agenda); insuring vital supplies of uranium ore (on orders from the Chief, Engineers in northwestern Canada sent barges to the Eldorado mine, near the Arctic Circle on Great Bear Lake); negotiating contracts for purified uranium oxide and uranium metal (the producers were the Mallinckrodt Chemical Works, Metal Hydrides, and Westinghouse Electric); planning a village for the main industrial site (Stratton's files yielded blueprints developed by the Corps for family housing at Ocala, Florida, and Passamaquoddy, Maine); furnishing the New York office and establishing a protective security system there (Vanden Bulck, with help from Colonel Dunn, quickly accomplished the job); pursuing a scheme to substitute silver for critically short copper in Professor Lawrence's process (thousands of tons of conductive metal would go into the giant coils and busbars); trying to think of a suitable cover name for the project (Somervell's suggestion, "DSM" for Development of Substitute Materials, satisfied virtually no one); and preparing a table of organization (Marshall expected to have 62 officers under his command by the end of the year).[20] For a time at least, all went well.

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[17] Nichols Interv, 18 Feb 64.

[18] (1) *Ibid.* (2) Marshall Diary, 6–7 Jul 42.

[19] Compton, *Atomic Quest*, pp. 95, 106.

[20] (1) Marshall Diary, 6–15 Jul 42, *passim.* (2) Groves, *Now It Can Be Told*, pp. 15–16. (3) Ltr, Marshall to Reybold, 18 Jul 42. 320.21 (Manhattan DO).

Then, in mid-July, the project received a setback: assignment of an AA–3 priority. To Marshall and Nichols, the news seemed incredible; surely, the S–1 effort rated higher than the Pennsylvania Ordnance Plant. But a talk with Clay convinced them that there had been no mistake. The atomic bomb was a long shot. Gambling on it too heavily might risk losing the war. Extremely urgent programs—airplanes, naval vessels, cargo ships, landing craft, synthetic rubber, and high-octane gasoline—were in desperate conflict for materials. Only essential weapons slated for early production could claim AA–1 and AA–2 priorities. The special triple-A rating was reserved for breaking bottlenecks. Under ANMB rules, AA–3 was the highest possible classification for plant construction jobs. Clay saw no reason for making an exception of DSM; in fact, he discouraged any move to upgrade the project. Deeply disappointed, Nichols consulted Reybold, who gave him this advice: let the issue ride awhile, wait for trouble to appear, and, then, launch a determined drive for top priority.[21]

If Marshall was downcast, his mood soon changed. Visiting the Radiation Laboratory of Professor Lawrence in the third week of July, he felt his spirits rise. High on a hill overlooking the Berkeley campus and San Francisco Bay, in a newly built domed structure, a mighty "calutron," a scaled-up adaptation of the California physicist's original cyclotron, was taking form. Its magnet, the world's largest, measured 184 inches in diameter and towered 20 feet above the floor. A C-shaped vacuum tank occupied the 72-inch pole gap. Enthusiastic and confident, Lawrence explained to Marshall how the apparatus would work: in the strong magnetic field, ions of uranium gas zipping through the vacuum at tremendous speeds would tend to separate according to mass, heavier particles describing longer arcs than lighter ones, and U–238 and U–235 ending up in different receptacles. Two smaller calutrons were already in operation. To be sure, their yield was minuscule and their product was highly impure; nevertheless, they were getting tangible results. A mass production plant patterned on this method would be extremely large and costly, but it would almost certainly succeed. When Lawrence spoke of trying to improve the process to effect economies, Marshall told him to "quit worrying about expense"—the Army would pay the tab. Summoning representatives of Stone & Webster, the colonel put them to work with the Berkeley scientists on preliminary plant designs. Encouraged, he noted in his diary: "Lawrence's method is ahead of the other three methods and should be exploited to the fullest extent without delay."[22]

Immediately upon his return to Washington, he asked for a gross appraisal of the Clinton site. O'Brien promised a rough estimate "about the middle of next week" and he was as good as his word. On 29 July he gave Marshall a cost breakdown. Eighty thousand acres at $30 per acre, plus improvements, crops, severance damages, and contingencies—the figures added up to approximately $4 million. Obtaining right-

[21] (1) Marshall Diary, 13 Jul 42. (2) Jones, MANHATTAN, ch. III, pp. 38–43. (3) Hewlett and Anderson, *The New World*, pp. 72–75 and 78–79.

[22] Marshall Diary, 20–21 Jul 42. See also Smyth, *Atomic Energy for Military Purposes*, pp. 139–41.

of-entry would take about ten days. Colonel Hall's real estate men were ready to start at once, but Marshall delayed giving them a green light until he could pin down the S–1 Executive Committee. Lawrence was insisting on a West Coast site for the big electromagnetic plant. Fermi's crucial experiment at Chicago was still months away. Gaseous diffusion and centrifugal separation had only theoretical feasibility. Before he laid out millions in public funds and uprooted hundreds of families, Marshall intended to have a fixed purpose in view.[23] The scientists wanted the Tennessee tract but could not say, specifically, what for. Recalling his ordeals with them, Marshall said: "When you get six or seven Ph.D.'s and three or four Nobel Prize winners around the table, you know, they are up in the clouds." Impatient, he told them "that if they didn't hurry up and make up their minds what they wanted to develop, we might not need a site; the war would be over." His sarcasm had no discernible effect.[24]

A darkening cloud of uncertainty overhung the project. Striving for an early start at Trail, Badger & Sons ran into trouble as work on components for the heavy water process stalled, while shops completed longer standing orders with the same AA–3 priority. Badger's case had disturbing implications, for, although Trail would be an auxiliary plant (its product was a possible substitute for graphite in the pile), its plight augured ill success for the whole atomic undertaking. Again and again, Marshall and Nichols tried and failed to wring a higher overall priority from General Clay and, through Bush and Conant, to enlist Donald Nelson's aid. Without full top-level support, all the projected plants could not be built in time to be of value in the war; and no such support was immediately forthcoming. Sensing that they might have to focus on a single process, the Conant committee deliberated, refusing to go all-out on Lawrence's method until Fermi's experimental results were in.[25] As planning bogged down in a morass of scientific indecision, Marshall endeavored to make headway in other areas.

Moving to Manhattan, he began shaping his command. By early August staffing was in full swing. A dozen officers in the Syracuse District were awaiting orders to join their former chief and various hand-picked civilians were preparing to take commissions in the Corps. A versatile group formed the nucleus of the new district. Among the men drawn from Syracuse were Lt. Col. John M. Harman, a Regular with 24 years' service; Maj. Thomas T. Crenshaw and Capt. Joseph F. Sally, both successful area engineers on big emergency projects; Capt. James F. Grafton, a crack operations man who had overseen construction of the Whitney Point Dam near Binghamton, N.Y.; Capt. Benjamin K. Hough, Jr., a keen-minded soils engineer who had studied under Terzaghi at MIT; and 1st Lt. Harold A. Fidler, a young D.Sc. from MIT who had worked with Hough at

[23] (1) Marshall Diary, 23, 24, and 31 Jul and 3 Aug 42. (2) Apps. of Site Sel and Land Acq for CEW, 15 Jun 45, Exhibit F–1. 601.1 (CEW). (3) Min, Meeting of S–1 Exec Comm, 30 Jul 42. AEC Files. (4) Nichols Interv, 18 Feb 64.

[24] Marshall Interv, 19 Apr 68.

[25] (1) Marshall Diary, 17 Jul–26 Aug 42, *passim*. (2) Hewlett and Anderson, *The New World*, pp. 78–81.

the Ithaca Soils Laboratory. The search for talent extended well beyond the Mohawk and Susquehanna watersheds. With assists from General Reybold and William H. Harrison, Marshall was able to recruit Wilbur E. Kelley, senior engineer for the Panama Canal, and Allan C. Johnson, a highly trained architect on loan to WPB from the American Telephone and Telegraph Company, and to make them both captains in the Corps. Another valuable find was Capt. John R. Ruhoff, the Mallinckrodt Company's brilliant young director of inorganic research, recently called to duty with the Chemical Warfare Service and shortly to be transferred to the Engineers. As the ranks started to swell, Marshall moved to place the organization on a firm footing.

On 16 August 1942 General Reybold formally established the Manhattan Engineer District (MED).[26] Selected by Groves and Marshall, the tag word "Manhattan" provided an effective cover, since ordinary Engineer districts took the names of their headquarters cities. Judged by Corps standards, the new supersecret setup was unusual. Unlike other districts, MED had no geographic boundaries and its areas were far apart: at Boston, Chicago, St. Louis, Berkeley, and Trail. Alone among district heads, Colonel Marshall had the authority of a division engineer and reported directly to the Chief. Another peculiar feature was the Washington Liaison Office, opened on the sixth floor of the New War Building to ensure concerted action with WPB, SOS, and other high-level agencies. Carefully matching men and duties, Marshall appointed Harman his administrative officer, put Kelley in charge of engineering, and gave Johnson the Washington assignment. In addition, he sent Crenshaw and Fidler to the Radiation Laboratory, Grafton to the Met Lab, Hough to Stone & Webster's hometown, Boston, and Sally to British Columbia. As head of the St. Louis office, Ruhoff carried on his vital work at the Mallinckrodt plant.[27] Still small but growing steadily, the Manhattan District was a going organization by late August.

After reading the first progress report from MED on 26 August, Reybold expressed his satisfaction with the project. Since mid-June the atomic program had come a long way. At Berkeley, Stone & Webster had completed blueprints for an electromagnetic pilot and construction was all set to go. At Chicago a Met Lab building was rising on the University campus and survey crews were busy at the Argonne Forest site. Although pinched for materials, the job at Trail was moving ahead. Even at Columbia, where Urey and his colleagues had still to work out kinks in the gaseous diffusion and centrifuge processes, construction plans were beginning to take form. Two major supply problems were clearing up: Marshall was about to close a deal with the Treasury for some 6,000 tons of silver; and Nichols was in touch with Edgar Sengier, a far-sighted Belgian mining magnate, who had 1,250 tons of Congo uranium ore cached in a warehouse on Staten Island. Marshall was prepared

[26] Officially: Manhattan District, U.S. Engineer Department.

[27] (1) OCE, GO 33, 13 Aug 42. (2) MED Circ Ltr A-1, 16 Aug 42. 323.7 (MDO). (3) Ltr, NAD to Reybold, 8 Aug 42, 210.3 (MDO). (4) MED SO 1, 21 Aug 42.

to break remaining logjams. Fed up with academic shilly-shallying, he recommended immediate acquisition of at least part of the Tennessee tract. Tired of taking no for an answer on priorities, he proposed to go over Clay's head.[28]

Achievements drew less notice from Dr. Bush than things left undone. Haunted by the fear that Hitler was winning the contest for the bomb, the OSRD chieftain was intolerant of delay. Apprehensive about the Tennessee site and the MED priority, he mistook deliberation for foot dragging and prudence for passivity. Feeling that the project needed more aggressive leadership and more effective status in the Army, he discussed with Generals Marshall and Somervell and others the formation of a policy committee that would command respect, a body composed of high-placed military men and eminent civilian scientists; and he spoke of appointing a prestigious officer, preferably Styer, as overall director. When Somervell mentioned Groves as the right man for this post, Bush cold-shouldered the suggestion. So uncertain, so precarious, yet so fraught with awesome possibilities, the atomic effort undoubtedly needed a strong hand and a resolute will to lead and guide and push it through. Bush intended to take one step at a time: first, choose the committee and, then, name the general to carry out its will.[29] But Somervell, adroit as ever, outmaneuvered him.

The week of 13 September was a decisive one for MED. Meeting at scenic Bohemian Grove near San Francisco, the S-1 Executive Committee put an end to much of the uncertainty that had surrounded the project. Urged on by Nichols and Crenshaw, who attended as observers, the scientists voted to center production at the Tennessee site, make a prompt beginning there, and push plans to break ground for the big electromagnetic plant around the first of the year.[30] In Washington, meanwhile, another major decision came to light. Emerging from a Thursday morning session with the House Military Affairs Committee, Groves bumped into Somervell, who told him: "The Secretary of War has selected you for a very important assignment . . . . If you do the job right, it will win the war." Groves, whose heart was set on going overseas, blazed with indignation, for he guessed correctly that the job involved "that thing," the atomic bomb[31]—a "pipe dream," as he saw it, with little chance of fulfillment. Reporting to Styer at the Pentagon later that morning, he received some rosy promises: a promotion, an easy task (merely to build a few plants), and virtual independence.[32] Unmollified, he reproached Styer for "letting me get hooked into this."[33] Then, unheralded, he called on Bush, who froze as the burly colonel introduced himself. Groves' stock soon rose. Good soldier that he was, he zealously obeyed his duty. Before the week was over, he had given the go-ahead on the Ten-

[28] (1) Marshall Diary, 26 Aug 42. (2) Marshall Interv, 19 Apr 68.

[29] (1) Hewlett and Anderson, *The New World*, pp. 81–82. (2) Nichols Interv, 18 Feb 64.

[30] (1) Min, Mtg of S-1 Exec Comm, 13–14 Sep 42. AEC Files. (2) Marshall Diary, 13–14 Sep 42. (3) Compton, *Atomic Quest*, pp. 150–54.

[31] *Now It Can Be Told*, pp. 3–4.

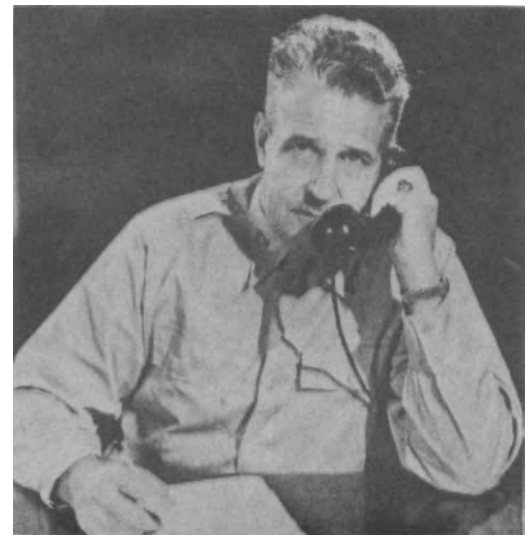
[32] Interv with Gen Groves, 28 Apr 67.

[33] Leslie R. Groves, "The Atom General Answers His Critics," *The Saturday Evening Post*, June 19, 1948, p. 16.

nessee tract and inveigled Donald Nelson into granting him power to assign triple-A priorities.[34]

Groves waited until 23 September, when he received his brigadier's star, before he assumed command. He understood rightly that a general could speak more convincingly than a colonel even to civilian scientists.[35] But mere rank did not account for the change in administration which resulted from his appointment. Groves' intrinsic qualities—his toughness, courage, and perspicacity—were far more significant. With exemplary self-discipline he gave every ounce of energy to a task which seemed as unrewarding as it was full of risk and all but impossible of accomplishment, and he expected no less of subordinates. He was often brusque and uncompromising, "ornery" by his own admission, a "brass hat" and a "stinker" in other people's words.[36] He little cared what was said about him. He was fighting to end a war, and he had a vivid appreciation of the personal consequences of failure. "The President has selected me to carry the ball, which is another way of saying that I am to be the Goat if it doesn't work," he told an MED colonel. "If our gadget proves to be a dud, I and all of the principal Army officers of the project . . . will spend the rest of our lives so far back in a Fort Leavenworth dungeon that they'll have to pipe sunlight in to us."[37]

Just as MED was unique as an Engineer district without territorial limits, so General Groves was unique as an Army officer without clear-cut status in the chain of command. On the face of it, Somervell's order to Reybold to release Groves for special duty with the DSM project seemed explicit: "He will report to the Commanding General, Services of Supply, for necessary instructions, but will operate in close conjunction with the Construction Division of your office and other facilities of the Corps of Engineers."[38] But Groves, who helped draft the order, dismissed this wording as "eyewash." "Initially," he commented, "General Somervell seemed to think that I would be under the SOS. This was never straightened out on paper. I never thought he wanted me



GENERAL GROVES AS HEAD OF THE MANHATTAN PROJECT

[34] (1) Groves, *Now It Can Be Told*, pp. 20–23. (2) Hewlett and Anderson, *The New World*, p. 82.

[35] (1) Groves Interv, 11 Feb 64. (2) Groves, *Now It Can Be Told*, p. 5.

[36] (1) Groves Interv, 27 Apr 67. (2) Antes Interv, 3 Jun 58. (3) Deland Interv, 5 Jan 68.

[37] Col Gerald R. Tyler, Résumé of Instructions from Gen Groves, Oct 44. Tyler Papers.

[38] Memo, Somervell for Reybold, 17 Sep 42. MED Files, MP Folder 25B.



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to be under the Chief of Engineers. He wanted me to run the thing and he didn't want anyone to interfere with me in any way." No one challenged Groves' interpretation. Among the high-ranking officers in the War Department, there was much fear that the project would absorb funds and materials in great amounts and then fail in its objective; and from this fear stemmed a growing desire not to be entangled. Somervell evidently looked upon the project as a hot potato more or less safely disposed of in Groves' hands, that is, handed to a man of steady nerves not likely to drop it. Reybold greeted the new arrangement with undisguised relief. Frankly sympathetic, Robins told Groves: "I hate to see you get this assignment, because if you fail in it, it will destroy you. I would be sorry to see that. But it would be still worse if it destroyed the Corps of Engineers. That would really make me sad."[39] Groves, an officer never reluctant to assume responsibility, now had it in abundance.

He also had abundant counsel and support. On 23 September, the same day Groves officially assumed command, the President's top atomic advisers created the Military Policy Committee, with Bush as chairman, Conant as his alternate, and two service members: Rear Adm. William R. Purnell, Assistant Chief of Naval Operations, and General Styer. This group formed a bond with the MED commander not unlike that of a corporation board with a chief executive officer. Some months later, recognizing the need for consultants who would demonstrate to the scientists that he had competent advice, Groves appointed Conant and Dr. Richard C. Tolman, graduate dean of the California Institute of Technology, to his immediate staff.[40] Throughout the life of the project, co-operation and cordiality characterized the relations of top scientists and top military men; what misunderstanding there was, and at times there was considerable, developed in the middle and lower echelons. The resources of the whole defense establishment were available to MED, and Groves exploited them methodically. The Medical, Signal, and Transportation Corps, Army Intelligence, and Naval Ordnance, all contributed significantly to the realization of the bomb. But by

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[39] Groves Interv, 11 Feb 67. See also Marshall Diary, 19 Sep 42; Ltr, Robins to authors, 12 Feb 64; and Ltr, Styer to authors, 12 Feb 68.

[40] (1) Smyth, *Atomic Energy for Military Purposes*, pp. 59–60. (2) Groves, *Now It Can Be Told*, pp. 24–25 and 44–45.

far the most massive contribution came from the Engineers. Construction was the central task, and the Corps' construction capability had never been greater. Men, money, machinery, materials, wide-ranging technical and administrative services—"Everything we wanted, we got," Groves related, "and we got it willingly."[41] A distinctive feature of MED was its "very limited organization," a feature that evidenced the firm support provided by the Engineer Department.[42]

An admirer of General Sherman, Groves believed in traveling light, and he held with Sherman that "a small staff implies activity and concentration of purpose." From a modest, sparsely furnished suite on the fifth floor of the New War Building, he steered the vast atomic endeavor almost single-handed. His principal assistant was his girl Friday, Mrs. Jean M. O'Leary. Saluted good-humoredly as Major O'Leary by MED wags, the pretty, spunky widow was his de facto executive officer. Not until early 1945, when General Farrell returned from CBI, did Groves have a deputy. Aided mainly by Mrs. O'Leary and a few picked men drawn from the Construction Division, he played what he described as the impresario's role in "a two-billion-dollar grand opera with thousands of temperamental stars in all walks of life." The story was epic and the stage was worldwide. Limited at first to plant construction and engineering, Groves' responsibilities rapidly ballooned to take in security and press censorship, intelligence and counterintelligence, all scientific research, and design of the weapon itself, and eventually encompassed matters of international relations, high-level policy, and atomic strategy. Much of his time was taken up by "numerous, all-important decisions, seemingly insuperable problems and fantastic controversies."[43] His account of MED, *Now It Can Be Told*, focused largely on these. "The bulk of the project," he wrote, "moved ahead by dint of the hard work and the feeling of urgency of everyone concerned and without requiring any personal supervision on my part."[44] Construction, which accounted for roughly 90 cents of every dollar spent, received comparatively little space in his book.

The fall of 1942 witnessed lively activity in the Clinch River Valley of Tennessee. On 24 September, the day after Groves formally assumed command, he and Marshall made a thorough, final reconnaissance of the site. Four days later an attorney from the Ohio River Division opened an office in Harriman and began mapping the area. On 6 October he filed a declaration of taking with the Federal Court at Knoxville and obtained immediate possession. Like virtually all mass condemnations, this one caused a furor—protest meetings, appeals to Washington, and congressional inquiries. Acquisition proceeded all the same. "Really child's play," Marshall termed it.[45] By mid-November U.S. marshals were tacking notices to vacate on farmhouse doors, and within a week

[41] Groves Interv, 11 Feb 64.
[42] Leslie R. Groves, "Development of the Atomic Bomb," *The Military Engineer*, June 1946, pp. 233–34.
[43] Groves, "The Atom General," p. 16.
[44] Groves, *Now It Can Be Told*, pp. xiii–xiv.
[45] Marshall Interv, 19 Apr 68.

or two residents were leaving.[46] Construction crews came in right behind them. On the scene since October the area engineer, Maj. Warren George, and Stone & Webster's project manager, T. Cortlandt Williams, were set for a fast start. Key men were arriving daily. Materials were on order. An employment office in downtown Knoxville was open for business. From the contractor's Boston headquarters plans and blueprints were flowing to the project. At the Chief's office in Washington Colonel Barker was pressing for prompt wage determinations and General Robins was circularizing the Corps for surplus equipment, supplies, and personnel. Late in November dirt began to move. Before long construction forces were spreading out to provide temporary utilities, improve primitive roads, run a rail connection to the Louisville & Nashville at Elza, and erect the project's first big structure, the main administration building.[47]

Even before a spade was turned at Clinton, the Engineers were moving toward their ultimate objective, the weapon itself. Late in October 1942, a Regular with the Syracuse District, Maj. John H. Dudley, received a special assignment, "to make a survey for an installation of unnamed purpose."[48] His orders, signed by Marshall, specified a partly developed site surrounded by hills in a thinly settled area of the southwest, where a community of 250–450 persons could live in isolation. His mission was the outgrowth of conversations between Groves and Dr. J. Robert Oppenheimer, the young Berkeley professor who spearheaded studies of the physics of the bomb. "The first job was to make the stuff," Oppenheimer related. "But in hope that would come out all right, we had to have a place where we could learn what to do with it."[49] After traveling thousands of miles, part of the way on horseback, consulting district engineers along his route, Dudley narrowed the search to the Santa Fe area. On 16 November he showed Groves and Oppenheimer a spot that fitted their stated criteria: Jemez Springs, a village of 500 on the floor of a canyon in the Jemez Mountains. Oppenheimer promptly objected that the tall surrounding cliffs "would give his people claustrophobia," and the houses, simple Indian and Mexican dwellings, would be too humble for them; while Groves noted that the site might be subject to flooding. The party then drove east and on up a steep, narrow dirt road to the exclusive Los Alamos Ranch School. On a mesa jutting out from the Jemez Mountains and overlooking the upper Rio Grande Valley, the 790-acre site was impressive in its solitude and scenic grandeur. The attractive campus, with its log and stone buildings and well-kept grounds, offered comforts and amenities taken for granted by the well-to-do. Oppenheimer indi-

[46] (1) Marshall Diary, 24 Sep 42. (2) Groves, *Now It Can Be Told*, pp. 25–26. (3) Apps. of Site Sel and Land Acq for CEW, 15 Jun 45. 601.1 (CEW). (4) 601.1 (CEW) Parts 1 and 2. (5) H Subcomm of the Comm on Mil Affs, Transcript of Hearings at Clinton and Kingston, Tenn., 11–12 Aug 43. 601.1 (CEW).

[47] (1) Gavin Hadden (comp.), Manhattan District History, Book I, Vol. 12. AEC Files. Cited hereinafter as MD Hist. (2) Hewlett and Anderson, *The New World*, pp. 116–17. (3) Ltr, Marshall to George, 21 Oct 42. 161 (MDO). (4) Ltr, Robins to Div Engrs, 20 Nov 42. 600.1 (MDO). (5) 600.1 (MDO) (Labor) Part 1.

[48] Ltr, Dudley to authors, 5 May 68.

[49] Oppenheimer's Testimony, 12 Apr 1954. In U.S. Atomic Energy Commission, *Hearings in the Matter of J. Robert Oppenheimer* (Washington, 1954), p. 28. Cited hereinafter as AEC, *Oppenheimer Hearings*.

cated that this was it. Groves and Dudley put their heads together. Except for the road, the setup seemed ideal: the owners were anxious to sell; the water supply was adequate for 500 people; and there was plenty of room for expansion. They made their selection then and there.[50]

Speed was the byword at Los Alamos. Responding to a signal from the Chief's office, the Albuquerque District snapped into action. Zia Project, named, fittingly enough, for the Sun God of the Pueblo Indians, promptly claimed the services of engineers, appraisers, and attorneys. By 21 November early reports were in. On the 23d the district engineer, Col. Lyle Rosenberg, obtained right-of-entry. Hand carried from Robins to Somervell to Patterson on the 25th, the formal site directive gave Colonel Neyland of the Southwestern Division authority to acquire the ranch school and environing forest and grazing lands—54,000 acres in all. Signed by Groves as Robins' deputy, a title he continued to use until mid-1943, the work directive came out on the 30th. Five days later Rosenberg awarded a secret contract to the M. M. Sundt Construction Company of Tucson. Sundt's deadline was short: a scientists' enclave, complete with dwellings and laboratories, fenced and tenanted by mid-May.[51] This schedule reflected the urgency that surrounded the project, the pressure, which Oppenheimer noted, "started at the beginning and never let up."[52] The need for haste was keenly felt by General Groves. Although leading scientists thought of putting a bomb together as a few months' work, Groves, thinking as an engineer, took nothing for granted: the widest possible margin of safety might not be wide enough.[53]

For all their brilliance, the academic scientists often seemed naive and impractical to hardheaded military engineers. As theorists "they were wonderful," Colonel Marshall said; but as doers he rated them low.[54] Nichols, who agreed with Marshall, chuckled over the scientists' self-esteem. One day, on a visit to Chicago, he found Fermi's group speculating how to design concrete, how to keep the water content in. "This was typical," he commented. "It's true of most scientists. They're outstanding and they are geniuses in one aspect, so they think that in every other aspect, in every other trade or profession, they can be equally proficient if they only try."[55] Groves, on entering the project, was appalled—"horrified" was his word—by the visionary nature of the enterprise. An all-round lack of concrete results, postulates taken as truths, key calculations accurate to a factor of 10, mistakes in simple mathematics—impressions gained on a tour of the laboratories spurred him to action.[56] Deciding to "wash out" the centrifuge ("We didn't know whether that would ever work,"

[50] (1) *Ibid.*, pp. 12 and 28. (2) Ltr, Dudley to authors, 5 May 68. (3) Groves, *Now It Can Be Told*, pp. 61 and 64–67.

[51] (1) Jones, Manhattan, ch. IV, pp. 28–31 and ch. VII, pp. 36–39. (2) 601.1 (Los Alamos, N.M.–Zia Project). (3) Ltr, Robins to Somervell, 25 Nov 42, and Patterson's approval thereon. MED Files. 601 (Santa Fe). (4) Ltr, Groves to Rosenberg, 30 Nov 42. MED Files. 600.1 (Santa Fe) thru 1944.

[52] AEC, *Oppenheimer Hearings*, p. 30.

[53] (1) Stephane Groueff, *Manhattan Project: The Untold Story of the Making of the Atomic Bomb* (Boston: Little, Brown & Co., 1967), pp. 41–42. (2) Groves, *Now It Can Be Told*, p. 60.

[54] Marshall Interv, 19 Apr 68.

[55] Nichols Interv, 18 Feb 64.

[56] (1) Groves, *Now It Can Be Told*, pp. 19 and 40. (2) Groves Interv, 27 Apr 67. (3) Groueff, *Manhattan Project*, pp. 17–39.

Marshall related), Groves favored bold assaults on the other processes. "We just can't wait for these people to perfect things," he and Marshall told Bush. "We have got to go ahead and build something and work out the details as we build it." The Engineers turned instinctively to industry for help.[57]

Groves knew which firms he wanted and he got them. To design, build, and operate the plutonium works, he picked DuPont, a company with a flawless record on Army munitions projects. As design consultant to Stone & Webster and operator of the electromagnetic plant, he chose Tennessee Eastman, the Kodak subsidiary which had masterminded the Holston Ordnance Works. For the gaseous diffusion process, he selected two highly reputable concerns, the M. W. Kellogg Company as architect-engineer and the Union Carbide and Carbon Corporation as operator. None of the manufacturing firms welcomed the assignment. "Why pick on us?" three vice presidents of Union Carbide asked Groves and Marshall.[58] DuPont officials were especially reluctant. Their forte was chemistry, not physics. Besides, they had their corporate image to consider. Association with a horror weapon would do their reputation no good. What's more, the odds were long, and they wanted no part of a fiasco. Equating consent with patriotic duty, Groves refused to take no for an answer. Primarily to reassure DuPont executives, who felt that the pile process was the least likely to succeed, Groves appointed a committee, headed by Dr. Warren K. Lewis, distinguished professor of chemical engineering at MIT, to evaluate the prospects of the various methods. As luck had it, the committee visited Chicago on 2 December 1942, the day Fermi gave his clinching demonstration—the first self-sustained nuclear chain reaction.[59]

Selling DuPont to the project was as difficult as selling the project to DuPont. Word that the company was taking over roused the Met Lab to near-mutiny. With a strong parental feeling toward their brainchild and an almost total blindness to engineering problems, the scientists wished to take the pile all the way themselves.[60] On visits to Chicago, Groves heard pleas to keep industrialists out.[61] Recalling a Met Lab roundtable, Nichols told a revealing story:

> I can remember Enrico Fermi protesting: "We don't need this great organization; they are too conservative. If you people will just hire for me the laborers and supply them with brick, I'll tell them where to lay it." Enrico Fermi was one of the greatest brains in the history of the world and that was a statement he made. I remember later going over to Arthur Compton, and Arthur said: "Sometimes, you know, I'm inclined to agree with Fermi. If we just had somebody to design the waterworks and roads, I think I'd almost be willing to back him." I said: "Well, Arthur, I'm a hydraulics expert and I have built a lot of roads and runways. I can design the waterworks and the roads. Let's do it." Then he started to laugh. He kept his feet on the ground. He was a great man, but he wanted us to listen to him.[62]

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[57] (1) Marshall Interv, 19 Apr 68. (2) Interv with Gen Groves, 11 Dec 69. See also Memo, Groves for Rcd, 11 Nov 42. MED Files. 334 (Committees).

[58] Groves Interv, 11 Feb 64.

[59] (1) Nichols Interv, 18 Feb 64. (2) Ltr, Compton to Conant, 23 Nov 42. MED Files. 334 (Committees). (3) Groves, *Now It Can Be Told*, p. 52.

[60] (1) Compton, *Atomic Quest*, pp. 164–65. (2) Groves, *Now It Can Be Told*, pp. 43–44. (3) Memo, E. P. Wigner for Compton, 7 Jan 44. MED Files. 319.1 (Rpts).

[61] Groves Interv, 27 Apr 67.

[62] Nichols Interv, 18 Feb 64.

Perturbed by DuPont's lack of enthusiasm, Compton suggested that a combination of General Electric and Westinghouse might be a better choice.[63] But Groves' decision was firm. "I wasn't interested in somebody who was enthusiastic," he explained, "I was interested in somebody who could do the job."[64]

A hunt for a second manufacturing site followed the hiring of DuPont. A talk with company president Walter S. Carpenter, Jr., confirmed Groves' own misgivings about putting the big plutonium works at Clinton. The chance that a nuclear reactor might explode, wreck the separation plants, and poison the air of Knoxville, thus destroying all security and forestalling further work on atomic energy—these thoughts impelled him to look elsewhere. Meeting at Wilmington on Monday, 14 December, DuPont officials, Met Lab scientists, and Corps representatives defined the site criteria: a 700-square-mile tract in a sparsely settled area with abundant power and water and year-round construction weather. Named by Groves to head the survey team was Maj. Franklin T. Matthias, a 34-year-old Engineer Reservist whose good work in the construction program had attracted the general's attention. Moving on the double, Matthias spent Tuesday arranging for DuPont men Gilbert P. Church and Albert E. S. Hall to join in the search and conferring with site and power specialists, principally General Robins and Mr. Giroux. All signposts pointed west toward the great hydroelectric dams, Boulder, Shasta, Grand Coulee, and Bonneville. After a day of preparation, the party left on Wednesday evening for Spokane.[65] Messages from OCE had paved the way. Impressed by the ready response, Matthias commented:

> A few telephone calls, a description of what we were looking for and every District and Division office in areas where a favorable site . . . seemed possible went to work . . . . They knew not why the site was needed, but they were told what was needed, and with their detailed knowledge of their District or Division were able to save us endless hours of investigation when any wasted time could result in a longer war or more lost lives.

On 31 December the three men turned in their report: near the village of Hanford, Washington, not far from Bonneville and Grand Coulee, they had found an almost perfect site.[66]

Bigger and bolder than scientific dreams, the atomic program crystallized in late 1942. Full-scale electromagnetic and gaseous diffusion plants plus a plutonium semiworks at Clinton; a complex of nuclear reactors and chemical separation plants at Hanford; camps for construction workers and towns for operating personnel at both main production sites; three heavy water plants in addition to the one at Trail; and Los Alamos, the wizards' workshop in the mountains of New Mexico: these were its major facets. The estimated cost was half a billion dollars. The target date for turning out the first bomb was sometime

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[63] Ltr, Compton to Conant, 23 Nov 42. MED Files. 334 (Committees).

[64] Groves Interv, 11 Feb 64.

[65] (1) Groves, *Now It Can Be Told*, pp. 68–74. (2) Groueff, *Manhattan Project*, pp. 128–30. (3) Col F. T. Matthias, Notes on the Hanford Engineer Works Project, May 1960. EHD Files.

[66] Ltr, Matthias to authors, 28 Apr 64.

in late 1944 or early 1945.[67] It was a desperate undertaking, fraught with perils and uncertainties. Contrary to all industrial experience, the plan made no provision for pilot plants. "With everything else the Corps built in the way of munitions plants," Marshall emphasized, "you would have a pilot plant until you perfected the process. But not in the Manhattan District."[68] So raw was the concept of gaseous diffusion that no one as yet knew how to make the barriers or porous membranes that were the very heart of the process. "Nothing like this had ever been attempted before," Groves reflected, "but with time as the controlling factor we could not afford to wait to be sure of anything. The great risks . . . simply had to be accepted."[69]

The chance that Hitler's Germany might gain the nuclear prize prompted the attempt and justified the risks. Mindful that the fate of mankind hung in the balance, President Roosevelt at the turn of the year committed the nation unreservedly to a concentrated drive for the bomb.[70]

Clinton and Hanford

To design and build the great manufacturing complexes in the States of Tennessee and Washington was, as Groves styled it, "the most exacting construction job of the entire war."[71] Vast, complicated, and supremely urgent, the task called for exceptional feats of engineering, organization, and management. To create a new industry normally took many years. From test tube to mass production, the development of nylon had spanned a decade; yet the nylon process was simple compared with any for fissionable materials. According to informed estimates, the electromagnetic plant at Clinton "in peacetime would easily require 10 to 15 years";[72] yet this was but one of three major plants undertaken by the Manhattan District. Together, the Clinton and Hanford Engineer Works comprised the largest crash construction job in history. Under the compelling stimulus of war, a generation of effort was compressed into a period of little more than two years.[73]

With remarkable swiftness, the peaceful, rural Clinch River Valley of Tennessee was transformed into a mammoth construction project, dusty, noisy, and pulsing with activity. Early in 1943 bulldozers swept through the area, clearing trees, demolishing sheds and shanties, and cutting broad roadways where narrow country lanes had served. In the northeast corner of the reservation, on the slopes of Black Oak Ridge, laborers battered subsurface rock to trench sewer and water lines for a residential community. To the south in East Fork Valley, alongside a new four-lane turnpike, carpenters erected plywood huts to house construction workers. Still farther south, beyond the crest of Pine Ridge, in the meadowlands of Bear Creek Valley, sur-

[67] (1) Memo, Groves for Rcd, 11 Nov 42. MED Files. 334 (Committees). (2) Memo, Conant for Groves, 9 Dec 42. Same File. (3) Compton, *Atomic Quest*, p. 145.

[68] Marshall Interv, 19 Apr 68.

[69] Groves, *Now It Can Be Told*, p. 72.

[70] Hewlett and Anderson, *The New World*, pp. 114–15.

[71] Groves, "The Atom General," p. 16.

[72] Thomas R. Thornburg, *et al.*, "Men and Materials for a $427,000,000 Job," *ENR*, December 13, 1945, p. 126.

[73] Unless otherwise indicated the following section is based on MD Hist, Books II and IV.

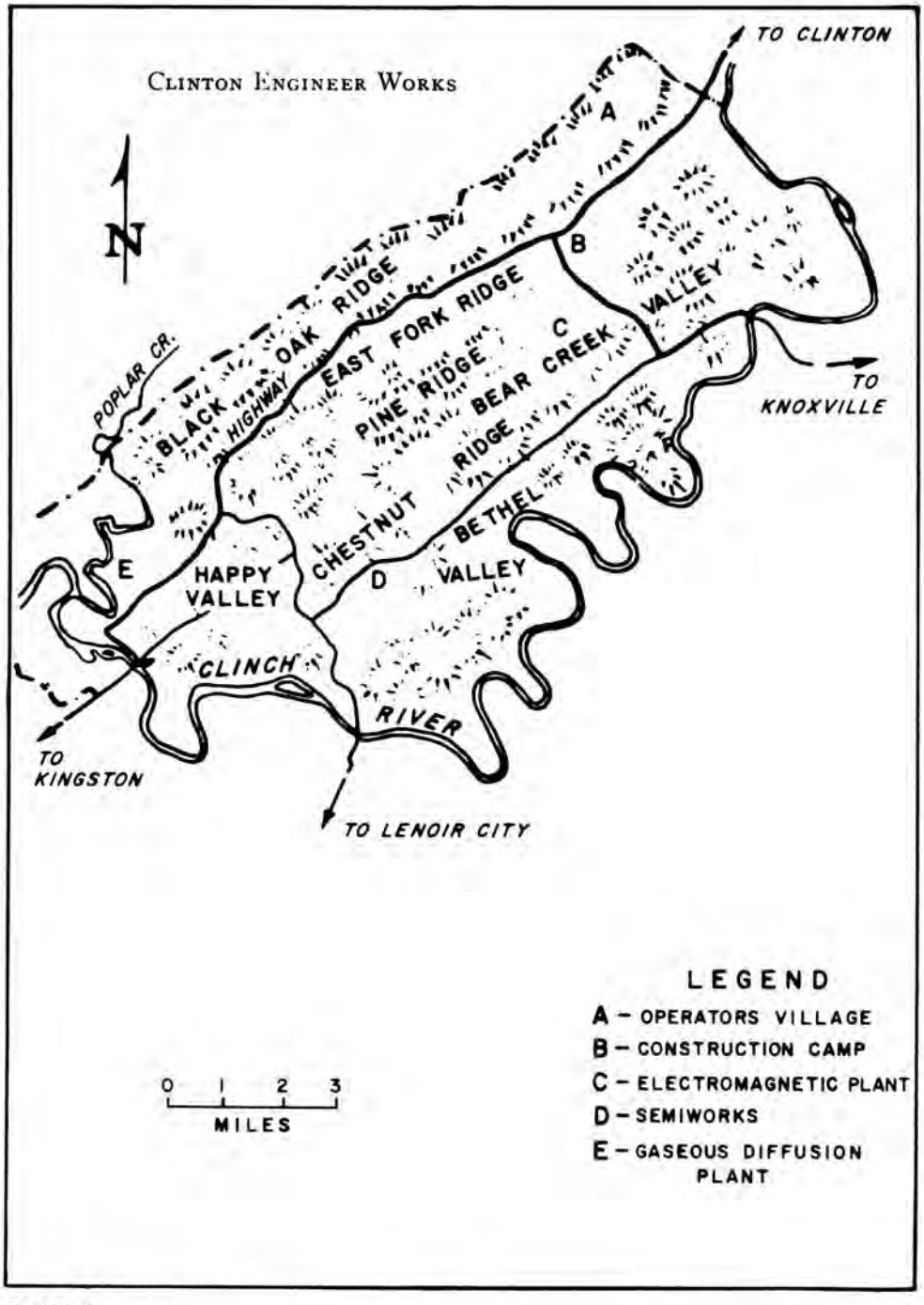
veyors staked out base lines for the great electromagnetic plant. Some six miles to the southwest, on the Bethel Valley Road, work gangs prepared the site for the plutonium semiworks. On the low ground of neighboring Happy Valley, near the spot where Poplar Creek flowed into the Clinch, engineers scanned a 5,000-acre tract with a view to building the gaseous diffusion plant there. (*Map 4*) Although no earth would move in Happy Valley for several months, mid-winter groundbreakings at other points in the Clinton site marked the opening of what would be one of the stiffest battles of the war.

Directing field operations were four organizations, each with an arduous mission to perform. Having general oversight of the entire project was MED's Tennessee Area, headed by Lieutenant Colonel George. Trained in two professions, engineering and law, George relied initially on a small, close-knit staff: Maj. Paul F. Rossell (Engineering); Capt. Samuel S. Baxter (Town Planning); Capt. Thomas J. Rentenbach (Procurement); and several others. Except Baxter, an official of the Philadelphia Public Works Department until the war, all were former Corps employees. Carrying major managerial responsibility was Stone & Webster's project force under Cortlandt Williams. An able, dedicated construction man, associated with the firm since 1923, Williams pulled in seasoned experts from other company jobs. Headquartered briefly at the Hotel Andrew Johnson, George and Williams soon took over a large converted garage in downtown Knoxville. Two smaller groups, arriving later, set up shop at the site. DuPont's James D. Wilson, in charge of building the semiworks, had his office in an abandoned school; and John O. Merrill, whose architectural firm, Skidmore, Owings & Merrill, had been selected in February to design the community, had his in a deserted farmhouse. The other teams continued working out of Knoxville until 15 March, when the project's main administration building, dubbed "The Castle," was ready for occupancy. By then, construction was well under way.[74]

From the window of his office in the Castle, Colonel George could view a fair-sized city in embryo. Red brick chimneys brightened the woods on Black Oak Ridge; and freshly dug foundations in East Fork Valley marked the sites of apartment houses, dormitories, eating places, commercial buildings, schools, a hospital, a theater, a post office, a firehouse, and a police station. Begun by Stone & Webster and carried forward by Skidmore, Owings & Merrill, the master plan for town development showed originality and skill. Roads and streets followed winding routes along natural grades, reducing cuts and fills and adding charm and grace. Clusters of stores and supermarkets with large adjoining parking lots were prototypes of the shopping centers that would dot postwar America. Cafeterias outfitted with Automat equipment would feed 2,000 diners per hour. Structural designs were streamlined and distinctive. Believing that high-class quarters were essential to attract high-caliber people, Colonel Marshall insisted that every

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[74] (1) Intervs with Thomas J. Rentenbach, 21 Nov 68; and T. C. Williams, 26 Sep 68. (2) William J. Nash and O. L. Persechini, "The First 1,000 Days," *Monsanto Magazine*, February 1946, p. 5. (3) Groueff, *Manhattan Project*, p. 165.


CLINTON ENGINEER WORKS
N
TO CLINTON
A
B
C
D
E
BLACK OAK RIDGE
HIGHWAY
EAST FORK RIDGE
PINE RIDGE
BEAR CREEK VALLEY
CHESTNUT RIDGE
BETHEL VALLEY
HAPPY VALLEY
POPLAR CR.
CLINCH RIVER
TO KNOXVILLE
TO KINGSTON
TO LENOIR CITY
0 1 2 3
MILES
LEGEND
A – OPERATORS VILLAGE
B – CONSTRUCTION CAMP
C – ELECTROMAGNETIC PLANT
D – SEMIWORKS
E – GASEOUS DIFFUSION PLANT

MAP 4



CEMESTO HOUSES ON BLACK OAK RIDGE, *Clinton Engineer Works, Tennessee.*

house have a fireplace and a porch. Since time was short, manpower scarce, and many materials were critical, a family unit developed by the John B. Pierce Foundation seemed just right for the purpose. Featuring prefabricated "cemesto" panels, consisting of fiber board with asbestos-cement bonded to both sides, and slotted wooden posts, the unit made use of available materials and permitted assembly-line construction. Cemesto, combined with brick instead of wood, also figured in Merrill's plans for attractive, modern, low cost schools. While Stone & Webster pushed work in the town center and provided utilities for a population of 12,000, O'Driscoll & Grove of New York City built the first thousand houses on the ridge.[75]

Over behind the hills, in Bear Creek Valley, men strained to meet a sterner challenge: construction of Y-12, the huge electromagnetic plant. Scientifically, industrially, in every way, the

[75] (1) Ernest A. Wende, "Building a City from Scratch," *ENR*, December 13, 1945, pp. 149–50. (2) George O. Robinson, *The Oak Ridge Story* (Kingsport, Tenn.: Southern Publishers, 1950), pp. 47–51. (3) Groueff, *Manhattan Project*, pp. 162–66. (4) Marshall Interv, 19 Apr 68. (5) Williams Interv, 26 Sep 68.

plant represented a daring leap from laboratory scale and methods. Research was still in progress and equipment only partially designed when excavation began on 18 February 1943. Bundles of drawings received from Boston gave project manager Williams a rough idea of what he was to build: three, and possibly four, huge concrete and masonry structures to house the separation process; two chemistry buildings for preparing feed material and recovering the final product; a development plant, complete with experimental calutrons; plus utilities, roads, spur tracks, storehouses, shops, a foundry, and numerous other supporting facilities. The plans showed the general layout, size, and profile of the process machinery: fantastic "race tracks"—enormous ovals formed by many jumbo magnets; vacuum systems larger and more powerful than any heretofore dreamed of; and rube goldberg phantasmagorias of pipes and valves. But many particulars were lacking, among them designs for vacuum pumps, ion sources, and receptacles. And troublesome questions were unanswered; for instance, would two stages of separation, Alpha and Beta, be required or would Alpha alone do the job. Although details were fuzzy, Williams pushed construction with all possible speed, for if the project was big and complicated, it was, above all, urgent. Groves wanted one racetrack in operation by July.[76]

Far smaller than Y–12 but scarcely less critical was the semiworks or X–10 plant in Bethel Valley. Explaining his decision to undertake this project, Groves dwelt upon the desperate need for uranium that had undergone irradiation in a pile and thus contained plutonium; until this need was met, planning for the chemical separation plants at Hanford would be handicapped. X–10 would meet other needs as well; although not a true pilot, it would nevertheless provide a practical demonstration of the basic production process and offer a means for training operating personnel. As blueprints emerged from DuPont's Wilmington drafting rooms, the construction task assumed fixed dimensions. Comprising the heart of the semiworks would be an experimental air-cooled pile, underwater storage, an underground canal, and a series of cells for chemical separation—all shielded by thick concrete walls and all operated by remote control. Other major structures would include laboratories, shops, a training school, and subterranean tanks for radioactive waste. When construction forces started work in February 1943, two veteran field engineers were on the scene: DuPont project manager Wilson and Captain Grafton, recently transferred to Clinton from Chicago. Both had tackled tall jobs before, but never a job like this. Key scientific decisions were still up in the air and the deadline for completion was "next fall."[77]

The buildup at Clinton was remarkably swift. Suddenly, in the early months of 1943, the hidden project in Tennessee became a loadstone for war-scarce manpower and supplies. Talks with regional labor leaders paved the way for a vigorous recruiting drive. Assists from the

[76] Hewlett and Anderson, *The New World*, pp. 142–52.

[77] (1) Groves, *Now It Can Be Told*, pp. 78–79. (2) Hewlett and Anderson, *The New World*, pp. 194–97. (3) Ltr, Grafton to authors, 11 Nov 68.

War Manpower Commission, the U.S. Employment Service, and Colonel Barker's staff in OCE helped to assure success. Construction forces mushroomed despite the need for at least a limited security check on every applicant. The largest payroll, Stone & Webster's, jumped from 1,000 men in January to 7,300 in April. Intensive courses in welding and other trades eased shortages of skilled workers; and women draftsmen, rodmen, and chauffeurs gave the job a boost. While early recruitment was largely local, procurement was countrywide. From towns and cities in nearly every state, shipments converged on the whistle-stops of Elza and Oliver Springs. Freight cars jammed sidings for miles around and traffic clogged highways, as thousands of tons of materials and hundreds of machines and vehicles flowed into the area. Materials bought by the contractors, purchases made centrally by Colonel Sherrill, and surplus transferred by Captain Rentenbach from other Corps jobs nearly swamped the project. Receiving and checking and distribution were major operations. Labor gangs, some composed entirely of Negro women, worked around-the-clock unloading, and carpenters put up the first of fifty big warehouses.[78]

Spring found construction moving forward amid rain and mud. Subcontractors' nameboards dotted the site—Clinton Home Builders of Charlotte, Foster & Creighton Company of Nashville, Harrison Construction Company of Pittsburgh, Transit-Mix Concrete Corporation of New York City, and D. W. Winckelman of Syracuse. Long lines of automobiles passed through the heavily guarded gates each morning and evening. Working conditions were still primitive (tank wagons hauled drinking water from the town of Clinton seven miles away and circus tents housed canteens), yet evidence of progress was all around. The main line connection with the Louisville & Nashville, completed and in use; a rambling frame laboratory, occupied by Met Lab scientists; deep excavations in the plutonium separation area; foundations under way for two Y-12 process buildings; a pump house and a filter plant rising near the Clinch River—these were among the highpoints. To Colonel Marshall, a frequent visitor, the job appeared to be going fairly well. To Groves, who showed up every other week or so for a predawn parley and a rigid inspection, the pace seemed fast but not nearly fast enough; he maintained a steady drumbeat for greater speed.

Meanwhile, two thousand miles northwest of Clinton, near the big bend of the Columbia River, a second production complex—the Hanford Engineer Works—was coming under development. Groves' mid-January decision to acquire 670 square miles of semiarid land in south central Washington had prompted brisk activity: subsurface explorations by the Seattle District; a power survey by Giroux and a site reconnaissance by Zach; establishment by the Portland District of a real estate office at Prosser; large-scale purchases of materials and equipment by Colonel Sherrill and DuPont; calls from the Chief's office to the field for surplus steel, relay rail, electric wire, trucks, tractors, loco-

[78] (1) Williams Interv, 26 Sep 68. (2) Notes of Conf, Groves, Lawrence, Lotz, *et al.*, 24 Apr 43. MED Files, 337 LC. (3) Thornburg, *et al.*, "Men and Materials," *ENR*, December 13, 1945, pp. 126–28. (4) 411.5, 412.42, 413.8, and 453.3 (CEW).

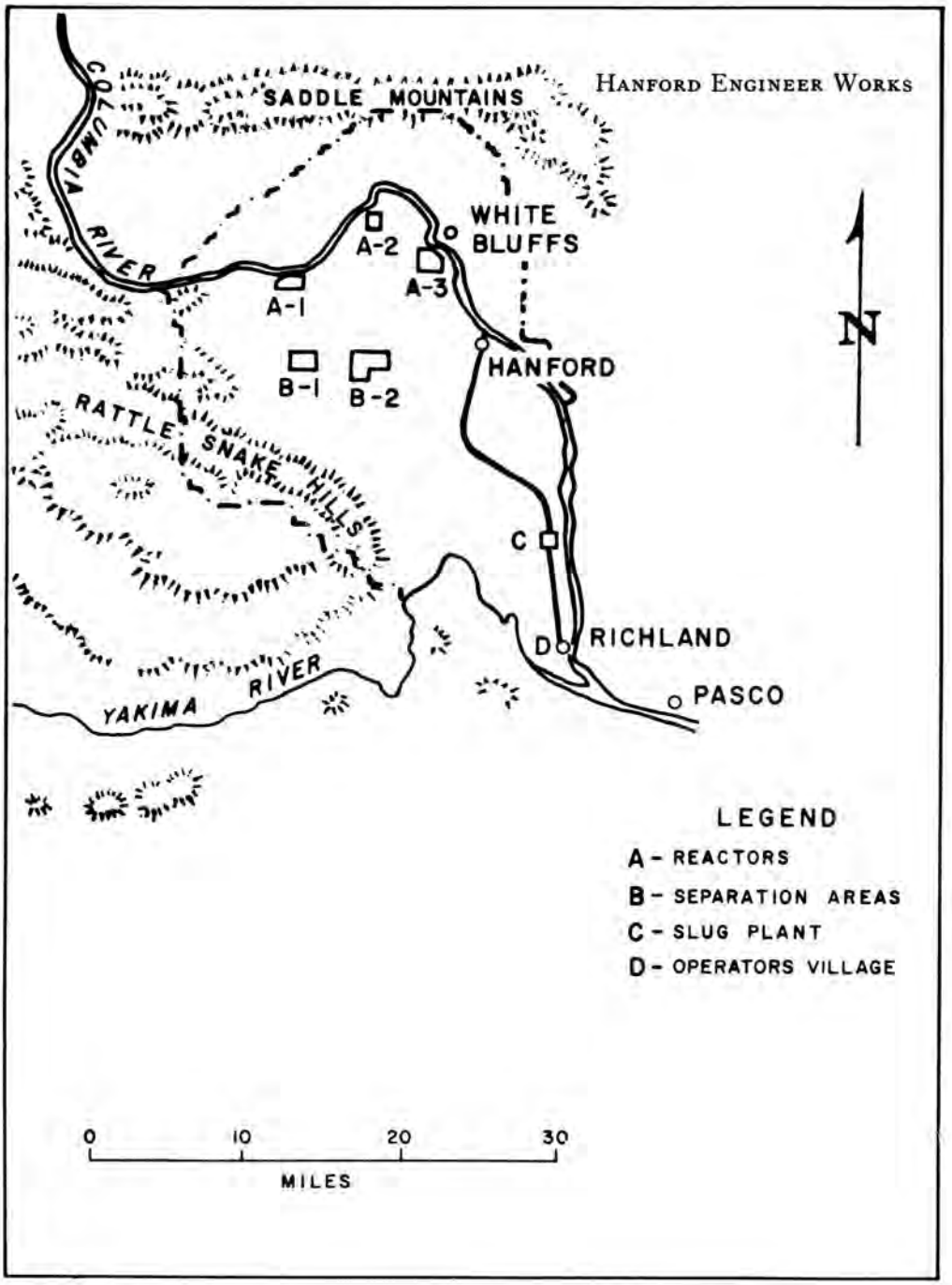
motives, and myriad other items; and countless meetings in Washington, Wilmington, Chicago, and New York. By mid-March preliminaries were well advanced. Temporary offices at the Gray Building in Pasco buzzed with new arrivals: Colonel Matthias, who had volunteered for the post of area engineer; Lt. Col. Harry R. Kadlec, his highly regarded deputy; Gilbert P. Church, DuPont's project manager; Leslie S. Grogan, his field superintendent; and large supporting staffs. A petition in condemnation had sailed through the Federal Court at Spokane; a hook-up with the Bonneville-Coulee power grid was in the works; arrangements were firming up to restrict flights over the area; the architect-engineer for the operators village, G. A. Pehrson of Spokane, was ready to start work; and the general layout for the entire project was falling into place.[79]

Late in March Groves and O'Brien spent two days at the job, going over the ground and settling details. With Church and Matthias, they covered many miles; northwest from Pasco to Richland, a hamlet nestled in the Y formed by the conflux of the Yakima and the Columbia; then on over parched dirt roads, through wide stretches of sand and sagebrush, to the villages of White Bluffs and Hanford. From a butte opposite White Bluffs, above the blue Columbia, they commanded a good view of the roughly circular site: the steep-faced Saddle Mountains on the northern rim; the narrow zone of irrigated orchards and croplands along the winding river; and the gray expanse of undulating tableland bounded on the south by the Rattlesnake Hills. At evening sessions in Pasco, Groves reviewed the layout: three huge reactors spaced miles apart on the right bank of the river; two chemical separation areas some distance to the south; a big construction camp at Hanford; a plant for making uranium slugs and testing pile materials midway on the Richland-Hanford road; and a town for operating personnel at Richland. (*Map 5*) Meantime, at after-dinner meetings with the real estate group at Prosser, O'Brien went over acquisition plans. At Groves' suggestion, he kept two secondary requirements in mind, minimum publicity for the project and maximum co-operation with the President's "Food for Victory" program. With construction planning barely begun, there was no need to bear down. Partly to soften owners' protests and partly to salvage growing crops, O'Brien told his men to rely mainly on negotiation, hold off eviction notices as long as possible, and let farmers and orchardmen bring in their harvests. Later, when bumper crops raised asking prices and sellers' resistance stiffened, Groves regretted this leniency, for the Hanford acquisition proved to be long and litigious.[80]

As the magnitude of the construction job became apparent, pressure began to mount. Planned on the same basic principles as the Clinton semiworks, the Hanford project was nonetheless formidably dissimilar; the 112-acre site in

[79] (1) Matthias Diary, Feb–Mar 43. (2) 410, 411.5, 412.42, 451.2, and 453.7 (HEW). (3) Ltr, Matthias to OCE, 8 Mar 43. 413.8 (MDO). (4) Ltr, Matthias to authors, 28 Apr 64. (5) TWX, Marshall to Reybold, 5 Mar 43. 210.3 (MDO).

[80] (1) Matthias Diary, 24–25 Mar 43. (2) Memo, O'Brien for Amberg, n.d. EHD Files, Leasing. (3) Groves, *Now It Can Be Told*, pp. 76–77. (4) Jones, MANHATTAN, ch. VIII, pp. 44–88.


HANFORD ENGINEER WORKS
SADDLE MOUNTAINS
COLUMBIA RIVER
WHITE BLUFFS
A-2
A-3
A-1
B-1
B-2
HANFORD
RATTLESNAKE HILLS
C
D
RICHLAND
PASCO
YAKIMA RIVER
N
LEGEND
A - REACTORS
B - SEPARATION AREAS
C - SLUG PLANT
D - OPERATORS VILLAGE
0
10
20
30
MILES

MAP 5

Bethel Valley was tiny compared with the vast sweep of prairie north of Pasco, and the Clinton pile's expected power output of 1,000 kilowatts shrank to insignificance beside the 250,000 kilowatts of each Hanford pile. There were other marked differences also. Unlike the Clinton midget, the giant reactors at Hanford would be water-cooled, a circumstance that raised such varied problems as rust prevention and streamlife preservation. The remoteness of the Hanford tract was another exceptional feature; since the nearest city of any size, Yakima, was 40 miles away, recruiting, transporting, housing, and feeding the workforce would take a lot of doing and so would keeping up morale. Massive industrial structures, heavily shielded to confine radiation and designed for operation by remote control, a permanent town for 17,000, a construction camp for 40,000, plus administration buildings, depots, shops, laboratories, test facilities, pumping stations, filtration plants, and hundreds of miles of roads, railroads, and transmission lines—the scope of the undertaking was impressive. The best way to meet the challenge was to tackle it head-on. Bringing machinery and materials from other Corps projects, recruiting labor throughout the northwest, opening gravel pits and obtaining concrete batch plants, establishing bus connections with nearby towns, erecting barracks and tents at Hanford, inaugurating food service, letting contracts for Richland Village, studying how to safeguard the Columbia River salmon, and pushing "hard and fast" on roads and railroads—all these activities proceeded during the spring of 1943. By May, 1,300 men were at work. With luck, the main task of plant construction would start in the summer.[81]

Although dwarfed by Clinton and Hanford, other industrial construction jobs were pressing and important. On Colonel Marshall's crowded itinerary were Milwaukee, Wisconsin, where the Allis-Chalmers Company was expanding to manufacture pumps; Niagara Falls, New York, where the Electro Metallurgical Company was erecting facilities to cast uranium ingots; and spots in Alabama, Colorado, Indiana, Iowa, Michigan, New Jersey, and West Virginia. Of the various auxiliary plants, those for heavy water were perhaps most noteworthy. The possibility of failure with graphite piles dictated Groves' decision in November 1942 to augment supplies of heavy water. At his request, DuPont engineers took the matter in hand. After weighing possible production methods, including the electrolytic process used at Trail, they backed distillation as the surest and quickest, though not the most economical. Soon plans were afoot for distillation units at three Ordnance works having excess steam capacity, Morgantown, Alabama, and Wabash River, plus an electrolytic finishing plant at Morgantown. A "horseback guess" put the cost at about $28 million. Started by DuPont in January and February 1943, the projects raced to meet close deadlines—partial operation by mid-summer and final completion by the end of the year.[82] With many

[81] (1) Franklin T. Matthias, "Building the Hanford Plutonium Plant," *ENR*, December 13, 1945, pp. 118–24. (2) Matthias Diary, Apr–May 43.

[82] (1) Hewlett and Anderson, *The New World*, pp. 292–94 and 104. (2) MD Hist, Book III. (3) Ltr, DuPont to Groves, 17 Mar 43, and Incl. MED Files, 600.12 (P-9). (4) Memo, Nichols for Groves, 17 May 43, and related docs. MED Files, 161. (5) Interv with Harry S. Traynor, 7 Nov 68.

such undertakings at scattered locations, the MED building effort was a miniature war construction program in itself.

Undergirding endeavors in the field was powerful support from contractors' home offices. At Boston, Stone & Webster had a special force of 800 employees, occupying 13 floors in 4 heavily guarded buildings, at work on the atomic program. Headed by the firm's chief mechanical engineer, dynamic, genial August C. Klein, this group discharged heavy duties: translating scientific data into construction plans and blueprints; procuring process equipment from Allis-Chalmers, General Electric, Westinghouse, and other manufacturers; expediting orders of basic raw materials, including uranium; and overseeing operations at Clinton and Trail. At Wilmington, DuPont had a comparable organization under the direction of chief engineer Everett G. Ackart and his hard-driving principal assistant, Granville M. Read. Early in the game, a 400-man design team toiled over information submitted by the Met Lab; in time, the pile project soaked up 90 percent of the company's engineering and construction talent. From the Woolworth Building in downtown Manhattan, a newly created Kellogg subsidiary, the Kellex Corporation, pioneered development of the gaseous diffusion process. The staff, which grew eventually to about 3,000, included many luminaries of the engineering profession, but none more brilliant than the president, Percival C. Keith.[83] With researchers at Columbia and associated universities, Keith and his group had baffling obstacles to overcome. Bracketing Kellex and the other contractors, Nichols related, "In every case, they really worked their hearts out to get the thing done."[84]

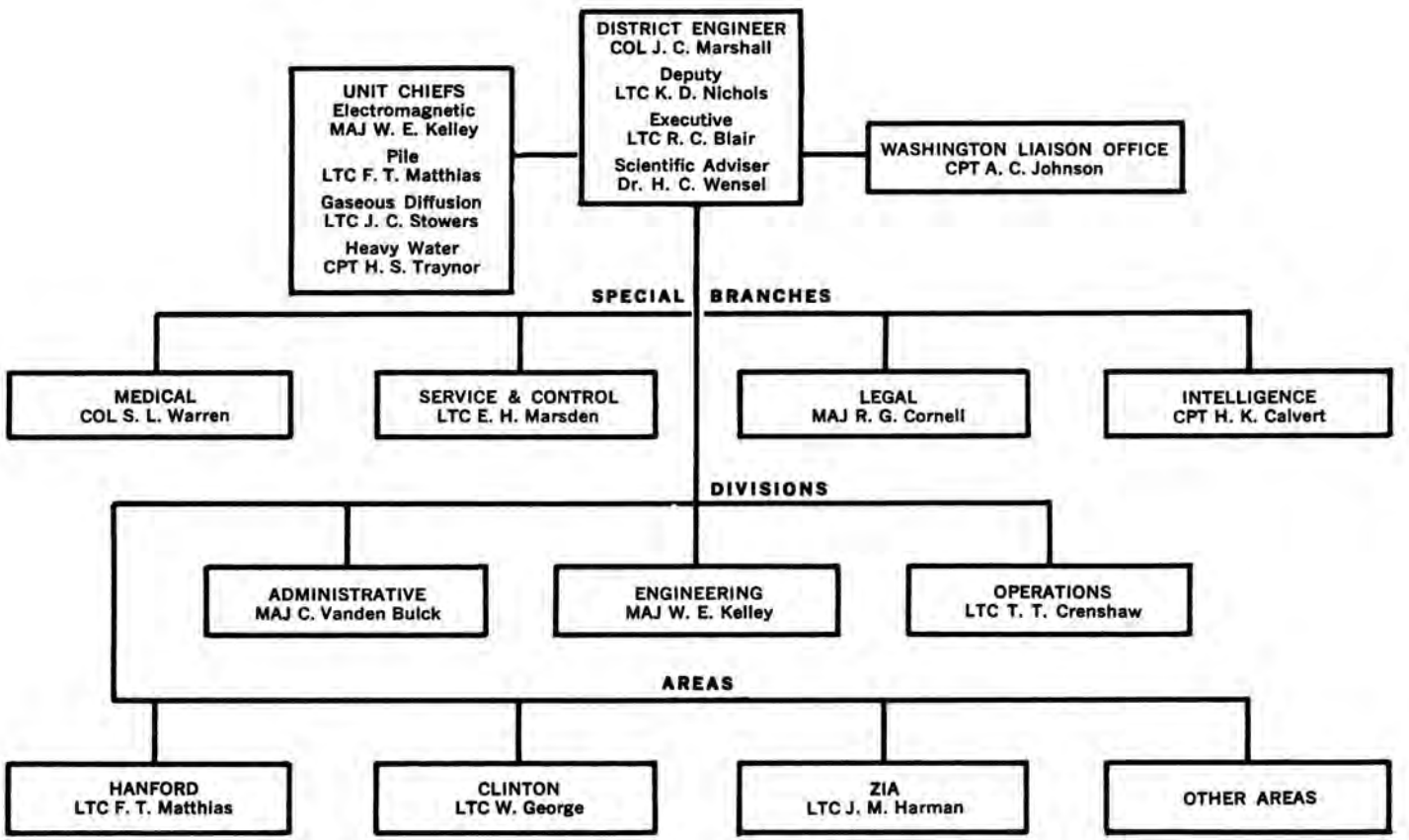
Tying all these vital cords together was the Manhattan District centered in New York. Grown too large for its Broadway headquarters, Colonel Marshall's staff had taken over floor after floor of a garment industry building at 261 Fifth Avenue. Aiming for "the same kind of District that we had at Syracuse," Marshall relied on the same sort of personnel and the same type of setup. The majority of his officers were Corps employees in uniform and many of his civilian aides wore Corps service pins in their lapels. But for a few exceptional features—a scientific adviser (Dr. Henry T. Wensel), a chief medical officer (Col. Stafford L. Warren), and four unit chiefs or process co-ordinators (Kelley for electromagnetic, Matthias for the plutonium piles, Lt. Col. James C. Stowers for gaseous diffusion, and Capt. Harry S. Traynor for heavy water)—the MED organization chart could have served most Engineer districts. (*Chart 27*) "We had a good organization," said Nichols, "and a group of people that could work together." The only rub was Groves. Dealing with him was "an interesting and difficult problem," according to Nichols: "There was no question as to his ability, but his methods of working were to violate all channels." Marshall, who outranked Groves on the permanent promotion list, did not take kindly to this mode of operation. "Who is the District Engineer?" he demanded. "You

[83] (1) *A Report to the People: Stone & Webster Engineering Corporation in World War II* (Boston: Stone & Webster, 1946), p. 13. Cited hereinafter as *A Report to the People.* (2) Groueff, *Manhattan Project*, pp. 167–68, 139, 131, and 105–06.

[84] Nichols Interv, 18 Feb 64.

Chart 27—Organization of Manhattan Engineer District, April 1943

(Simplified)



Source: Orgn. Chart, MED, 1 Apr 43. EHD Files.

are," Groves replied. "Who gives the orders?" "You do." Nevertheless, as time went on, the general exerted more and more authority. At one point, Marshall told him, "There is no need for both of us here; I want out." Groves demurred, but finally agreed: "O.K., at the first opportunity." Absorbed in his work, Marshall soon forgot the conversation; and, apparently, so did Groves. The two men pegged along, disagreeing occasionally, but never reaching an impasse. Too big to harbor grudges, they pushed toward their common goal.[85]

Both kept an anxious eye on Clinton, a healthy project on the whole, but not immune to trouble. By May 1943 the job was bounding ahead. The atmosphere was one of challenge and excitement, and the spirit was enthusiastic. The construction camp was filling up, as recruiting centers throughout the South funneled workers to the site. A ten-hour shift and a partial second shift kept equipment running from dawn to dusk, and unloading crews grappled with hundreds of incoming freight cars. Three thousand houses were under construction on Black Oak Ridge, and water and sewer lines were advancing at the rate of one mile per day. In the Y–12 area, dozens of structures, among them a recently authorized Beta process building, were going up, and the development plant, started in mid-April, was already roofed. The plutonium semiworks was right on schedule. Good progress notwithstanding, the job produced its share of headaches. Two were political: a strained relationship with the Governor of Tennessee and an impending congressional probe into land acquisition. Another was administrative: a personality clash between George and Williams, in part smoothed over after Blair took command of Clinton on 15 May and George became his construction officer.[86] But these problems, however vexing, were relatively minor. The really big ones flowed from the complexities of the engineering task.

Foundations for the Y–12 process buildings proved to be a rugged undertaking. From the beginning, some difficulty seemed inevitable. "Everybody knew the place was faulted," Williams pointed out; and because of the many heavy magnets, load concentrations would be quite high and permissible settlement, practically zero. With due precaution, Stone & Webster mobilized a crack team of foundation engineers, captained by Lynnwood Kerr, one of the best men in the business.[87] Early in 1943 Kerr sent William F. Swiger, a young Harvard-trained soils technologist, down from Boston to take core-borings and dig test pits. On the north side of Bear Creek Valley, Swiger found underground formations of Conosauga shale, an excellent support for heavy structures. On the south side, where the main process buildings were to go, he came upon less favorable conditions: uptilted beds of deeply weathered limestone. After rejecting several alternatives, Kerr adopted a procedure which

[85] (1) Marshall Interv, 19 Apr 68. (2) Nichols Interv, 18 Feb 64.

[86] (1) Interv with Edward J. Bloch, 13 Nov 68. (2) G. E. Crosby and P. B. Streander, "Water Supply and Sewage Works for the Atomic Bomb City," *ENR*, December 13, 1945, p. 154. (3) Traynor Interv, 7 Nov 68. (4) Williams Interv, 26 Sep 68. (5) Ltr, Blair to authors, 24 Jan 1969. (6) 601.1 (CEW) II. (7) Ltr, Marshall to Blair, 5 Jul 43. 161 (CEW).

[87] Williams Interv, 26 Sep 68.

worked nicely for the first two Alpha buildings: stripping the surface, grouting seams and joints, and founding footings on this "dental work." When excavating crews removed the overburden at the site of Alpha III, he faced crueler obstacles: irregular boulders up to 30 feet in diameter, lodged closely together and imbedded in soft clay. "Here," he wrote, "was real trouble, so serious that time and labor expended in attempting to excavate to suitable foundations only made conditions appear more hopeless." Eventually, he opted for an unorthodox method, a military engineer's expedient proposed by Groves. Leaving the rock where it was, he flushed out the muck with firehoses and then poured a heavy concrete mat, two to three feet deep in some spots, eight feet in others, which amalgamated the whole mass into one firm solid base. Conventional engineering or not, the trick succeeded. The job was well and swiftly done.[88]

When earthmovers started work in Happy Valley on June 2d, the atomic project passed another milestone. Picked by the Lewis Committee as the method most likely to succeed, gaseous diffusion—K–25 in code—was also the most disheartening. Based on Graham's Law, the process was beautifully simple in theory—when uranium hexafluoride gas was pumped against porous membranes, the lighter U–235 molecules would tend to pass through more easily than the heavier U–238—but making it work industrially was a herculean labor. Thousands of separation stages, millions of kilowatts of electricity, unique metallic barriers or membranes with countless submicroscopic holes, pumps and seals of revolutionary design, new coolants and lubricants, corrosion-proof materials, vacuum tightness, surgical cleanliness, and watchmakers' tolerances were items in the engineer conspectus. Moreover, the Columbia scientists, at odds with one another, inspired Groves with far less confidence than the ebullient Lawrence team or the coolly competent Met Lab group. Bright spots in the picture were "Dobie" Keith and his "can-do" associates, whose initial progress was reassuring, and the Union Carbide engineers, who were moving into operational planning. As development of component parts went forward (soon the barrier remained the chief unsolved riddle) and as construction drawings multiplied (the total would eventually reach 12,000), Groves made a bold commitment. In mid-May Marshall signed a letter contract with the J. A. Jones Construction Company for the largest steam-electric power plant ever built. Within a fortnight, Jones' men were on the scene.

High-geared and high-priced, the power plant project exemplified the don't-spare-the-horses spirit of MED. Scheduled for completion in 10 months, the $185-million generating station was an added safeguard, another hedge against misfortune. The decision to build it rested on the scientists' belief, later proved unfounded, that a momentary outage would shut down K–25 production for many weeks and also on the reasoning that since TVA current, coming by wire, was subject to interruption by storms and sabotage, locally generated current was a necessity. A difficult undertaking at best, construction of the plant

[88] Lynnwood Kerr and Paul Brown, "Process Buildings Over Faulted Rock," *ENR*, December 13, 1945, pp. 129–31. See also Ltr, William F. Swiger to authors, 18 Nov 68; and Groves Interv, 11 Feb 64.

was rendered more difficult by unfavorable site conditions and wartime shortages. By bringing in top-notch subcontractors, among them the A. S. Shulman Electric Company of Chicago and The Foundation Company of New York; by commandeering boilers and turbines intended for Commonwealth Edison's new Fiske Street Station in Chicago; and by vigorous expediting, MED leaders helped the cause along. Within a short time, the job was booming.[89] Assigned to Clinton in late July as K–25 construction officer, Maj. William P. Cornelius found the powerhouse "fairly well established."[90]

The same vim was evident at Hanford, which was fast taking on the atmosphere of a wild West frontier town. An intensive recruitment program, launched in the spring of 1943, had unexpectedly quick results. Barred from the industrial areas of Washington and Oregon by the War Manpower Commission, DuPont agents fanned out through the Great Plains, enlisting hundreds of workers each week. Coping with the influx of new employees—a total of nearly 10,000 in May, June, and July—kept Church and Matthias on the go. Providing room and board was an especially arduous task, since local custom demanded that men bunk two to a room and have table service at meals. Maintaining order and arousing enthusiasm were no easy matters. Many of the workers were rough and tough and far from the restraining influences of family and friends. Brawling, drunkenness, and thievery in the barracks called for dexterous handling. Moreover, an unbalanced workforce—the ratio of skilled to common labor was far too high—hampered operations. But despite drawbacks, construction moved ahead. Experienced subcontractors reinforced DuPont: among them, Guy F. Atkinson of San Francisco, Twaits-Morrison-Knudsen of Los Angeles, and Hankee-James-Zahniser & Warren of St. Paul. Additions to project staffs strengthened management and a stream of visitors from Chicago, Wilmington, and Washington gave advice and support. By mid-summer preparations were virtually complete and shovels were scooping out foundations for the piles.[91]

Abruptly, on 20 July 1943, the Manhattan District underwent a change in leadership. Colonel Marshall was in the Governor's office at Nashville, when a rush call came through to him from Groves. "Congratulations," said the general and blurted out the news: Marshall was getting a brigadier's star and going to command Camp Sutton; Nichols was taking over as district engineer. Shocked and indignant, Marshall concluded, despite Groves' denials, that he was being fired. General Reybold soon put the matter to him in a different light: noting that Marshall was overdue for a well-deserved promotion and that his current post did not call for one, the Chief had asked Groves to release him.[92] In a touching message, Marshall bade farewell to MED:

> My change in assignment has come about through no desire for such a change on my part. . . . I feel that we have the finest

[89] John D. Watson, "Building a Power Plant in 10 Months," *ENR*, December 13, 1945, pp. 141–44.

[90] Interv with Col William P. Cornelius, 15 Nov 68.

[91] (1) Matthias Diary, May–Sep 43. (2) Groves Interv, 11 Feb 64. (3) Ltr, DuPont Explosives Dept to Nichols, 4 May 43. MED Files. 161 (DuPont).

[92] (1) Marshall, Office Diary, 20 July 43. EHD Files. (2) Marshall Interv, 19 Apr 68. (3) Groves, *Now It Can Be Told*, p. 29.

organization in the Corps of Engineers, one that the Chief of Engineers and others in authority familiar with our work know is doing a fine job . . . . The district has a long task ahead of it, but I know that a continuation of the wholehearted efforts being put forth by all of you . . . will produce the results expected by the War Department.

Adios.[93]

His departure gave Groves a freer hand. Almost immediately, district headquarters moved from New York to Tennessee, a switch the general had long urged on Marshall. Although most stayed on, some members of the old guard left for overseas and men of Groves' own stamp came in to replace them. Going out of channels became more or less routine. Informal and unmilitary, the system worked successfully because the officers involved were more intent on getting the job done than on asserting prerogatives. In particular, Nichols' forbearance won the admiration of associates. To many of them the smooth, level-headed, thoroughly competent young officer was the hero of the piece.

In both the widely separated areas which were the principal scene of its mysterious construction activities, the Manhattan District faced similar basic problems, differing in detail, but alike in the complications caused by wartime scarcities. Mere statistics spoke volumes; combined requirements for Clinton and Hanford included 360,000,000 board feet of lumber, 1,200,000 cubic yards of concrete, more than 75,000 tons of structural steel, and 22,500 pieces of equipment. Contractors did most of the purchasing; Stone & Webster paid out a total of $260,000,000 to vendors and DuPont's Hanford field office alone placed 42,000 orders. Even so, many essentials came courtesy of the Corps: the Central Procuring Agency bought 80 percent of the lumber and the bulk of the rail and reinforcing steel; districts and divisions unearthed divers hard-to-get items; and most construction machinery was recaptured surplus. While hundreds of expediters helped speed deliveries, the prime troubleshooter was Captain Johnson of the Washington Liaison Office. Manhattan's assigned priority, AA–3 until March 1943 and AA–2x thereafter, though effective ordinarily, often proved too low. At least 50 calls for help reached Johnson every week. With the super triple-A rating, always in reserve, he could, and repeatedly did, edge out competing war programs. "We were notorious for robbing people," said Nichols. Victims, unable to fathom the atomic secret, complained bitterly. Soothing "gripes on interference caused by our work" became one of Johnson's routine duties, and, occasionally, Groves, Patterson, or Stimson had to damp down discontent.[94] Strained and stringent though it was, the procurement effort succeeded. One way or another, the Army and its contractors kept the crucial projects well supplied.

Manpower, not matériel, was the agonizing headache. At the peak of construction, Hanford employed 45,000 workers; Clinton, 47,000. With millions

[93] Ltr, Marshall to All Employees, 23 Jul 43. EHD Files.

[94] (1) Ltr, Johnson to Marshall, 16 Mar 43. MED Files. 201 (General). (2) Nichols Interv, 18 Feb 64. (3) WPB Files. 411.33 (Constr Projects–Mil). (4) MED Files. 400.1301 (Priority).

in the armed services and in defense plants, mustering these forces was no mean feat. Although contractors did most of the brush beating, Engineers also played an influential role. Colonel Barker's dedicated efforts earned Groves' encomium: "a key man to the success of the undertaking."[95] Full co-operation from war manpower authorities, all-out support from leaders of the building trades, timely wage boosts in critically short crafts, and diplomatic arbitration of disputes were among his contributions. Other loyal helpers were General Robins, who pressed the district engineers into service as recruiters, and Lt. Col. Edward A. Brown, Jr., of OCE, who assisted in forming elite Special Engineer Detachments, made up of technically educated GI's, to take over scientific chores for which civilians were unobtainable. Barely less troublesome than problems of recruitment were problems of stability and morale. Turnover was abnormally high at both Clinton and Hanford; many weeks new hires did little more than match dropouts. Absenteeism was flagrant and discontent was widespread. Gripes commonly heard at construction camps could not explain the situation; but some observers felt that secrecy could. In the dark as to end products, workers tended to view the plants as colossal boondoggles. A desire for war work was a frequent reason for quitting. Nichols' labor relations man, Lt. Col. Curtis A. Nelson, applied every known remedy—appeals from Reybold and Robins, patriotic posters and Army displays, recreation and entertainment programs, complaint periods, exit interviews, and more. These measures helped subdue unrest but could not dispel it.[96]

Progress surveys in the fall of 1943 showed much good work accomplished but much more still to do. At Hanford the first pile building, a massive, windowless cube, was rising from the desert amid a jumble of related structures; parts of the fabrication and testing center were already in use; two large excavations, abandoned temporarily for want of manpower, told where the separation plants would stand; the sprawling construction camp, a patchwork of barracks, tents, and trailers, could accommodate 13,000 persons; and Richland, the white collar village, was home to several hundred families. At Clinton, where Crenshaw had succeeded Blair, a great deal of construction was in place. The community of Oak Ridge, named by Colonel Marshall, was a rapidly growing city, managed by the newly formed Roane-Anderson Company. Labor camps flourished at three locations, and development of utilities, roads, and railroads was proceeding apace. The semiworks was nearing completion and would produce its first plutonium, a tiny amount but enough to experiment with, before the end of the year. The Y–12 project was going like a house afire. Many minor structures were in service and the first Alpha racetrack was undergoing trial runs. Far behind the other processes, K–25 was the longshot in the race for bomb stuff; not until September did

[95] Groves Interv, 11 Feb 64.

[96] (1) Ltr, Robins to Div and Dist Engrs, 26 Oct 43. 600.1 (MDO) (Labor) Part 1. (2) 220.3 (MDO). (3) 320.22 (MDO). (4) 600.1 (CEW) (Labor). (5) 600.1 (HEW) (Labor). (6) Message, Robins to Workers at CEW, 25 Nov 43. 330.11 (CEW). (7) Message, Reybold to Men and Women of CEW, 10 Feb 44. 201.21 (CEW).

excavation for the main gaseous diffusion plant get under way. Two decisions around that time eased the pressure on K–25 and tightened the squeeze on Y–12. Encouraged by recent improvements in Lawrence's method and knowing that the final, upper stage of K–25 would require tremendous engineering efforts, Groves resolved, first, to use diffusion to carry separation only part way and, second, to double the size of the electromagnetic plant.[97] Asked afterwards how he reacted to this news, Cortlandt Williams pointed to a small bronze figure of Sisyphus at his incessant labor.

Scientifically the least elegant of all the processes and industrially the least efficient, Y–12 put constructors through a cruel ordeal. Embracing more than 160 separate buildings and a still crude technology, the plant construction job, in Williams' phrase, was the "most complicated ever." The killing pace, the novel industrial equipment, and the ultra high standards of workmanship were harrowing enough, but variable plans were even worse. As researchers at Berkeley scored repeated breakthroughs, engineers at Clinton strove frantically to stabilize design. Because electromagnetic separation was a batch method, design could be frozen by units or groups of units, and Groves soon insisted on doing so despite Lawrence's rebuke: "That's the stupidest thing I've heard yet."[98] Contending that successive freezes made the difference between "chaos and ability to get the job done," unit chief Kelley explained: "Had Groves not stepped on the scientists' toes, they would have just run wild with little changes." As the first process building neared completion in September 1943, Stone & Webster fought a tough bout, unscrambling equipment delivered out of sequence and rushing installation. With masons still at work on the opposite end of the structure, cranemen hoisted the heavy magnets into place and specially trained mechanics began final assembly of the number one racetrack. When the power was turned on in mid-October, project leaders received a hard blow. During trial runs, the 14-ton vacuum tanks crept inches out of line and, more serious, the magnet coils showed a tendency to ground. Baffling at first, the mystery of the tanks cleared up when someone remembered Maxwell's Third Equation; obedient to the laws of physics, the oval racetrack was trying to pop out into a circle. Anchored securely, the tanks stayed put. The mystery of the coils proved harder to fathom. Not until 5 December, when Groves ordered a magnet broken open, was the cause apparent: Major Kelley reached in and scooped out rust and scale by the handful. Grumbling about inexcusable carelessness, his own as well as others', Groves ordered drastic action: tear down the racetrack and send the magnets back to the factory for cleaning and rebuilding; erect a pickling plant and pickle every piece of pipe; install filters and do whatever else was necessary to eliminate contaminants from the system.[99] The job was in critical straits, and these were dark days for the Y–12 team.

Brighter days were slow in coming,

[97] (1) Hewlett and Anderson, *The New World*, pp. 215–16, 219, and 159–61. (2) Matthias Diary, Sep–Nov 43. (3) Robinson, *Oak Ridge Story*, p. 50 ff.

[98] Williams Interv, 26 Sep 68.

[99] (1) Interv with Dr. Wilbur E. Kelley, 14 Oct 68. (2) Groves, *Now It Can Be Told*, pp. 103–06.



Y-12, ELECTROMAGNETIC PROCESS PLANT

as ill luck dogged the enterprise and morale sagged. Electrical failures, mechanical breakdowns, shortages of spare parts, and many minor hitches and delays hampered round-the-clock efforts to get the second racetrack running. Using a favorite technique, Groves tried to revitalize the project by injecting new blood. Lt. Col. John S. Hodgson, a prominent contractor in civil life, replaced George as construction officer, and Maj. Walter J. Williams, who had a brilliant record on big Ordnance plant jobs, took charge of the original Y–12 area. The recently appointed head of the Y–12 extension, Maj. Mark C. Fox, one of the best area engineers in the country, stayed on. Meantime, apparently to take the heat off, Stone & Webster hired Frank R. Creedon, who had left the Construction Division in late 1942 to join the synthetic rubber program, as resident manager at Clinton. Brusque and bearish, Creedon offended the suave company executives, and eventually matters reached a point where he or Cortlandt Williams had to go. Williams went. Rating Creedon's performance as "miraculous," Groves credited the hard-driving methods they both espoused.[100] Miracles worked by any

[100] Ltr, Groves to Creedon, 17 Feb 45. MED Files. 201.22 (Ltrs of Appreciation and Commendation).

means were welcome at Y–12, for fresh obstacles loomed at almost every turn. One was especially forbidding. By the spring of 1944 several racetracks were in operation, but much of their product remained inside trapped in tubes and piping or buried in the mess of dust and metal flakes that splattered vacuum tank walls. Concentrating on the physics of separation, Lawrence had given too little attention to the chemistry of recovery. Dismantling the calutrons every week or two and scouring or scraping their parts upped the yield somewhat but not greatly. Assaults on the problem were nightmares of frustration, of testing one design and then another, installing pipe by the mile and then ripping it out again. Weeks went into months and still there was no answer.[101] Twinkling over his understatement, Groves reminisced, "It wasn't easy to bring the magnet around."[102]

Bringing around gaseous diffusion was no cinch, either. The main K–25 process building, a four-story U-shaped affair measuring more than one mile from end to end, was the largest in the whole Manhattan Project. Small by comparison, but a major undertaking in itself, was the so-called "conditioning" plant which would thoroughly clean all parts and preassemble process units. With the great steam-electric powerhouse, laboratories, shops, labor camps, and other appurtenances, K–25 covered nearly eight square miles. Already at work on roads, railroads, and utilities, J. A. Jones began the main separation plant in September 1943, about the same time that Ford, Bacon & Davis of New York broke ground in the conditioning area. Both firms placed ace men in charge: company executive Edwin L. Jones headed the Jones setup; and Charles C. Whittlesey, who had just completed a $60,000,000 synthetic rubber plant at Charleston, West Virginia, was project manager for Ford, Bacon & Davis. The job demanded all their expertise, for it raised many perplexing problems that "called for excursion far into the unknown."[103] The contractors adopted striking innovations, for instance, streamlined methods of surveying, dropped-in caissons for the powerhouse substructure, compacted fill foundations for the separation plant, and temporary partitions and movable electric substations to give the conditioning plant built-in flexibility. All the same, the project was a grind. "Clean as a surgeon's forceps" and "vacuum tight as a thermos bottle" were phrases Jones and Whittlesey would not soon forget. Devising adequate cleanliness controls, evolving special welding techniques, and developing leak detection tests were taxing assignments. And waits for plans from Kellex were nerve-wracking experiences. Patience, ingenuity, and hard work had results. By the spring of 1944, Cornelius could report steam in the powerhouse boilers, part of the conditioning plant in operation, and, on the main plant, foundations in, steel framework going up, and crews at work on the first separation stages. But barriers, the

[101] (1) Hewlett and Anderson, *The New World*, pp. 163–64 and 294–96. (2) Groueff, *Manhattan Project*, pp. 236–37. (3) Kelley Interv, 14 Oct 68. (4) Leslie R. Groves, "Development of the Atomic Bomb," *The Military Engineer*, June 1946, p. 237.

[102] Groves Interv, 11 Feb 64.

[103] Groves, "Development of the Atomic Bomb," *The Military Engineer*, June 1946, p. 237.

prime essential, were still lacking.[104] Aptly, Groves likened the job at this point to "building an automobile without a rear axle, inserting a broomstick between the rear wheels until we figured out how the axle should be made."[105]

Hanford, meantime, made haste slowly. Carefully conservative, DuPont engineers tried to reduce the risk of failure by using ample safety factors. Their attitude was "if fifty million extra dollars will help make us sure of success they should be spent."[106] Some hallmarks of their design were extremely close tolerances, almost perfect welds, alternate power systems, and duplicate water lines. Another, highly significant, was spare capacity built into each pile—500 tubes for uranium over and above the 1,500 specified by the Met Lab. Against protests from scientists who scorned empirical methods, Groves backed DuPont all the way, even to providing a $10,000,000 water purification plant, "just in case," that was never used. Superior craftsmanship was not good enough; perfection was the norm. Skilled mechanics had to undergo intensive training before their work could measure up. Persistent shortages of plumbers, millwrights, welders, and electricians hindered progress, and every feature added to the plant stretched the ranks thinner. Wise management offset certain handicaps, for example, specialists in central shops did much of the close precision work, prefabricating and prefitting materials for the process buildings; regular inspections and frequent servicing kept over-age equipment from breaking down; and on-site production plants assured supplies of concrete blocks and concrete pipe. Good year-round construction weather and ideal foundations of sand and gravel were unmixed blessings. By concerted action, DuPont and dozens of subcontractors pushed the project forward. By the second quarter of 1944, the first pile building was more or less complete and assembly of the pile itself was under way. The first separation building, a stark rectangular hulk of concrete and steel, was not far behind. If all went well, Hanford would start turning out plutonium in the fall. Nonetheless, grave misgivings tormented project chiefs. Recent reports from Los Alamos cast doubt on the value of the plant: making a plutonium bomb might prove impossible.[107]

In fact, the whole atomic venture might well end up as a mountainous fiasco. By mid-June, outlays totaled roughly $800,000,000, and the forthcoming military appropriation concealed an allocation of $600,000,000 more.[108] The industrial complexes at Clinton and Hanford staggered most observers; and so did the operators' "villages," for

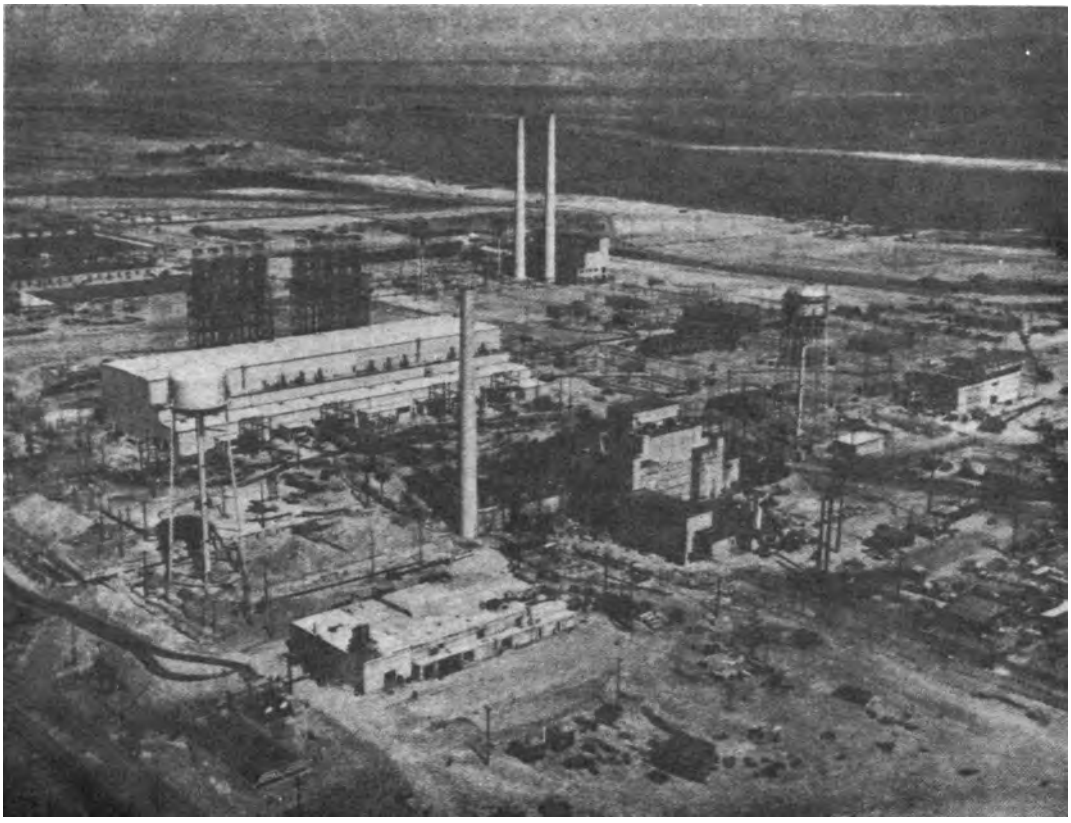
[104] (1) *ENR*, December 13, 1945: Howard J. Kornberg, "Surveying for Fast Construction," pp. 146–48; John D. Watson, "Building a Power Plant in 10 Months," pp. 141–44; John D. Watson and O. R. Bradley, "Compacted Fill Equals Natural Ground," pp. 144–46; and John F. Hogerton, "Largest of the Atom-Bomb Plants," pp. 134–37. (2) Min of Mtg, Jones, Cornelius, *et al.*, 28 Feb 44. MED Files, 001. (3) Hewlett and Anderson, *The New World*, pp. 130–41.

[105] Groves, "The Atom General," p. 101.

[106] Quoted in Compton, *Atomic Quest*, p. 194.

[107] (1) Nichols Interv, 18 Feb 64. (2) Hewlett and Anderson, *The New World*, pp. 217–18 and 220. (3) John F. Sembower, "On-the-Job Training Speeds Completion of Atomic Bomb Project by 45,000 Workers," *Construction Methods*, December 1945, pp. 104–106 and 146–56. (4) Matthias, "Building the Hanford Plutonium Plant," *ENR*, December 13, 1945, pp. 118–24.

[108] Hewlett and Anderson, *The New World*, pp. 289–90.

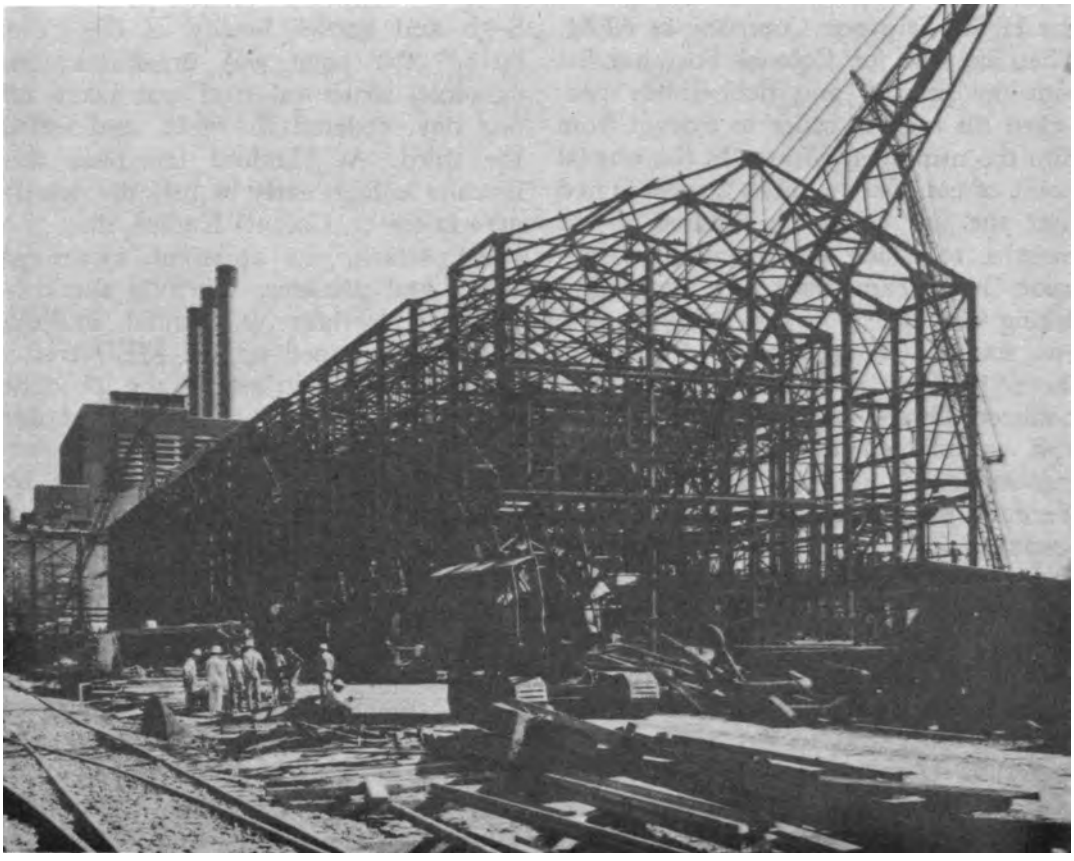


FIRST PILE AREA AT HANFORD, WASHINGTON, JUNE 1944. *Pile building is at right center.*

Oak Ridge was already the fifth largest city in Tennessee and Richland was almost as big as Walla Walla. Still, the ultimate goal was a long way off. The only major plant in operation was a painfully slow producer and the other two were question marks. Time was growing short; D-day in Europe had come and gone and the tentative date for invading Japan was October 1945. Failure to fulfill the MED mission—to perfect the weapon and use it strategically against the enemy—would, Groves knew, trigger a congressional investigation to end all congressional investigations. Far more disturbing to him was the thought of a longer war and longer casualty lists. Most men would have cracked under such pressure. Fortunately, Groves was not the worrying type, and never, even inwardly, did he lose heart. Faithful to the Corps motto, "Essayons," he kept trying. "There was only one thing to do," he said, "do our best and that we did."[109]

When he found a steep path straight ahead, he detoured along a route rejected as impracticable early in the race for the bomb. On the day of his appoint-

[109] Groves, Speech before the 11th Armored Div, 16 Aug 47. MED Files. 201 (Groves, L. R., Lt. Gen.) (Misc.).



S-50, THERMAL DIFFUSION PLANT UNDER CONSTRUCTION

ment in September 1942, he had visited the Naval Research Laboratory in Washington to learn what he could about liquid thermal diffusion, a separation process under development there. Viewing the apparatus, a tall, externally cooled tube with a steam heated cylinder inside, he was unimpressed. True, the experimental model seemed to work; but a full-scale plant was unthinkable. Its cost would be at least two billion dollars, and so insatiable would be its appetite for fuel that the output of all the country's coal mines might be insufficient to provide the necessary steam. No one at that time thought of carrying the process only part way. In June 1944 such a thought occurred to Oppenheimer. Telephoning Groves, he suggested in the double talk they always used that they had missed the boat; a small thermal diffusion plant could produce enriched feed which would double the yield of Y–12.[110] "Absolutely right," Groves promptly agreed; the big question was "how fast can we build it." After check-

[110] Groves, *Now It Can Be Told*, pp. 23 and 119–20.

ing the Navy's progress, he brought in the H. K. Ferguson Company as AEM. Then he sent for Colonel Fox, handed him the project, and deliberately provoked his rage in order to extract from him the utmost in effort. On the crucial point of completion time, Groves stated that the job could be finished in six months, to which Fox assented, whereupon Groves came back with the breathtaking dictum: "I'm not going to give you six months; you have to do it in three."[111] Bitter in his reaction, Fox denounced Groves as a "double-crosser" and complained to Nichols, "This is impossible."[112] Groves never let up. Terming the three-month deadline "reasonable," he wrote to Fox: "I think you can beat it."[113]

Renewed determination infused the whole atomic project. Insistent appeals to war manpower and war production authorities earned MED first call nationwide on labor and an AA-1 priority on materials. Dismantling operations at surplus munitions plants released hard-to-get components. Furloughs for plumbers in the armed services and extra inducements for civilian electricians eased shortages in critical trades. Enlisted strength of the Special Engineer Detachments soared to more than 3,100 men. Construction surged ahead at Clinton in the summer of 1944, as 37,000 workers pushed the two main separation plants toward completion and builders in the town of Oak Ridge assembled hundreds of new-model prefabricated houses. At the recently begun thermal diffusion plant, code-named S-50 and known locally as the "Fox farm," the pace was breakneck; for example, structural steel was taken off one day, ordered the next, and rolled the third. At Hanford the pace was literally killing; early in July the deputy area engineer, Colonel Kadlec, died of a heart attack, an apparent victim of strain and pressure. Likening the construction workers to combat soldiers, Patterson summed up the MED credo: every day saved in getting the job done would shorten the war by at least one day.[114]

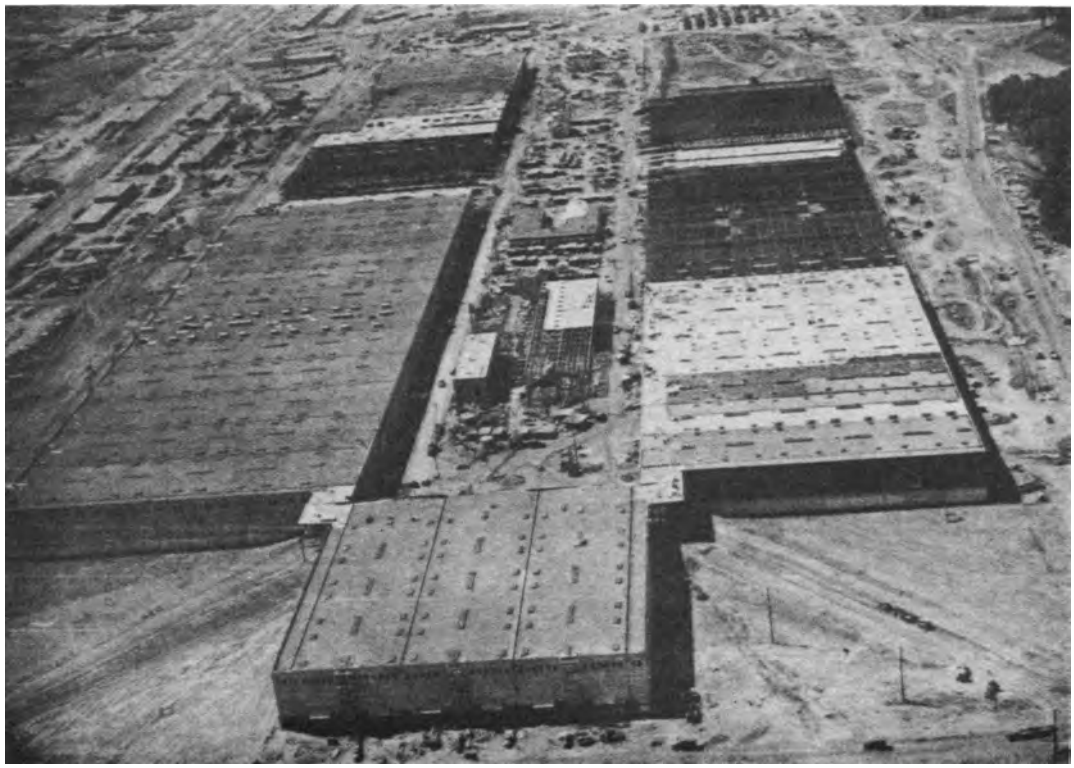
Remaining obstacles toppled one by one. Phenomenal exertions by manufacturing firms culminated as shipments of vital parts reached Clinton: zirconium insulators, which signaled the end of Y-12 electrical failures, from the Coors Porcelain Company; 48-foot copper and nickel columns, the principal items of S-50 process equipment, from the Mehring & Hanson and Grinnell Companies; nickel-plated, corrosion-proof pipe, essential for K-25, from the laboratories of Blasius Bart, developer of the Corps' metal mirror searchlights; and, most happily, the first diffusion barriers, from Houdaille-Hershey's Decatur plant, built originally for one process and recently converted to another. A two-year effort by DuPont to can uranium at last bore fruit; aluminum-jacketed slugs would be ready when the time came to load the Hanford piles. Construction,

[111] Groves Interv, 11 Feb 64. See also Memo, Nichols for Groves, 11 Oct 44. MED Files, 337 LC.

[112] Interv with Col Mark C. Fox, 19 Mar 69.

[113] Ltr, Groves to Fox, 3 Jul 44. MD Hist, Book VI, Appendix D1.

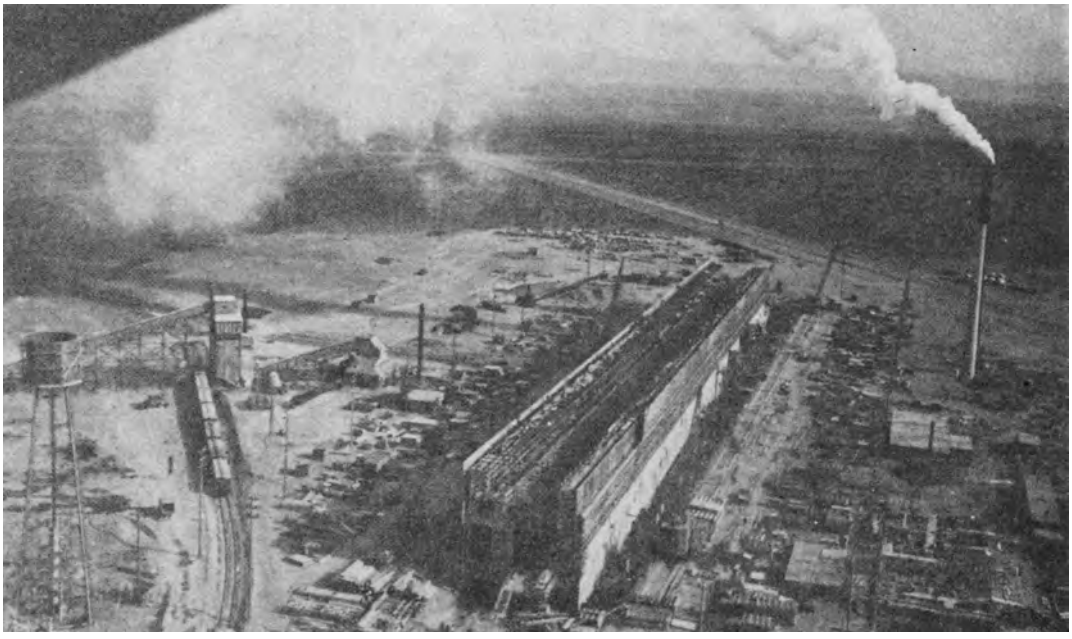
[114] (1) MED 400.1301 (Priority). (2) 400.225 (CEW). (3) Groves, *Now It Can Be Told*, pp. 99-102. (4) 600.1 (HEW) (Labor) I. (5) 220.3 (MDO). (6) Lt. Col. Mark C. Fox, "Thermal Diffusion Plant Built Rapidly," *ENR*, December 13, 1945, p. 133. (7) Matthias Diary, 2 July 44. (8) Message, Patterson to Men and Women of Hanford, 10 July 44. MED Harrison-Bundy 80-MD Proj.



K-25, GASEOUS DIFFUSION PLANT NEARING COMPLETION

meanwhile, streaked ahead, holding stride in the home stretch. Incorporating simplified and improved designs (steel-frame, asbestos-siding structures and rectangular racetracks), the Y–12 extension proceeded much faster than the original plant. With barriers finally on the way, the K–25 team gave utmost effort to completing the giant U and speeding installation. Situated alongside the K–25 powerhouse and dependent upon it for steam, S–50 made spectacular progress; with Ferguson engineer Wells N. Thompson, Colonel Fox contrived unusual shortcuts: tailoring plans to available stocks of steel, using ugly but plentiful corrugated iron siding, transporting supplies in passenger trains, and more. Still somewhat handicapped by labor unrest, Hanford scored big gains through bold engineering. Visiting the job in August 1944, General Robins witnessed one especially noteworthy feat, concreting the roof of the separation building—its walls 800 feet long and 60 feet wide with no intermediate supports—through the means of traveling forms similar to those used in tunnel lining. Step by step, constructors were winding up their work and plant operators were taking charge.

The shakedown runs were cliff-hangers. The deadline-beating startup of S–50 on 15 September 1944 was posi-



SEPARATION BUILDING AT HANFORD, SUMMER 1944

tively hair-raising. When operators turned on the steam and jetted it with saturant cold water, all hell broke loose. "That kind of stress, you know," Fox explained, "when cold water hits extremely hot and extremely high pressure steam—why it just shook those great big pipes like a dog shaking a rag. Everybody started running for the doors."[115] Soon the plant was leaking like a rusty boiler. When, in mid-October, the first token delivery went to Y-12, weeks of patching and fixing lay ahead. Wednesday, 27 September 1944, was Hanford's day of reckoning. With the first pile loaded and ready, Fermi gave the signal to begin. As control rods were withdrawn, the chain reaction started, continued for some hours, and then mysteriously died. Bystanders went weak with disappointment. Something had gone radically wrong. The error came to light fairly quickly: a mistake in the scientists' purely theoretical calculations.[116] Thanks to DuPont, the corrective was at hand; when all the spare tubes in the pile were loaded with uranium, the chain reaction went. A company balladeer summarized it neatly: "The tale's been told, as well you know,/ That Hanford nearly flopped, although/ The piles were later made to go/ Through brilliant engineering." "When the crisis came," the safety factor was the "trick that saved the game."[117] The initial test of K-25 early in the new year also proved suspenseful, as cycling and recycling of

[115] Fox Interv, 19 Mar 69.

[116] Nichols Interv, 18 Feb 64.

[117] Quoted in Compton, *Atomic Quest*, pp. 192–93.

uranium gas through the first stages of the cascade revealed defects in pumps which required last-minute modification. While trial runs were under way at other plants, Y-12 came into its own. Aided by Ruhoff, who swapped jobs with Kelley in September 1944, Tennessee Eastman engineers had whipped the bugs out of the chemical purification processes. By March 1945, all plants were in operation, production was on the rise, and bulk quantities of bomb stuff were in prospect.[118]

At Clinton and Hanford all was ending well. The final, climactic scenes of the atomic drama would take place elsewhere.

Zia

Most secret and sensitive of all MED projects, Los Alamos or Zia was also the most turbulent.[119] Conceived as an ivory-towered physical laboratory with a staff of 150 scientists and technicians, the remote mountain hideaway developed by rapid fits and starts into a quasi-military compound jammed with 7,000 people whose purpose embraced ordnance, metallurgy, and engineering as well as physics. Perched high on the Pajarito Plateau, amid a scenic wilderness, the mesa smouldered with discontent. Crises were recurrent and intense. An out-of-the-way location, improvised plans, wartime shortages, and a never-changing deadline—"as soon as possible" —made construction hard going. Austere living conditions, cloak-and-dagger security, the ever-present uniforms, and an almost eerie atmosphere, coupled with the great practical difficulties of producing the bomb, kept the scientists on edge. For the officers who commanded there, the post was a sore trial. The construction men who toiled there knew the place as "The Hectic Hill of the Sun God."

Even by MED standards the setup on the Hill was strange. A scientific laboratory operated by the University of California and an Army installation under the Chief of Engineers, Los Alamos had two heads, a civilian director, Dr. Oppenheimer, and a commanding officer, initially Colonel Harman.[120] The dividing line between them, tolerably clear in theory, was in fact somewhat blurred, for both had a hand in security and both were concerned with welfare and morale. On paper, neither at first had anything to do with construction, which was the province of the Santa Fe Area, established for the purpose at Groves' request by the Albuquerque District; but actually both entered into it. What was even more anomalous, the project lay outside normal channels of command. Deeming secrecy most vital there, Groves sealed off Los Alamos from the rest of MED. Leaving only routine administrative matters to Marshall and Nichols, he ran the show himself. "You might say," he stated, "that Los Alamos was right under my thumb all the time."[121] Few details were too small to interest him, and his often quick decisions were authoritative. Likened by

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[118] (1) Hewlett and Anderson, *The New World*, pp. 299–300. (2) Kelley Interv, 14 Oct 68.

[119] Unless otherwise indicated the following section is based on MD Hist, Book VIII; and USEO, Albuquerque, N. M., Zia Project, Compl Rpt, 1 Dec 43, and Supplement, 1 Apr 44.

[120] (1) Ltr, Groves to Somervell, 27 Feb 43. MED 322 (Los Alamos). (2) Groves, *Now It Can Be Told*, pp. 53–54.

[121] Groves Interv, 11 Feb 64.

one resident to "an absentee landlord, mysterious and unseen,"[122] Groves exercised control by means of frequent visits and constant telephone calls.

For M. Eugene Sundt, as for Oppenheimer, the winter of 1942–1943 "had hardly hours enough to get Los Alamos established."[123] While the physicist combed the nation's campuses, seeking recruits for "Oppie's army" and begging or borrowing laboratory gear, the contractor's project manager sped preparations at the site. Arriving at Santa Fe on 1 December, Sundt began a whirlwind buildup, renting space at 215 Water Street, cornering local materials markets, transferring men and equipment from a nearly completed company job at Camp Luna near Las Vegas, staking out a thousand-man construction camp, and sending for his uncle, an architect, to set up a drafting room and start cranking out plans. No sooner had the area engineer, Capt. Hubert L. Shepard, opened shop in the Bishop Building on 9 December than Sundt had him tracking down generators, pumps, boilers, and other scarce items.[124] When Willard C. Kruger & Associates of Santa Fe signed on as architect-engineers in late December, bulldozers were already roaring up and down the mesa scooping out roads and foundations. Among Kruger's early recollections of the job was an encounter with Groves; early one morning, after working until two or three o'clock the night before, Kruger and Oppenheimer found the general waiting for them miffed because they were five minutes late.[125] Groves' impatience was infectious. Referring to the breakneck pace at other war projects, Shepard's assistant, Capt. James A. Loughridge, said, "But this was even faster."[126]

"A terrible job, involving many difficulties," was Groves' capsule summary of Zia project.[127] Nearly all the familiar wartime problems plagued constructors on the Hill—manpower shortages, supply bottlenecks, shipping snarl-ups, and the like; and these Sundt took in stride. But some of his troubles were highly unusual. Access to the site was limited at first. At the headmaster's insistence, Secretary Stimson agreed to let the Ranch School finish out the term. Until classes ended in late January, faculty and students were in the workmen's way. Planning was spasmodic and sometimes slipshod. Change orders to the contract came thick and fast, 70 in 11 months; and scientists with little engineering sense masterminded designs for technical buildings.[128] The worst headache by far was transport. From the railhead at Santa Fe, the haul was 35 miles by one backcountry route and 46 by another. The last eight-mile stretch was a trucker's nightmare, a hazardous climb up a narrow, unpaved, cliffside road, with hairpin turns and grades up to 14 per-

[122] Bernice Brode, "Tales of Los Alamos," *LASL Community News*, June 16, 1960, p. 6.

[123] AEC, *Oppenheimer Hearings*, p. 12.

[124] (1) Ltr, J. K. S. Walter to M. E. Sundt, 15 Mar 69. EHD Files. (2) F. E. Baumer, Los Alamos, 1943 (MS), 1969. EHD Files. (3) Interv with M. Eugene Sundt, 4 Feb 69.

[125] (1) Peggy Pond Church, *The House at Otowi Bridge* (Albuquerque: University of New Mexico Press, 1959), p. 83. (2) M. E. Sundt, Zia Project Notes (MS), 1969. EHD Files.

[126] Interv with Col James A. Loughridge, 28 Jun 68.

[127] Groves Interv, 11 Feb 64.

[128] (1) Ltr, Stimson to A. J. Connell, 1 Dec 42. EHD Files. (2) Ltr, Shepard to M. M. Sundt Constr Co., 1 Jan 43. EHD Files. (3) Contract W-911-eng-1667, 5 Dec 42, and supplements. (4) Groueff, *Manhattan Project*, pp. 197–98.

cent; "not a road but an obstacle course," Sundt pronounced it.[129] Vehicles took a merciless beating. Only "by the Grace of God and an abundance of welding rod, ingenuity, and baling wire," said one company official, was the maintenance problem "ever solved."[130] Through God's Grace and man's improvisation ("They called us 'substitute and laminate,' " Sundt remembered), other problems got solved, too. Spring found the once lovely mesa strangely transformed by drab apartment units, bleak TO barracks, makeshift laboratories, and forbidding chain-link fences. The job was generally ahead of schedule and by mid-May completion seemed assured.

Discord racked the infant community. Hustled to New Mexico ahead of time, several hundred civilians converged on Los Alamos between mid-March and early May. Their first reactions ranged from indignation to despair. Mindful that war demanded sacrifices, Groves had decreed no frills. "These scientists will like anything you build for them," he told Marshall. "Put up some barracks. They will think they are pioneers out here in the Far West."[131] Like it the scientists did not. Paper-thin walls, inadequate wiring, and old-fashioned cookstoves; no sidewalks, no telephones, no gas, no bathtubs except in the group of Ranch School houses christened "Bathtub Row," and, worse, no school. One wife wept when she saw her new home; another bolder woman reportedly challenged Groves to prepare dinner on her "Black Beauty" range; and Oppenheimer hired his own architect, Bernis E. Brazier, to design a school.[132] The technical area became a scene of conflict, as scientists occupied laboratories that were still under construction. Some mornings, craftsmen would arrive for work to find entries barred and Sundt's superintendent would swear "like a sailor" over time lost.[133] Colonel Harman soon clashed with Oppenheimer. With the arrival of 250 troops, Engineers and MP's, and the formation of a most unmilitary town council, the rift widened. On visits to Groves' office Oppenheimer learned to know Lt. Col. Whitney Ashbridge, a Philadelphia patrician, MIT graduate, and Corps Reservist, who had attended the Ranch School. In May, when Oppenheimer suggested that Ashbridge be assigned to Harman's staff, Groves went him one better. On the 31st Ashbridge began a tension-filled, 18-month tour as commanding officer on the Hill.[134]

With the new commander came orders to expand. Added missions—bomb stuff purification and ordnance-ballistics work—and corollary staff increases spurred a topsy-like growth. Housing for a population that would double, redouble, and double again before the end of the year, enlarged water and power supplies, a modern 8-room school, an air conditioned and dustproof chemical-metallurgical laboratory, and a proving ground at Anchor Ranch a few miles to the south were major features of

[129] (1) Ltr, J. S. Sundt to SWD, 1 Feb 45. MED 161. (2) Sundt Interv, 4 Feb 69.

[130] Answers to Questionnaire, William E. Naumann to authors, 3 Mar 69.

[131] Marshall Interv, 29 Apr 68.

[132] (1) Lansing Lamont, *Day of Trinity* (New York: Atheneum, 1965), pp. 49–50. (2) Brode, "Tales of Los Alamos," June 2, 1960, p. 7; and June 30, 1960, pp. 5–7.

[133] Loughridge Interv, 28 Jun 68.

[134] (1) M. E. Sundt, Zia Project Notes. (2) Interv with Col Whitney Ashbridge, 3 Mar 64.

the fast burgeoning program. Fresh vitality infused the job. Col. Reuben E. Cole, newly appointed engineer at Albuquerque, reinforced the area office with long-time district stalwarts, including crack expediter Capt. Frank E. Wilson. Company president John S. Sundt moved with a large retinue to Santa Fe to stay with the job to the end. Lowdermilk Brothers of Denver, under contract to the New Mexico State Highway Department, started improving the tortuous road. A recruitment drive by the Engineer Department and the unions brought craftsmen to the Hill from points as far away as Omaha. A powerful Corps-wide procurement effort worked miracles; soon air shipment of materials was more or less routine, and Zia had more copper than some construction veterans had ever seen before.[135]

The Hill grew more hectic as summer wore on. Several hundred loads a day—freight from the railhead at Santa Fe, brick from the local penitentiary, and aggregate from the Rio Grande—moved in over the now partially torn up road. Truckers fought for every mile, battling dust and detours. Fifty "damn good trucks" wore out and even the MED priority could produce only second-hand replacements. A far more accessible project started in July, at Bruns General Hospital in Santa Fe, siphoned off men from Los Alamos. Indians and farmers of Mexican descent became mainstays of Sundt's 3,000-man labor force. But neither worked full time. Hopis, Navajos, Jemez, and San Ildefonsos each went off in a body for their tribal dances. "No sooner would one group return from the Corn Dance," John Sundt complained, "than it would be time for the Antelope Dance of another group, . . . [or] the Harvest Dance, or Rain Dance, or Snake Dance." Similarly, the farmers took leave to tend their crops.[136] Meanwhile, Brazier's activities gave rise to awkward complications. His design for the school proved costly, and when Groves discovered this "glorious extravagance," the area engineer bore the brunt of his displeasure and got orders to depart. With Oppenheimer's backing, Brazier cut a wider swath. Forming a separate construction division, he assembled a staff of about 250 men. He and his associates issued orders on a day-to-day basis, often disrupting the conduct of the job.[137]

For everyone at Los Alamos, water was a supercritical problem. According to Indian belief, the spirits in the nearby sacred burial grounds had called upon the gods to doom White settlements in the area. In the early years of the Ranch School, the gods played havoc with the water supply. With the coming of the Army in late 1942, they waxed wrathful anew. Little snow fell that winter and no spring runoff filled the reservoir in Los Alamos Canyon. Soon water was low. A hydrologist from the Albuquerque District recommended a pipeline to the creek in Guaje Canyon, some six miles to the north; but Groves, on advice from Ray

[135] (1) Ltr, Ashbridge to Cole, 26 May 43. (2) Ltr, Groves to Cole, 17 Jun 43. Both in Zia Compl Rpt, 1 Dec 43. (3) Ltr, J. S. Sundt to SWD, 1 Feb 45. MED 161. (4) Roundtable Discussion, J. A. Remington with J. R. Brennand, J. A. Loughridge, R. O. Ruble, E. N. Sanchez, and F. E. Wilson, 4 Feb 69.

[136] Ltr, J. S. Sundt to SWD, 1 Feb 45. MED Files 161.

[137] (1) Brode, "Tales of Los Alamos," July 14, 1960, p. 7. (2) Ltr, Ashbridge to Shepard, 10 Jul 43, and related docs in Zia Compl Rpt, 1 Dec 43. (3) M. E. Sundt, Zia Project Notes.

Lawrence of OCE, decided to try a quicker and easier solution—lines to several nearby smaller streams. Perhaps failure was preordained. The summer was the driest in many years and, with the sharp rise in population, Los Alamos became a town that said Grace when the faucets flowed. Algae fouled the reservoir, and Ashbridge had to restrict the use of water. As anxiety mounted within the community, Groves gave orders for a surface line to Guaje to be laid within a month.[138] The country was rugged, some of the roughest and wildest in the United States; and much of the government-furnished pipe was second-hand, "strings of holes held together with rust," old pipeliners described it; but by prodigious efforts Sundt finished up on time. When the valves were opened early in October, portions of the line "looked like the fountains at Versailles."[139] Patched, repatched, and winterized, the Guaje conduit saw the project through to the end of the war—but barely, for water was always short and the supply always precarious.

The contractor had demobilized his forces and the Santa Fe Area was preparing to shut down, when in late 1943 another great expansion engulfed the project. Discovery that gun-type assembly, the most straightforward detonation method, might not work with plutonium prompted a frantic drive to develop an untried technique—implosion. Whereas the gun device would fire one subcritical mass of bomb stuff into another to create an instantly exploding supercritical mass, implosion would involve a sphere-shaped charge designed to burst inward and compress fissionable material to produce a nuclear blast. The new scientific thrust would mean more people and more facilities. With another crash construction program at hand, the question arose how best to organize. Maj. Frank M. Newell, whom Colonel Cole had brought from the Tulsa District to head the area office, wished to import an Oklahoma firm to replace the capable, but outspoken Sundts. Cole, who felt the Tucson outfit had done a splendid job, agreed that new blood might be beneficial; after months of 14- to 16-hour days and 7-day weeks, Sundt's men seemed near exhaustion. Vetoing Newell's suggestion, Cole chose two El Paso companies, J. E. Morgan & Sons to erect 28 prefabricated duplex apartment buildings and Robert E. McKee, one of the largest general contractors in the Southwest, to construct a small explosives plant and a plant for shaping charges at "S" site, one mile south of Anchor Ranch.[140] Kruger stayed on as architect-engineer. Meanwhile, Ashbridge assumed a larger role. Absorbing Brazier's staff, he established a Post Operations Division, to be headed, first, by Maj. Frank W. Salfingers and, later, by Lt. Col. Wilber A. Stevens. Upon completion of current contracts with Morgan and McKee, the area would drop out of the picture and all future construction would come under Ashbridge.

Morgan and McKee performed well under adverse circumstances. The win-

[138] (1) USEO, Albuquerque, N. M., Rpt on Water Supply, Los Alamos Project, 9 Oct 43. 670.1 (Los Alamos, N. M.). (2) Ltr, Groves to Cole, 25 Aug 43. Zia Compl Rpt, 1 Dec 43.

[139] Answers to Questionnaire, William E. Naumann.

[140] (1) Interv with Maj Frank M. Newell, 17 Jan 69. (2) Interv with Col Reuben E. Cole, 28 Jun 68.

ter of 1943–1944 was extremely hard. Temperatures dropped as low as minus 28 degrees, and only the very old men in the San Ildefonso Pueblo could remember "so much snow on the ground for so many weeks."[141] When the contractors started work in mid-January, a 3-foot cover blanketed the site, and during the next 8 weeks snowfall totaled 24 inches. Scrapers toiled overtime heaping snow into piles that did not melt completely until July. "Snowed all the time," Morgan superintendent Herbert N. Sherwood recalled. "Everything was frozen," McKee manager Jack R. Brennand said—earth, water, and, at times, freshly poured concrete.[142] Even so, there were no major delays. Sherwood finished "Morganville" on 15 March, right on schedule, and Brennand beat his 1 April deadline by 15 days. When Ashbridge invited both firms to bid on a new administration building, McKee submitted the lower offer. Thus began a lasting affiliation. Although force account crews handled small, routine jobs, McKee did most of the construction work from this point onward, enlarging the technical area, providing hutments, quonset huts, and trailer camps for the mushrooming population, and building at 25 outlying sites, including the fabled "DP" bomb-assembly area. In the postwar period, Zia Company, a McKee subsidiary, would furnish management and maintenance services and carry out construction for the Los Alamos Scientific Laboratory.[143]

When Oppenheimer first explained his plan for a mesa-top Shangri-La, Met Lab scientist Leo Szilard predicted that everyone who went there would "go crazy."[144] At times in 1944 this prophecy appeared to have been fulfilled. Latecomers to the Hill found a world of barbed wire fences, armed guards, and snarling patrol dogs, where mail was censored and telephones were tapped, a world of spreading slums and pinching privations, where the austere Sundt Apartments were called "Snob Hollow," where fresh milk, vegetables, and meat were occasionally in short supply, and where water and power were rationed. Uniforms were much in evidence. Every third laboratory worker belonged to the Special Engineer Detachment; many of these men, naturally disgruntled, were former Los Alamos civilians, drafted and put back in their old jobs as GI's. Other soldiers were mocked as security "creeps" or custodial "plumbers" by the citizenry at large. Hostilities ran deep and factions flourished. Grievances were many and forcibly expressed. Ashbridge's background placed him at a disadvantage. The Gentleman's Code did not envisage name-callers, mischief-makers, and housewives who flung hamburger on the commander's desk, shrieking "dogmeat." The continual turmoil took a physical toll. Ashbridge developed a heart condition, and at the Amarillo airport, on a trip back from Washington, he collapsed. Played out by the long ordeal at Los Alamos, he left soon for a calmer post in the South Pacific.[145] Fortunately, a replacement

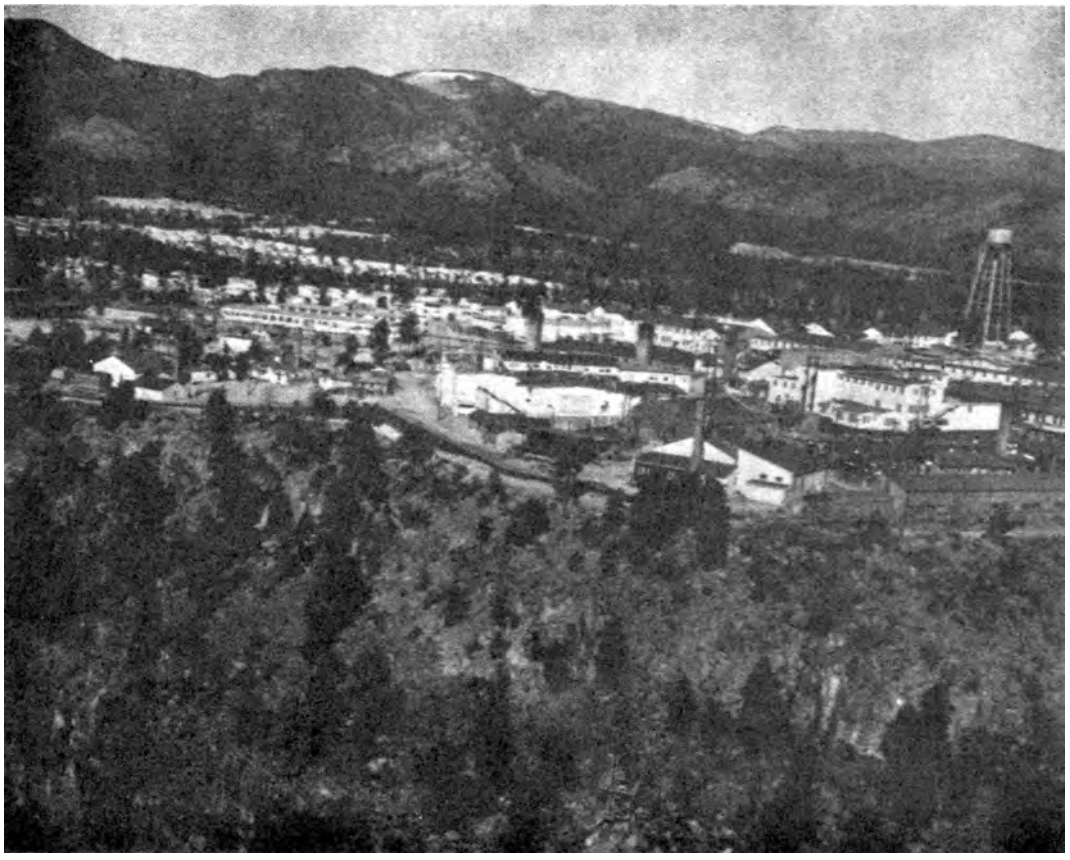
[141] Church, *Otowi Bridge*, p. 126.

[142] (1) Interv with Herbert N. Sherwood, 15 Oct 69. (2) Interv with Jack R. Brennand, 4 Feb 69.

[143] Robert E. McKee, *The Zia Company at Los Alamos: A History* (El Paso: Carl Hertzog, 1950), pp. 1–2.

[144] Nuel P. Davis, *Lawrence and Oppenheimer* (New York: Simon & Schuster, 1968), p. 163.

[145] (1) Ashbridge Interv, 3 Mar 64. (2) Lamont, *Day of Trinity*, p. 63.



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was at hand. Col. Gerald R. Tyler, always steady and reliable, had just come off the Alcan Highway. Groves' instructions to Tyler were revealing:

> The scientists detest the uniform. They'll make your life a hell on earth and will do everything they can to embarrass you. When you start talking to them about property accountability, . . . they'll scream that you are a Fascist and that you are trying to regiment them. Your job will be to run the post. Try to satisfy these temperamental people. Don't allow living conditions, family problems, or anything else to take their minds off their work.[146]

Tyler's regime was relatively peaceful. Perhaps it was his firmness, tempered by forthright exercise of justice and a saving sense of humor, that calmed the ferment. Presented with a list of demands by the town council, the newly appointed commanding officer announced that he would entertain requests, not demands. He added that the first person, man, woman, or child, who threw hamburger onto his desk would "go straight through my screen window."[147] Knowing Groves well and enjoying his confidence, Tyler was

[146] Tyler, Résumé of Instructions, Oct 44.

[147] Lamont, *Day of Trinity*, p. 64.

able to persuade him to spend more money for improvements and ease up a little on constraints.[148] Perhaps, too, good fortune played a part. When Tyler took over in late 1944, the scientific outlook was improving; riddles of bomb design were yielding one by one and emphasis was shifting from research to development and production. With the new year, the tempo changed from presto to prestissimo. Efforts to perfect the gadget became almost ceaseless; and men from the laboratory joined in wide-ranging preparations, helping to ready the special air group that would drop the bomb, to choose targets, and to plan the take-off from Tinian, in the Marianas, 1,500 miles from Tokyo. After Germany capitulated on 7 May, the pace grew "still more frantic," for MED leaders wished to get the job finished "before the war was over and nothing much could be done."[149] Resentments were largely forgotten as excitement mounted to fever pitch and everyone gave his all to crown the project with success.

Increasingly, attention focused on the Jornada del Muerto, the Journey of Death, a desolate desert area in southern New Mexico dreaded by long-ago conquistadors, now a part of the Alamogordo Bombing Range. Recommended to Groves by a committee of scientists and engineers as an acceptable nuclear test site, the Jornada took the code name "Trinity," a word not to be spoken aloud. The uranium gun, a surefire weapon, could be battle tested, but the uncertain implosion device cried out for a prior test; a dud, if combat dropped, would give the show away and might put precious plutonium in enemy hands. In the late fall of 1944, Colonel Tyler sent 100 Engineer troops under Capt. Samuel P. Davalos to establish a base camp for the one-shot experiment. Using CCC building sections furnished by the Albuquerque District, the J. D. Leftwich Construction Company of Lubbock, Texas, quickly provided berths for Davalos' detachment, 100 MP's, and several hundred scientists. Meantime, at the Albuquerque office, a picked group of civilians, isolated in a separate room, rushed plans and layouts for the desert proving ground. A local outfit, Brown Brothers Construction Company, called in by Colonel Cole in mid-December, discovered that nothing to be built was unusual but that pressure for speed was extreme. "Hotter than anything we had ever gotten hold of," firm president Theodore R. Brown described the project.[150] Along with husky Engineer GI's and tenderfoot professors, Brown's 100-man force endured oppressive heat, talcum-fine volcanic ash, Gila monsters, scorpions, and other noxious creatures, and monastic seclusion. Despite hardships, work steadily advanced on roads, bunkers, magazines, a communications hookup, a power system, and a network of control points; on an unloading platform at Pope, New Mexico, for Jumbo, the giant steel vessel designed to contain the atomic explosion but never used; on a 20-foot wooden tower for the 100-ton trial blast of TNT set off on 7 May; and, finally, on a job entrusted to the Eichleay Corporation of Pittsburgh, Pennsylvania —erection of the 100-foot steel tower that

[148] Interv with Col Gerald R. Tyler, 24 Feb 64.
[149] AEC, *Oppenheimer Hearings*, pp. 31–32.
[150] Interv with Theodore R. Brown, 28 Oct 69.

would cradle the bomb. By 15 July all was in readiness.[151]

The predawn detonation on the 16th ushered in the Nuclear Age. The power of the bomb exceeded all expectations. The details were almost beyond belief: the huge fireball, mushrooming to a height of 10,000 feet; the massive cloud of radioactive dust, billowing up into the stratosphere; the brilliant light visible at Santa Fe, 180 miles away; and the "awesome roar which warned of doomsday." Witnesses reacted each in his own way. Oppenheimer, a sensitive man and a student of Eastern religions, recalled a snatch of the *Bhagavad-Gita:* "I am become Death, the destroyer of worlds." Fermi, coolly scientific, noted the "very intense flash of light," the "sensation of heat" on exposed parts of his body—and then, by a simple experiment with bits of paper, correctly measured the force of the blast as 20,000 tons of TNT.[152] Groves' feeling was largely one of profound relief. "I personally thought of Blondin crossing Niagara Falls on his tightrope," he recorded, "only to me this tightrope had lasted for almost three years, and of my repeated, confident-appearing assurances that such a thing was possible and that we would do it."[153] Seen through any eyes, the shot was a stunning success. For the good or ill of mankind, atomic energy was here to stay.

Reflecting on the Allied victory in World War II, General Reybold counted American construction power as a decisive factor. Production of atomic bombs had been "primarily a problem of engineering design and construction of plants." Similarly, camps and cantonments had been key to mobilization; munitions plants, to rearmament; and airfields, to air superiority. The American achievement had amazed the world. The secret of this remarkable performance lay in the rapid conversion of the rivers and harbors organization from peace to war, the consolidation of all military construction under one agency, and the skilled efficiency of the Army-industry building team. Knowledge of this secret offered hope for the future; Reybold saw reliable construction power as "the cornerstone of an enduring America."[154] History seemed likely to confirm his view.

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[151] (1) Ltrs, Groves to Cole, 8 Nov and 1 Dec 44. MED 600.1 (Santa Fe) thru 1944. (2) Tyler Interv, 24 Feb 64. (3) LASL, *Los Alamos: Beginning of an Era, 1943–1945* (LASL Brochure: n.d.), pp. 29–42. (4) Lamont, *Day of Trinity*, pp. 94–95 and 120–23.

[152] LASL, *Los Alamos: Beginning of an Era*, pp. 53–54.

[153] Memo, Groves for Stimson, 18 Jul 45. In Groves, *Now It Can Be Told*, app. VIII, pp. 438–39.

[154] Lt Gen Eugene Reybold, *Engineers in World War II: A Tribute*, pp. 1, 2, 10.

Appendix

Army Construction in the Continental United States
1 July 1940–31 August 1945

(in Billions of Dollars)

Type of Installation	Cost	
Total		$15.3[a]
Industrial		5.0
Aircraft assembly, ordnance, and other plants	3.2	
Installed equipment and machinery	1.8	
Command		7.5
Air	3.2	
Ground	2.8	
Storage and shipping	1.0	
Miscellaneous	0.5	
Manhattan District		2.0
Civil		0.8

[a] This figure excludes approximately $3 billion expended for real estate and maintenance.

Source: (1) ASF, Control Div, Statistics Br, *Statistical Review: World War II*, p. 11. (2) Data compiled by Special Assistant for Plans and Policy, OCE, 1970. (3) *Annual Reports of the Chief of Engineers, U.S. Army*, 1940–45. (4) Gideon, History of Military Real Estate Program, 1939–45. EHD Files. (5) OCE, O Dir Mil Constr, R & U Div, History of Repairs and Utilities, 1939–1945, p. 49.

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Unpublished documentary sources in the National Archives provided the bulk of the information presented in this book. First and basic were the construction records of the Corps of Engineers and the Quartermaster Corps. Comprising letters, memorandums, circulars, reports, minutes, manuals, plans, and other materials, and ranging in subject matter from high-level policy decisions to the minutiae of on-site activity, these records consumed countless hours of research and study. Less voluminous but no less essential to the story were relevant records of other elements of the Army—the War Department General Staff, the Army Air Forces, the Army Service Forces, and The Adjutant General's, Inspector General's, Medical, and Ordnance Departments—and of the Secretary of War, the Under Secretary of War (including two special collections, the Madigan and Ohly files), and the Joint Army and Navy Munitions Board. For nonmilitary aspects of the building program, papers in the Franklin D. Roosevelt Library, the records of the U.S. Congress, and the records of the War Production Board were indispensable. All files except those of the Corps of Engineers bear identifying symbols in the footnotes. *Federal Records of World War II*, Volumes I and II, prepared by the General Services Administration, National Archives and Records Service, the National Archives (Washington: 1950–51), offers a general guide to researchers.

Supplementing official archival records was a welter of unpublished primary material. (1) Convenience files maintained by operating elements of the Office, Chief of Engineers, were helpful in tracing developments. Containing informal memos, working notes, transcripts of telephone conversations, briefings, logs, and diaries, these files often told the inside story. Some of these collections have been destroyed and screenings have made inroads on the rest. Photostats of essential documents are preserved in the Engineer Historical Division. (2) Private papers of participants also shed light on events. Those of Joseph A. Bayer, Harry W. Loving, Victor V. Martin, Maj. Gen. Russell L. Maxwell, Lt. Gen. Samuel D. Sturgis, Jr., Col. Elmer G. Thomas, and Col. Gerald R. Tyler afforded worthwhile insights. Exceptionally valuable was the Diary of Secretary of War Henry L. Stimson for the years 1940–1945. The Martin and Sturgis papers are in EHD; the Maxwell papers, in the U.S. Army Military History Research Collection at the Army War College, Carlisle, Pennsylvania. The Stimson Diary is in the Henry L. Stimson Papers, Yale University Library. (3) Contemporary accounts by participants provided important background information and pertinent detail. Especially valuable were Lt. Col. David B. Gideon, History of Military Real Estate Program, 1939–1945; Gavin Hadden (comp.), Manhattan District History; Gavin Hadden, The Pentagon Project; Col. Walter E. Lorence, Logistics in World War II: Engineer Phase; Harry W. Loving, History of the Fixed Fee Branch; Harry W. Loving, History of the Construction Division, OQMG;

Brig. Gen. Richard C. Marshall, Jr., History of the Construction Division of the Army; and Col. Fred G. Sherrill, Lumber in the War. The Atomic Energy Commission made available the Manhattan District History. Copies of the other manuscripts are in EHD. (4) Records of the Associated General Contractors of America furnished explanations of industry's position on key issues.

Interviews and correspondence with participants were stimulating and productive. Of the several hundred persons who shared their recollections with the authors, the following are due especial mention: Col. Donald E. Antes; Whitney Ashbridge; Samuel S. Baxter; Joseph A. Bayer; George E. Bertram; Col. Mortimer B. Birdseye; Robert C. Blair; Edward J. Block; Everard H. Boeckh; W. Keith Boyd; Leslie E. Brigham; Maj. Gen. James H. Burns; Lt. Gen. Levin H. Campbell, Jr.; Arthur Casagrande; Ralph H. Case; Maj. Gen. Hugh J. Casey; Lt. Gen. Stephen J. Chamberlin; Reuben E. Cole; William P. Cornelius; Winnie W. Cox; Brig. Gen. Wilmot A. Danielson; Lt. Gen. Garrison H. Davidson; General John L. DeWitt; M. Scott Dickson; Ferdinand J. C. Dresser; Brig. Gen. Christian F. Dreyer; Herbert E. Foreman; Mark C. Fox; Maj. Gen. James L. Frink; James F. Grafton; Lt. Gen. Edmund B. Gregory; Lt. Gen. Leslie R. Groves; Frank M. Gunby; Gavin Hadden; Maj. Gen. John R. Hardin; Col. Bartley M. Harloe; Maj. Gen. Charles T. Harris, Jr.; Brig. Gen. Charles D. Hartman; Forrest S. Harvey; Maj. Gen. Kester L. Hastings; Gail A. Hathaway; John P. Hogan; Col. Simon Jacobson; Louis A. Johnson; Col. Homer W. Jones; Wilbur E. Kelley; Lincoln G. Kelly; Col. Elmer E. Kirkpatrick; Oscar I. Koke; Frank E. Lamphere; Maj. Gen. Edmond H. Leavey; Lt. Gen. John C. H. Lee; Marshall O. Leighton, Luther M. Leisenring; Col. George F. Lewis; Harry W. Loving; Michael J. Madigan; General of the Army George C. Marshall; Brig. Gen. James C. Marshall; Brig. Gen. Richard C. Marshall, Jr.; Franklin T. Matthais; Maj. Gen. Russell L. Maxwell; John J. McCloy; Frank M. Mellinger; James T. Mitchell; Maj. Gen. Richard C. Moore; Admiral Ben Moreell; Maj. Gen. Kenneth D. Nichols; Col. Howard B. Nurse; Jean M. O'Leary; Mary B. Pagan; Robert R. Philippe; Malcolm Pirnie; Maj. Gen. Ewart G. Plank; O. James Porter; Thomas B. Pringle; Maj. Gen. Milton A. Reckord; Brig. Gen. Clarence Renshaw; Lt. Gen. Eugene Reybold; Col. Lloyd C. Ritchie; Maj. Gen. Thomas M. Robins; Maj. Gen. Julian L. Schley; Brig. Gen. John W. N. Schulz; Brig. Gen. A. Owen Seaman; Maj. Gen. Lyle E. Seeman; Evan Shelby; Arthur L. Sherman; Col. Fred G. Sherrill; August G. Sperl; Brig. Gen. James H. Stratton; Lt. Gen. Samuel D. Sturgis, Jr.; Lt. Gen. Wilhelm D. Styer; M. Eugene Sundt; Richard H. Tatlow III; Col. Elmer G. Thomas; Harry S. Traynor; Harry S. Truman; Willard J. Turnbull; Morton C. Tuttle; Col. Gerald R. Tyler; Brig. Gen. George P. Tyner; Col. Rigby D. Valliant; Col. Andre L. Violante; Stephen F. Voorhees; Ezra B. Whitman; T. Cortlandt Williams; Col. Milton E. Wilson; Leon Zach; and Harry B. Zackrison. Interview notes and correspondence are preserved in EHD.

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List of Abbreviations

AAF	Army Air Forces
AC	Air Corps; assistant chief
ACofS	Assistant Chief of Staff
Acq	Acquisition
Actg	Acting
Adm	Administrative
Adv	Advisory
A-E	Architect-engineer
AEF	American Expeditionary Force
AEM	Architect-engineer-manager
AFL	American Federation of Labor
AGC	Associated General Contractors of America
AGF	Army Ground Forces
AIA	American Institute of Architects
AIC	Army Industrial College
ANMB	Army and Navy Munitions Board
Appns	Appropriations
AR	Army regulation
ASCE	American Society of Civil Engineers
ASF	Army Service Forces
Asgmt	Assignment
ASN	Assistant Secretary of the Navy
ASW	Assistant Secretary of War
B&G	Buildings and Grounds
B&Q	Barracks and quarters
Bd	Board
Bks	Barracks
BOB	Bureau of the Budget
BOWD	Budget Officer, War Department
Br	Branch
Bull	Bulletin
C	Chief
CA	Corps area
CAA	Civil Aeronautics Authority
Canton	Cantonment
CAQM	Corps area quartermaster
CBI	China-Burma-India
CBR	California Bearing Ratio
CCC	Civilian Conservation Corps
CE	Corps of Engineers
CEW	Clinton Engineer Works
CG	Commanding general

Chm	Chairman
CIO	Congress of Industrial Organizations
Circ	Circular
CofEngrs	Chief of Engineers
CofOrd	Chief of Ordnance
CofS	Chief of Staff
Comd	Command
Comm	Committee
Compl	Completion
Conf	Conference
Constr	Construction
Corresp	Correspondence
Cp	Camp
CPA	Central Procuring Agency, Civilian Production Administration
CPFF	Cost-plus-a-fixed-fee
CQM	Constructing quartermaster
CSC	Civil Service Commission
CSigO	Chief Signal Officer
CWA	Civil Works Administration
DA	Department of the Army
DCofEngrs	Deputy Chief of Engineers
DCofS	Deputy Chief of Staff
Def	Defense
Dep	Deputy
Dev	Development
D/F	Disposition form
Dir	Director
Distr	Distribution
Div	Division
DL	Department of Labor
DO	District office
DPC	Defense Plant Corporation
DS	Disposition sheet
DSM	Development of substitute materials
EHD	Engineer Historical Division
Engrg	Engineering
ENR	*Engineering News-Record*
Equip	Equipment
ExecO	Executive officer
FBM	Feet board measure
FCA	Farm Credit Administration
FF	Fixed-fee
Fin	Finance
Fld	Field
F.R.	*Federal Register*
FWA	Federal Works Agency

G–3	Operations and Training Division, War Department General Staff
G–4	Supply Division, War Department General Staff
GLD	Great Lakes Division
GMP	General Mobilization Plan
GO	General order
Gp	Group
Grnd	Ground
GS	General Staff
HEW	Hanford Engineer Works
HRB	Highway Research Board
ICC	Interstate Commerce Commission
IG	Inspector General
IMP	Industrial Mobilization Plan
Ind	Indorsement; industrial
Ins	Insurance
Insp	Inspection
Interv	Interview
JAG	Judge Advocate General
JAGO	Judge Advocate General's Office
LASL	Los Alamos Scientific Laboratory
Legis	Legislation; legislative
LMVD	Lower Mississippi Valley Division
LR	Labor Relations
MAD	Middle Atlantic Division
M&E	Materials and Equipment
MC	Maritime Commission
MDO	Manhattan District Office
MED	Manhattan Engineer District
Mil	Military
Min	Minutes
MIT	Massachusetts Institute of Technology
Mobl	Mobilization
MRC	Mississippi River Commission
MRD	Missouri River Division
MtD	Mountain Division
Mtg	Meeting
Mun	Munitions
NA	National Army
NAD	North Atlantic Division
Nat	National
ND	Navy Department
NDAC	Advisory Commission to the Council of National Defense
NED	New England Division

NG	National Guard
NPD	North Pacific Division
NPWDA	National Public Works Department Association
O	Office; officer
OASW	Office of the Assistant Secretary of War
OCE	Office, Chief of Engineers
OCMH	Office, Chief of Military History
OCofAC	Office, Chief of the Air Corps
OCofOrd	Office, Chief of Ordnance
OCofS	Office, Chief of Staff
OD	Ordnance depot
ODCofS	Office, Deputy Chief of Staff
OEM	Office for Emergency Management
OIC	Officer in charge
OP	Ordnance plant
OPA	Office of Price Administration
OPM	Office of Production Management
Opns	Operations
OQMG	Office of The Quartermaster General
ORD	Ohio River Division
Ord	Ordnance
Orgn	Organization
OSRD	Office of Scientific Research and Development
OTIG	Office of The Inspector General
OUSW	Office of the Under Secretary of War
OW	Ordnance works
OZCQM	Office of the Zone Constructing Quartermaster
P&E	Procurement and Expediting
PD	Pacific Division
Pers	Personnel
Plng	Planning
PMP	Protective Mobilization Plan
POE	Port of Embarkation
Pr	Proving
PR	Progress report
Proc	Proceedings
Proj	Project
PS&T	Purchase, Storage, and Traffic
PubRelO	Public relations officer
PWA	Public Works Administration
QMC	Quartermaster Corps
RA	Regular Army
Rad	Radiogram
R&H	Rivers and Harbors

R&R	Routing and record
R&U	Repairs and Utilities
Rcd	Record
RDX	Research department explosive (cyclonite)
RE	Real Estate
Reorgn	Reorganization
Reqmts	Requirements
RFC	Reconstruction Finance Corporation
Rpt	Report
SAD	South Atlantic Division
SCQM	Supervising constructing quartermaster
Sec	Section
Secy	Secretary
SGO	Surgeon General's Office
SGS	Secretary of the General Staff
SO	Special orders
SOS	Services of Supply
Sp	Special
SPAB	Supply Priorities and Allocations Board
Sup	Supply
Svc	Service
SvcC	Service command
SW	Secretary of War
SWD	Southwestern Division
TAG	The Adjutant General
TD	Treasury Department
Tel conv	Telephone conversation
Telg	Telegram
TIG	The Inspector General
Tng	Training
TO	Theater of Operations
T/O	Table of organization
Tps	Troops
TQMG	The Quartermaster General
TVA	Tennessee Valley Authority
TWX	Teletype message
UMVD	Upper Mississippi Valley Division
USED	United States Engineer Department
USEO	United States Engineer Office
USES	United States Employment Service
USO	United Service Organizations
USW	Under Secretary of War
WAAC	Women's Army Auxiliary Corps
WCD	War College Division, War Department General Staff
WD	War Department

WDPAB	War Department Price Adjustment Board
WDGS	War Department General Staff
WES	Waterways Experiment Station
WPA	Works Progress Administration
WPB	War Production Board
WPD	War Plans Division, War Department General Staff
ZCQM	Zone constructing quartermaster

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