Logistical Support of the Armies



Volume I
May 1941–September 1944

WORLD WAR II
50th Anniversary
Commemorative Edition

UNITED STATES ARMY IN WORLD WAR II

The European Theater of Operations

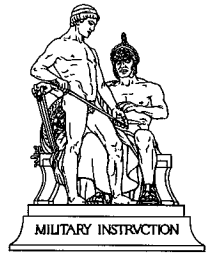
LOGISTICAL SUPPORT OF THE ARMIES

In Two Volumes

Volume I: May 1941–September 1944

by

Roland G. Ruppenthal



CENTER OF MILITARY HISTORY
UNITED STATES ARMY
WASHINGTON, D.C., 1995

Library of Congress Catalog Number: 53–60080

First Printed 1953—CMH Pub 7–2–1

For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop: SSOP, Washington, D.C. 20402

. . . to Those Who Served

Foreword

A tank without gasoline or a vital part might better be a pillbox. A rifleman without ammunition must use his bayonet or club his rifle. A modern army without food will not long survive. This book tells, among other things, how in the European Theater of Operations the tank got its gas (when it did), how the ammunition went forward, and how the food reached the troops.

The necessity of anticipating events so that the needs of men in current-day battle can be promptly and continuously met is evident even to a casual reader. The question whether the modern soldier demands too much on the battlefield is one for all to ponder.

Man tends to regard the problems with which he is faced as unique. To guide those faced with the logistic problems of the future, a number of supply principles have been laid down in regulations. This record of World War II experience tells how the principles were actually applied. Those who take the time and trouble to study it will find their efforts well rewarded.

ORLANDO WARD
Maj. Gen., U. S. A.
Chief of Military History

Washington, D. C.
15 June 1952

Introductory Note

In all the extensive literature of military history there are but few volumes devoted to the study of logistics. Although the rationalization of army supply is fairly old in the history of warfare the written record normally has been confined to the exposition, in field service regulations and manuals, of how supply, evacuation, and troop movement should be organized, rather than the narrative account of what actually happened in the course of wars and campaigns. The term "logistics" is itself of recent coinage. During World War I, it was confined chiefly to French lexicons, and it remained for World War II and for the American armed forces to give the term meaning and wide usage. Even so the definition of "logistics" is subject to wide variations. As used in the present volume the term covers the supply of armies in the field and the movement of troops to the combat zone. Little attention is given the evacuation of the wounded since other Army historians will tell this story.

When plans were made for writing a series of volumes dealing with U.S. Army operations in the European theater during World War II, the importance of the logistical support given the armies in the field literally forced this subject upon those planning the series. It was decided that the story of logistics could not be treated as an appendage within the various volumes dealing with combat operations but would have to be told in the form of a sustained and independent narrative moving from ports and beaches forward to the combat zone. Months of research led to the conclusion that the complexity and scope of logistical history demanded more than a single volume. This volume is the first of two entitled *Logistical Support of the Armies.* It is intended that the history herein recounted stand by itself as the complete story of supply operations in Europe. But the thoughtful reader will find his understanding and appreciation of the role of logistics enhanced by referring also to those volumes in the European series which deal with the high command and combat operations.

The author of *Logistical Support of the Armies*, Dr. Roland G. Ruppenthal, is a graduate of the University of Wisconsin and holds the Ph. D. degree from that institution. During the war he served with the VII Corps and the Third Army as historical officer in four campaigns. Subsequently he was appointed Assistant Theater Historian for the European Theater of Operations and charged with the direction of historical coverage for supply and administration within the theater. Dr. Ruppenthal is the author of a combat history, *Utah Beach to Cherbourg,* in the AMERICAN FORCES IN ACTION series, and is a lieutenant colonel in the United States Army Reserve.

HUGH M. COLE
Chief, European Section

Washington, D. C.
29 May 1952

Preface

World War II provided a convincing demonstration of the decisive role which materiel supremacy can have in modern warfare. But while the importance of logistics is repeatedly asserted, little has been written to indicate the complexity of the administrative machinery needed to bring the required logistic support to bear at the proper place and time, or to show the difficulty of anticipating the requirements of distant battles. This work recounts how U.S. forces were built up in the United Kingdom for the great invasion of 1944, and how they were supplied during operations on the European Continent. The present volume begins with the arrival of the first small group of U.S. Army "Special Observers" in the United Kingdom in the spring of 1941 and carries the story of logistic support on the Continent to the end of the pursuit in northern France in mid-September 1944. A second volume will carry the story forward to the end of hostilities in Europe in May 1945.

The aim throughout has been to relate the problems of logistic support to tactical plans and operations. While the story of procurement, movement, and distribution of supplies and manpower is told largely from the point of view of the theater or SOS-Communications Zone, the agency responsible for the support of U.S. forces, the focus throughout is on the influence which logistic support or lack of it had on the planning and conduct of combat operations by the field armies. The substantial apportionment of space to the discussion of theater command and organization is explained by the direct bearing which that problem had on the administrative structure of the European theater and consequently on the logistic support of U.S. forces.

Except for the period of the U.K. build-up, little attention is given the logistic support of the Army Air Forces, since the story of that support is told elsewhere. Limitations of space have made it necessary to exclude from treatment in this volume certain activities normally falling within the definition of logistics, such as evacuation, hospitalization, and salvage. The importance of transportation, of port and railway construction, and of shortages of major items such as ammunition and combat vehicles, to the story of logistic difficulties has resulted in an unavoidable encroachment on the histories of the technical services. The technical aspects of their operations are left to the histories of those services.

While an attempt has been made to maintain a chronological organization, constantly relating supply to tactical developments, the nature of the subject has made it necessary to combine the chronological with the topical treatment. Some trespassing on strict chronology has therefore resulted, as, for example, in recounting the story of Cherbourg's reconstruction and per-

formance. That story is postponed to the second volume where the port problem as a whole is treated at length. Command and organizational developments of the pursuit period, including the circumstances surrounding the move of the Communications Zone headquarters to Paris, and an analysis of the command decisions of early September 1944 in the light of the logistic situation at that time are likewise postponed to Volume II.

It is a pleasure to acknowledge both the direct assistance and encouragement provided by many persons in the preparation of this volume. It was mainly through Col. S. L. A. Marshall, theater historian in 1945, that the author was first initiated into the study of logistics and transferred from the field to theater headquarters at the end of hostilities in Europe to organize the research and writing of preliminary monographs on the administrative and logistical history of the theater. Since then Colonel Marshall has continued to provide friendly and expert counsel and to give generously of his time in constructive criticism of the manuscript.

The author's labors have been substantially lightened by the use of several preliminary studies prepared by members of the Historical Section, ETO, at the conclusion of the war in Europe. Three of them had particularly valuable application to this volume and merit special mention: George H. Elliott's history of the ETOUSA predecessor commands, SPOBS and USAFBI, covering the activities of the U.S. Army in the United Kingdom in the year before the formal activation of the theater; Clifford L. Jones's two-volume manuscript on the training of U.S. forces in the logistics of amphibious operations and on the activities of the engineer special brigades at the beaches; and Robert W. Coakley's two-volume study of theater command and organization. These three outstanding products of research carried out under difficult circumstances were an invaluable and irreplaceable source in the preparation of this volume.

It is a pleasure to acknowledge the research assistance of Dr. Mae Link, who aided in the preparation of three chapters on the U.K. build-up, and of Mr. Royce L. Thompson, whose effective sleuthing for elusive records both at St. Louis and Washington and researching on a variety of questions saved the author much time-consuming labor.

Special thanks are due those individuals who co-operated so generously and cordially in the final production of the volume: Mr. Joseph R. Friedman, Chief of the Editorial Branch, made an immeasurable contribution, saving the author many writing faults through his unfailing tact and expert editorial judgment. Mr. Wsevolod Aglaimoff, Chief of the Cartographic Branch, and his assistants have solved a knotty mapping problem with their customary imagination and skill. Capt. Kenneth E. Hunter, Chief of the Photographic Branch, selected and edited the photographs which have added substantially to the appearance and value of the volume. Miss Gay Morenus ably carried out the laborious task of copy editing, and the index is the product of many hours of work by Mrs. Pauline Dodd.

The author must acknowledge, in addition, the consistently cheerful assistance given by Mr. Israel Wice and his staff of the General Reference

Branch of the Office, Chief of Military History; by the records personnel of the Departmental Records Branch in Washington and of the Records Administration Center in St. Louis, both of the Office of the Adjutant General; and by the historians of the technical services. Footnotes attest in part to the contributions of key staff officers and commanders who generously provided personal knowledge of the events of the period. Generals John C. H. Lee, Raymond G. Moses, Robert W. Crawford, and Ewart G. Plank read the entire manuscript in draft form.

This volume was prepared under the general direction of Dr. Hugh M. Cole, Chief of the ETO Section, Office of the Chief of Military History, with whom the author was privileged to serve in the European theater, and who has been his constant mentor and most unfailing source of encouragement in a new field of study.

ROLAND G. RUPPENTHAL

Washington, D. C.
4 June 1952

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Principal Commanders and Staff Officers

Associated With the Logistic Support of U.S. Forces in the European Theater *

ADCOCK, Brig. Gen. (subsequently Maj. Gen.) Clarence L.—Born in Waltham, Mass., 1895. Graduated from the U.S. Military Academy and appointed 2d lieutenant in the Corps of Engineers in 1918. Held the usual engineer assignments in the first years, including duty in Hawaii, as an assistant PMS&T ** at Massachusetts Institute of Technology, with the engineer office of the First Corps Area, and later as Executive Officer of the Office of the Chief of Engineers in Washington. Graduated from the Command and General Staff School in 1935; from the Army War College in 1939. Went to England as G–4 of the II Corps in 1942, participating in the North African invasion, and successively held the same position on the staff of the Fifth Army, AFHQ, and then 6th Army Group. After the war became G–5 of U.S. Forces in Europe and subequently held various posts in the Military Government of Germany. Retired in 1947, but was recalled for temporary duty with the European Command in 1948, returning to retired status in 1949.

CHANEY, Maj. Gen. James E.—Born in Chaney, Md., 1885. Entered U.S. Military Academy after attending Baltimore City College for three years, graduating and accepting appointment as 2d lieutenant of Infantry in 1908. After various infantry assignments, including a tour in the Philippines, was detailed to the Air Service in 1917, serving with the AEF in France and Germany. Graduated from Command and General Staff School in 1926 and from Army War College in 1931. Served between the wars as Assistant Military Attaché for Aviation at Rome, technical adviser on aviation at Geneva Disarmament Conference in 1932, Assistant Chief of Staff of Air Corps in 1935, and head of Air Defense Command at Mitchel Field, N. Y. Went to England in 1940 to observe the Battle of Britain, and the following year returned there as head of the Special Observer Group, forerunner of the later theater headquarters. Commanded U.S. forces in Britain in the first half of 1942, returning to the United States in June and becoming Commanding General, First Air Force.

* The list is restricted to general officers and includes several who held prominent staff and command positions in supply in the 6th Army Group and SOLOC, and whose main role in the logistic support of U.S. forces falls in the period covered by the second volume.

** Professor of Military Science and Tactics.

Later held commands in the Pacific and served in the Office of the Secretary of War. Retired in July 1947.

COLLINS, Brig. Gen. Leroy P.—Born in Troy, N. Y., 1883. Entered military service as enlisted man in 1904, serving with 15th Cavalry until 1907, when appointed 2d lieutenant in Field Artillery. Graduated from Command and General Staff School in 1924, from Army War College in 1929, and from Naval War College in 1930. Served tours of duty in the Philippines, the Panama Canal Zone, and the Office of the Chief of Field Artillery in Washington. Was PMS&T at Leland Stanford University, Assistant Commandant of the Field Artillery School at Fort Sill, member of War Plans Division of the General Staff, and commander of various field artillery brigades. Went to the European Theater in 1942 and commanded the Northern Ireland Base Section, the Western Base Section in England, and later the Loire Section on the Continent. Retired in 1945.

CRAWFORD, Maj. Gen. Robert W.—Born in Warsaw, N. Y., 1891. Graduated from U.S. Military Academy and commissioned in Corps of Engineers in 1914. Graduated with degree in Electrical Engineering from Cornell University in 1921, from Command and General Staff School in 1929, and from Army War College in 1936. Served with Corps of Engineers and Chemical Warfare Service in France in 1917–18. Held various engineer assignments in the United States and Hawaii, and served with the Public Works Administration and the Works Progress Administration in the 1930's. Between 1939 and 1942 saw duty with the War Department General Staff and with the Armored Force at Fort Knox. In December 1942 became Commanding General of the U.S. Army Services of Supply in the Middle East. Went to England in 1943 and served briefly as Chief of Operations, Chief of Staff, and Deputy Commanding General, SOS, and as theater G–4. Became G–4 of Supreme Headquarters, Allied Expeditionary Force, early in 1944, remaining in that position until the end of hostilities. In September 1945 was named Division Engineer of the Lower Mississippi Valley Engineer Division, with headquarters at Vicksburg, and in 1946 became President of the Mississippi River Commission. Retired in 1948.

GILLAND, Brig. Gen. Morris W.—Born in Brooklyn, N. Y., 1898. Graduated from U.S. Military Academy and appointed 2d lieutenant in Corps of Engineers in 1918. Early assignments included duty at Engineer School at Camp Humphreys, and service as PMS&T at the Virginia Military Institute. Almost all later assignments in field of engineering, including duty in Panama Canal Zone and in various engineer districts in United States. In 1942, after serving briefly as engineer of Southern Base Section in England, went to North Africa and there became engineer of Mediterranean Base Section, then Chief of Staff, Headquarters, SOS. After the southern France invasion, became Chief of Staff, Southern Line of Communications, and, upon that command's dis-

solution in February 1945, G–4 of Headquarters, Communications Zone, ETO. In November 1945 became Chief of Staff of Second Service Command at Governor's Island, N. Y., and in 1946 was assigned to duty at Fort Belvoir. Retired in September 1948.

GROWER, Brig. Gen. Roy W.—Born in Richmond, N. Y., 1890. Graduated with engineering degree from University of Syracuse in 1913. Commissioned as 1st lieutenant in ORC in 1917 and as 1st lieutenant in Corps of Engineers, RA, in 1920. Served with the engineers in France in World War I and then in various assignments, including PMS&T at the University of Cincinnati, Assistant PMS&T at the Alabama Polytechnic Institute, duty in the Panama Canal Zone, with the Works Progress Administration, and in the Upper Missouri Valley Engineer District. Went to the European Theater in 1943, serving successively with the 351st Engineer General Service Regiment, as a Base Section Engineer, Deputy Base Section Commander, and Commanding General, Eastern Base Section, in England. After invasion of France, became Commanding General of Brittany Base Section and later commander of Burgundy District of the Continental Advance Section. Retired in 1946.

HAWLEY, Maj. Gen. Paul R.—Born in West College Corner, Ind., 1891. Graduated with B. A. degree from Indiana University in 1912, and with M. D. from University of Cincinnati in 1914. Commissioned 1st lieutenant in the medical Reserve in 1916 and appointed 1st lieutenant in the Medical Corps, RA, in 1917. Graduated from Army Medical School in 1921, Command and General Staff School in 1937, and Army War College in 1939. Served with AEF in France in 1918–19, in the Philippines in 1924–27, and as Chief Surgeon of U.S. Army troops in Nicaragua. Became Executive Officer of Army Medical Center in Washington, D. C., in 1931. Went to England as Chief Surgeon of the Special Observer Group in 1941, and remained as Chief Surgeon of the European Theater throughout the period of hostilities. In 1945 became adviser to the Chief of the Veterans Administration, Gen. Omar N. Bradley, on medical affairs. Retired in June 1946, thereafter serving as Director of the American College of Surgeons.

HOGE, Brig. Gen. (subsequently Lt. Gen.) William M.—Born in Boonville, Mo., 1894. Graduated from U.S. Military Academy and appointed 2d lieutenant in Corps of Engineers in 1916. Received degree in Civil Engineering from Massachusetts Institute of Technology in 1922, and graduated from Command and General Staff School in 1928. Served with AEF in France in 1918 and in a variety of peacetime assignments, including duty as instructor at Virginia Military Institute, at Engineer School at Fort Humphreys, and at Infantry School at Fort Benning. Organized the Corps of Engineers of the Philippine Army, becoming its first Chief of Engineers. Was District Engineer at Memphis and Omaha. In 1942 commanded engineer units in construction of the Alaskan Highway, then successively commanded 4th and 5th Engineer

Special Brigades. In 1944 was selected to command Provisional Engineer Special Brigade Group, consisting of 5th and 6th ESB's which supported V Corps in the landings at OMAHA Beach in Normandy. Subsequently became commander of 16th Major Port, which first operated the Brittany ports and then Le Havre. Later in 1944 took command of Combat Command B of 9th Armored Division, which captured the Rhine bridge at Remagen, and then was given 4th Armored Division, which he commanded in the final drive into central Germany. After the war commanded the Engineer School, U.S. troops in Trieste, and in 1951 the IX Corps in Korea.

JACOBS, Brig. Gen. Fenton S.—Born in Gordonsville, Va., 1892. Enlisted in the 1st (Virginia) Cavalry, National Guard, in 1916, and was appointed 2d lieutenant of Cavalry in the Officers Reserve Corps in 1917. Accepted RA commission later the same year. Served with AEF in France in 1917–18, and on occupation duty. Was Assistant PMS&T at the University of Arizona. After graduation from Command and General Staff School in 1936, instructed at the Cavalry School. In 1942 became Chief of Staff, 91st Division, and in the following year went to England and served as Deputy Commander and Chief of Staff of Western Base Section, then as Commanding General of Western Base. Commanded the Channel Base Section on the Continent. After the war in Europe served briefly as a base commander in the western Pacific, then as Commanding General of the Seattle Port of Embarkation.

LARKIN, Maj. Gen. (subsequently Lt. Gen.) Thomas B.—Born in Louisburg, Wis., 1890. Graduated in 1910 from Gonzaga University, Washington, with B. A. degree, and from U.S. Military Academy with appointment as 2d lieutenant in Corps of Engineers in 1915. Served with 2d Engineers in Mexico in 1916, and with AEF in France in 1917–19. Between wars assignments included duty in Office, Chief of Engineers, Washington, D. C., in Panama Canal Zone, as Assistant Military Attaché in Tokyo, as Assistant to District Engineer at Pittsburgh, and later as District Engineer at Vicksburg and at Fort Peck District in Montana. Graduated from Army Industrial College in 1927, Command and General Staff School in 1929, and Army War College in 1938. In 1942 went to England with General Lee, becoming the first Chief of Staff of the SOS, ETO. In November accompanied the TORCH force to North Africa, becoming successively Commanding General of the Mediterranean Base Section, of the SOS, North African Theater of Operations, and then of the Communications Zone, North African Theater. In 1944 went to southern France to command the Southern Line of Communications, and with that command's dissolution in February 1945 became Deputy Commander for Operations of the Communications Zone, ETO, and finally also Chief of Staff. Returned to United States later that year to take command of Second Service Command. In 1946 became Quartermaster General, and in 1949 Director of Logistics (subsequently redesignated G–4), Department of the Army General Staff.

LEE, Lt. Gen. John C. H.—Born in Junction City, Kans., 1887. Graduated from U.S. Military Academy in 1909, from Army General Staff College at Langres, France, in 1918, from Army War College in 1932 and from Army Industrial College in 1933. For other biographical data see Chapter I, Section 5. After dissolution of the Communications Zone in 1945, became Commanding General of the successor command, Theater Service Forces, European Theater. In January 1946 became Commanding General of the Mediterranean Theater and Deputy Supreme Allied Commander, Allied Forces, Mediterranean. Retired in December 1947.

LITTLEJOHN, Maj. Gen. Robert M.—Born in Jonesville, S. C., 1890. Graduated from U.S. Military Academy and appointed 2d lieutenant of Cavalry in 1912. Graduated from Command and General Staff School in 1926 and from Army War College in 1930. First assigned to 8th Cavalry in the Philippines. Served with machine gun battalion in AEF in France, 1918. In 1919 in France began to see increasing duty with the Quartermaster Corps, serving with the Subsistence School, completing a second tour in the Philippines, and carrying out an assignment with the Office of the Quartermaster General in Washington. Went to England in 1942 and served as Chief Quartermaster of the European Theater for remainder of the war, also acting as Chief of Staff of the SOS for a brief period. Retired in 1946.

LORD, Maj. Gen. Royal B.—Born in Worcester, Mass., 1899. Graduated from U.S. Military Academy and appointed 2d lieutenant in Corps of Engineers in 1923. Graduated from Engineer School in 1924 and from University of California with B. S. degree in Civil Engineering in 1927. Served in the Philippines and Hawaii, instructed at the Military Academy, and, like many Army engineer officers, saw duty with various agencies specially created by the government in the 1930's, including the Passamaquoddy Project in Maine, the Resettlement Administration, and the latter's successor, the Farm Security Administration. In 1941–42 served as Acting Director of the War Department Bureau of Public Relations and Assistant Director of the Board of Economic Warfare. Ordered to England in July 1942, serving first in the Office of the Chief Engineer. Subsequently became Deputy Chief of Staff, SOS, then Chief of Staff of the SOS and the Communications Zone and, at the same time, Deputy Chief of Staff, ETOUSA. In April 1945 became Commanding General of the Assembly Area Command, which directed redeployment of U.S. forces from the European Theater. Retired in 1946 and entered business in New York.

MOORE, Maj. Gen. Cecil R.—Born at Grottoes, Va., 1894. Graduated from Virginia Polytechnic Institute with B. S. degree in Electrical Engineering and was commissioned 2d lieutenant in Coast Artillery Corps, RA, in 1917. Graduated from the Engineer School at Fort Humphreys in 1924, from Command and General Staff School in 1933, and from Army War College in

1938. Saw service in France, England, and Germany in 1918–22 and held various engineering assignments in the United States thereafter. Went to the Office of the Chief of Engineers in Washington in 1930 and later became District Engineer at Portland, Oreg. Appointed Chief Engineer of the European Theater in 1942, serving as such until 1946, when he retired.

MOSES, Brig. Gen. Raymond G.—Born in Buffalo, N. Y., 1891. Graduated from U.S. Military Academy and was appointed 2d lieutenant in Corps of Engineers in 1916. Served in Panama Canal Zone before going to France in 1918. After World War I, attended Massachusetts Institute of Technology, graduating with a degree in Civil Engineering in 1921. Graduated from Command and General Staff School in 1931, and from Army Industrial College in 1933. Held normal engineering assignments, including duty in Mississippi and Ohio Valley engineer districts. Served with American Battle Monuments Commission in France and instructed at U.S. Military Academy. In 1941 went to the Office of the Chief of Engineers in Washington, and then to the War Department General Staff as G–4. In 1943 went to the European Theater and became G–4 of 1st (later 12th) Army Group, heading the U.S. Administrative Staff attached to General Montgomery's headquarters to plan the logistic support of the Normandy invasion. Served after war as Division Engineer, New England Division. Retired in 1949.

MULLER, Brig Gen. (subsequently Maj. Gen.) Walter J.—Born at Fort D. A. Russel (now Fort Warren), Wyo., 1895. Graduated from U.S. Military Academy and appointed 2d lieutenant of Infantry in 1918. Postwar infantry duty in France and Germany, continuing in various infantry assignments after return to the United States in 1923. Assistant PMS&T at the University of Florida in 1931; graduate of the Command and General Staff School in 1938. Served increasingly in the field of supply with assignment to Fort Knox as Assistant G–4 for Armored Force, then G–4 of I Armored Corps. Served as G–4 of Desert Training Center at Camp Young, Calif., and returned to I Armored Corps as G–4 for planning and execution of North African invasion. Became G–4 of Seventh Army in 1943 Sicilian invasion. Continued to serve General Patton as G–4 of Third Army throughout campaigns of 1944–45. After war served successively as Military Governor of Bavaria, as G–4 and Chief of Logistics Section, Army Field Forces. In 1951 became Deputy Chief of Staff for Logistics and Administration, and Senior Officer U.S. Element, Allied Land Forces Central Europe.

PLANK, Maj. Gen. Ewart G.—Born in Garden City, Nev., 1897. Graduated from U.S. Military Academy in 1920, from Rensselaer Polytechnic Institute in 1922, and Command and General Staff School in 1940. Major peacetime assignment with Engineer office at Fort Peck, Mont. Appointed commander of the Eastern Base Section in England in 1942, and served as Commanding General of the Advance Section throughout the period of operations on the

Continent in 1944–45. After V–E Day took command of Philippine Base Section, and in 1946 became Commanding General of New York Port of Embarkation. Retired in 1949.

RATAY, Brig. Gen. John P.—Born in Posen, Poland, 1893. Enlisted in the Regular Army in 1914, serving in Coast Artillery Corps, and commissioned a 2d lieutenant in Field Artillery in 1917. Saw duty as an artillery officer with 2d Division in France, 1918–21. From 1924 to 1928 served as language officer and Assistant Military Attaché in Peking, China, and prepared textbooks on the study of Chinese. Graduated from Command and General Staff School in 1934. Collected historical material in Berlin for the Historical Section, Army War College, 1934–38, and in 1939–42 served as Military Attaché in Bucharest, Romania. Accompanied the Western Task Force as Deputy G–2 in the North African landings, November 1942, and thereafter became successively commander of Atlantic Base Section in Morocco, the 20th Port Training Command in North Africa, the Northern Base Section in Corsica, and Delta Base Section, Southern Line of Communications, in southern France. Retired in August 1946.

RICKARD, Brig. Gen. (subsequently Maj. Gen.) Roy V.—Born in Osseo, Wis., 1891. Appointed 2d lieutenant of Infantry in the ORC in 1917, and commissioned a 1st lieutenant, RA, in 1920. After early duty in various provost assignments, served increasingly with infantry units, including duty in the Panama Canal Zone and the Philippines, at the Infantry School, and as Assistant PMS&T at the University of Iowa. Gradually shifted to the field of supply, beginning with his assignment to the G–4 Section of Ninth Corps Area at the Presidio of San Francisco in 1940. In 1943 participated in the Kiska operation in the Aleutians as a landing force commander. In the fall of the same year became G–4 of the Fourth Army, and in the following year G–4 of the Ninth Army, serving in the latter position until the end of hostilities. After a brief tour of duty in the United States he returned to Europe, serving successively as Assistant Inspector General, Provost Marshal, and Chief of Special Services of the European Command. Retired in 1951.

ROGERS, Brig. Gen. Pleas B.—Born in Alice, Tex., 1895. Entered military service as enlisted man with 2d Infantry, Texas National Guard, on border duty in 1916–17, and was appointed 2d lieutenant in Infantry, Texas National Guard, in 1917. Served with AEF in France in 1918–19, and accepted RA commission as 1st lieutenant of Infantry in 1920. Graduated from Command and General Staff School in 1935, and from Army War College in 1937. Infantry duty included service with Philippine Scouts. Commanded London Base Command (changed to Central Base Section) from 1942 to 1944, when named to a like assignment as Commanding General, Seine Section (Paris area), serving in that capacity through end of the war. Senior Instructor, ORC, in state of New York until retirement in 1948.

Ross, Maj. Gen. Frank S.—Born at Aspen, Colo., 1893. Entered military service as enlisted man via Texas National Guard in 1916, serving initially on border patrol duty. Received Reserve commission in 1917, and, after short tour of duty in France in 1918, returned to United States and accepted RA commission in 1920. Had the usual peacetime itinerary: Infantry School, service in Philippines, PMS&T at North Dakota Agricultural College, duty with Civilian Conservation Corps. Graduated from Command and General Staff School in 1931, and from Army War College in 1936. Between 1938 and 1942 served in G–4 Section of War Department General Staff. Essentially a combat officer, and as late as March 1942 was assigned to command medium tank regiment in armored division. Shortly thereafter was selected as Chief of Transportation of European Theater. Held this post until end of the war except for brief tour in same capacity in North African Theater. Had absorbing interest in marksmanship during his years in the Infantry, holding the Distinguished Marksman Medal, the highest Army award as a rifle shot. High-strung, and full of restless, driving energy, Ross, like Hawley and Moore, was regarded as one of the ablest of the technical service chiefs. Scornful of formality, and a man for whom only the essentials mattered, he presented a personality contrasting sharply with that of his superior, General Lee. Retired in 1946.

ROWAN, Brig. Gen. Hugh W.—Born in Newport, R. I., 1894. Graduated from Yale University in 1915 (B. S.) and from Harvard in 1917 (M. A.) Commissioned as 2d lieutenant in Coast Artillery Corps, RA, in 1917. Saw action with 89th Division in France in 1918 as Chemical Warfare officer. Resigned commission in 1919, and was recommissioned in Chemical Warfare Service in 1920. Graduated from Army Industrial College in 1925. Held various assignments in Chemical Warfare Service, including teaching at Chemical Warfare School and Army Industrial College. Assistant Military Attaché in Berlin for four years. Served in Office of the Chief of Chemical Warfare from 1938 to 1942; then became Chemical Warfare Officer of European Theater, holding that position through the war. In 1945 named President of Chemical Corps Board at Edgewood Arsenal, and in 1951 assigned to Chemical Training Center at Fort McClellan, Ala.

RUMBOUGH, Maj. Gen. William S.—Born in Lynchburg, Va., 1892. Entered Army as enlisted man in National Guard, serving with 5th (Maryland) Infantry in 1916–17. Continued in various infantry assignments, including duty in France and Germany, until 1920, when transferred to Signal Corps. Graduated from Signal School in 1924, from George Washington University in 1927, from Command and General Staff Schol in 1931, and from Army War College in 1934. Was PMS&T at University of Illinois in 1920, and held various Signal Corps assignments thereafter, including duty in Hawaii. Became Chief Signal Officer of the European Theater in 1942, continuing through end of the war. Retired in 1946.

SAYLER, Maj. Gen. Henry B.—Born in Huntington, Ind., 1893. Graduated from U.S. Military Academy and appointed 2d lieutenant in Coast Artillery Corps in 1915. Served with artillery units in France in 1917–18. Attended Ordnance School, Watertown Arsenal (Mass.), in 1922, and Command and General Staff School in 1933. Held assignments as Ordnance Officer of 7th Division at Camp Meade, Md., Post Ordnance Officer at Fort Riley, Kans., and Ordnance Officer of the Fourth Corps Area at Atlanta, Ga. Became Chief Ordnance Officer, European Theater in 1942, continuing in that post, like the other technical service chiefs in the ETO, until end of hostilities. Principal postwar assignment as Chief of the Research and Development Division, Office of the Chief of Ordnance. Retired in 1949.

STRATTON, Brig. Gen. James H.—Born in Stonington, Conn., 1898. Entered Army as enlisted man via New Jersey National Guard in 1917. Graduated from U.S. Military Academy and appointed 2d lieutenant in Field Artillery in 1920. Immediately transferred to Corps of Engineers, graduating from Engineer School in 1921, and from the Rensselaer Polytechnic Institute at Troy, N. Y., with degree in Civil Engineering in 1923. Served in various engineering assignments, including duty in Panama Canal Zone and in Construction Division of Office of the Chief of Engineers in Washington. In 1943 became Chief of Operations of the SOS, ETO, and then theater G–4. Returned to Office of the Chief of Engineers in Washington early in 1945, subsequently serving as Chief, Special Engineering Division, in Panama Canal Zone and then as Division Engineer, New England Division. Retired in 1949.

THRASHER, Brig. Gen. Charles O.—Born in Paxton, Ill., 1886. Received temporary commission as 2d lieutenant in 1917, serving with Quartermaster Corps in France in 1918. Recommissioned as 1st lieutenant in Quartermaster Corps, RA, in 1920. Graduated from QM School in 1929, and from Army Industrial College in 1930. Assignments included duty in Hawaii and command of Seattle Port of Embarkation and QM Depot. In 1942 became Commanding General of the newly created Southern Base Section in England which served as main staging area for invasion of Normandy. In 1944 took command of Oise Intermediate Section of Communications Zone in France. Retired in 1946.

VAUGHAN, Maj. Gen. Harry B.—Born in Norfolk, Va., 1888. Graduated from Virginia Polytechnic Institute with degree in Civil Engineering in 1912. Commissioned 1st lieutenant in Engineer Reserve in 1917, and then served with AEF in France and on occupation duty in Germany. Graduated from Engineer School in 1923, and from Command and General Staff School in 1930. Assignments included tours of duty in Hawaii, as PMS&T at the University of Illinois, in the Office of the Chief of Engineers in Washington, and as District Engineer at Philadelphia. Went to European Theater in 1943, holding various assignments there, including that of Deputy Commander for

Forward Echelon, Communications Zone, and then Commanding General of United Kingdom Base Section. After end of hostilities became Commanding General of Bremen Port Command. Retired in 1946.

WHARTON, Brig. Gen. James E.—Born in Elk, N. Mex., 1894. Commissioned 2d lieutenant in ORC in 1917 and appointed 2d lieutenant in Regular Army the same year. Graduated from Command and General Staff School in 1933, from Army War College in 1937, and from Army Industrial College in 1940. Held usual assignments with infantry units, including tour of duty in the Philippines, instructed at Command and General Staff School, and became Assistant Division Commander of 80th Division in 1942. In 1943 went to England and was later given command of 1st Engineer Special Brigade, which supported landings of VII Corps at UTAH Beach in Normandy. Killed in action within a few hours of taking command of the 28th Infantry Division in August 1944.

WILSON, Maj. Gen. Arthur R.—Born in Cherokee, Calif., 1894. Entered Army as enlisted man in 1916, first serving on border duty with 2d Infantry, California National Guard, and was commissioned 2d lieutenant in Field Artillery the following year. Duty between the wars included various assignments with artillery units, as PMS&T at Colorado Agricultural College and the University of Missouri, service in the Philippines, and with the Works Progress Administration and the Federal Works Agency. Graduated from Command and General Staff School in 1934, and from Army War College and Chemical Warfare School in 1935. Went to North Africa as head of service forces supporting the Western Task Force late in 1942, subsequently becoming Commanding General of Atlantic Base Section and Mediterranean Base Section in North African Theater. After the landings in southern France, commanded Continental Base Section and its successor, the Continental Advance Section, retaining that command until end of war. Retired in May 1946.

WILSON, Brig. Gen. Robert W.—Born in Harrisburg, Pa., 1893. Commissioned 2d lieutenant of Field Artillery in ORC in 1917 after graduation from Yale University, and accepted RA commission the same year. Resigned the latter after World War I and reverted to status of Reserve officer. Recalled to extended active duty in 1941, graduating from Command and General Staff School the same year and going to European Theater in July 1942 to serve as G–4 of II Corps in North Africa and Sicily. Returned to England with General Bradley in September 1943 to become G–4 of the First Army. Held this position through remainder of the war. Served frequent short tours of active duty in the years after the war.

THE UNITED KINGDOM BUILD-UP

CHAPTER I

Origins of the European Theater of Operations 1941–June 1942

(1) The United States "Observes" the War in Europe

The spectacle of hard-fought air and ground battles often obscures the vast and prolonged preparations which must precede them. When Anglo-American forces launched the great cross-Channel invasion in June 1944 they did so from an island base which probably had witnessed more intense and sustained military preparations than had any area of equal size in history. For the American forces participating in this operation these preparations had been going on for a full three years.

The European Theater of Operations, United States Army (ETOUSA), came into being on 8 June 1942, just two years before the D Day of the Normandy invasion. But this marked only the formal beginning of the organization which directed the build-up of U.S. troops and supplies in the British Isles. American soldiers had already been in the United Kingdom for some time, and earlier organizations had furnished the roots from which the tree of ETOUSA was to grow.

After the outbreak of hostilities in September 1939 the United States maintained an increasingly watchful attitude toward events in Europe, and in 1940 sent more and more military observers to its embassies abroad. Among them was Maj. Gen. James E. Chaney, an Air Corps officer, who was sent to England in October to observe the air battles which were then raging in British skies. By this time the Nazis had overrun Denmark, Norway, the Netherlands, Belgium, and France in quick succession, and Britain stood alone to resist the German aggressor. In December 1940 General Chaney submitted his report to the War Department, making several recommendations on the adoption of British aerial equipment and methods of defense, concluding that the Luftwaffe had been overrated, and predicting that Britain would not be defeated.

Early in 1941 the United States took two steps which more positively aligned her with Great Britain in the struggle against the Continental enemies, and thus added a ray of hope to an otherwise dismal outlook. On 11 March the 77th Congress enacted the Lend-Lease Act, initially allotting a fund of $7,000,000,000 to provide war materials for the democracies of the world. While this measure was being

debated, military leaders of the United States and Britain met in Washington in the first of several conferences which were to have tremendous import for the future conduct of the war. On 29 January 1941 representatives of the U.S. Army Chief of Staff and Chief of Naval Operations and representatives of the British Chiefs of Staff initiated a series of meetings known as ABC–1 (for American-British Staff Conversations) to establish principles of joint operations and determine the best method of acting jointly against the Axis Powers in the eventuality of U.S. entry into the war. The whole matter of American-British collaboration at this time was a delicate one. The United States, maintaining a technical neutrality, was discussing war plans with Great Britain, a belligerent. For this reason President Franklin D. Roosevelt gave no official sanction to the meetings and avoided all formal commitments for the time being. The conversations were undertaken by military leaders, the chief instigator being Admiral Harold R. Stark, then U.S. Chief of Naval Operations, who believed that safety and prudence, as well as common sense, dictated that the United States have some sort of initial plan ready in the event it suddenly was plunged into war.[1]

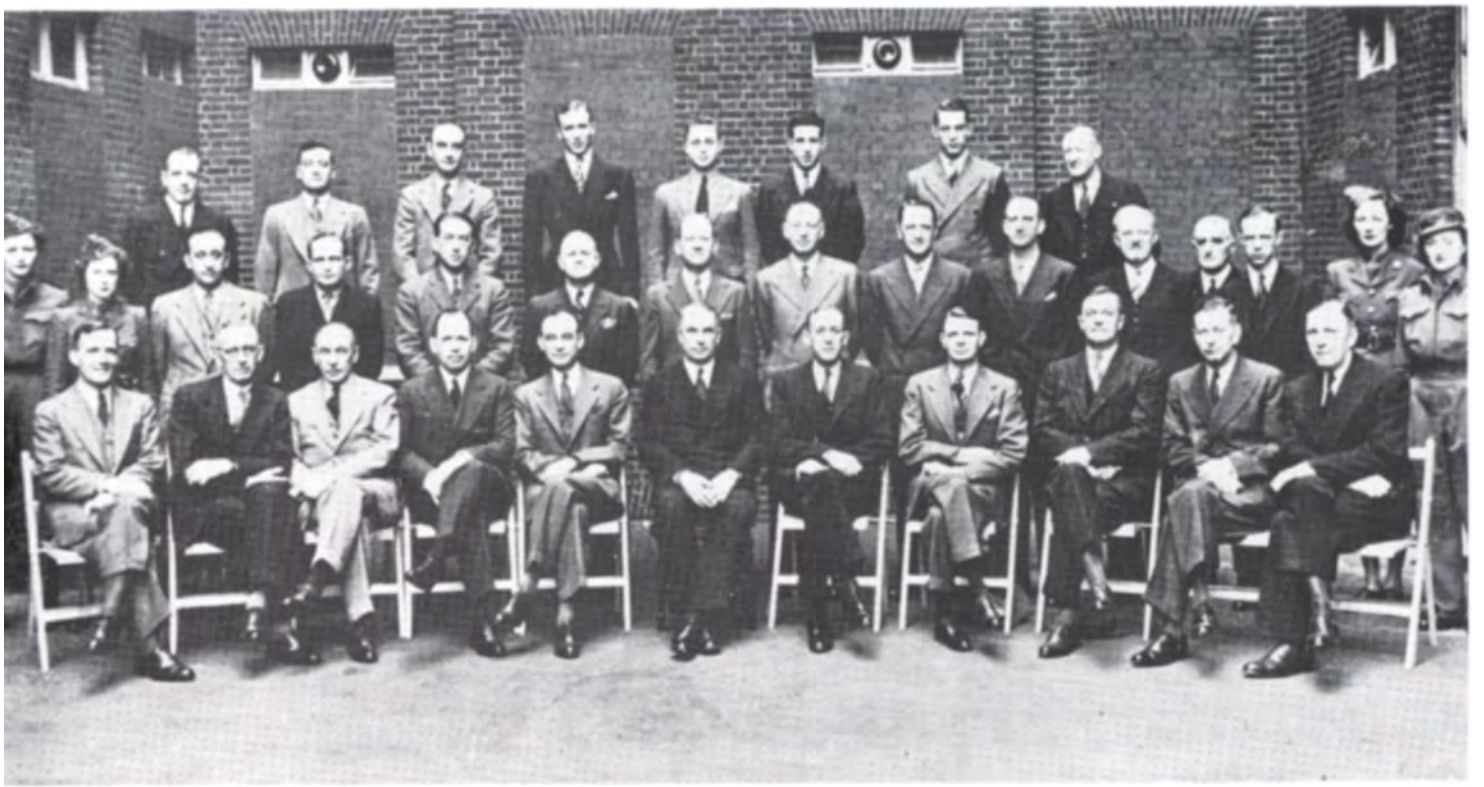
Of most immediate importance, so far as Anglo-American co-operation was concerned, was the agreement to collaborate continuously in planning. The United States and Great Britain were each to establish a joint planning staff in the other's capital. The conferees also made the important decision at this time to concentrate the principal effort against the European enemies should the United States be forced into the war with both Japan and Germany. Finally, the conversations formally specified naval, land, and air tasks and listed the forces which each nation was to make available. In accord with the course of action already outlined in an earlier war plan known as RAINBOW 5, the United States, in the event of its entry into the war, planned to provide one reinforced division to relieve British forces in Iceland, a token force for the defense of the United Kingdom, and an air force command with both bombardment and pursuit squadrons to carry out offensive operations against Germany and defensive operations against attempted invasion. The projected troop basis totaled 87,000 men in addition to the reinforced division for Iceland.[2] Except for the agreement to exchange missions and co-ordinate planning, action on the ABC–1 decisions was contingent on U.S. entry into the conflict.

The United States and Britain took the first step by exchanging military missions. In the interest of a tenuous neutrality, however, the U.S. mission to London was christened the Special Observer Group, or SPOBS, and its chief was given the name Special Army Observer. General Chaney was chosen to head the group, and Brig. Gen. Joseph T. McNarney, who headed the Joint Planning Committee of the War Plans Division and who as a colonel had participated in the ABC–1 conversations, became his chief of staff. The entire group comprised eighteen officers and eleven enlisted men.[3] With five of his officers pres-

[1] Ltr, Admiral Stark to Col S.L.A. Marshall, ETO Historian, 10 Sep 45, ETO Adm 322B SPOBS Material. See Mark Skinner Watson, *Chief of Staff: Prewar Plans and Preparations*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1950), Chapters IV and XII, for the background of the ABC meetings.

[2] Memo, Lt Col John E. Dahlquist for Chaney, n. d. (Jul or Aug 42), sub: Hq Organization, ETO 381 Great Britain, U.S. Troops in U.K.

[3] In addition, Rear Adm. Robert L. Ghormley headed a Naval Group as Special Naval Observer.



THE SPECIAL OBSERVER GROUP. *Front row, left to right: Colonel Case, Colonel Hinman, Colonel McClelland, Colonel Davison, General McNarney, General Chaney, Colonel Summers, Colonel Lyon, Colonel Bolté, Colonel Griner, Colonel Dahlquist. Middle row: Sheila Yeldham, Br.; Jean MacDonald, Br.; Sergeant Long, Chief Clerk; Sergeant Fulford, AG records; Major Welsh, Surgeon; Colonel Middleswart, QM; Colonel Matejka, Signal Officer; Colonel Coffey, Ordnance Officer; Major Snavely, Assistant Air Officer; Major Griffiss, General Chaney's aide; WO Louprette, General Chaney's secretary; Lord Gilbey, Br.; Sergeant Bristol, AG Section; Kay Summersby, Br.; Betty Shore, Br. Back row: Frank Wallace, Br.; Sergeant Casazza; Sergeant Schwaiger, supply sergeant; Sergeant Paisly, typist pool; Sergeant Rapetti, secretary to AG; Sergeant Christian, messenger; Sergeant Miller, secretary to Cof S; Sergeant Leland, Engineer Section. (The British civilians included in the photograph worked with the Special Observers.)*

ent, General Chaney opened temporary headquarters in the U. S. Embassy at No. 1 Grosvenor Square, London, on 19 May 1941. A few days later he occupied permanent quarters across the square at No. 18–20, the address that was to remain the center of American activity in the United Kingdom for the remainder of the war. By the end of June the entire Special Observer Group had arrived and begun to operate.

It was clear from the beginning that SPOBS was to be more than a group of observers. Its larger function is indicated both in the instructions issued to General Chaney and in the tasks to which the group immediately set itself. SPOBS was instructed to co-ordinate all details relative to the reception and accommodation of American forces sent to the United Kingdom under ABC–1; it was to help coordinate the allocation of equipment shipped under lend-lease from the United States; and it was to advise the Army Chief of Staff as to the manner in which U.S. forces were to be employed in the United Kingdom. In short, it was to "deal with any problem which arose in connection with the war plan agreed upon under ABC–1." [4]

The instructions pointed out the necessity of establishing as soon as possible all channels of co-operation between the armed forces of the two countries, and authorized SPOBS to conduct negotiations with the British Chiefs of Staff on military affairs of common interest relating to joint co-operation in British areas of responsibility. All military matters requiring joint decision were henceforth to be taken up through SPOBS (or the British military mission in Washington) rather than diplomatic channels, with the result that SPOBS became the sole agency through which American representatives in London presented military matters to British military officials.[5]

To the casual observer SPOBS might have appeared to be merely part of the expanding staff of the U.S. Embassy in London, for the entire group wore civilian clothes. But its duties were essentially those of a military mission, and it was organized along traditional military staff lines. General Chaney's instructions noted that he was to be provided with a general and special staff designated as special assistant army observers, and gave clear indications of SPOBS' possible transformation. "Your appointment . . . ," they read, "is preliminary to your possible appointment at a later date as Army member of the United States Military Mission in London." The British concept regarding the purpose of the London and Washington missions was similar. They were to make whatever plans and achieve whatever co-ordination they found necessary to insure a smooth and rapid transition from peace to war in the event that the United States entered the conflict.[6]

SPOBS' first task was to establish liaison with the appropriate British agencies. Upon their arrival in the United Kingdom General Chaney and General McNarney immediately called on the British Chiefs of Staff Committee, which included Admiral Sir Dudley Pound, First Sea Lord and Chief of the Naval Staff, Field Marshall Sir John Dill, Chief of the

[4] Min of War Cabinet Conf, 27 May 41, cited in [Henry G. Elliott] The Predecessor Commands, SPOBS and USAFBI, Pt. I of The Administrative and Logistical History of the ETO, Hist Div USFET, 1946, MS (hereafter cited as The Predecessor Commands), p. 24, OCMH.

[5] Ltr, Marshall to Chaney, 26 Apr 41, sub: Ltr of Instructions, Incl to Ltr, Chaney to Chief, Hist Div, 21 Oct 46, OCMH.

[6] Min of War Cabinet Conf, 27 May 41.



HEADQUARTERS, ETO, *at 20 Grosvenor Square, London.*

Imperial General Staff, Air Chief Marshal Sir Charles Portal, Chief of the Air Staff, and Maj. Gen. Hastings L. Ismay, Chief Staff Officer to the Ministry of Defence. In the succeeding six months representatives of SPOBS attended eight meetings of the Operational Planning Section of the British Joint Planning Staff to discuss such various subjects as liaison with military agencies, the strategic situation in the Middle East, Russian requests for lend-lease aid, and problems of an air offensive against Germany. In addition to establishing this high-level liaison, the general and special staff officers of the Special Observer Group made contact with their opposite numbers in the British Army and Royal Air Force (RAF). Lt. Col. Charles L. Bolté, Assistant Chief of Staff for War Plans (then G–5), for example, and Lt. Col. Homer Case, G–2, examined the British airdrome defense network; the SPOBS ordnance officer, Lt. Col. John W. Coffey, inspected British ordnance equipment; the antiaircraft officer, Lt. Col. Dale D. Hinman, conferred with British officers on antiaircraft defenses; and so on. Before long the special observers were well along with their first mission—establishing liaison with the British, learning about their equipment and methods of operation, and exchanging information.

(2) The Occupation of Iceland

SPOBS had been in the United Kingdom only a few weeks and had hardly started on these duties when it was called on to undertake a major project—arranging for the American occupation of Ice-

land. Even though the United States had not entered the war, President Roosevelt had negotiated an agreement with the Icelandic Government shortly after the ABC–1 meetings whereby the protection of the country was entrusted to the United States, and American troops were invited to occupy the island. Iceland held a strategic position as a vital link in communications between North America and the British Isles, and aircraft based there could cover a portion of the North Atlantic shipping routes.

While the decisions on the shipment of an occupying force were made by the War Department, SPOBS immediately became involved in an advisory capacity and in providing liaison with the British. Early in June it was agreed that a Joint Admiralty-War Office-Air Ministry committee should work with SPOBS in planning the relief of British forces. Seven of the special observers, including Lt. Col. George W. Griner, G–4, Lt. Col. Donald A. Davison, Engineer, Maj. Ralph A. Snavely, Assistant Air Officer, and other special staff officers, immediately made a reconnaissance tour of Iceland. At the conclusion of the tour Colonel Griner went on to the United States to advise the War Department on such matters as shipping, the provision of fighter aircraft, cold weather clothing, housing, and fuel.

Plans for the size and composition of the Iceland force underwent repeated changes in the summer of 1941, partly because of the legislative restrictions on employment of selectees and Reserve officers. In July the War Department actually temporarily canceled plans to send the 5th Division to Iceland. This restraint was finally overcome by the passage of the Selective Service Extension Act late in August. Meanwhile a force of approximately 4,400 marines of the 1st Provisional Brigade under Brig. Gen. John Marston landed at Reykjavik on 7 July. One month later the first Army troops landed—the 33d Pursuit Squadron of the Air Forces—1,200 of its men arriving via ship. Planes of the squadron were brought in by the aircraft carrier *Wasp,* whence they were flown to their stations under British air escort. Army ground troops did not begin to arrive until mid-September, when 5,000 men of the 10th Infantry Regiment and the 46th Field Artillery Battalion landed as an advance detachment of the 5th Division under Maj. Gen. Charles H. Bonesteel. War Department plans called for additional shipments to augment the Iceland force, and General Bonesteel was asked to establish priorities for the units to be sent, taking into consideration such factors as housing, storage, and port facilities. In the remaining months before the Pearl Harbor attack, plans for the reinforcement of the Iceland garrison continued to fluctuate, and after 7 December were subject to even more drastic revisions. Late in January the first of the Marine battalions sailed for the United States, and by early March the entire Marine brigade had departed. But these withdrawals were more than balanced by additional shipments of other ground troops. Approximately 14,000 American troops were added to the Iceland force by convoys arriving in March, April, and May 1942. As they took over more and more of the scattered camps and other installations on the island, the relief of the British forces was gradually accomplished. The first contingent had departed in September 1941, although the British force still totaled nearly 12,000 at the end of May 1942. By the end of September it had dropped to less than 800. General Bonesteel in the meantime had assumed command of the combined forces on the island when the commanding general of

the British forces departed in April 1942.

One of the major problems faced by the occupying force was the dearth of facilities. Providing adequate security for Iceland, a barren island with 2,500 miles of exposed shore line, meant wide dispersal of troops. The 5th Division alone had to occupy some ninety camps, many of them in platoon strength only. SPOBS was directly involved in arranging for the accommodation and supply of the Iceland force and negotiated with the British for many items, including construction materials. Partly because reception facilities at Reykjavik were limited, shipment of Nissen hutting lagged, and American units met their initial needs by taking over in place much of the equipment of the British troops and U.S. Marines, including motor vehicles, huts, artillery and antiaircraft weapons, construction materials, and maintenance stocks. Property acquired from the British was accounted for through reverse lend-lease vouchers.

The question of command and operational control of the Iceland force provided the first of several points on which General Chaney and the War Department were to disagree. U.S. Army forces in Iceland were under the control of General Headquarters (GHQ) in Washington, and in August 1941 the War Department proposed to group the Iceland troops with those of Newfoundland and Greenland for command purposes. Because strategic responsibility for Iceland rested with the British, even after the relief of their forces by American troops, General Chaney considered Iceland more rightly a part of the British sphere of operation. He thought that American troops stationed in Iceland and in the United Kingdom should be grouped together. Such in fact was the concept agreed to in the ABC–1 conversations. GHQ, on the other hand, held that Iceland's chief importance lay in its position as a vital link in communications, and pointed out that the island could never be used as a base for offensive operations against the European Continent. Furthermore, should the island be attacked, reinforcements, naval support, supplies, and replacements all would have to come from the United States. For several months to come the U.S. Iceland forces came directly under the field force commander at GHQ in Washington (Gen. George C. Marshall).

But General Chaney's view that Iceland belonged strategically to the European theater eventually won out with the War Department. The island was included in the theater boundaries when ETOUSA was created in June 1942, and thus came under the theater command for tactical purposes. Administrative and logistical matters, however, were exempted from theater control and were to be handled by direct contact with the War Department. The supply of Iceland was therefore to continue from the Boston Port of Embarkation, except for a few items such as Nissen huts and coal, which could be furnished more cheaply from the United Kingdom.[7]

(3) American Troops Go to Northern Ireland

The Special Observers had been called on to arrange for the reception of U.S. soldiers in Iceland on very short notice, since the troop movement had not awaited U.S. entry into the war. For the eventual arrival of American contingents in the United Kingdom SPOBS had more time to prepare.

The ABC–1 agreements had provided for the establishment of four "forces" in the United Kingdom—a bomber force of

[7] The above is drawn from Chapter II of The Predecessor Commands.

about 36,000 men, a token force of about 7,500 men for the British Southeastern Command area, a Northern Ireland force of 30,000, and a force of 13,500 in Scotland—with a total strength of about 87,000 men. A good portion of these troops was to be employed in the defense of naval and air bases used primarily by American units, and SPOBS had immediately taken steps to arrange for the construction of these bases. As early as June 1941 the British Government signed contracts with an American firm for the construction of naval bases in Northern Ireland and Scotland, the costs to be met through an allocation of lend-lease funds. Skilled labor from the United States as well as unskilled labor recruited locally or in Eire was to be employed. The first contingent of approximately 350 American technicians arrived at the end of June, and work on the projects began immediately. In view of the U.S. position as a nonbelligerent these projects were undertaken ostensibly by the British and for the British. International law did not restrict the nationals of a neutral state from volunteering for service in the employment of a belligerant. Anticipating enemy propaganda on this point the British Foreign Office admitted the presence of workmen from the United States in Ulster, taking pains to emphasize that they had exercised a legal right to become employees of the British Government.[8] Technically, therefore, American neutrality was not compromised, although the bases were being built by American contractors with American money for the eventuality of American use.

At the same time SPOBS began a study of the troop needs for the protection of these bases, the number of pursuit planes required, and the accommodations needed, and undertook reconnaissance tours to both Northern Ireland and Scotland. Tentative agreement was reached in July on the location of airfields north of London, and by September construction was in progress on five 1,000-man camps in southern England for the token force.

A detailed report on a reconnaissance of Northern Ireland revealed some of the problems and some of the requirements which had to be met to prepare for the arrival of U.S. troops. A depot was needed at Langford Lodge for third echelon repair, maintenance, and supply of spare parts for American-built aircraft. The quartermaster officer suggested that a general depot be established and, to improve the inadequate baking, laundry, and motor repair facilities, also recommended an increase in the allotment of quartermaster troops for the Northern Ireland force. There were too few freight cars, a portion of the harbor facilities at Belfast had been destroyed by enemy air attacks, and there was a great need for lumber, trucks, and other equipment. In an earlier preliminary report to the War Department General Chaney had already apprised it of some of the deficiencies, pointing out the shortages in both skilled and unskilled labor, and warning that much of the construction material needed for the Northern Ireland installations would have to come from the United States. In the course of later surveys it was recognized that the construction of installations and troop accommodations would undoubtedly be the most troublesome task. Early in December Colonel Davison, the SPOBS Engineer, submitted to the War Plans Division of GHQ and to the Chief of Engineers in

[8] John W. Blake, Official War History of Northern Ireland, Draft Ch. VII, The Coming of the Americans to Northern Ireland, 1941–1944, p. 20.

Washington a proposed construction plan for Northern Ireland, with recommendations on the procurement of labor and construction materials, and a proposed division of planning responsibilities between the War Department agencies and those in the United Kingdom.

Other SPOBS officers made additional visits to Northern Ireland in the fall of 1941 to gather information on antiaircraft defenses, on the military and political situation in Eire, and on other matters. By December, when the United States was drawn into the war, SPOBS was thoroughly familiar with the situation in Northern Ireland and aware of the problems which required solution before American troops could be received there.

Throughout the months before Pearl Harbor SPOBS walked a tightrope to avoid violating U.S. neutrality. In an early report on his group's activities General Chaney took pains to point out that he had scrupulously "emphasized constantly that the Special Observer is not authorized to make commitments of any nature and that all British construction in the area is undertaken with a view to British utilization and is not contingent upon U.S. participation in the war." [9]

The situation was radically altered in the days following the Pearl Harbor attack. The declaration of war between the United States and Germany and Italy on 11 December 1941 removed the need for subterfuge and caution, and the War Department acted swiftly to put into operation the ABC–1 agreements. But RAINBOW 5, which was to have implemented ABC–1, was never actually put into effect as far as the British Isles were concerned. The original troop estimates and plans for Northern Ireland now fell short of actual requirements, not because the United States entered the war, but because American soldiers had to relieve British troops that were needed in North Africa. RAINBOW 5 consequently was superseded by a plan called MAGNET, which called for the shipment of a much larger American force to Northern Ireland. In place of the 30,000 previously planned, a force of four divisions (three infantry and one armored) plus service troops was now contemplated, totaling approximately 105,000 men. American forces were to relieve mobile elements of the British forces in Northern Ireland and assume a larger share of the responsibility for defending it against Axis attack. About 30,000 antiaircraft troops were to be dispatched later to take over the defense of Northern Ireland against air attack. American units initially were to be dependent on the British for quarters, certain types of aircraft, antiaircraft and other light artillery weapons, and ammunition.

The U.S. entry into the war also led logically to the transformation of SPOBS into something more than "special observers." On 8 January, while SPOBS was making arrangements for the reception of the projected troop shipments, the War Department took the first step to establish a U.S. Army headquarters in the United Kingdom by authorizing the activation of the United States Army Forces in the British Isles (USAFBI). General Chaney was retained as its commander and was also named Army member of the United States Military Mission to Great Britain. The latter office was short-lived, and the order establishing the organization was soon revoked. [10]

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[9] The Predecessor Commands, pp. 68–69.

[10] Cbl 293, AGWAR to SPOBS, 8 Jan 43, ETO Adm 502 Boundaries and Comd.

Meanwhile the commander of USAFBI designated a general and special staff. Actually the change initially involved little more than a change in letterheads, for it amounted to nothing more than a transfer of the special observers to the same positions in the new headquarters. It would have been difficult to distinguish between the old SPOBS group and the new headquarters. The staff still consisted of Col. John E. Dahlquist as G–1, Colonel Case as G–2, Col. Harold M. McClelland as G–3, Colonel Griner as G–4, Lt. Col. Iverson B. Summers as Adjutant General, Colonel Davison as Engineer, Col. Alfred J. Lyon as Air Officer, Lt. Col. Jerry V. Matejka as Signal Officer, Lt. Col. William H. Middleswart as Quartermaster, and Colonel Coffey as Ordnance Officer. Colonel Bolté (G–5) was now chief of staff in place of General McNarney, who had returned to Washington, Col. Aaron Bradshaw had become Antiaircraft Officer, and Col. Paul R. Hawley had become the Chief Surgeon. Several staff positions remained unfilled for lack of officers, for the War Department did not immediately provide General Chaney with the necessary personnel to organize even a skeleton headquarters.[11] Nor was the establishment of USAFBI accompanied by a directive assigning Chaney a definite mission. The activation of the new command was therefore in a sense largely a formalization of the status of SPOBS. Nevertheless, the creation of USAFBI marked the establishment of an Army command in the United Kingdom, giving General Chaney command over all the American forces that soon would be coming into the British Isles. General Chaney's duties as a special observer continued, a matter which later caused some confusion, and he lacked some of the powers of a theater commander. But USAFBI was eventually to grow into ETOUSA.

For tactical purposes the Northern Ireland force was organized as V Corps, and was planned to consist of the 1st Armored and the 32d, 34th, and 37th Infantry Divisions, plus supporting and service troops. Machinery had immediately been set in motion in the War Department to assemble and dispatch the first contingent, but the plans for its size saw frequent changes. At one time they called for an initial shipment of 17,300 men, which was then reduced to 4,100 so that troop needs in the Pacific could be met. The advance party of the first MAGNET contingent arrived at Gourock, Scotland, on 19 January 1942. The following day the enlisted men were taken to Glasgow and outfitted with civilian clothes at the Austin Reed clothing firm. The seventeen officers meanwhile went on to London for conferences, most of them proceeding to Belfast on 23 January wearing civilian clothes "borrowed from Londoners for the occasion."

Despite the weak attempts to keep secret the coming arrival of American troops, which even involved discussing the choice of the correct moment for notifying the government of Eire, the secret was poorly kept, and the fact that American troops would soon appear in Ulster was well known to many who had no official knowledge of the plans. On 26 January the first contingent of the MAGNET force—about 4,000 troops—debarked at Belfast. Maj. Gen. Russell P. Hartle, commanding general of the 34th Division, was the first to go ashore and was met by several high officials, including John Andrews, the Prime Minister of Northern Ireland; the Duke of Abercorn, Governor General;

[11] Memo, Dahlquist for Bolté, 22 Apr 46, OCMH.

General G. E. W. Franklyn, commander of British troops in Ulster; and Sir Archibald Sinclair, Secretary of State for Air. As representatives of the British Government they officially welcomed the U.S. troops.

Plans for the ceremony at Dufferin Quay had provided that the first American soldier to set foot in Northern Ireland should be properly publicized and photographed, and arrangements accordingly had been made for a suitable time gap between the arrival of the first and second tenders. To the horror of the planners, the "first" American soldier was just about to come down the gangway when they heard the strains of a band at the head of a column which had already debarked and was marching down the dock road from another quay. While the "first" man—Pfc. Milburn H. Henke of Hutchinson, Minnesota, an infantryman of the 34th Division—was duly publicized, about 500 had actually preceded him.[12] A second increment of approximately 7,000 men reached Northern Ireland on 2 March.

On 24 January, two days before the arrival of the first MAGNET contingent, the first ground force command was established in the United Kingdom when creation of United States Army Northern Ireland Force (USANIF) was officially announced. Headquarters, USANIF, was actually little more than V Corps headquarters, the highest ground force headquarters in the United Kingdom. Maj. Gen. Edmund L. Daley, who had commanded the V Corps in the United States, had been designated commanding general of the new headquarters. He never came to the United Kingdom, however, and the command went to General Hartle, who also retained his command of the 34th Division.

USANIF, or V Corps, was initially both a tactical and administrative headquarters controlling the combat as well as administrative installations of Northern Ireland. In order to meet the need for an administrative base should the V Corps be assigned a tactical mission, it was decided to organize a striking force, a force reserve, and a base command. The striking force was to consist of the V Corps; the force reserve was to include any other troops that might become available; and the base command was to provide for all the administrative and supply details and a permanent area command in Northern Ireland. Northern Ireland Base Command was accordingly established on 1 June under Brig. Gen. Leroy P. Collins, former division artillery commander of the 34th Division. The Northern Ireland command—that is, V Corps, or USANIF—was of course subordinate to the command of General Chaney, though for operational control V Corps came under the British commander in Northern Ireland.

The problem of housing American troops in Britain naturally became urgent after the United States entered the war. On the basis of the ABC–1 plans General Chaney quickly resurveyed the accommodations situation in Northern Ireland for the War Department, listing the British housing already available and indicating the required construction. In January he sent Colonel Davison, engineer member of SPOBS, to Washington with detailed data on construction problems in the United Kingdom, and within a month Colonel Davison reported that the War Department had approved his basic plans.

[12] Official War History of Northern Ireland, p. 33; The Predecessor Commands, pp. 91–92.



JOHN G. WINANT, U.S. AMBASSADOR TO BRITAIN, *visiting a camp in Northern Ireland, accompanied by General Chaney to his left and General Hartle.*

They were changed frequently, however, because of the shifting troop basis. Even while Colonel Davison was in Washington the troop basis for Northern Ireland was more than tripled. Subsequently the size of the first contingent was drastically reduced. Fortunately the early shipments could be quartered in camps evacuated by the British. Camp commanders worked closely with the local British garrison officers through American utility officers who saw to it that existing rules and regulations on maintenance were carried out and that the necessary services were provided. In wartime Britain accommodations were always at a premium because of one shortage or another. In an effort to overcome the steel shortages in the United Kingdom, a mutual exchange of American steel for British Nissen huts was arranged in February. While this improvisation helped, it did not solve the problem, and huts for USANIF installations were scarce from the beginning. Early in March General Chaney instructed General Hartle to formulate a detailed program of construction necessary to accommodate the proposed MAGNET force, and authorized the extension of contracts which an American firm, the G. A. Fuller-Merritt Chapman Corporation, already had with the Navy. The construction undertaken in the next few months closely approximated early plans. Of the projects completed by June 1942, four were carried out by U.S. Army engineers (mainly enlargements of



NISSEN HUT QUARTERS *for American troops arriving in Northern Ireland, 1942. Note World War I helmets.*

existing British installations), twelve by contracting firms, two by British labor, one by the U.S. Navy, and one by the British Air Ministry.[13]

Accommodating the Northern Ireland forces was only one of many difficulties which SPOBS and USAFBI faced. There were problems of security, hospitalization, postal service, recreation, maintenance supplies, and even such mundane matters as laundry, dry cleaning, and shoe repair services. Lacking their own service organization and their own maintenance supplies, the first American troops in Northern Ireland relied heavily on the already overtaxed British for many of these services and for many items of supply and equipment.

To the first U.S. troops, arriving in old-style helmets that brought to mind the World War I soldier, Britain was a strange country where they were quartered in oddly constructed buildings, ate strange-tasting English food, drank weak, warm beer, and reported for sick call to British military and civilian hospitals. The first divisions came to Northern Ireland without their 105-mm. howitzers and were provided with British 25-pounders instead. To avoid completely retraining the American gun crews, these weapons were adapted so that the U.S. troops could use

[13] Field and Service Force Construction (United Kingdom), Hist Rpt 7, Corps of Engrs, ETO, prep by Ln Sec, Int Div, OCofEngrs ETO, Aug 45, MS, p. 37, ETO Adm.

the panoramic sights they were accustomed to. Even rations had to be provided by the British, and British Army cooks were left in camps taken over by USANIF to acquaint American mess sergeants with the use of British rations and equipment. The earliest supply ships arrived on 8 February, and on 18 March U. S. troops ate American rations for the first time. USAFBI had by this time established priorities for supply shipments to the United Kingdom. Included in the early requisitions were the usual PX "morale" supplies, including the inevitable Coca-Cola.

Some of USAFBI's problems in receiving and accommodating the U.S. force—particularly construction—were partially and temporarily alleviated by the fact that the full strength of the projected V Corps force never came to Ireland. A third shipment, comprising additional units of the 34th Infantry and 1st Armored Divisions, arrived on 12 May, and a fourth contingent of approximately 10,000 troops carried in the *Queen Mary* landed a few days later. With these shipments the Northern Ireland force reached its peak strength in 1942, totaling 32,202. Plans had changed at least twice during the build-up, and by the end of May the V Corps consisted of only the 34th Infantry and 1st Armored Divisions, plus certain corps troops. Thus, the MAGNET plans were never fully developed. V Corps remained the highest U.S. ground force command in the United Kingdom for some time, though it was to move from Northern Ireland and its divisions were to be withdrawn for the North African operation. Instead of becoming a ground force base, therefore, Northern Ireland in 1942 developed as a base for the Air Forces and as a base section of the Services of Supply.

(4) Establishing an Air Force in the United Kingdom

The U.S. entry into the war called for fulfillment of still another provision of ABC–1 and RAINBOW 5—the build-up of an American air force in the British Isles. The conversations of early 1941 had specifically provided for an air offensive against the enemy should the United States enter the war. The force which was to be sent to the United Kingdom under the ABC–1 agreements was designed almost entirely for air operations or for support of such operations. Plans provided for the shipment of thirty-two bombardment and pursuit squadrons to Britain. The bombardment force—about 36,000 men—was to be located in England and was to carry out an offensive mission against the Continent. In addition, both the Northern Ireland and Scotland forces (30,000 and 13,500 respectively) had large components of pursuit aviation and antiaircraft units and were designed to defend air and naval bases. Only the small token force of 7,500 in southern England was to have no air elements.

Air operations were in fact the only sustained offensive operations to be carried out from the United Kingdom for some time to come. Preparations for the air force build-up consequently assumed primary importance in 1941 and early 1942, and the initial prominence given this aspect of the American build-up was reflected in the large representation of air officers in the Special Observer Group, including Generals Chaney and McNarney, Colonel McClelland, the G–3, and Colonel Lyon and Major Snavely in the Air Section. Within a few weeks of its arrival in the United Kingdom SPOBS had met with the British Air Ministry, discussed

problems of an air offensive against Germany with the British Joint Planning Staff, and gathered information on aircraft and British methods of air operations. In July tentative agreements were reached on the location of airfields for the use of American bombardment units, and several of the observers made reconnaissance tours of Scotland and Northern Ireland to examine potential sites for air bases and training areas. Further surveys in the fall of 1941 resulted in the selection of eight airfields then under construction in the Huntingdon area, sixty-five miles north of London, for use by the first American bomber units. By the time the United States entered the war General Chaney and his group had made excellent progress in establishing liaison with the British and in arranging for accommodations for the projected American troop arrivals.

General Chaney was considerably less successful in getting his ideas on command and organization accepted for the United Kingdom. In September 1941, a few months after his arrival in England, he proposed to General Marshall a system of operational and administrative controls in the United Kingdom based on the ABC–1 and RAINBOW 5 provision for the several forces for the British Isles. General Chaney's plan called for a series of area commands, one each for the token force, Northern Ireland, and Scotland, a bomber command, and in addition a base command for supply services in England and Scotland. A few weeks later, while Chaney was temporarily on duty in Washington, Lt. Gen. Henry H. Arnold, chief of the Army Air Forces, precipitated a prolonged argument over the question of organization and command by suggesting that American forces in the United Kingdom be organized into two major commands, one for the ground forces and one for the air forces. General Chaney objected vigorously to this counterproposal in a letter early in December, pointing out that American air units would be operating under the British and that there was no reason for interposing another headquarters between the over-all American command and the British. He held further that, with the exception of the small token force, the only purpose for the presence of American ground troops in the United Kingdom was to contribute to the successful operation of air combat units. General Chaney's concept was based on ABC–1 and RAINBOW 5, which made no provision for large American ground forces in the United Kingdom or for any offensive mission for ground troops. His concept thus embraced two basic missions for American forces in the United Kingdom—an air offensive and defense. The air defense of Britain, he maintained, could not be subdivided, and American pursuit units would have to be placed operationally under the British fighter command. For offensive operations he favored the creation of a bomber command under the over-all American commander. The relatively small ground forces were to come to the United Kingdom primarily to assist the air units in their missions and would therefore come under the various area commands.[14]

[14] This section is based on [Robert W. Coakley] Organization and Command in the ETO, Pt. II of The Administrative and Logistical History of the ETO, Hist Div USFET, 1946, MS (hereafter cited as Organization and Command), I, 16–20, and on Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II: I, Plans and Early Operations, January 1939 to August 1942* (Chicago, 1948), pp. 575–90, 618–54.

With the implementation of RAINBOW 5 following U.S. entry into the war, and with the creation of USAFBI, General Chaney's position was temporarily strengthened. But the concept of the RAINBOW 5 plan was almost immediately altered by the revision that provided for a greatly enlarged ground force in the United Kingdom. General Arnold was therefore encouraged to revive his scheme for an over-all air command and again urged the acceptance of his ideas on both General Chaney and General Marshall late in January 1942. General Chaney once more rejected his arguments, noting that Arnold's proposed structure would only parallel the British organization and use up badly needed personnel. GHQ momentarily upheld General Chaney in this stand; but it was a losing battle, for the trend was now definitely toward the organization of three co-ordinate forces or commands in each theater—air, ground, and service—and this trend was to be reflected shortly in the War Department's own reorganization along these lines. General Arnold's arguments were further strengthened by the Joint Chiefs' acceptance of the view that pursuit aircraft sent to the United Kingdom would no longer be considered limited to a defensive role.

The headquarters of the Eighth Air Force and its component bomber, interceptor, and base commands were activated in the United States in the last days of January. In order to prepare for the earliest possible commitment of American air units in the United Kingdom, Brig. Gen. Ira C. Eaker was designated bomber commander of USAFBI and immediately sent to England. The instructions he carried stated specifically that he was to prepare not only for the reception of his own command but also for an intermediate air headquarters between bomber headquarters and the theater commander. General Arnold thus proceeded on the assumption that his scheme of command and organization would ultimately be accepted.

General Eaker arrived in England on 20 February and immediately presented his plans for the establishment of an American air force. On 22 February General Chaney ordered the establishment of a bomber command (shortly to be named the VIII Bomber Command), but found Eaker's proposal for an air force command difficult to accept. The USAFBI staff was anything but receptive to the air force plan, and General Chaney continued to protest it to the War Department. The latter, in the throes of planning for the second front, at first was disposed to support General Chaney. But the month of March saw several changes in the War Department's plans for the token force and the forces in Scotland and Northern Ireland. These changes in effect nullified the old RAINBOW 5 plan, and thus rendered Chaney's plans for area commands obsolete. Early in April he was definitely notified that a separate air force would be organized and trained in the United States and transferred to the United Kingdom. General Chaney therefore had no choice but to accede in the matter of the organizational structure thus decided on, and he proceeded with arrangements for the location of the new command and its bomber, fighter, and service commands. On 2 May Maj. Gen. Carl Spaatz was designated commanding general of the Eighth Air Force, although he remained in the United States until June to organize his new command and arrange for the movement of its units overseas.

Plans for phasing air units to the United Kingdom underwent frequent revisions,

just as in the case of ground units for Northern Ireland and Iceland. The lack of enough trained units, the competing demands from other areas, the frequent changes in plans in the early months of the war, all contributed to make the future of the U.K. build-up unpredictable. In January plans called for the dispatch of a total of 4,748 planes to the United Kingdom, of which 3,328 would be bombers. These figures were amended downward in the following months, and none of the movements of planes or personnel to Britain were accomplished as scheduled, in part because of the shortage of shipping and in part because of a temporary suspension in the movement of planes occasioned by critical developments in the Pacific. The first shipment of Eighth Air Force troops arrived on 11 May.

Early commitment of the Eighth Air Force units depended largely on the ability to ferry planes to the United Kingdom via the North Atlantic route. The Ferrying Command (later renamed the Air Transport Command) had been established in May 1941, but the Air Forces had acquired little in the way of either experience or facilities in the first year to prepare it for the large-scale movements now projected, and had relied on the British both for meteorological data and for some of the servicing of its planes. Early in 1942 the Ferrying Command redoubled its efforts to extend the network of weather stations and communications facilities. Late in June the first combat planes of the Eighth Air Force took off from Presque Isle, Maine, for Goose Bay, Labrador, and then proceeded to Greenland, Iceland, and finally Prestwick, Scotland, the eastern terminus of the route. The first plane to reach the United Kingdom by air, a B–17, arrived on 1 July. Thus, the flow of men and planes, via water and air, was just beginning at the time the European theater was activated early in June 1942.

Logistical preparations for the reception and accommodation of American air units had been going on for many months. Considerable spadework had already been accomplished by the Special Observer Group, particularly by General Chaney's air officer, Colonel Lyon, who continued this work after the arrival of the advance detachment of the VIII Air Force Service Command in the spring of 1942. SPOBS investigated air force facilities shortly after its arrival in England, and in November 1941 had presented to the British a survey of requirements for such facilities as airfields, workshops, ammunition depots, bakeries, and storage. In this work SPOBS had the full co-operation of the Air Ministry, which in February 1942 prepared a comprehensive statement of policy and procedure known as the Joint Organization and Maintenance (U.S.), providing an invaluable guide on problems involving the reception, accommodation, and servicing of American air force units.

The task of preparing for the arrival of American air force units naturally fell to General Eaker and his staff upon their arrival in the United Kingdom in February. A few days after his arrival General Eaker was instructed to proceed to the RAF Bomber Command in order to understudy its staff, to draw up plans for the reception, administration, and supply of bombardment and service units, and to make recommendations regarding the training, equipment, tactical doctrine, and methods of employment of American air units. General Eaker and his staff immediately set about these tasks, establishing themselves initially with the RAF Bomber Command, and in mid-April setting up

their own headquarters near by at Wycombe Abbey, an evacuated girls school at High Wycombe, about thirty miles west of London. On 20 March General Eaker submitted his bomber command plan outlining the problems that had to be solved before American bombardment units could start operations. The ideal method, he observed, required a substantial build-up of American forces in order to permit operations to begin at maximum efficiency and in order to insure their continuity. An independent system of supply and maintenance would also have to be developed before operations could start. Obviously such preparations would delay American participation in the offensive effort. The alternative was to make immediate use of the eight airfields then ready, committing the bomber groups as they became available and making extensive use of British depots, repair facilities, intelligence, and hospitals until the American logistical organization could be built up. The latter course would entail a heavy dependence on the British and a hand-to-mouth existence in supplies, but it had the obvious advantage of allowing earlier inauguration of operations and was therefore recommended by Eaker.

Agreement had already been reached with the British in December 1941 for an initial transfer of eight airfields, then under construction for the RAF, to the first American bomber units expected in England. By May 1942 plans had been made with the British for the construction or transfer of 127 fields to the Eighth Air Force. American participation in the air offensive based on the United Kingdom thus meant a tremendous expansion in the construction program in the British Isles, where the shortage of labor and materials already pinched a strained economy.

Equal in magnitude to the airfield construction program was the problem of providing adequate supply and maintenance. Here again, fortunately, valuable preliminary measures had been taken before the United States became a belligerent. The RAF had already been flying American-built aircraft for some time, and the British had therefore been faced with the problem of maintenance and repair of these craft. Almost simultaneously with the arrival of the Special Observers in England in the summer of 1941 a small number of American maintenance crews had gone to England to assist the British, and in July the British had asked that this aid be greatly expanded. While surveying Northern Ireland that month SPOBS looked for a suitable site where U.S.-built aircraft could be serviced, and in September General Chaney recommended that a depot be established at Langford Lodge, several miles west of Belfast. This recommendation was endorsed by a special Air Forces mission under Maj. Gen. George H. Brett which had been sent to the United Kingdom to study the whole problem. In December 1941 the Lockheed Aircraft Corporation, already operating an assembly plant for the British near Liverpool, was requested to install a service maintenance base at Langford Lodge. The depot was to be manned by American civilians. While the War Department did not sign a contract with the Lockheed Overseas Coporation until May 1942, Lockheed representatives began to make detailed plans for the base in December 1941, and General Chaney proceeded to negotiate with the British Air Ministry on the provision of buildings, utilities, housing, and other facilities.

Concurrent with the negotiations over Langford Lodge, SPOBS had taken steps to establish a second depot for the repair of American-operated aircraft at Warton,

about twenty-five miles north of Liverpool. Both the SPOBS engineer, Colonel Davison, and General Brett agreed on this selection in the fall of 1941. Early in January 1942 the War Department therefore authorized General Chaney to secure this location for the repair of bombers and engines, and he proceeded to arrange with the Ministry of Aircraft Production to build the depot and provide accommodations for about 4,000 men.

Since Langford Lodge was not to open until September 1942, and Warton not until January 1943, it was necessary to find some interim facilities to meet the needs of American air units if their participation in operations was not to be delayed. A search was therefore made for existing facilities which could be utilized immediately. Late in April, after inspections by General Eaker and Colonel Lyon, General Chaney made his recommendations to the War Department and was authorized to negotiate with the British for the transfer of the repair facilities already existing at Burtonwood, about midway between Liverpool and Manchester. Burtonwood was then operated by the British Government and employed about 4,000 civilians. After a period of joint operation, Burtonwood was to be transferred to the exclusive control of the Americans. In the absence of enough skilled American military technicians, both Langford Lodge and Burtonwood were to be staffed initially with civilians, although it was intended that they would eventually be operated by military personnel. General Arnold arranged for the transfer of soldiers with the requisite training from Army Air Forces depots in the United States. Arrangements for acquisition of the Burtonwood installation were completed in May, and joint operation of the facilities began in June. Because of the delay in bringing Langford Lodge and Warton into operation, Burtonwood carried the main burden of air force maintenance for several months to come, and in fact was to remain the principal center of American air force supply and maintenance in the United Kingdom.

On 19 May the Headquarters Detachment, Eighth Air Force, under General Eaker, assumed command of all American air units in the United Kindom, and General Spaatz took command of the Eighth Air Force on 18 June, with headquarters at Bushy Park, on the southwest edge of London. By this date important steps had been taken to prepare for direct participation by American air units in the war against the Axis Powers. Even at this time, however, the build-up of American forces was only beginning, and their logistical organization was hardly born. Whatever influence the American air forces were to have on the air offensive developing in these first months was due largely to British assistance.

(5) The Formation of the Services of Supply and the Activation of ETOUSA

By the early spring of 1942 the existing U.S. Army organization in the United Kingdom was no longer equal to the tasks it was called on to perform. One deficiency which had been felt from the very beginning was the lack of personnel, and General Chaney's small staff had been asked to shoulder an increasing number of responsibilities. In addition to its other duties it handled the technical aspects of lend-lease to both Britain and the USSR; it supervised the Electronics Training Group, a group of American signal, air, and anti-aircraft officers sent to England for training in radar maintenance and operation; and it operated the Ferrying Command.

Each new task undertaken by SPOBS required additional manpower and inspired repeated requests to the War Department. With the shipment of troops to Northern Ireland early in 1942 an obvious need arose for personnel to make up an administrative headquarters for these troops, and for trained officers to fill the staff positions General Chaney wished to fill. In mid-January there still were only twenty-four officers and thirteen enlisted men in London, although SPOBS had been transformed into the headquarters of the U.S. Army in the United Kingdom. This small group was temporarily reinforced in March when about 260 men—military police, signal men, and housekeeping personnel—were borrowed from the 34th Division in Northern Ireland to begin the organization of a headquarters command. But there was no augmentation of Chaney's staff from the United States until the first week in April, when six officers arrived.[15] In February a bomber command had been activated, forming the advance echelon of an over-all air force command in the United Kingdom. But these organizations could hardly do more than meet the requirements envisaged in the ABC-1 and RAINBOW 5 concepts—that is, aid in the defense of Northern Ireland and participate in the air offensive against the Continent.

In March General Marshall gave the first hint that a much larger role was contemplated for American forces in the European area when he instructed General Chaney to formulate plans which would permit a large expansion of both air and ground units in the United Kingdom.[16] In April strategic decisions were made which had far-reaching effects on the U.S. Army organization in Britain. The next few months saw the activation of not only a theater of operations, with a specific directive to its commander on his mission and responsibilities, but also a Services of Supply, providing the vitally important machinery to handle the supply and troop build-up in the British Isles.

American and British military leaders had met for the second time in Washington in December 1941 and January 1942 to define more specifically the combined command arrangements, organize an over-all command agency (the Combined Chiefs of Staff), and confirm existing agreements on the priority for the defeat of the European Axis and agreements regarding the shipment of American forces to the United Kingdom. Plans for the conduct of the war were of course under continuous study in the War Department during the winter months, and in March 1942 the Operations Division (OPD, formerly WPD or War Plans Division) produced an outline plan for the build-up of American forces in the United Kingdom with a view toward an eventual invasion of the Continent. In April General Marshall and Harry L. Hopkins, confidential adviser to the President, accompanied by other officials, went to London to meet with Prime Minister Churchill and the British Chiefs of Staff. In a series of conferences at Claridge's Hotel the Americans won acceptance of the War Department proposal, which came to be known as the BOLERO plan.

The acceptance of the BOLERO plan, involving as it did a great build-up of American forces in Britain and an even-

[15] Memo, Chaney for Hist Div, 23 Jul 46, sub: Comments on MS The Predecessor Commands, and Memo, Dahlquist for Bolté, 22 Apr 46, OCMH.

[16] Ltr, Marshall to Chaney, 18 Mar 42, sub: U.S. Army Forces in British Isles, ETO AG 381 War Plans—General.

tual cross-Channel operation, was bound to have a tremendous effect on the development of the U.S. Army in the United Kingdom. The first step that reflected the enhanced importance of American activities in the British Isles and presaged the scope of coming preparations was the formation of the Services of Supply (SOS), the third of the great subcommands which were basic to the theater's structure. General Chaney himself took the initiative in this matter and on 2 May 1942 outlined to the War Department his ideas on the organization of the SOS and requested the necessary personnel. Chaney's plan roughly followed outlines given in the Field Service Regulations, which were based on World War I experience. It provided for five service divisions: depots, transportation, replacement and evacuation, construction, and administration. Chaney named Donald Davison, now a brigadier general, as his choice to command the SOS.[17]

Although General Marshall had discussed the matter of the U.K. build-up with Chaney during his trip to London in April, it is not clear that he had outlined the organizational structure he desired. At any rate General Chaney soon learned that his proposed organization of the SOS did not conform with War Department wishes. General Marshall informed him that the nucleus of the new SOS organization was being formed in Washington under Maj. Gen. John C. H. Lee, and that Chaney's request for personnel would have to await Lee's arrival in England. Anticipating an early build-up of troops, Chaney was anxious to have the SOS operating without delay, and he therefore went ahead with plans and even drafted an order outlining the functions and organization of the SOS. But General Marshall's decision was final; General Lee was to organize the SOS in the United Kingdom. Thus, as in the matter of the air force command, the War Department now also determined the organization of the SOS and was to dispatch it to England with little regard for General Chaney's wishes in the matter.

The history of the logistics of the war in Europe, so far as U.S. participation is concerned, is basically the history of the SOS and its successor on the Continent, the Communications Zone; and the logistical story is therefore inseparably associated with the officer who in May 1942 was designated by General Marshall to command the SOS. General Lee was commanding the 2d Division at Fort Sam Houston, Texas, when on 3 May Lt. Gen. Brehon B. Somervell, commanding general of the War Department SOS, summoned him to Washington for the new assignment. General Lee was a Regular Army officer, a West Point graduate of 1909, and, like so many of the officers who were to hold key positions in the European theater, an engineer. Between 1909 and 1917 his assignments included tours of duty in the Canal Zone, Guam, and the Philippines, as well as the zone of interior. During World War I he served first as aide to Maj. Gen. Leonard Wood, commanding general of the 89th Division and former Army Chief of Staff, and then as chief of staff of the 89th Division, later going overseas and actively participating in the planning and execution of the St. Mihiel and Meuse–Argonne offensive. In the course of his overseas duty he was awarded the Silver Star, the Distinguished Service Medal, and was twice decorated

[17] Except as indicated, this discussion of command and organization is based on the monograph Organization and Command in the ETO, I, 20–70.



GENERAL LEE, *Commanding General, SOS, ETOUSA.*

by the French Government. During most of the period between wars Lee held the usual peacetime engineer assignments, principally on rivers and harbors projects. In 1934 he became district engineer of the North Atlantic Division at Philadelphia, and in 1938 division engineer of the North Pacific Division at Portland, Oregon. In 1940 Lee was given command of the San Francisco Port of Embarkation and promoted to brigadier general; a year later he took command of the 2d Division; and in 1942 he was again promoted.[18]

The choice of General Marshall and General Somervell thus brought to the job a man of varied experience and an officer with a reputation as an able organizer and strict disciplinarian. It also brought to the job a controversial personality, for about Lee and his position most of the controversies over theater organization and command were to rage for the next three years.

Lee arrived in Washington on 5 May and in a series of conferences in the next two weeks laid the basis for the SOS organization in the United Kingdom. On 7 May General Somervell held a meeting of all the service chiefs and chiefs of staff divisions in the War Department SOS to outline the BOLERO plan and point up the major problems which would have to be met in building a base in the United Kingdom. Lee's primary concern was the selection of a "team" which he could take with him to England. To recruit such a staff General Somervell instructed each chief in the SOS to recommend the best two men in his branch, one of whom would be selected to accompany General Lee, the other to remain in Washington. A staff was selected within the next week. Among those chosen were many officers who were to become well known in the European theater, including Brig. Gen. Thomas B. Larkin, Lee's first chief of staff; Brig. Gen. Claude N. Thiele, initially his Chief of Administrative Services; Col. Charles O. Thrasher, Chief of Depot Services; Col. Douglas C. MacKeachie, Director of Procurement; Col. Frank S. Ross, Chief of Transportation Services; Maj. James M. Franey, Administrative Assistant; Col. Nicholas H. Cobbs, Finance Officer; Brig. Gen. William S. Rumbough, Signal Officer; and Brig. Gen. Robert M. Littlejohn, Chief Quartermaster. On 14 May General Lee held the first meeting of his service chiefs, at which he read the draft of a directive indicating the lines along which General Marshall and General Somervell desired to have the SOS organized. Before leaving Washington General Lee also met with members of the British Army staff and the British Ambassador, Lord Halifax, to orient himself on reception and accommodation problems in the United Kingdom. Just before his departure from the United States he flew to New York and discussed shipping matters with Maj. Gen. Homer M. Groninger, commanding general of the port which was to handle the millions of tons of supplies shipped to Europe in the next few years. Finally, acutely aware of the difficulties faced by the SOS in 1917–18, General Lee also called on Maj. Gen. James G. Harbord, commanding general of the American Expeditionary Forces SOS in World War I, hoping to profit from his experience and thus avoid a repetition of the errors of that period. On 23 May 1942 General Lee left the United States with nine members of his staff and with basic plans for the organization of the SOS in England.[19]

[18] Biographies of General Officers, OCMH.

[19] Tendons of an Army, prep by Hist Sec, ETO, 1944, MS, pp. 9–10, ETO Adm 531.

Meanwhile General Chaney had been informed more specifically of the plans which the Chief of Staff desired to have carried out in the United Kingdom. On 14 May General Marshall sent a letter directive to the USAFBI commander embodying the ideas already communicated to General Lee in Washington. The directive made it clear that the U.S. forces in the United Kingdom were to be organized along lines parallel to the new War Department structure—that is, with three co-ordinate commands, one each for air, ground, and services—and described in detail the Chief of Staff's desires on the organization of the SOS, which was to be undertaken at once. General Marshall specified that Chaney's headquarters (soon to become the theater headquarters) was to be organized "along the general pattern of a command post with a minimum of supply and administrative services." These were to be grouped under the SOS and commanded by General Lee. More specifically, General Lee was given the following powers:

> [He was] invested with all authority necessary to accomplish his mission including, but not limited to, authority to approve or delegate authority to:
>
> a. Approve all plans and contracts of all kinds necessary to carry out the objectives of this directive.
>
> b. Employ, fix the compensation of, and discharge civilian personnel without regard to civil service rules.
>
> c. Purchase any necessary supplies, equipment, and property, including rights in real estate practicable of acquirement.
>
> d. Adjudicate and settle all claims.
>
> e. Take all measures regarded as necessary and appropriate to expedite and prosecute the procurement, reception, processing, forwarding, and delivery of personnel, equipment, and supplies for the conduct of military operations.[20]

The letter announced that while "the organization prescribed for the War Department need not be slavishly followed at your Headquarters, it will, in the main, be the pattern for similar organizations of the Services of Supply in the British Isles."

The directive of 14 May thus assigned broad powers to the SOS, and for this reason it developed into one of the most controversial documents in the history of the theater. It undoubtedly bore the strong influence of General Somervell, who was acutely conscious of the difficulties experienced by the SOS in World War I. These he attributed in part to the fact that the SOS of the American Expeditionary Forces had had to adopt an organization which did not parallel that of the War Department, with the result that there were no clearly defined command and technical channels between the two, and in part to the poor organizational control of the SOS, whereby supply and administration were closely controlled from General Pershing's GHQ, through which all communications with the War Department were routed.[21] He now desired that the SOS in the theater parallel that of the zone of interior, in which the supply command had just been assigned broad powers. But the attempt to limit the top U.S. headquarters to a minimum of administrative and supply functions and to assign them to the SOS was the cause of a long struggle between the SOS and the theater headquarters and the basic reason for the several reorganizations which the two headquarters underwent in the next two years.

[20] Ltr, Marshall to CG USAFBI, 14 May 42, sub: Organization SOS, ETO Adm 311A SOS—General.

[21] Memo, Somervell for Maj Gen Dwight D. Eisenhower, 22 Jun 42, ETO Adm 129 ETO Organization and Comd.

It is hardly surprising that General Chaney and his staff should have taken issue with the proposed scheme of organization, for it appeared to go contrary to the doctrine in which they had been schooled between the two wars. They were poorly oriented on the entire concept under which the War Department had recently reorganized itself, creating three great subcommands for air, ground, and service forces.[22] It is apparent that General Chaney and his staff had not taken the new organization into consideration in formulating their own plan. The USAFBI commander did not believe that a purely functional division of command was feasible, but in this matter he had already been overruled and had been forced to acquiesce by accepting the separate air command. Now he was to take issue with the Services of Supply aspect of the new organizational scheme as well.

General Lee and his party arrived in London on 24 May. In his diary for this day he made the terse entry: "Reported to 20 Grosvenor, offices assigned, program of initiating the SOS commenced." [23] On the same day General Chaney's headquarters published General Order 17, establishing the SOS, USAFBI, and designating General Lee as its commanding general.

Activating the new command was a simple matter. Outlining its functions and defining its exact sphere of responsibilities proved more difficult. General Lee and his chief of staff, General Larkin, conferred with General Chaney on the problem the day after their arrival in England, and on 28 May Lee submitted a draft of a general order outlining the functions and responsibilities of the SOS. The proposed order placed all supply arms and services, "excepting so much thereof as are essential to the minimum operation of supply and administration" by Headquarters, USAFBI, under the SOS. General Lee believed that virtually all supply and administrative functions of the theater should be taken over by the SOS. Such, he thought, was the intention of General Marshall and General Somervell, and in submitting his plan he stated that he was endeavoring "to comply with the spirit of the instructions contained in the War Department letter of 14 May 1942.[24]

General Lee's proposal produced a strong reaction in the USAFBI headquarters. General Chaney's staff objected to it almost to a man, and a compromise was eventually reached which satisfied no one. All staff sections were given an opportunity to comment on General Lee's draft, and their remarks brought into focus some of the key issues that were to plague the SOS in its relations with the theater headquarters and eventually were to involve the armies and the supreme command also. Some of the USAFBI staff took exception to the entire functional organization of the U.S. forces in the United Kingdom into three co-ordinate commands. But this was already a lost battle since the basic organizational structure was already determined by the creation of the ground,

[22] For the background of this reorganization see John D. Millett, The Organization and Role of the Army Service Forces, a volume in preparation for this series.

[23] Lee Diary, ETO Adm 102.

[24] Ltr, Lee to Chaney, 28 May 42, sub: Order Creating SOS, with draft GO, ETO Adm 311A SOS—General. The arms and services listed for changeover to SOS by Lee included the Corps of Engineers, Signal Corps, Chemical Warfare Service, Ordnance Department, Quartermaster Corps, Medical Department, and the Offices of the Adjutant General, the Chief Chaplain, the Inspector General, the Chief of Finance, the Judge Advocate General, the Provost Marshal, Special Troops, Special Services, and the Army Exchange Service.

air, and service commands. More unanimous was the chorus of opposition voiced against the assumption of theater-wide functions by a subordinate command, the SOS. Almost every reply developed some aspect of this fundamental objection and argued that more control over particular functions should be retained by the highest command, USAFBI.

Brig. Gen. John E. Dahlquist, the G–1, put his finger on the basic difficulty by pointing out that, while the SOS would procure all supplies for U.S. forces in the United Kingdom, it would not provide all the services and supplies in all the components of the command, since many would be provided by service elements which were integral parts of the various task forces or subcommands, such as the Eighth Air Force. The inspector general, the chief finance officer, the adjutant general, and others, he noted, could not exercise theater-wide functions from the SOS, which was a command co-ordinate with the air and ground commands. Most of the supply arms and services would have to be maintained on a theater level (that is, at USAFBI level), and the top commander of the U.S. forces would need his own special staff. Since a chief of service in the SOS, a command co-ordinate with the air and ground commands and subordinate to USAFBI, could not exercise supervision over the troops of other commands, it was definitely wrong, Dahlquist believed, to place a theater chief of service in the SOS.[25]

Other staff members generally supported this argument, citing specific examples that stressed the impracticability of the proposed assignment of functions as applied to their particular service or department. Some were willing to see their functions split between USAFBI and SOS, but almost all of them felt that over-all policy making and varying degrees of control over service functions would have to be retained by the higher headquarters. The G–4, General Griner, for example, asked how the inspector general could perform theater-wide functions for the commanding general if he were placed under the commander of the SOS. As later developments were to show, many of these arguments were not altogether invalid, and the armies and the air forces were to object strongly to the exercise of theater-wide functions by the SOS.

General Lee's proposal had already raised the problem of the extent to which the air forces should handle their own supplies. In the successive steps by which the Army Air Forces was achieving more and more autonomy, the War Department had acknowledged the peculiarities of air force supply and had established a separate Air Force Service Command for the Air Forces. This principle was extended to the theaters in early 1942, and an Air Service Command had been set up as part of the Eighth Air Force and was in the process of movement to the United Kingdom in May and June. Before leaving the United States General Lee had met with AAF officials at Bolling Field and had agreed to a division of supply functions between the SOS and the Air Service Command. The main provisions were that the Air Service Command would assume complete responsibility for supplies peculiar to the air forces, would place liaison officers at the ports to attend to their interests, and would leave to the SOS all construction

[25] Memo, Dahlquist for CofS USAFBI, 1 Jun 42, sub: Comments on Draft Order Establishing SOS, ETO Adm 311A SOS—General. The memorandums from the other staff sections on this subject are also in this file.

and the handling of supplies common to both ground and air forces. In his draft proposal of 28 May outlining the responsibility of the SOS the only mention made of this problem was the statement that the handling of supplies peculiar to the air forces would be excepted from SOS control. Brig. Gen. Alfred J. Lyon, the USAFBI air officer, pointed out that it was the practice of the Air Service Command to maintain control not only of supplies peculiar to the air forces, but also of certain services (such as aviation engineer construction), and he desired a change in the draft to clarify this point.

The controversy over the position and functions of the SOS was not to come to a decision under USAFBI. The whole discussion was interrupted in the first week of June and momentarily postponed. On 8 June USAFBI was officially transformed into the European Theater of Operations, United States Army. The need for such a transformation had been realized for some time, particularly in General Chaney's headquarters. Strategic plans for the employment of American forces in the European area had been radically altered since USAFBI had been created early in January. The BOLERO plan agreed to in April contemplated an invasion of the Continent in 1943, and therefore involved the shipment of large numbers of troops and great quantities of supplies to the United Kingdom. USAFBI had not been created with BOLERO in mind, and General Chaney keenly felt the lack of a specific statement of his mission and powers. The initiative in obtaining such a directive finally came from Chaney's own staff. In the course of the Claridge Conference in April General Dahlquist asked General Marshall for a directive, at the same time submitting a draft to Col. John E. Hull, an officer from the Operations Division of the War Department. The following month Maj. Gen. Dwight D. Eisenhower, then chief of OPD, visited the United Kingdom, and Brig. Gen. Charles L. Bolté, Chaney's chief of staff, took the opportunity to outline some of the problems of USAFBI, again urging the "definite need for a basic directive to the Commanding General USAFBI, concerning his authority, responsibility and mission." [26] General Eisenhower responded by presenting a draft directive to General Marshall shortly after his return to the United States, and on 8 June the War Department cabled the directive establishing ETOUSA, naming Chaney its commander and outlining his powers and responsibilities. It was patterned closely after the draft presented by General Dahlquist, who in turn had based his draft largely on the one given General Pershing in World War I.[27]

The directive charged the Commanding General, European Theater of Operations, with the "tactical, strategical, territorial, and administrative duties of a theatre Commander." "Under the principle of unity of command" he was to exercise planning and operational control over all U.S. forces assigned to the theater, including naval. The War Department instructed General Chaney to "co-operate with the forces of the British Empire and other allied nations" in military operations against the Axis Powers, but specified that in doing so the American forces were to "be maintained as a distinct and separate component of the combined forces." The theater commander was vested with

[26] Memo, Bolté for Eisenhower, 29 May 42, as cited in Organization and Command, I, 46.

[27] Interv with Dahlquist, 16 Jul 45, ETO Adm 517 Intervs.

all authority over administrative or logistical matters previously assigned to the Commanding General, USAFBI, and was directed to establish "all necessary bases, depots, lines of communications, and other arrangements necessary in the operation, training, administration, maintenance and reception of the U.S. Army Forces." Finally, the directive gave as the mission of the Commanding General, European Theater of Operations, "to prepare for and carry on military operations in the European Theater against the Axis Powers and their allies, under strategical directives of the combined U.S.-British Chiefs of Staff. . . ." [28]

A separate cable on 16 June defined the territorial extent of the newly activated theater. The boundaries of the European Theater of Operations (ETO) included roughly all of western Europe. (*Map 1*) Iceland was now also under the theater's jurisdiction, although the separate Iceland Base Command dealing directly with the War Department would continue to handle administrative and logistical matters.

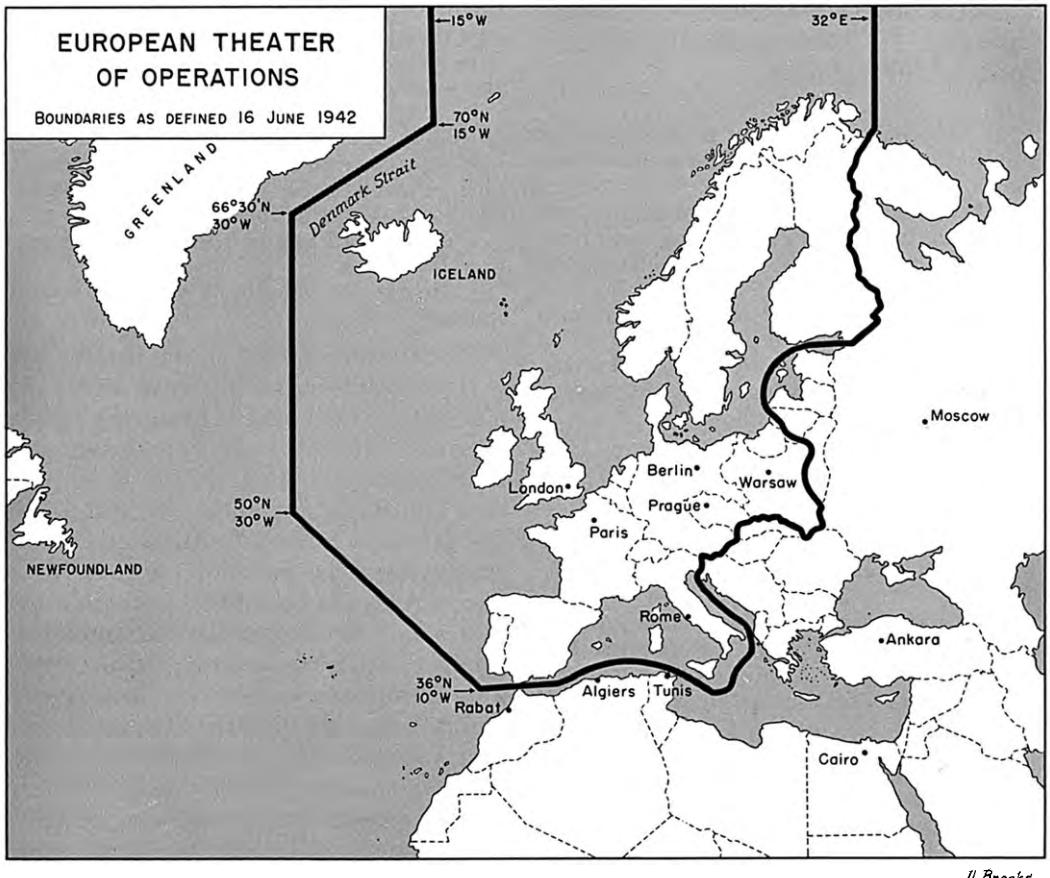
Outwardly the transition from USAFBI to ETOUSA was a change in name only. The War Department directive activating a theater of operations did not change General Chaney's duties greatly. But it did constitute a statement of his mission and authority, which he had lacked as commanding general of USAFBI, and thus gave him a clear-cut conception of his command and clarified his position with relation to the other commands in the United Kingdom. Chaney's general staff remained unchanged. General Bolté was the chief of staff, General Dahlquist was G–1 and now also deputy chief of staff, Colonel Case was G–2, Brig. Gen. Harold M. McClelland the G–3, and Brig. Gen. George W. Griner the G–4. Col. Ray W. Barker had been appointed Assistant Chief of Staff for War Plans early in April.

Assignments to the special staff, on the other hand, were to reflect the initial solution to the thorny organizational controversy about the extent of control that the SOS was to exert over supply and administration. The activation of ETOUSA had not seriously interrupted the search for a satisfactory answer to this problem, and a compromise solution had in fact been reached by 8 June. The dilemma faced by General Chaney and his staff was to find a solution which would preserve for the theater headquarters the control of theater-wide services without violating the Marshall directive of 14 May. In his memo to General Eisenhower in May, General Bolté had alluded to the problem of the relationship between SOS and USAFBI and had noted that, "unless the basic principle that authority and responsibility must go hand in hand is to be abandoned, the commander of the force as a whole must have the freedom of action to organize, dispose, and employ the personnel and means provided by him under the broad mission assigned him by higher authority." [29] The War Department directive which followed on 8 June certainly granted the theater commander broad enough powers and left no doubt of General Chaney's authority over all U.S. forces in the theater. But it had not specifically released him from previous instructions, and the directive of 14 May therefore still held.

An unidentified member of the USAFBI staff in the meantime had recommended

[28] Cbl 1120, AGWAR to USFOR London, 8 Jun 42, ETO Adm 129 ETO Organization and Comd.

[29] Memo, Bolté for Eisenhower, 29 May 42.



MAP 1

a division of staff functions, with the senior officer of most of the services assigned to the SOS and only a portion of the special staff remaining at General Chaney's headquarters. But on 8 June, when the theater was activated, a general order announced a complete special staff at theater headquarters, made up of the senior officers in the various services, and therefore included many of the officers who had been chosen for General Lee's organization. Among them were General Littlejohn, Chief Quartermaster, Col. Everett S. Hughes, Chief Ordnance Officer, General Rumbough, Chief Signal Officer, and Colonel Cobbs, Finance Officer. An attempt to clarify the entire matter was made in a circular, dated 13 June, outlining in detail the responsibilities of the SOS and the division of the special staff. It charged the Commanding General, SOS, with the "formulating of detailed plans for supply, transportation, and administration, and with the operation of all supply and administrative services which serve this theater as a whole and which are not

a part of other subordinate forces of the theater. . . ." More specifically, these responsibilities included:

a. Receipt and delivery to depots of all supplies from the zone of the interior or from local or foreign sources.

b. Procurement, storage, maintenance, salvage, and basic issues of all equipment and supplies, except certain items peculiar to the Air Force.

c. The establishment of purchasing and contractual policies and procedure.

d. Control of all transportation and traffic pertaining to the theater except that under control of other commands.

e. Construction.

f. Quartering, to include acquiring by such means as may be necessary accommodations and facilities for all forces and activities.

g. Operation of all elements of the Army Postal Service except those assigned to other forces.

h. The establishment and maintenance of a Central Records Office for all army elements of the theater, including establishment and operation of a Prisoner of War Information Bureau.

i. The acquirement or production and issue of all publications, training films, film strips, and blank forms.

j. Operation of Graves Registration Service.

k. The requisitioning, quartering, training, and distribution under directives and policies prescribed by this headquarters of all replacements except the operation of Air Force combat and ground crew replacement center.

l. The establishment and control of all disciplinary barracks, and military police control of all members of the theater, outside other commands.

m. The establishment and operation of such training centers and officer candidate schools as may be directed by this headquarters.

n. The operation of centers for reclassification of officers to include administration of reclassification boards, appointed by the theater commander.

o. Evacuation from other commands of prisoner of war and administration and control of all prisoner of war establishments, except those pertaining to other commands.

p. Evacuation and hospitalization of sick and wounded from other commands.

q. Preparation of estimates of funds required for operation of the theater.

r. Adjudication and settlement of all claims and administration of the United States Claims Commission for this theater.

s. Organization and operation of recreational facilities.

t. Promotion of sale of war bonds and stamps.

The circular named eleven theater special staff sections to "operate under the CG SOS." They included the big supply services, but these were to maintain separate liaison sections at theater headquarters. The SOS commander was granted all the necessary powers "authorized by law, Army Regulations, and customs for a Corps Area Commander" in the United States; he was allowed direct communication with other commanders in all supply and administrative matters; and he was authorized to organize the SOS into whatever subordinate commands he saw fit. Beyond this the circular was carefully worded to meet the provisions of the Marshall directive of 14 May and at the same time retain control of theater-wide functions for the theater's highest headquarters. It cautiously spelled out General Lee's authority. In an attempt to subordinate SOS policy making to the control of theater headquarters, for example, it prescribed that the SOS would carry out its functions "under directives issued by the Theater Commander," and that all measures taken would be "consistent with policies and directives of this headquarters" (ETOUSA). The authorization to communicate directly with subordinate elements and officers and agencies of the U.S. and British Governments was restricted to matters "which do not involve items of

major policy, which do not affect other commands of the theater, or which do not affect matters specifically reserved by the theater commander." It empowered the Commanding General, SOS, to "issue to other force commanders instructions on routine administrative matters arising directly from his duties and responsibilities," but in order to make certain that the SOS did not exercise an improper amount of authority over other co-ordinate commands (the Eighth Air Force and V Corps) the circular stipulated that such instructions were not to interfere with "inherent command responsibilities of other force commanders." [30]

The circular was therefore guarded in its grant of authority to the SOS and was not as broad a concession as General Lee desired, although it gave him control of eleven of the fifteen special staff sections he had requested. In meeting some of the objections of Chaney's staff it consequently represented a compromise with the concept contained in the Marshall directive. The solution was anything but final, for the division of responsibility and the split in the staffs between SOS and ETOUSA produced a long controversy and resulted in many attempts at reorganization.

The first alterations in the settlement were made within a month, occasioned by a change in the top American command. General Chaney served as commanding general of the newly activated ETOUSA less than two weeks. The man chosen to succeed him was General Eisenhower, chief of OPD. Since General Marshall's trip to England in April, the Chief of Staff had not been satisfied that the USAFBI commander and his staff were familiar enough with the War Department's plans for the theater. A successor had not yet been chosen when General Eisenhower made his inspection trip to the United Kingdom in May, and upon his return at the end of the month his suggestion of General McNarney for the command was rejected by the Chief of Staff, who already had another important assignment in mind for that officer. Early in June General Eisenhower submitted to General Marshall the draft directive for the establishment of ETOUSA and was told for the first time that he himself might be chosen as the new commander of the theater. On 11 June Eisenhower was told definitely that he had been chosen, and on the 17th he received orders relieving him from his duties in the War Department and assigning him as Commanding General, ETOUSA.[31]

General Chaney meanwhile was notified on 11 June of his impending relief, and he departed from the United Kingdom on the 20th.[32] In the three-day interim after General Chaney's departure the theater was commanded by General Hartle, the senior American officer in the United Kingdom. General Eisenhower assumed command upon his arrival on 24 June.

One of the new theater commander's first tasks was to re-examine the confused organizational structure which had just come into existence. While he considered the division of functions and staff between SOS and ETOUSA as faulty, General Eisenhower was not immediately disposed to make radical changes. For the most part he therefore accepted the compromise

[30] Cir 2, Hq ETO, 13 Jun 42, CofS A45-466 Codes—USAFBI.

[31] Dwight D. Eisenhower, *Crusade in Europe* (Garden City, N. Y., 1948), pp. 49-50.

[32] Cbl 2543, Marshall to Chaney, 11 Jun 42, OPD Exec 10, Folder 33. The reasons for Chaney's relief are more fully discussed in the following section of this chapter.

outlined in Circular 2, although certain modifications were made in the interest of clarity. Others were necessitated by an entirely new factor that complicated the whole situation—the proposed move of the SOS to Cheltenham, which was some distance from London. A complete restatement of the responsibilities of the SOS and its position vis-à-vis ETOUSA was the result, and was published as General Order 19, dated 20 July 1942.

General Order 19 made only one important change in the mission of the SOS. General Lee now was assigned the additional function of administrative and supply planning for operations in the theater. He also was authorized to communicate directly with the War Department and British officials on supply matters without reference to theater headquarters. Otherwise, his responsibilities remained the same.

Like Circular 2, the new order was careful to define and delimit the authority of the Commanding General, SOS. His authority as a corps area commander was restricted in that it was not to apply to areas where another commander had already been given such authority (for example, military police control in Northern Ireland), and all orders, policies, and instructions prepared by the chiefs of services and applying to the entire theater were to be submitted to the Commanding General, SOS, and, after approval, published by the Adjutant General, ETOUSA.

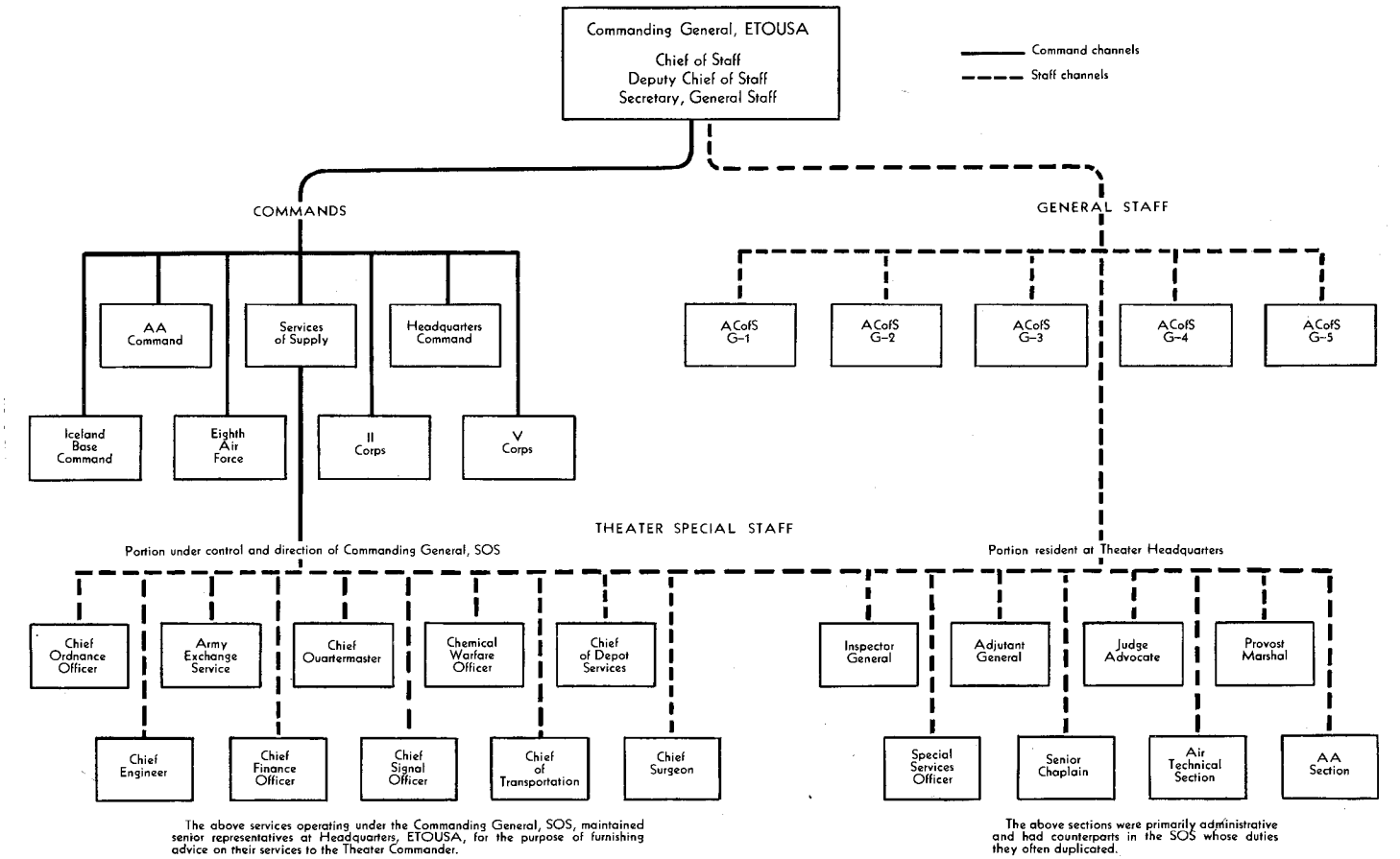
The order announced eighteen staff sections, eight of which were to be resident at theater headquarters. *(Chart 1)* The chiefs of services were to be located as directed by the SOS commander. If not located at theater headquarters, they were to have senior representatives there selected by the theater commander. At this time a separate Transportation Service was added to the usual services. Previously divided between the Corps of Engineers and the Quartermaster Corps, transportation services were from this time on to be organized as a separate corps, as recommended by General Somervell. It was to have a vital role in the logistical operations in the European war, and ably justified its claim to separate status as a service.

General Order 19 did not alter the position of the SOS fundamentally. It did not give the SOS any additional theater-wide control over supply and administrative functions and therefore did not enhance its position. In fact General Order 19 actually reduced the number of staff sections directly under its control and resident at Headquarters, SOS. The retention of more of the staff sections at theater headquarters was probably the result of the removal of the SOS to Cheltenham. The July settlement represented the product of prolonged deliberations and contentions over this knotty problem. It was a compromise solution which did not please everyone and resulted in the creation of overlapping agencies and much duplication of effort. The wording of the order indicates that General Eisenhower considered the whole arrangement temporary; but more pressing matters in the next few months precluded any overhauling of the system, with the result that General Order 19 remained the constitution of ETOUSA for about a year.

(6) The Heritage of SPOBS and USAFBI

The events of June and July did much to establish the general shape and framework which the theater command was to retain for the next few years. ETOUSA's organizational structure was now deter-

CHART 1—EARLY COMMAND AND STAFF ORGANIZATION OF ETOUSA ESTABLISHED BY ETO GENERAL ORDER 19, 20 JULY 42.



mined; its command relationships were at least temporarily fixed; and within a four-week period three commanders arrived—Lee, Spaatz, and Eisenhower—who were destined to be key figures in its future development. These events resulted in the gradual displacement of the SPOBS and USAFBI personnel. General Eisenhower retained General Chaney's general staff only temporarily, and within a few months all but one of the positions had changed hands. In the special staff there was more stability of tenure.

Before assessing the accomplishments of SPOBS and USAFBI it should be pointed out that the original special observer function continued to be carried out under one name or another even after the activation of ETOUSA. The mission of SPOBS had not ended with the formation of USAFBI early in January 1942. That it had not was due mainly to the fact that General Chaney had to deal with many matters outside the British Isles, particularly developments in the Middle East. The War Department had specified at that time that in addition to taking over as Commanding General, USAFBI, General Chaney was to continue as Special Army Observer and was also to act as Army member of a newly created U.S. Military Mission to Great Britain. As indicated earlier, the military mission was never established, but General Chaney and his staff continued to function as special observers, with a vaguely understood relationship to USAFBI which caused considerable administrative confusion. In March and April General Chaney protested the War Department's practice of continuing to assign personnel to SPOBS rather than to Headquarters, USAFBI.

One of the most important functions that remained after the formation of an army command in the United Kingdom was the study of technical developments in British aircraft and reporting on the performance of American equipment, particularly aircraft. For this purpose a Technical Committee had been formed in SPOBS in November 1941. This special observer mission continued after the establishment of Headquarters, USAFBI; but in April, apparently to clear up the administrative confusion over SPOBS' status with relation to USAFBI, the Technical Committee was reorganized as the Air Section, USAFBI, under General Lyon. What was left of SPOBS was thus properly reduced to the position of a staff section in the new headquarters. Henceforth it dealt almost exclusively with aircraft, was given a semi-independent status, and was allowed to communicate directly with appropriate War Department agencies on purely technical matters. This reorganization appears to have clarified the rather anomalous position of SPOBS after the formation of USAFBI, although the enlisted men of the Headquarters Detachment of SPOBS were not finally transferred to Headquarters, USAFBI, until the end of May.

In the organization of ETOUSA early in June the Air Section became the Special Observer Section. Its mission was now defined as including "all matters which do not pertain directly to operations of U.S. forces in the ETO." This involved liaison on all lend-lease matters with the Harriman mission, the Munitions Assignments Board, the Munitions Assignments Committee (Air), and the various British ministries concerned with production and supply. Procurement of technical data on the production and operation of aircraft was also included in the mission. In carrying out these duties, however, the Special

Observer Section came into increasing competition with other agencies, particularly the Eighth Air Force, which wanted jurisdiction over the section, and with the SOS. The Special Observers had always considered their name an unfortunate choice, and in July, on General Lyon's recommendation, the section was redesignated the Air Technical Section. As such it continued to collect and report on British technical developments, but it no longer had any duties involving areas outside the European theater.

It is difficult to evaluate the work of SPOBS and USAFBI, for much of what they accomplished was intangible. For the most part their work was preparatory and preliminary. The extent of their accomplishment is certainly not reflected in the size of the U.S. forces brought to the United Kingdom in this period. At the end of May 1942, just before the activation of ETOUSA, the U.S. troop strength in the British Isles totaled only 35,668, of which 32,202 comprised the Northern Ireland forces. Fewer than 2,000 men of the Eighth Air Force had arrived. Thus, the build-up of U.S. forces was only beginning, and the rate of this build-up was not the responsibility of SPOBS or USAFBI.

As for the basic organizational structure or framework of the theater, it had been established more in spite of General Chaney and his staff than because of them. Chaney had plumped for an organization that called for regional rather than functional commands, and for an SOS organization that occupied a more subordinate position than that outlined in directives from the War Department. On both these matters he found himself out of harmony with current War Department thinking. This state of affairs probably resulted as much from misunderstanding and lack of information on what was transpiring in the War Department as from basic disagreement on principle. Significant developments had taken place in March and April 1942 which tended to nullify if not to render obsolete the command ideas of the USAFBI commander. First of all, strategic decisions at this time resulted in a radical alteration of the ABC–1 agreements as they applied to the United Kingdom, and provided for a huge build-up of U.S. forces there and a greatly enlarged role for American forces in the European area. Perhaps an even more important factor which operated to defeat General Chaney's ideas on command was the reorganization of the War Department whereby three co-ordinate subcommands had been established. Both the SOS and the Air Forces in the United States were headed by strong personalities who wanted to set up parallel commands in the theater and to establish direct lines of technical control to the theater counterparts of their commands in the zone of interior. In view of Chaney's lack of knowledge of these developents, his plans for the organization of his command were logical and understandable. The War Department's own early indecision on these matters is reflected in the disposition on the part of OPD to uphold General Chaney initially in his views on the separate air force command.

But however justified General Chaney was in opposing the command arrangements imposed from the War Department and in arguing the merits of his own ideas, these contentions undoubtedly influenced the decision to relieve him from his command. In notifying Chaney of his relief, General Marshall explained the change by stating that he deemed it urgently important that the commander in the ETO

be an officer more intimately acquainted with the War Department's plans and one who had taken a leading part in the developments since December.[33] It is apparent that other factors entered into the War Department's decision. Chaney had been overcautious in undertaking any commitments in the United Kingdom, even after the United States had definitely joined the ranks of the belligerents; he was thought to lack the necessary drive to carry out the enlarged program in the theater; and it was felt inappropriate for an air force officer to command the large ground forces which were to be sent to the United Kingdom. He was out of sympathy with General Arnold's ideas, and it is obvious that he was not in the highest favor with the inner circle of the Air Forces, for he was never given one of its top commands.

General Chaney had held a difficult position both as head of SPOBS and as Commanding General, USAFBI. His mission had never been clearly defined, and his authority over U.S. forces in the United Kingdom was indefinite even after his appointment as Commanding General, USAFBI, in January 1942. In the opinion of one of his staff, USAFBI was not a theater of operations, but rather "one of several forces operating in the theater." [34] This view is supported by the fact that Chaney was frequently bypassed in the arrangements made by the War Department for the organization of the theater. For example, the War Department cable announcing the appointment of the V Corps commander went directly to General Hartle in Northern Ireland without previous reference to General Chaney for approval.[35] In the spring of 1942 General Arnold visited the United Kingdom, met with Air Chief Marshal Sir Charles Portal and laid out sites for air units, again without the knowledge or consent of General Chaney. The anomalous position of the USAFBI commander is further revealed in the questions which the British put to General Eisenhower during his visit to the United Kingdom in May. They looked upon Chaney as something "other than a Theater Commander," and were obviously puzzled as to the U.S. agencies and officials with whom their planners were to work. It was then that Eisenhower, and Arnold and Somervell, who were also in England at this time, realized the necessity of impressing upon the British the fact that Chaney had complete responsibility for U.S. forces in the United Kingdom.[36] Before this time, however, there was no real acknowledgment in practice that Chaney possessed such full authority. The same attitude was reflected in the tendency to keep General Chaney in the dark as to what was being planned in Washington and what was expected of USAFBI. While General Chaney was forewarned of the shipment of troops to the British Isles, the MAGNET plan itself was not received in his headquarters until after the first contingent had already arrived in Northern Ireland.[37]

This situation was inevitably accompanied by an overlapping of function, confusion of authority, and duplication of effort. General Chaney really had a dual role. Until the War Department reorganization of 1942, as Commanding General,

[33] Cbl 1197, Marshall to Chaney, 11 Jun 42, OPD Exec 10, Folder 33.

[34] Organization and Command, I, 44.

[35] Interv with Dahlquist, 16 Jul 45, ETO Adm 517 Intervs.

[36] Eisenhower's Rpt, BOLERO Trip, 23–30 May 42, OPD ABC 381 BOLERO, 3–16–42, Sec 1.

[37] Memo, Chaney for Hist Div, 23 Jul 46, and Memo, Brig Gen Homer Case for Hist Div, 19 Jul 46, OCMH.

USAFBI, he came under the immediate control of the Commanding General, Army Field Forces (GHQ), which was not organized or prepared to exercise proper control over an overseas command. As Special Army Observer Chaney reported directly to the War Department.[38] The result was that the USAFBI commander received directives from several offices in the War Department. There was a definite lack of co-ordination in the assignment and control of the various groups of observers sent to the United Kingdom. Some worked under SPOBS, some under USAFBI, some under the military attaché, and some as "special military observers" sent to the United Kingdom on separate missions. Many reported directly to the War Department, working independently of SPOBS and the military attaché, and duplicated the work others had already done. In this way Northern Ireland was reconnoitered and surveyed at least four or five times, to the bewilderment of the British.[39]

Another handicap under which SPOBS and USAFBI labored was the lack of adequate personnel for the many duties they were called on to perform. This became a particularly serious drawback after the announcement early in January that troops would soon arrive in the United Kingdom. USAFBI initially operated with a headquarters smaller than that of a regiment. Most of the staff sections consisted of but one officer and one enlisted man, and certain staff positions could not be filled at all initially. USAFBI was so shorthanded at the time the reception of the first Northern Ireland contingent was being planned that officers had to be borrowed from the military attaché,[40] who for some time operated with a staff much larger than that of General Chaney.[41] The War Department did not even begin to send additional officers to build up the headquarters until April, and the necessary housekeeping troops were provided only by transferring men from Northern Ireland.

SPOBS even considered its name a handicap. The choice was dictated by considerations of security, but as a result many officers in the War Department were unaware of the true significance of the group and came to look upon it as a mere information-gathering agency. Actually SPOBS went to the United Kingdom as a military mission and "not just to look at gadgets," and became the nucleus of a headquarters for an operational force in that country.[42]

Despite their many difficulties and the fact that they were overruled on some matters, SPOBS and USAFBI made many positive contributions toward the development of the theater. Perhaps the most tangible of their accomplishments were the preparations they made for the first American troop arrivals and the planning they carried out for the reception of greater numbers later. The reception of U.S. units in Northern Ireland constituted a "preliminary canter" in which many of the problems that were to arise under the BOLERO build-up were resolved in minor form. In making these preparations

[38] Cbl 293, AGWAR to SPOBS, 8 Jan 42, ETO Adm 502 Boundaries and Comd; Interv with Dahlquist, 16 Jul 45.

[39] Memo, Chaney for Hist Div, 23 Jul 46, OCMH; Interv with Brig Gen Ralph A. Snavely, 17 Oct 45, and Interv with Dahlquist, 16 Jul 45, ETO Adm 517 Intervs.

[40] Interv with Brig Gen G. Bryan Conrad, 12 Aug 45, ETO Adm 517 Intervs.

[41] Interv with Dahlquist, 15 Jul 45, ETO Adm 517 Intervs.

[42] Intervs with Dahlquist, 16 Jul 45, and Bolté, 4 Oct 45, ETO Adm 517 Intervs.

SPOBS and USAFBI established an early liaison with the British on all types of military matters, thus laying the foundation for one of the most intimate collaborations ever achieved by two allies.

Arranging for the accommodation of American troops afforded the services, particularly the engineers, an especially fruitful opportunity to gain experience. While little new construction was actually completed in the first year, the engineers under General Davison went far in establishing policy for the transfer of accommodations and in setting up standards of construction, and had made good progress in planning the housing facilities for American troops and arranging for the transfer and construction of airfields. The Chief Surgeon, Colonel Hawley, likewise had determined on a scheme of hospitalization agreeable to the British, had established requirements and standards, and had inaugurated an expansion of the hospital construction program. The Signal Corps was probably the first of the services to acquire practical working experience in the United Kingdom. Colonel Matejka, SPOBS Signal Officer, had early established working arrangements with the British signals organization on the use of British installations and equipment, and on the schooling of American units in British communications procedure. The Quartermaster Corps also shared in the early determination of policy for the accommodation of American troops. Under the USAFBI Quartermaster, Colonel Middleswart, a British suggestion that American troops draw their food supplies from the same sources as British troops was rejected, and steps were taken to establish separate U.S. imports and depots to insure that American troops would have American rations.[43]

Other staff sections also traced their beginnings to the days of SPOBS and USAFBI, and initiated the activities which later were greatly expanded in the much enlarged ETOUSA organization. Agreements were reached with the British on the handling of mail; the *Stars and Stripes* was launched as a weekly in April; and on General Chaney's recommendation the War Department designated the Red Cross as the sole welfare agency to work with troops in the theater. He also insisted on the control of press relations and censorship as a function of his command, independent of the British.[44] It was in the SPOBS period also that discussions were initiated with the British government leading to the passage of the Visiting Forces Act by the British Parliament in August 1942, which gave the Americans full legal jurisdiction over their own forces and exempted them from criminal proceedings in the courts of the United Kingdom.

All the varied activities of the predecessor commands—their work with the Harriman mission in inaugurating lend-lease aid to both Britain and the USSR; their efforts in connection with the technical aspects of lend-lease; their aid in the establishment of bases in the Middle East for maintenance of American-built equipment used by the British; their supervision of the Electronics Training Group; their collaboration with the British, through the Technical Committee, on radar and jet propulsion; their assistance in expediting modifications in American equipment as a result of their reporting of defects in U.S. airplanes, tanks, and other matériel used

[43] See the technical service histories in this series for more detailed coverage of the SPOBS accomplishments.

[44] Memo, Case for Hist Div, 19 Jul 46, OCMH.

by the British in combat, especially their valuable recommendations on the improvement of fighter planes, notably the P–51—all these and their many other services constituted a formidable record of accomplishment that enriched the legacy bequeathed to ETOUSA. Even though, as one of the special observers has pointed out, ETOUSA insisted on repeating much of the work of SPOBS and USAFBI, the new headquarters inherited invaluable permanent working organizations and the hard core of a command structure for the theater.

CHAPTER II

The SOS and ETOUSA in 1942

(1) BOLERO Is Born

The first major task confronting the newly activated ETOUSA, beyond its internal organization, was to prepare for the reception of the American forces which were scheduled to arrive in the British Isles. The strategic decision which provided the basis for this build-up was taken in April 1942.

At the ARCADIA Conference in Washington in December 1941–January 1942, American and British military leaders had taken steps to allocate shipping and deploy troop units, had determined on the principle of unity of command, and had created the Combined Chiefs of Staff (CCS) as an over-all combined co-ordinating agency. Despite the unexpected manner in which the United States had been drawn into the war, they also reaffirmed the earlier resolution to give priority to the defeat of Germany. Beyond this, however, no decisions were made on how or where the first offensives were to be carried out. In 1941 British planners had drawn up a plan, known as ROUNDUP, for a return to the Continent. But ROUNDUP was not conceived on the scale required for an all-out offensive against a strong and determined enemy. It was designed rather to exploit a deterioration of the enemy's strength, and to serve as the *coup de grâce* to an enemy already near collapse. It reflected only too well the meager resources then available to the British. The conferences at ARCADIA gave more serious consideration to a plan for the invasion of northwest Africa, known as GYMNAST. This also became academic in view of the demands which the Pacific area was making on available troops and shipping. The ARCADIA deliberations therefore led to the conclusion that operations in 1942 would of necessity have to be of an emergency nature, and that there could be no large-scale operations aimed at establishing a permanent bridgehead on the European Continent that year.

In the first hectic months after American entry into the war, when the United States was preoccupied with measures to check Japanese expansion toward Australia, U.S. planners had not agreed on a long-range strategy. But an early decision on ultimate objectives was urgently needed if the American concept of a final decisive offensive was ever to be carried out. The President urged immediate action on such a guide, and in March 1942 the Operations Division of the War Department worked out a plan for a full-scale invasion of Europe in 1943. General Marshall gave the proposal his wholehearted

support and, after certain revisions in language had been made, presented it to the President on 2 April. The Commander in Chief promptly approved the plan and also the idea of clearing it directly with the British Chiefs of Staff in London. General Marshall and Harry Hopkins accordingly flew to England immediately and, in discussions between 9 and 14 April, won the approval of the British Chiefs of Staff for the "Marshall Memorandum." The plan that it embodied had already been christened BOLERO.

It contemplated three main phases: a preparatory period, the cross-Channel movement and seizure of beachheads between Le Havre and Boulogne, and the consolidation and expansion of the beachheads and beginning of the general advance. The preparatory phase consisted of all measures that could be undertaken in 1942 and included establishment of a preliminary active front by air bombardment and coastal raids, preparation for the possible launching of an emergency operation in the fall in the event that either the Russian situation became desperate or the German position in Western Europe was critically weakened, and immediate initiation of procurement, matériel allocations, and troop and cargo movements to the United Kingdom. The principal and decisive offensive was to take place in the spring of 1943 with a combined U.S.-British force of approximately 5,800 combat aircraft and forty-eight divisions.

Logistic factors were the primary consideration governing the date on which such an operation could take place. It was proposed that at the beginning of the invasion approximately thirty U.S. divisions should be either in England or en route, and that U.S. strength in Britain should total one million men. To move such a force required a long period of intensive preparation. Supplies and shipping would have to be conserved, and all production, special construction, training, troop movements, and allocations co-ordinated to a single end. The shortage of shipping was recognized as one of the greatest limitations on the timing and strength of the attack, and it was therefore imperative that U.S. air and ground units begin moving to the United Kingdom immediately by every available ship. Because the element of time was of utmost importance, the Marshall Memorandum emphasized that the decision on the main effort had to be made immediately to insure that the necessary resources would be available.[1]

Such a decision was obtained with the acceptance of the BOLERO proposal by the British in mid-April. Despite the succession of defeats in the early months of 1942, approval of the Marshall Memorandum instilled a new optimism, particularly among American military leaders. There now was hope that what appeared to be a firm decision on the Allies' major war effort would put an end to the dispersion of effort and resources. The decision of April provided a definite goal for which planners in both the United States and the United Kingdom could now prepare in detail.

To implement such planning for the BOLERO build-up a new agency was established. Within a week after agreement was reached in London, Brig. Gen. Thomas T. Handy, Army member of the Joint Staff Planners of the Joint Chiefs of Staff, on the suggestion of General Eisenhower, proposed the establishment of a combined U.S.-British committee for detailed

[1] Plan, Operations in Western Europe, n. d., ETO Adm BOLERO Misc.

BOLERO planning,[2] and on 28 April the Combined Chiefs of Staff directed the formation of such an agency as a subcommittee of the Combined Staff Planners. This agency was known as the BOLERO Combined Committee and consisted of two officers from OPD, two Navy officers, and one representative from each of the three British services. The committee was to have no responsibility for preparing tactical plans. Its mission was to "outline, co-ordinate and supervise" all plans for preparations and operations in connection with the movement to, and reception and maintenance of American forces in, the United Kingdom. This would cover such matters as requirements, availability, and allocation of troops, equipment, shipping, port facilities, communications, naval escort, and the actual scheduling of troop movements.[3] As observed by its chairman, Col. John E. Hull, at the first meeting of the BOLERO Combined Committee on 29 April 1942, the new agency's principal business would be to act as a shipping agency.[4]

A similar committee, known as the BOLERO Combined Committee (London), was established in England. The London committee's main concern was with the administrative preparation for the reception, accommodation, and maintenance of U.S. forces in the United Kingdom. Working jointly, the two agencies were to plan and supervise the entire movement of the million-man force which was scheduled to arrive in Britain within the next eleven months. To achieve the closest possible working arrangement, a system of direct communications was set up between the two committees with a special series of cables identified as Black (from Washington) and Pink (from London). The exchange of communications began on the last day of April, when the Washington committee requested information on British shipping capacities and urged that the utmost be done to get the movement of troops started promptly in order to take advantage of the summer weather.[5] By the first week in May detailed planning for the movement and reception of the BOLERO force was under way in both capitals.

For several weeks after the April decision on strategy and the establishment of the Combined Committees considerable confusion arose over the exact scope and meaning of the term BOLERO. The proposal that General Marshall took with him to London had carried no code word; it was titled simply "Operations in Western Europe." The code name BOLERO had first become associated with the plan in the War Department OPD. In that division's first outlines of the plan BOLERO embodied not only the basic strategic concept of a full-scale cross-Channel attack in 1943 but also the preparatory phases, including the supply and troop build-up in the United Kingdom and any limited operations which might be carried out in 1942. Within a few weeks two additional code names had come into use for specific aspects of the over-all plan. General Marshall's memorandum had spoken of a "modified plan" which it might be necessary to carry out on an "emergency" basis. By this was meant a limited operation which might be launched against the

[2] JPS Min (extract), 13th Mtg, 22 Apr 42, OPD ABC 381 BOLERO 3-16-42, Sec 1.

[3] CPS Dir, Preparation of War Plan BOLERO, CPS 26/2/D, 28 Apr 42, OPD ABC 381 BOLERO 3-16-42, Sec 1.

[4] BCC(W) Min, 1st Mtg, 29 Apr 42, ETO Adm BOLERO Misc.

[5] Cbl Black 1, BCC(W) to BCC(L), 30 Apr 42, ETO Adm 391 BOLERO 1943.

European Continent in the event the Red armies showed signs of collapse or the German position in France was materially weakened. For such an operation the scale of possible American participation would be particularly limited because of the shortage of shipping. It was estimated that not more than 700 combat planes and three and a half divisions would have arrived in England by mid-September, although considerably larger forces would be equipped and trained in the United States and ready to take part as shipping became available. This "emergency" or "modified plan" soon came to be known as SLEDGEHAMMER, a name which Prime Minister Winston S. Churchill had coined earlier in connection with similar plans made by the British. Similarly, the more purely tactical aspects of the BOLERO plan—the actual cross-Channel attack—were soon commonly referred to by the name which British planners had used in connection with their earlier plans for continental operations, ROUNDUP, even though those earlier plans bore little resemblance to the project now in preparation. There already existed in London a ROUNDUP committee engaged in the administrative planning for a cross-Channel operation.

The increased use of SLEDGEHAMMER and ROUNDUP in communications produced an inevitable confusion and doubt over the exact meaning of BOLERO. Late in May USAFBI pointed out to the War Department the wide divergency in views held in Washington and London,[6] and OPD finally took steps to have the term BOLERO defined. Early in July a presidential directive was issued stipulating that BOLERO would cover specifically the "preparation for and movement of United States Forces into the European Theater, preparation for their reception therein and the production, assembly, transport, reception and storage of equipment and supplies necessary for support of the United States Force in operations against the European Continent." [7] Thenceforth the use of the name BOLERO was confined to the plan for the great build-up of men and matériel in the United Kingdom.

The inauguration of the BOLERO build-up initially posed a fourfold problem: the establishment of a troop basis; a decision on the composition of the BOLERO force, including the priority in which units were desired in the United Kingdom; setting up a shipping schedule; and preparing reception and accommodation facilities in the United Kingdom. Designating the priority in which various units were desired and preparing their accommodations in the British Isles were problems that had to be solved in the theater. Establishing the troop basis or troop availability and setting up a shipping schedule were tasks for the War Department, the shipping schedule more specifically in the province of the BOLERO Combined Committee in Washington. But the four tasks were interrelated, and required the closest kind of collaboration between the theater headquarters, British authorities, the two Combined Committees, the OPD, and other War Department agencies.

One step had already been taken toward establishing a troop basis when the Marshall Memorandum set the goal of a build-up of a million men in the United Kingdom by 1 April 1943. In fact, this was the only figure that had any near-stability

[6] Memo, Bolté for Eisenhower, 29 May 42, USFET AG 381 54-40 BOLERO.

[7] Memo, OPD for CofS, sub: Code Designators for Opns in ETO, 7 Jul 42, with draft presidential dir, WD AG, ETO.

in the rapidly shifting plans of the first months. The accompanying target of 30 U.S. divisions in England or en route by April 1943 represented hardly more than wishful thinking at this time. It proved entirely unrealistic when analyzed in the light of movement capabilities, and War Department planners within a matter of weeks reduced the figure first to 25 divisions, then to 20, and finally to 15.[8]

Meanwhile planners in both the United States and in the United Kingdom had begun work on a related problem—the composition of the BOLERO force, and the priority in which units were to be shipped. In determining what constituted a "balanced force" there was much opportunity for disagreement. Ground, air, and service branches inevitably competed for what each regarded as its rightful portion of the total troop basis. A survey of manpower resources in the spring of 1942 revealed a shocking situation with regard to the availability of service units. Only 11.8 percent of the 1942 Army troop basis had been allotted for service troops, a woefully inadequate allowance to provide support for combat troops in theaters of operations. Neglect of the service elements in favor of combat troops reflected an attitude which was common before the Franco-Prussian War of 1870, but which hardly squared with the proven logistic requirements of modern warfare. A study made in the War Department SOS in April showed that, of the total AEF force of nearly two million men in France at the end of World War I, 34 percent were service troops, exclusive of the service elements with the ground combat and air force units. On the basis of the 1917–18 experience the study estimated that the SOS component of the BOLERO force should be at least 35 percent, or about 350,000 men, and General Somervell requested OPD to take these figures into consideration in any troop planning for BOLERO.[9]

The earliest breakdown of the BOLERO force troop basis provided that approximately 26 percent of the troop basis be allotted to service forces. The Combined Committee in Washington tentatively suggested the following composition of the U.S. force early in May, and requested USAFBI's opinion on the proportions: [10]

Type	*Number*
Total	1,042,000
Air Forces	240,000
Services of Supply	277,000
Ground Forces	[1] 525,000

[1] (17 divisions plus supporting units).

These figures already embodied a small reduction of an earlier ground force troop basis made to preclude a reduction in the service troop allocation.[11] Approximately one fourth of the BOLERO force was thus allotted to service troops.

Later in May the War Department established the general priorities for the movement of American units. Air units were to be shipped first, followed by essential SOS units, then ground forces, and then additional service units needed to

[8] Memo, Secy WDGS for CG SOS *et al.*, sub: Troop Basis, 19 May 42, WDAG OPD 320.2 BOLERO. The various copies of the BOLERO plan reveal later downward revisions. ETO Adm BOLERO Misc.

[9] Memo, Col Roy C. L. Graham, Deputy Dir of Opns SOS, for Somervell, sub: Proportion of Svc Troops to Ground Forces, 27 Apr 42, and Memo, Somervell for Eisenhower, 29 Apr 42, WDAG C/S 370.5 4-27-42; Remarks, Col Carter B. Magruder, Plng Div ASF, ASF Conf, 2 Jun 42, ASF Plng Div 106 BOLERO.

[10] Cbl Black 2, BCC(W) to BCC(L), n. d. (early May 42), ETO 381 BOLERO 1943.

[11] BCC(W) Min, 3rd Mtg, 6 May 42, Annex 1, OPD ABC 381 BOLERO, Sec 1.

prepare the ground for later shipments.[12] By the end of the month General Chaney, who was still in command in the United Kingdom, submitted lists of priorities within the War Department's announced availabilities.[13]

There still remained the problem of finding and making available the numbers and types of troop units which the theater desired. This presented no insurmountable difficulty so far as combat units were concerned, since adequate provision had been made for their activation and training. But in the spring of 1942 few trained service troops were available for duty in overseas theaters, and service troops beyond all others were required first in the United Kingdom. It was imperative that they precede combat units in order to receive equipment and supplies, prepare depots and other accommodations, and provide essential services for the units which followed. Certain types of units were not available at all; others could be sent with only some of their complements trained, and those only partially.[14] On the assumption that "a half-trained man is better than no man," General Lee willingly accepted partially trained units with the intention of giving them on-the-job training, so urgently were they needed in the United Kingdom.[15] As an emergency measure, the War Department authorized an early shipment of 10,000 service troops.[16]

Scheduling the shipment of the BOLERO units proved the most exasperating problem of all. The shortage of shipping circumscribed the planners at every turn, strait-jacketing the entire build-up plan and forcing almost daily changes in scheduled movements. U.S. shipping resources were limited to begin with, and were unequal to the demands suddenly placed on them by planned troop deployments in both the Atlantic and Pacific. War Department planners estimated early in March 1942 that 300,000 American troops could be moved to the United Kingdom by October. This prospect was almost immediately obscured by decisions to deploy additional British forces to the Middle East and the Indian Ocean area and U.S. troops to the Southwest Pacific, and by the realization that enemy submarines were taking a mounting toll of Allied shipping. Late in March the earlier optimism melted away in the face of estimates that large troop movements could not begin until late in the summer, and that only 105,000 men, including a maximum of three and a half infantry divisions, might be moved to Britain by mid-September.

British authorities had offered some hope of alleviating the shortage in troop lift by transferring some of their largest liners to the service of the BOLERO build-up as soon as the peak deployment to the Middle East had passed. But the shortage of cargo shipping was even more desperate, and the fate of the build-up depended on the balancing of cargo and troop movements. There was particular urgency about initiating the build-up during the summer months, in part to take advantage of the longer days which permitted heavier

[12] Ltr, Hull to Bolté, 19 May 42, ETO AG 381 re-40 May–Dec 42.

[13] Cbl 839, Marshall to USFOR London, 24 May 42, and Cbl 1761, USFOR to AGWAR, 29 May 42, ETO 381 BOLERO 1943.

[14] Remarks by Col Magruder, ASF Conf, 2 Jun 42.

[15] The remark was made by General Larkin, Lee's chief of staff, in one of the organizational conferences held in the War Department before the departure for England. Lee Diary, 18 May 42.

[16] Memo, Col Griner, G-4 USAFBI, for CofS, sub: Breakdown of 10,000 SOS Troops, 22 May 42, ETO Preinvasion 321 BOLERO.

unloadings at British ports, and in part to avoid the telescoping of shipments into a few months early in 1943 in view of the unbearable congestion it would create in British ports. In mid-April, at the time of the Marshall visit to England, American authorities took some encouragement from a British offer to provide cargo shipping as well as troopships on the condition that American units cut down on their equipment allowances, particularly for assembled vehicles. But these commitments were unavoidably vague, for it was next to impossible to predict what shipping would be available for BOLERO in the summer of 1942, when the Allies were forced to put out fires in one place after another.[17]

The hard realities of the shipping situation made themselves felt again shortly after the London conference. On 9 May the War Department issued a "Tentative Movement Schedule" providing for the transfer of about 1,070,000 American troops to the United Kingdom by 1 April 1943.[18] The title was immediately recognized as a misnomer, for the figure simply indicated the number of troops which would be available for movement and bore no relationship to actual shipping capabilities. On the very day this so-called movement schedule was issued, the BOLERO Combined Committee of Washington revealed the sobering facts regarding the limitations which shipping imposed, notifying the London committee that a build-up of not more than 832,000 could be achieved in the United Kingdom by 1 April 1943.[19] There was even talk of lowering the goal to 750,000 and so allocating the various components as to create a balanced force in case a reduction proved necessary. The revised figure would have been 250,000 short of the million-man target and more than 300,000 short of the total number of troops available. For the moment it again appeared that a force of only 105,000 men could be moved to the United Kingdom by September. Even this number was to be reached only by postponing the evacuation of British troops from Iceland. The Combined Chiefs of Staff, in approving these shipments, noted that while long-range schedules could be projected it was impossible to forecast what the shipping situation might be in a few months.[20]

The warning that shipping capacity might fluctuate was soon justified. Within a week British officials were able to promise additional aid for the month of June by diverting troop lift from the Middle East–Indian Ocean program. They offered the use of both of the "monsters," the *Queen Mary* and *Queen Elizabeth*, and part-time use of other ships, including the *Aquitania*, beginning in August.[21] Accordingly in mid-May it was possible to schedule an additional 45,000 for shipment in June, July, and August, which would bring the strength in the United Kingdom to approximately 150,000 by 1 September 1942.[22] Part of the accelerated movement

[17] See Richard M. Leighton and Robert W. Coakley, The Logistics of Global Warfare, in preparation for this series, draft chapter "BOLERO: First Phase," for a full discussion of BOLERO planning at the War Department level.

[18] Tentative Movement Schedule, 9 May 42, OPD ABC 381 BOLERO, Sec 1.

[19] Cbl Black 4, BCC(W) to BCC(L), 9 May 42, ETO 381 BOLERO 1943.

[20] CCS Min (extract), 19th Mtg, 12 May 42, OPD ABC 381 BOLERO.

[21] Leighton and Coakley, Logistics of Global Warfare, Ch. XII; JCS Min (notes and extract), 15th Mtg, 18 May 42, sub: BOLERO—Rpt of CPS, OPD ABC 381 BOLERO 3-16-42, Sec 1.

[22] Cbl 742, AGWAR to USFOR London, 18 May 42, ETO BOLERO Incoming Msgs, BOLERO Movements; Memo, Hull, 21 May 42, sub: Troop Movement Schedules for BOLERO and NABOB, OPD ABC 381 BOLERO 3-16-42, Sec 1.

was to be accomplished by the overloading of troop carriers. The long-range shipping schedule now projected a build-up of 892,000 by 1 April 1943.

These schedules had no more permanency than those prepared earlier. A further revision was made early in June, slightly reducing the shipments for July and August. Later in June, the darkest month of the war, fresh disasters threatened to upset the entire build-up projected for that summer.

In the meantime the theater had attempted to reconcile its BOLERO troop allotment with limitations imposed by the shipping shortage. Early in June the War Department had submitted to ETOUSA a troop basis made up as follows:

Type	*Number*
Total	1,071,060
Air Forces	206,400
Services of Supply	279,145
Headquarters units	3,932
Combat divisions (20)	278,473
Ground support units	303,110

The deficit in shipping, however, obliged ETOUSA to determine whether, within the limitations, a force of adequate strength and balance could be built up in the United Kingdom. Senior commanders there had decided that a minimum of fifteen divisions out of the twenty provided for in the War Department troop basis must be present in the United Kingdom on the agreed target date. Theater planners therefore estimated that 75,000 places could be saved by dropping a maximum of five divisions. Another saving of 30,000 could be realized by deferring the arrival of certain ground support troops until after 1 April. Even these cuts left a deficit of 35,000 places, and the theater therefore found it necessary to direct its major commands to make a detailed study of their personnel requirements with a view toward further reducing troop requirements and deferring shipments. These steps were taken reluctantly, for the theater deplored deferring the arrival of units which it thought should be in the United Kingdom by the target date, and naturally would have felt "more comfortable" with assurances that the million-man build-up would be achieved.[23]

A few weeks later the theater headquarters made a new statement of its requirements for a balanced force. It called for a force of sixteen divisions and provided for reductions in all other components to the following numbers:

Air Forces to	195,000
Services of Supply	250,000
Divisions (16)	224,000
Ground support units	292,564

But the estimate included a new requirement for 137,000 replacements, which had the net effect of increasing the troop basis to approximately 1,100,000.[24] The deficit in shipping consequently became greater than before. In attempting to achieve the target of the BOLERO plan the two nations thus faced an unsuperable task in the summer of 1942. By the end of July, however, a major alteration in strategy was destined to void most of these calculations.

(2) BOLERO Planning in the United Kingdom, May–July 1942: the First Key Plans

While the War Department wrestled with the shipping problem, preparations

[23] Memo, Hq ETO for BCC(L), 26 Jun 42, ETO BCC Bk 1; Staff Memo, Col Barker for Cof S ETO, 15 Jun 42, sub: Troop Basis, ETO Adm 346 Troop Basis.

[24] BCC(L) Progress Rpt 10, 20 Jul 42, ETO BCC Bk 2.

for the reception and accommodation of the BOLERO force got under way in the United Kingdom. The principal burden of such preparation was assumed at first by British agencies, which had been prompt to initiate planning immediately after the strategic decisions made at Claridge's in April, a full month before the arrival of General Lee and the activation of the SOS. British and American planners had of course collaborated in preparing for the arrival of the MAGNET force in Northern Ireland, but the BOLERO plan now projected a build-up on a scale so much greater than originally contemplated that it was necessary to recast accommodation plans completely.

The million troops that the War Department planned to ship to the European theater were destined to go to an island which had already witnessed two and one-half years of intensive war activity. Now the United Kingdom was to be the scene of a still vaster and more feverish preparation as a base for offensive operations. The existence of such a friendly base, where great numbers of troops and enormous quantities of the munitions of war could be concentrated close to enemy shores, was a factor of prime importance in determining the nature of U.S. operations against the continental enemy. It was a factor perhaps too frequently taken for granted, for the United Kingdom, with its highly developed industry and excellent communications network, and already possessing many fixed military installations, including airfields and naval bases, was an ideal base compared with the underdeveloped and primitive areas from which American forces were obliged to operate in many other parts of the world.

The United Kingdom already supported a population of 48,000,000 in an area smaller than the state of Oregon. In the next two years it was to be further congested by the arrival of an American force of a million and a half, requiring such facilities as troop accommodations, airfields, depots, shops, training sites, ports, and rolling stock. Great Britain had already carried out a far more complete mobilization than was ever to be achieved in the United States. As early as 1941, 94 out of every 100 males in the United Kingdom between the ages of 14 and 64 had been mobilized into the services or industry, and of the total British working population of 32,000,000 approximately 22,000,000 were eventually drafted for service either in industry or the armed forces.[25] The British had made enormous strides in the production of munitions of all types. In order to save shipping space they had cut down on imports and made great efforts to increase the domestic output of food. There was little scope for accomplishing such an increase in a country where nearly all the tillable land was already in cultivation. In fact, the reclamation of wasteland was more than offset by losses of farm land to military and other nonagricultural uses. Raising the output of human food could be accomplished only by increasing the actual physical yield of the land, therefore, and by increasing the proportion of crops suitable for direct human consumption, such as wheat, sugar beets, potatoes, and other vegetables.

[25] Of the total male population of 16,000,000 between the ages of 14 and 64, 15,000,000 were mobilized into the services and industry, and of the total female population of 16,000,000 between the ages of 14 and 59, about 7,000,000 were eventually mobilized. W. K. Hancock, ed., *Statistical Digest of the War (History of the Second World War, Civil Series)*, prepared in the Central Statistical Office (London, 1951), p. 8; British Information Service, *50 Facts about Britain's War Effort* (London, 1944), p. 7.

Despite measures such as these the British had accepted a regimentation that involved rigid rationing of food and clothing, imposed restrictions on travel, and brought far-reaching changes in their working and living habits. For nearly three years they had lived and worked under complete blackout; family life had been broken up both by the withdrawal of men and women to the services and by evacuation and billeting. Production had been plagued by the necessity to disperse factories in order to frustrate enemy air attacks and by the need to train labor in new tasks. Nearly two million men gave their limited spare time after long hours of work for duty in the Home Guard, and most other adult males and many women performed part-time civil defense and fire guard duties after working hours. An almost complete ban on the erection of new houses and severe curtailment of repair and maintenance work on existing houses, bomb damage, the necessity for partial evacuation of certain areas, and the requisition of houses for the services all contributed to the deterioration of living conditions. Britain's merchant fleet, which totaled 17,500,000 gross tons at the start of the war, had lost more than 9,000,000 tons of shipping to enemy action, and its losses at the end of 1942 still exceeded gains by about 2,000,000 tons. A drastic cut in trade had been forced as a result. Imports of both food and raw materials were reduced by one half, and imports of finished goods were confined almost exclusively to munitions. Before the war British imports had averaged 55,000,000 tons per year (exclusive of gasoline and other tanker-borne products). By 1942 the figure had fallen to 23,000,000—less than in 1917.[26]

In an economy already so squeezed, little could be spared to meet the demands for both supplies and services which the reception and accommodation of the BOLERO force promised to make upon it. It is not surprising that British planners should visualize the impact which the build-up would have on Britain's wartime economy, and they were quick to foresee the need for an adequate liaison with the American forces in the United Kingdom, and for administrative machinery to cope with build-up problems. Planning in the United Kingdom began in earnest with creation of the London counterpart of the BOLERO Committee in Washington on 4 May 1942. The BOLERO Combined Committee (London) was established under the chairmanship of Sir Findlater Stewart, the British Home Defence Committee chairman. Its British membership included representatives of the Quartermaster General (from the War Office), the Fourth Sea Lord (from the Admiralty), the Air Member for Supply and Organization (from the Air Ministry), the C-in-C (Commander-in-Chief) Home Forces, the Chief of Combined Operations, the Ministry of War Transport, and the Ministry of Home Security.[27]

U.S. forces in the United Kingdom were asked to send representatives to the committee. Four members of General Chaney's staff—General Bolté, General McClelland, Colonel Barker, and Colonel Griner—attended the first meeting, held on 5 May at Norfolk House, St. James's Square. Because of the continued shortage of officers in Headquarters, USAFBI,

[26] *Statistical Digest of the War*, pp. 173–74, 177, 180; *Statistics Relating to the War Effort of the United Kingdom*, presented by the Prime Minister to Parliament, November, 1944 (London, 1944), pp. 1, 16–17, 19–21, 31.

[27] BCC(L) Min, 1st Mtg, 5 May 42, ETO Preinvasion 322.

however, regular U.S. members were not immediately appointed, and American representation varied at each meeting.[28] General Lee first attended a session of the BOLERO Combined Committee with a large portion of his staff on 26 May, two days after he arrived in the United Kingdom.[29]

The mission of the London Committee was "to prepare plans and make administrative preparation for the reception, accommodation and maintenance of United States Forces in the United Kingdom and for the development of the United Kingdom in accordance with the requirements of the 'ROUNDUP' plan." [30] The committee was to act under the general authority of a group known as the Principal Administrative Officers Committee, made up of the administrative heads of the three British services—the Quartermaster General, the Fourth Sea Lord, and the Air Member for Supply and Organization. To this group major matters of policy requiring decision and arbitration were to be referred. Each of the "administrative chiefs of staff," as they were first called, was represented on the Combined Committee. Sir Findlater Stewart commented at the first meeting that much detailed planning would be required. But it was not intended that the committee become immersed in details. It was to be concerned chiefly with major policy and planning. The implementation of its policies and plans was to be accomplished by the British Quartermaster General through the directives of the Deputy Quartermaster General (Liaison) and carried out by the various War Office directorates (Quartering, Movements, for example) and by the various departments of the Ministries of Labor, Supply, Works and Buildings, and so on. These would co-ordinate plans with the Combined Committee through the latter's subcommittees on supply, accommodation, transportation, labor, and medical service, which were shortly established to deal with the principal administrative problems with which the Committee was concerned. *(Chart 2)*

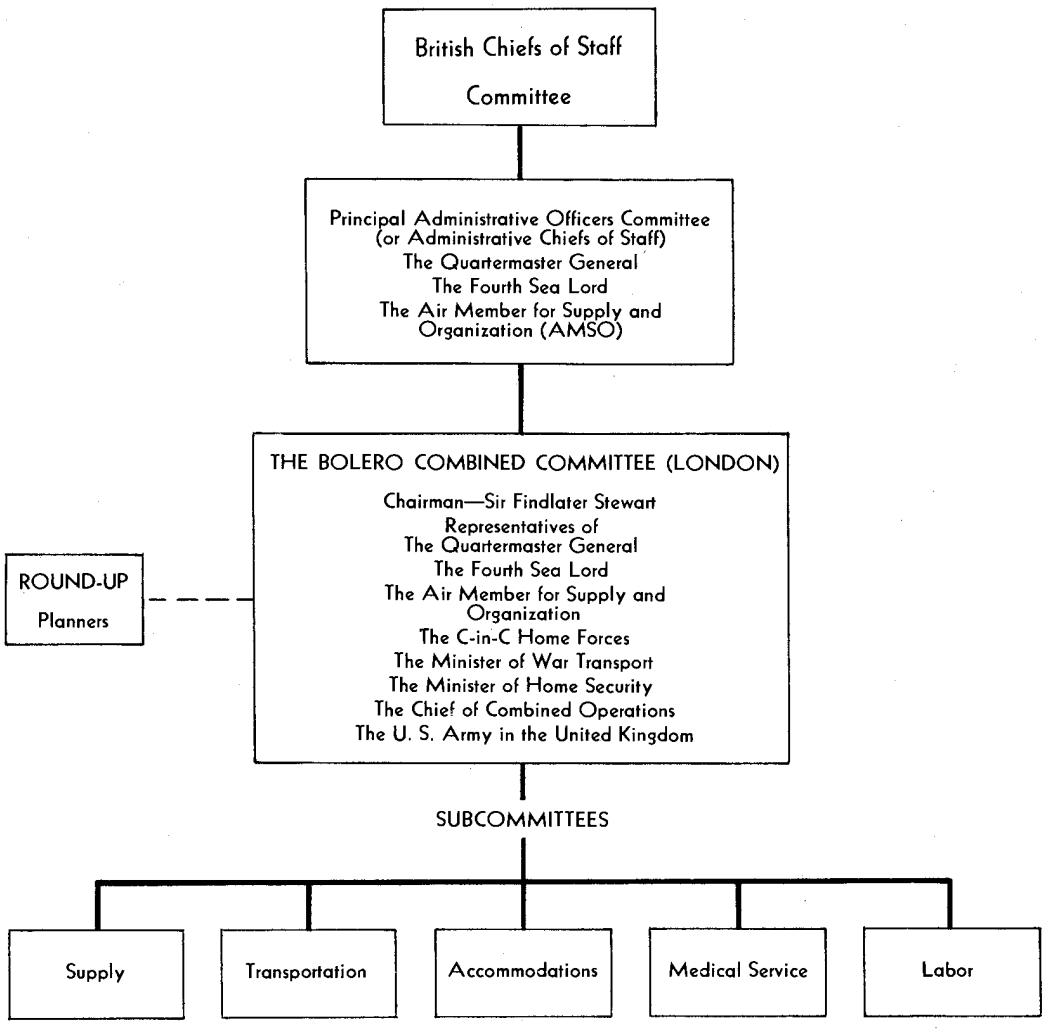
One of the key members of the Combined Committee was the Deputy Quartermaster General (Liaison), Maj. Gen. Richard M. Wootten. This officer was not only the representative of the British Quartermaster General on the London Committee and as such responsible for the implementation of the committee's decisions, but also the official agent of liaison with the American forces. British problems with respect to BOLERO were primarily problems of accommodations and supply, which in the British Army were the responsibility of the Quartermaster General (Lt. Gen. Sir Walter Venning). It was logical, therefore, that his office become the chief link between the War Office and the American Services of Supply. To achieve the necessary co-ordination with the Americans on administrative matters the War Office established a special branch under the Quartermaster General to deal exclusively with matters presented by the arrival of U.S. forces. This branch was known as Q (Liaison), and was headed by General Wootten. Q (Liaison) was further divided into two sections, one known as Q (Planning Liaison) to deal with the executive side of planning for reception and accommodation, and the other as Q (American Liaison) to deal with problems of the relation-

[28] *Ibid.*

[29] BCC(L) Min, 6th Mtg, 26 May 42, ETO Preinvasion 322.

[30] Note by Secy, War Cabinet, BCC(L), 4 May 42, ETO Preinvasion 322.

CHART 2—THE BOLERO ADMINISTRATIVE ORGANIZATION IN THE UNITED KINGDOM



Representation on the subcommittees varied. For example, the Accommodations Subcommittee had representatives from the War Office, the Admiralty, the Ministries of Air, Works and Buildings, and Health, and from ETOUSA. The Subcommittee on Supply had representatives from the War Office Director of Army Requirements, the Ministries of Production, Supply, War Transport, and Air, and U. S. representatives. The Transportation Subcommittee had representatives from the War Office, the Railway Executive Committee, the Home Forces, the War Office Director of Movements, the Ministries of War Transport, Air, and Production, and ETOUSA

ship between British and American armies in matters of discipline, morale, welfare, and public relations.

It was through the office of the Deputy Quartermaster General (Liaison) that all the BOLERO planning papers were issued in the next year and a half. General Wootten issued his first directive on 5 May 1942, the same day on which the BOLERO Combined Committee (London) held its first meeting. In it he emphasized strongly the inseparable relationship between BOLERO and ROUNDUP, and sounded the keynote of the committee's early deliberations by stressing the need for speed. The only purpose of the BOLERO build-up was to ready an American contingent of 1,000,000 men to take part in a cross-Channel invasion in April 1943. In view of the necessity to complete all preparations in less than a year, Wootten noted: "Every minute counts, therefore there must be a rapid equation of problems whilst immediate and direct action on decisions will be taken, whatever the risks, without of course disturbing the defense of this country as the Main Base." Planners were enjoined to "produce the greatest possible effort in their contribution tc defeat 'Time,' so that the goal might be met within the allotted twelve months." [31]

It was intended, therefore, that the ROUNDUP plan would be the governing factor in the administrative development of the United Kingdom as a base of operations, although this objective actually proved difficult at first in the absence of a detailed operational plan. But the BOLERO Combined Committee planned to work in close consultation with the parallel ROUNDUP administrative planning staff, and the Deputy Quartermaster General immediately asked for an outline of requirements both in labor and materials for the development of BOLERO, even though he recognized that these could only be estimates at this time. He directed that basic planning data and information be submitted so that a plan for the location of installations and facilities could be issued within the next few weeks. In fact, General Wootten did not await the receipt of planning estimates. As preliminary steps he announced that the Southern Command would be cleared of British troops, and that a census of all possible troop accommodations, depot space, and possible expansion in southern England was already being made. Certain projects for base maintenance storage and for personnel accommodation were already being studied and carried out. Acutely aware of the limited time available, General Wootten foresaw the necessity of making a large allotment of British civil labor to these projects, and, lacking definite shipping schedules from the United States, he proposed to start preparations at once for an initial force of 250,000 which he assumed would arrive between August and December. These preparations included projects for troop quarters, the construction of four motor vehicle assembly plants, and the clearance of storage and repair facilities for this force. He then proposed to deal with accommodations and storage for a second increment of 250,000. General Wootten attacked the gigantic task with vigor and with full comprehension of the myriad problems and the measures which would have to be taken to receive a force of a million men. In the first planning paper he raised a multitude of questions which he knew must be answered, and made numerous suggestions

[31] DQMG(L) Paper 1, Administrative Planning etc., for BOLERO and ROUNDUP 1943, ETO Adm BOLERO Misc.

on the most economic use of existing accommodations, on methods of construction, and on the demands which might have to be made on the civil population.[32]

Within a few weeks the BOLERO Combined Committee appointed subcommittees on accommodations, transportation, and medical service, drawing on the War Office, the Admiralty, U.S. representatives, and the various Ministries of Health, War Transportation, and Works and Buildings for representation according to interest and specialty. The Combined Committee met six times in May and by the end of the month had gathered sufficient information and planning data to enable the Deputy Quartermaster General to outline for the first time in some detail the problem of receiving and accommodating the BOLERO force. This outline was known as the First Key Plan and was published on 31 May 1942. The First Key Plan was not intended as a definitive blueprint for the reception and accommodation of the American forces, the title itself indicating the probability of revisions and amendments. But it served as a basic outline plan for the build-up which was to get under way immediately. The Combined Committee and its subcommittees continued to meet and discuss various BOLERO problems in June and July, and additional planning papers and directives were issued by the Deputy Quartermaster General dealing with specific aspects of reception problems. On 25 July the more comprehensive Second Edition of the BOLERO Key Plan was published.

Although issued by the British Deputy Quartermaster General, the Key Plans were confined primarily to a consideration of U.S. requirements. Their object was stated as follows: "to prepare for the reception, accommodation and maintenance of the U.S. Forces in the United Kingdom," and "to develop [the United Kingdom] as a base from which ROUND UP operations 1943 can be initiated and sustained." [33]

The July edition of the Key Plan reiterated that ROUNDUP should be the governing factor in developing Britain as a base. But in the absence of any indication as to how cross-Channel operations were to develop, and lacking a detailed operational plan, it was accepted that administrative plans could be geared to ROUNDUP only "on broad lines," and that more detailed planning must await a fuller definition of the type and scope of the operations envisaged. One major assumption was made at an early date, however, and had a profound influence on the work of the BOLERO Committee. This was the assumption early in May which determined the location of U.S. forces in the United Kingdom. The committee noted that the general idea of any plan for a cross-Channel operation appeared to indicate that U.S. troops would be employed on the right and British troops on the left, and that U.S. forces would therefore embark from the southwestern ports when the invasion was launched. Since American personnel and cargo were to enter the United Kingdom via the western ports—that is, the Clyde, Mersey, and Bristol Channel ports—it was logical that they be concentrated in southwestern England, along the lines of communications between the two groups of ports. Such an arrangement would also avoid much of the undesirable cross traffic between American and British forces at the time of embarkation for the

[32] *Ibid.*

[33] DQMG(L) Paper 8, Key Plan for the Reception, Accommodation, and Maintenance of the U.S. Forces (Second Edition), 25 Jul 42, ETO, DQMG(L) Papers.

cross-Channel movement.[34] Thus the main principle governing the distribution of U.S. forces in the United Kingdom was that they be located primarily with a view to their role in ROUNDUP. It was not by accident, therefore, that the great concentration of American ground forces was destined at an early date to take place in the Southern Command area of the United Kingdom, and the early BOLERO planning dealt almost exclusively with that area.

The principal concern of the London Committee and the Deputy Quartermaster General was to find housing, depot space, transportation, and hospitalization for the projected BOLERO force. The size of this force had originally been set at a round figure of one million men. In the process of breaking down this figure into a balanced force of specific types and numbers of units, ETOUSA had by mid-May arrived at a troop basis of 1,049,000, and this was the working figure used in the First Key Plan.[35] This figure underwent continuing refinement in the following weeks. The Second Edition of the Key Plan reflected ETOUSA's upward revisions in June and used a troop basis of 1,147,000 men, with eighteen divisions.[36]

The BOLERO planners in the United Kingdom, like the Washington Committee, were well aware of the shipping shortage and based their program on the assumption that not more than approximately 845,000 of the projected 1,147,000 would arrive in the British Isles by 1 April 1943. But to establish a force of even that size presented an appalling movement problem, not only across the Atlantic, but from British ports to inland accommodations. The London Committee at one of its first meetings foresaw the cargo-shipping shortage as one of the greatest limitations on the movement of so large a force and considered some of the "heroic measures" which it thought were called for to reduce the problem to manageable dimensions. These included stringent economy measures, such as a further cutting of the U.K. import program, keeping down reserves and freight shipments to the lowest level, and scaling down vehicle allowances to the lowest possible figures. The problem of vehicle shipments was given particular attention because of the huge stowage space requirements involved, and the committee advocated the shipment of as many unassembled or partially assembled vehicles as possible and the construction of assembly plants in the United Kingdom.[37]

The magnitude of the movement problem within the United Kingdom is best illustrated by the tonnage which it was estimated would have to be handled, and the number of trains required for port clearance. Monthly troop arrivals were expected to average almost 100,000 men. To move such numbers would require about 250 troop trains and 50 baggage trains per month. The build-up of equipment and supplies for these forces was expected to require 120 ships per month, carrying 450,000 tons, in addition to approximately 15,500 vehicles, mostly in single and twin unit packs. To clear this

[34] Note by Secy, BCC(L), sub: Plng Factors Which Influence Work of BOLERO Com, 8 May 42, ETO Preinvasion 322.

[35] DQMG(L) Paper 2, 15 May 42, ETO Adm BOLERO Misc.

[36] DQMG(L) Paper 4 (First Key Plan), 31 May 42, and Second Edition of Key Plan, 25 Jul 42, ETO DQMG(L) Papers.

[37] Thousands of vehicles eventually were shipped in single and twin unit packs (SUP and TUP). A TUP, for example, consisted of several crates containing the partially assembled components of two vehicles. Note on Cargo Shipping Involved in Projected American Move, BCC(L), n. d. (early May), ETO Preinvasion 322.



CRATES OF PARTIALLY ASSEMBLED JEEPS *being unloaded at an assembly shop.*

tonnage inland from the ports alone would require 75,000 freight cars per month, the equivalent of 50 special freight trains per day.[38]

Reception in itself thus posed a formidable problem for the British both because of the limitations on the intake capacity of the ports and because of the added burden on the transportation system. Since the restriction on port discharge arose mainly from the shortage of dock labor, ETOUSA immediately took steps to arrange for the shipment of eight port battalions and three service battalions by the end of September, and for additional port units in succeeding months to augment the British labor force.

The United Kingdom possessed an excellent rail network and the system was in good condition at the outbreak of the war. At that time it consisted of 51,000 miles of track, nearly 20,000 of which constituted route mileage, and it possessed nearly 20,000 locomotives, 43,000 passenger cars, and 1,275,000 freight "wagons."[39] Control of the railways had been greatly simplified by the consolidation of 123 separate companies into four large systems in 1923. These had come under the control of the government in 1939 through the Emergency Powers Defence Act, a control which

[38] Second Edition, Key Plan, 25 Jul 42.
[39] *Statistical Digest of the War*, p. 188.



BRITISH "GOODS VANS" *unloading at a quartermaster depot.*

extended to docks, wharves, and harbors. Although the British railways easily withstood the first impact of the war with its increased demands and enemy bombings, it was hard put to accept the added burden which the U.S. build-up now entailed. The Movement and Transportation Sub-Committee of the Combined Committee estimated that the additional traffic resulting from BOLERO would require 70 freight trains per day. By the summer of 1942 the railways were already running 5,000 special trains for troops and supplies every month over and above normal traffic,[40] and their net ton-mileage eventually surpassed prewar performance by 40 percent.[41] An example of the remarkable degree of control and co-ordination and of the density of traffic on the British railways in wartime is seen in the scale of activity at Clapham Junction, on the Southern Railway south of London, which saw the passage of more than 2,500 trains each day.[42]

The British roads had been suffering from a deficiency of rolling stock for some time. The shortage of locomotives, in particular, had necessitated frequent cancellations of freight movements in the previous

[40] *Facts about British Railways in Wartime* (London, 1944), p. 20.

[41] *Statistics Relating to the War Effort of the United Kingdom*, p. 30.

[42] *British Railways in Wartime*, p. 62.



ENGLISH RAILWAY STATION SCENE *with U.S. unit waiting to board train.*

winter (658 trains in one week in March). For troop and cargo arrivals under the BOLERO program alone the Transportation Sub-Committee foresaw a need for 400 additional freight engines, and 50 shunting engines to operate on sidings at U.S. depots. In June the subcommittee requested that the United States meet these requirements,[43] and orders were subsequently placed for 400 freight engines (2–8–0 type) and 15 shunting engines for early delivery to the United Kingdom. Measures were also taken in Britain to improve the rail lines of communications by providing "war-flat" and "war-well" cars to facilitate the handling of American tanks and other awkward loads on the British railways.[44] In general, British rolling stock was small by American standards, the average "wagon" having only about one-sixth the capacity of freight cars on the American roads.

Four major types of accommodations were to be found or prepared for the BOLERO forces: personnel quarters, depot and shop space, hospitals, and airfields. Personnel accommodations and depot space were not immediately serious problems. Plans were made for the gradual removal of British troops from the South-

[43] Note on Locomotive Position, Movement and Transportation Sub-Committee, BCC(L), 6 Jun 42, ETO Preinvasion 322.

[44] Second Edition, Key Plan, 25 Jul 42.

ern Command area, to be completed by mid-December, and the housing of U.S. forces thus entailed only a minimum of new construction at first. Arrangements were already initiated in July 1942 to prepare for approximately 770,000 of the total force of 845,000 which was expected to arrive by 1 April 1943. Except for forces in Northern Ireland and air force accommodations to be arranged by the Air Ministry in eastern England, the great bulk of the American forces were to occupy installations in the Southern Command area, with a few going into southern Wales. The policy was early established that American troops would not be billeted in British homes except in emergency. Combat units were to be organized into divisional areas of 25,000 each and corps areas of 15,000, and service of supply troops were to be accommodated in depots, ports, and other major installations along the lines of communications. By July, four corps areas and fifteen divisional areas were already mapped out, and in some cases the specific locations of higher headquarters were determined. In general, availability of both signal communications and accommodations governed the location of headquarters. With these considerations in mind General Wootten in the First Key Plan of May had made a tentative selection of sites for several corps headquarters, had concluded that the SOS headquarters should be established at Cheltenham, and had chosen Clifton College, Bristol, as the most suitable location for an army headquarters. Both the army and SOS locations were eventually utilized as recommended.

ETOUSA had estimated that approximately 15,000,000 square feet of covered storage would be required, including 1,228,760 square feet of workshop space. Approximately half of this requirement already existed, and a program was immediately outlined for the expansion of existing facilities and for new construction. But it was estimated that space would have to be turned over to the Americans at a minimum rate of one and two-thirds million feet per month, and very little new construction was expected to become available before January 1943. There was likely to be an interim period in November and December 1942 before new construction became available, when there would be a serious deficiency of covered storage accommodation. To overcome this threatened deficit the planners concluded that additional space would simply have to be found and requisitioned in the Southern Command.[45] U.S. forces also needed facilities for the storage of 245,000 tons of ammunition. This requirement the British also expected to meet by turning over certain existing depots from which they would evacuate their ammunition, and by expansion and new construction. In the case of currently occupied depots the final clearance of ammunition was to be phased with the evacuation of British troops, and Americans were to replace British depot personnel in easy stages so that the British could initiate the Americans in the operation of the depots.

The provision of adequate hospitalization called for a larger program of new construction than did either personnel or depot accommodations. It proved one of the more troublesome of the BOLERO problems, and the construction program repeatedly fell behind schedule. Hospital requirements had to be calculated in two phases. In the pre-ROUNDUP or build-up phase provision had to be made for the

[45] Second Edition, Key Plan.

normal incidence of sickness and would have to keep pace with new arrivals. In the period of actual operations hospitalization was required for casualties as well as normal illness. The number of beds required in the build-up period was based on a scale of 3 percent of the total force, with an additional allowance for colored troops owing to their higher rate of illness, and an additional provision for the hospitalization of air force casualties. On this basis it was figured that the BOLERO force would need 40,240 beds. Requirements in the ROUNDUP period were estimated on a scale of 10 percent of the total force engaged plus the accepted rate for sickness of forces remaining in the United Kingdom. On this basis an additional 50,570 beds were needed, or a total of 90,810 beds for the BOLERO force after operations began. Before publication of the First Key Plan, negotiations with the British for the acquisition of hospitals was conducted on an informal basis by the theater chief surgeon. By May 1942 Colonel Hawley by personal arrangements had procured from the War Office and the Ministry of Health five hospitals with a capacity of some 2,200 beds.[46] Arrangements were also made in May for the transfer to the Americans of certain British military hospitals, and in addition several hospitals constructed under the Emergency Medical Service program. The latter had been undertaken in preparation for the worst horrors of the Nazi air blitz. Thanks to the victory over the Luftwaffe not all the emergency hospitals were needed, and several were now offered to the U.S. forces.[47]

The hospital requirement, unlike that for personnel and depot accommodations, could be met only in small part by the transfer of existing facilities. In the build-up period much of the requirement for hospital beds had to be met by new construction. During May the group with which the chief surgeon had been meeting was formally constituted as the Medical Services Sub-Committee of the BOLERO Combined Committee, and by the end of the month the subcommittee had determined in general the methods by which U.S. hospital requirements would be met. Most of the new construction was to take the form of hospitals with capacities of 750 beds, and a few of 1,000 beds. As a rough guide it had been accepted that one 750-bed hospital should be sited in each divisional area of about 25,000 men. By the time the Second Edition of the Key Plan was issued in July, orders had already been given for the construction of two 1,000-bed Nissen hut hospitals and eleven 750-bed Nissen hospitals, and for the expansion and transfer of certain British military hospitals. Reconnaissance was under way for sites for nine more 750-bed hospitals, and British authorities hoped to obtain approval for a total of thirty-five of this type of installation by mid-August so that construction could begin in the summer months.

To ease the great strain on U.K. resources, the BOLERO planners hoped to meet the additional requirements of the

[46] Two of these plants—the Churchill Hospital at Oxford, and the American Red Cross Harvard University Field Hospital Unit at Salisbury—had for some time been operated by volunteer American units which had come to England before the United States entered the war. Administrative and Logistical History of the Medical Service Com Z ETO, prep by Hist Sec, Office, Chief Surgeon, ETO, 1945, MS (hereafter cited as ETO Medical Service History), Ch. II, pp. 22–24, ETO Adm 581. See also the history of the Medical Department now in preparation for this series.

[47] Maj. Gen. Paul R. Hawley, The European Theater of Operations, May 44, MS, p. 8, ETO Adm 519.



GENERAL HAWLEY, *Chief Surgeon, ETOUSA. (Photograph taken in 1945.)*

second phase or ROUNDUP period with a minimum of new construction. The Deputy Quartermaster General estimated that the 54,000-bed program, if provided by new construction, would cost about $40,000,000, which represented one fifth of the entire U.K. construction program in terms of labor and materials. A proposal was therefore made to use hutted camps, barracks, and requisitioned buildings to fill the need, any deficiency to be made up in the form of tented hospitals. Colonel Hawley objected strongly to this feature of the First Key Plan, insisting that neither hutted nor tented camps would be suitable. Faced with a desperate shortage of labor and materials, however, there was little choice but to adopt the basic idea behind the proposal. Before publication of the July plan, agreement was reached on the use of two types of military camps—the militia camp and the conversion camp—which were to be converted to hospitals after the departure of units for the cross-Channel operation. The militia camps were already in existence and, with the addition of operating rooms, clinics, and laboratories, could be rapidly converted when the troops moved out. Representatives of ETOUSA proceeded to reconnoiter all existing camps and barracks with a view to conversion after ROUNDUP was launched, and found a good number of them suitable for this purpose. It was broadly estimated that 25,000 beds could be provided in this way. The conversion camp was essentially the same type of installation—that is, an army barracks—but was not yet built, and could therefore be designed with the express intention of conversion after D Day by certain additions. Ten of the 1,250-man camps being built in southern England accordingly were laid out to make them readily convertible to hospitals of 750 beds each, which would provide an additional 7,500 beds. A total of some 32,500 beds was to be provided by conversions after D Day. To make up the remaining deficit of 18,000 beds the BOLERO planners had to project new construction. In July plans were under way to provide 10,000 of these beds by building ten 1,000-bed Nissen hospitals.[48]

Financing the above construction program was another of the earliest hurdles to be surmounted, and the London Committee pressed for quick approval of a block grant of £50,000,000 ($200,000,000), well aware that such an estimate could only be tentative at the time. It is of interest to

[48] *Ibid.*, pp. 9–10; ETO Medical Service History, Ch. II, pp. 29–30, 33–34; Second Edition, Key Plan.

record, however, that the construction program eventually was carried out at almost precisely that cost.[49]

The requirements described above were the responsibility of the War Office and were outlined in the Key Plan. Independent of this program, and involving more than twice as great an expenditure of funds, was that undertaken by the Air Ministry to provide accommodations for the bulk of the U.S. air forces and the airfields they required. Air force plans underwent several revisions in the summer of 1942. Originally calling for only 23 airfields and personnel accommodations for 36,300, the program was momentarily expanded in May to 153 airfields in addition to workshop and depot facilities. In July the air force program achieved relative stability with stated requirements of 98 airfields, 4,000,000 square feet of storage space, 3 repair depots, 26 headquarters installations, and personnel accommodations for 240,000.[50]

By far the largest single task faced by the BOLERO planners was that of construction. Although the U.S. forces were to acquire many of the facilities they needed by taking over British installations, a substantial program of new construction could not be avoided. Because of the ever-worsening shortage of labor it was impossible for British civil agencies to carry the program to completion unaided. Foreseeing the difficulty the BOLERO planners specified that the military services of both Britain and the United States would assist the British works agencies. Construction was to be carried out by both British military labor or civil contract under the supervision of the Royal Engineer Works Services Staff, through the agency of the Ministry of Works and Planning, and by U.S. engineer troops in co-operation with the Royal Engineers.[51]

While the provision of accommodations was undoubtedly the foremost preoccupation and worry of the BOLERO planners, the first Key Plans of May and July 1942 were remarkably comprehensive in their anticipation of other problems attending the reception of American forces. The BOLERO planners foresaw that U.S. troops, coming into a strange land, would be "as ignorant of our institutions and way of life as the people among whom they will be living are of all things American," and recognized that one of their most urgent tasks was "to educate each side so that both host and guest may be conditioned to each other." [52] They also foresaw that U.S. forces initially would be unavoidably dependent on the British for many services, and the Deputy Quartermaster General went to great lengths to insure that the arrival of American troops would be as free of discomfort as possible. Reception parties were to be formed to meet new arrivals and to minister to all their immediate needs, including such items as hot meals, canteen supplies, transportation, training in the use of British mess equipment, and all the normal barracks services. Key British personnel were to remain in existing

[49] The Bolero Project, extract monograph prep by Q (Ops) Hist, War Office, mimeo, OCMH; Maj. Gen. A. G. B. Buchanan, "Bolero," *The Royal Engineers Journal*, LIX (September, 1945), 188.

[50] Construction in the United Kingdom, prep by Hist Sec ETOUSA, Oct 44, MS, p. 23, ETO Adm 506; Air Force Construction (United Kingdom), Hist Rpt 6, Corps of Engrs ETO, prep by Ln Sec, Int Div, OCofE ETO, Aug 45, MS, p. 7, ETO Adm.

[51] For greater detail on the construction program see the history of the Corps of Engineers now in preparation for this series.

[52] Note by Chm, BCC(L), sub: Problems Affecting Civil Administration, 13 May 42, ETO Preinvasion 322.

depots, wherever possible, for necessary operation, and British workshops were to be handed over as going concerns. British Navy Army Air Force Institute (NAAFI) workers were to continue to run existing canteens in accommodations occupied by U.S. troops until American post exchanges were in a position to take over. In short, arrangements were made to provide all requirements for daily maintenance, including rations, water, light, fuel, cooking facilities, hospitalization, and dental care, and, to include a more somber aspect, even cemetery space. The guiding principle was to give all possible aid to American units at the outset and to train them so that they would as soon as possible assume full responsibility for their own maintenance.[53]

The BOLERO planners envisaged a gradual relinquishment by the British of military responsibilities and activities in the Southern Command area. On the operational side it was specified that the existing chain of command and its parallel operational administrative organization would remain in being until the immediate threat of a German invasion had receded, and until American forces were in a position to assume operational responsibility. On the administrative side the British command was to pass through two phases: the planning and constructional phase, which included the reception of increasing numbers of U.S. troops and responsibility for all aspects of their daily maintenance; and a final phase in which operational command had passed to the Americans, and in which the British would retain responsibility for only residual functions toward American troops and the control and maintenance of the existing Home Guard organization and a small number of British troops.

The implementation of the Key Plans required the closest possible co-ordination between U.S. and British agencies. U.S. staffs had to confirm plans for the locations of division and corps areas, and specify breakdown of storage and workshop requirements; the British Southern Command, in collaboration with U.S. officials, had to allocate space in accordance with American needs, prepare projects for construction, and select sites for hospitals. British administrative staffs were therefore to be strengthened in the planning and constructional phase (the next several months), and the Key Plans provided for an enlarged machinery of liaison between the U.S. and British forces. In addition to the liaison between the Deputy Quartermaster General and ETOUSA, a liaison officer was to be appointed from the former's staff to visit SOS headquarters each day. U.S. Army liaison officers were to be attached to War Office branches as soon as more officers were available for such duty. In the meantime the War Office attached officers to Headquarters, SOS. At the next lower level a Q (Liaison) branch was established at Southern Command headquarters, eight U.S. officers were attached to the staff of Southern Command, and U.S. officers were also to be attached to the headquarters of the British districts (subdivisions of Southern Command.)[54]

To handle the tremendous administrative arrangements entailed by the build-up in the United Kingdom and to ensure that the preparations visualized in the Key Plan could be made effective, the London Combined Committee felt it im-

[53] DQMG(L) Paper 5, Movement of U.S. Units from Ports of Disembarkation, 1 Jun 42, ETO Adm 50 BOLERO.

[54] DQMG(L) Paper 6, 2 Jun 42, ETO DQMG(L) Papers; Second Edition, Key Plan.

perative that U.S. service units should arrive in correct proportions ahead of combat formations. U.S. units were needed not only to assist in the construction or expansion of installations and accommodations, but also to receive and build up maintenance and reserve supplies and equipment, to operate depots, and to provide local antiaircraft protection for the main depots and installations.[55] The BOLERO planners also hoped that every effort would be made in the United States to dispatch units in accordance with the priority lists, but there were difficulties in the way. Bulk sailing figures were not likely to be known until shortly before convoys left the United States, and the breakdown of these bulk figures into individual units might not be available until sometime after the convoy had actually sailed. The lack of advance information on these sailings was regarded as a major difficulty in arranging quarters. By late June, however, the London Committee was satisfied that sufficient accommodations were being made available in bulk, and reception arrangements could be made at fairly short notice for the assignments of specific units to specific accommodations once the units were identified.[56] U.S. forces in the United Kingdom at the end of June had a strength of 54,845. At the end of July the BOLERO build-up had not yet achieved any momentum. Shipments were still proceeding haltingly and U.S. forces in the United Kingdom at the end of the month numbered only 81,273.

As indicated earlier, the BOLERO plan was an inseparable part of the concept of a cross-Channel invasion. The Key Plans pointed toward such an operation in the spring of 1943, and assumed that the build-up of U.S. forces in the United Kingdom would be carried out with the greatest possible speed. Concurrent with the BOLERO preparations planning had also been initiated on both the operational and logistical aspects of ROUNDUP. The first meeting of the ROUNDUP administrative officers took place within a few days of the organization of the BOLERO Combined Committee, early in May. In the absence of a firm operational plan much of the logistical planning was at first highly hypothetical. Nevertheless, in mid-June the ROUNDUP administrative planners issued the first comprehensive appreciation of administrative problems in connection with major operations on the Continent, dealing with such matters as maintenance over beaches, the condition of continental ports, and inland transportation. The deliberations of the first two months were carried on with almost no representation from the U.S. Services of Supply, for the SOS was then in its earliest stages of organization. Both General Eisenhower and General Lee appreciated the need for coordination of ROUNDUP logistical planning with BOLERO, particularly with regard to procurement planning, and early in July took steps to have SOS officers placed on the ROUNDUP Administrative Planning Staff so that they could participate in the decisions which vitally affected their own planning. The work of the staff by this time had been divided among forty committees which had been formed to study the many administrative aspects of a cross-Channel operation.[57] Significant preliminary steps had thus been taken by mid-July to prepare for a continental invasion.

[55] DQMG(L) Paper 2, 15 May 42, ETO Adm 50 BOLERO.

[56] Rpt by Secy, BCC(L), on Reception Arrangements, 20 Jun 42, with annexes, ETO Preinvasion 322.

[57] Progress Rpt 2, RAP Stf, 26 Jun 42; RAP Survey of Administrative Problems in Connection with Major

(3) The SOS Organizes, June–July 1942

At the height of the U.S. build-up in the United Kingdom, the American uniform was to be evident in every corner of the land, American ammunition and other supplies and equipment were to be stacked along every road, and American troops were to occupy more than 100,000 buildings, either newly built or requisitioned, and ranging from small Nissen huts and cottages to sprawling hangars, workshops, and assembly plants, in more than 1,100 cities and villages.

There was little visible evidence in June 1942 to portend the future scale of American activity in the United Kingdom. At the time the European theater was activated there were fewer than 35,000 American troops in the British Isles, most of them ground force units assigned to the V Corps in Northern Ireland. In England the first stirrings of American activity centered around the small air force contingent and in the theater headquarters in London. There were at this time only about 2,000 air force troops in England, hardly more than an advance echelon of the VIII Bomber Command. This small force was in the process of taking over the first airfields in the Huntingdon area and preparing to utilize the first big depot and repair installation at Burtonwood. Londoners were of course already familiar with the sight of Americans in Grosvenor Square, and the U.S. headquarters was to grow rapidly after the formation of ETOUSA.

As the governing metropolis of the United Kingdom and the seat of the War Office, London naturally became a center of American activity. That this activity should center about Grosvenor Square arose primarily from the fact that the work of the Special Observers had brought them near the American Embassy and the military attaché with whom they worked closely. Situated in the heart of Mayfair, Grosvenor Square was one of the exclusive residential areas in London. Surrounding it were the multistoried town houses and luxury flats which had provided the setting for the dinners and balls of the London social season. In the center was a private park of hedges and tall trees, once enclosed by an iron fence which had since disappeared into the scrap heap of war. From behind the dense shrubbery there now arose each evening a barrage balloon which swayed gently back and forth in the black of the London night.

Most of the modern buildings in Grosvenor Square were untouched by the blitz, but many were vacant, their former occupants having moved to the country. Beginning with the lease of No. 18–20 to SPOBS in May 1941, more and more of the apartments were taken over by the Americans. Stripped of their furnishings they quickly lost their glitter and acquired the utilitarian appearance of an army installation. Grosvenor Square was soon to be transformed into a bit of America, and the good humor with which Londoners received the increasing evidence of American "occupation" was expressed in the parody of a popular song: "An Englishman Spoke in Grosvenor Square."

The first housekeeping units had arrived in London in March, a dispensary was opened, and the first enlisted billet was established at the old Hotel Splendide at 100 Piccadilly. Aside from this halting expansion of the new headquarters and

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Operations on the Continent, 17 Jun 42; and GHQ Home Forces Paper, sub: Assumptions for RAP, 25 Jul 42. All in SOS ETO RAP 1942–43. Ltr, Eisenhower to Lee, 10 Jun 42, sub: RAP Plng, and 1st Ind, Lee to CG ETO, 22 Jul 42, SOS ETO AG 381 Plan.

the beginnings of activity at a few airfields, there were as yet no operating services and no depots prepared to receive large shipments of either cargo or troop units. Until April 1942 there was not even a single army storage point in London. The scale of supply operations in the London area is illustrated by the fact that such supplies as were required in the headquarters were received and handled in a room on the fourth floor of No. 20 Grosvenor. That month a small warehouse was opened in the former showrooms of the Austin Motor Company on Oxford Street, and before long it was necessary to turn over all requisitions to a new depot in the East End. In the absence of U.S. shipments to fill immediate needs, meanwhile, there was a great scramble to obtain supplies and services in the British market, and considerable confusion was to result from the initial lack of reciprocal aid policy on such local procurement.

The gigantic task of organizing the Services of Supply was undertaken by General Lee upon his arrival in England late in May 1942. There were three major tasks to be carried out in fulfilling the mission of the SOS: organizing the reception of troops and cargo in the port areas, establishing a depot system for the storage and distribution of supplies, and initiating the construction program, particularly of airfields. Transforming the SOS into an operating organization, however, presented innumerable problems which first required solution.

Within twenty-four hours of his arrival in the United Kingdom, General Lee was busily engaged in a series of conferences, first with General Chaney, which led to a definition of the responsibilities and authority of the SOS (discussed in Chapter I), and then with members of the BOLERO Committee at Norfolk House, London, where he learned of the plans British officers had already made for the accommodation of the projected American force. During the next several weeks General Lee spent much of his time inspecting ports, depots, and other accommodations offered by the British. On the first of these reconnaissance trips he was accompanied by General Somervell, Brig. Gen. Charles P. Gross, the Chief of Transportation, War Department SOS, and Brig. Gen. LeRoy Lutes, Chief of Operations of the SOS in the War Department, who had followed Lee to England late in May. The special train of General Sir Bernard Paget, commander of British Home Forces, was put at the disposal of the party to tour port installations at Avonmouth, Barry, Liverpool, Manchester, Glasgow, and Gourock. On the basis of the survey, General Somervell reported to General Marshall his opinion that administration and supply arrangements for the reception and accommodation of American troops could be worked out satisfactorily, although he recognized tremendous problems for the SOS, and foresaw particular difficulties in rail transportation and airfield construction. General Somervell at this time stressed the importance of the early completion of operational plans so that supply and administrative planning could get under way. This was to become a familiar and oft-repeated request from the Services of Supply.[58] General Lee later took members of his own staff on a reconnaissance of possible port and depot areas in southern England, including Bristol, Plymouth, Exeter, Taunton, Warminster, Thatcham, and Salisbury, all of which later became

[58] Tendons of an Army, prep by Hist Sec ETO, MS, pp. 12-13, ETO Adm 531.

key installations in the SOS network of facilities.

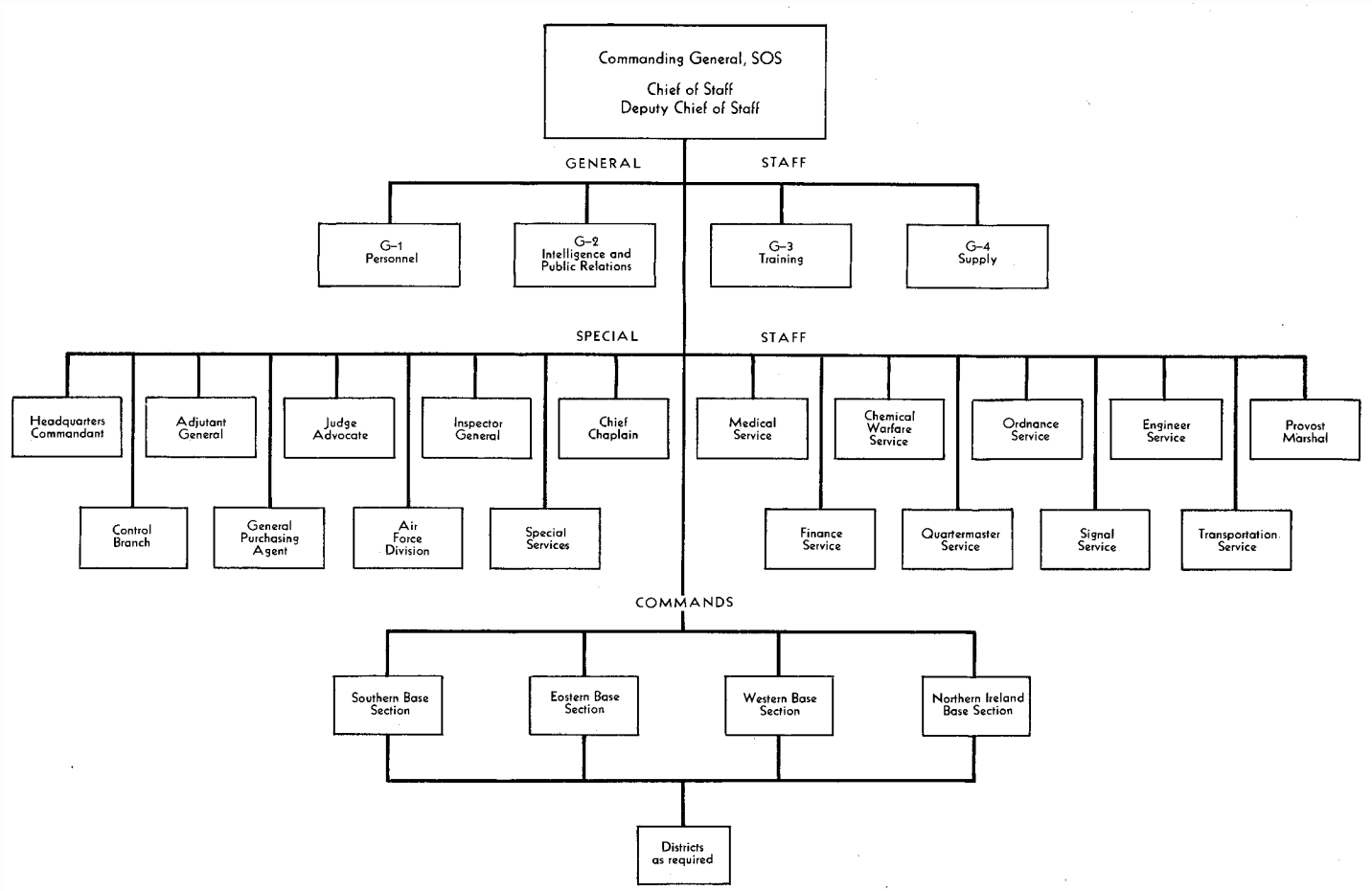
Meanwhile General Lee also made progress in the organization of the SOS staff which was announced at the end of June. It included Brig. Gen. Thomas B. Larkin as chief of staff, Lt. Col. Ewart G. Plank as deputy chief of staff, Col. Murray M. Montgomery as G–1, Col. Gustav B. Guenther as G–2, Col. Walter G. Layman as G–3, Col. Paul T. Baker as G–4, Lt. Col. Orlando C. Mood as Chief, Requirements Branch, and Col. Douglas C. MacKeachie as Chief, Procurement Branch.

The services were at first divided into operating and administrative, the former including the normal supply services under the supervision of the G–4, the latter the more purely administrative services under the Chief of Administrative Services. The incumbents of the operating services were the following: Col. Everett S. Hughes, Chief Ordnance Officer; Brig. Gen. Robert M. Littlejohn, Chief Quartermaster; Brig. Gen. William S. Rumbough, Chief Signal Officer; Brig. Gen. Donald A. Davison, Chief Engineer; Col. Edward Montgomery, Chief of Chemical Warfare Service; Col. Paul R. Hawley, Chief Surgeon; Col. Charles O. Thrasher, Chief, General Depot Service; Col. Frank S. Ross, Chief, Transportation Service.

Brig. Gen. Claude M. Thiele was named Chief of Administrative Services, which included the following officers: Col. Roscoe C. Batson, Inspector General; Lt. Col. William G. Stephenson, Headquarters Commandant; Col. Alexander M. Weyand, Provost Marshal; Col. Adam Richmond, Judge Advocate; Col. Victor V. Taylor, Adjutant General; Col. Nicholas H. Cobbs, Chief Finance Officer; Col. James L. Blakeney, Senior Chaplain; Lt. Col. George E. Ramey, Chief of Special Services; Col. Edmund M. Barnum, Chief of Army Exchange Service. In addition, Col. Ray A. Dunn was named Air Force Liaison Officer, and Col. Clarence E. Brand was designated President of the Claims Commission, both on the SOS staff.

This organization within the SOS reflected very closely the organization of the SOS in the War Department, the memorandum outlining the organization of the administrative services following virtually word for word a similar memorandum issued by the SOS in the zone of interior. Within two months, however, several changes were announced and no further mention was made of the division into operating and administrative services. The general division of function continued, with the supply or operating services coming under the supervision of the G–4, and the administrative services passing to the province of the G–1, who later came to be known as the Chief of Administration. In general, the operating services included those whose chiefs were also members of the theater special staff and thus served in a dual capacity, maintaining senior representatives at Headquarters, ETOUSA. The administrative services were those in which counterparts were named at Headquarters, ETOUSA, and in which the division of authority became very troublesome. Even those staff sections which General Eisenhower had decreed should be placed under ETOUSA—that of the provost marshal for example—were split when the SOS moved to Cheltenham. ETOUSA and SOS each established its own adjutant general, inspector general, provost marshal, and other special staff officers. The inevitable result was an overlapping of function and a conflict over jurisdiction.

CHART 3—ORGANIZATION OF THE SERVICES OF SUPPLY, ETOUSA, 19 AUGUST 1942



(*Chart 3*) In varying degrees this tendency also carried over into the supply services, where the senior representatives at theater headquarters were inclined to develop separate sections and encroach on the functions of the SOS.

Following the organizational pattern of the War Department SOS, the newly founded SOS also included a General Depot Service as one of the operating agencies. Colonel Thrasher was named as its first chief, and the service was announced as an ETOUSA special staff section operating under the SOS. Shortly thereafter, however, again in line with similar War Department action, the functions of the General Depot Service were turned over to the chief quartermaster. The operation of the depots was eventually shared by the chiefs of services and the base sections which were soon to be formed. The Army Exchange Service, likewise established as a special staff section of ETOUSA and operated by the SOS, also ceased to be a special staff section and was placed under the chief quartermaster.

From the very beginning it was established policy in ETOUSA that the United States would purchase as many of its supplies as possible in the United Kingdom in order to save shipping space. Local procurement was therefore destined to be an important function, and to handle such matters a General Purchasing Board and a Board of Contracts and Adjustments were created in June, both of them headed by a General Purchasing Agent. Colonel MacKeachie, former vice-president of the Great Atlantic and Pacific Tea Company and Director of Purchases for the War Production Board, had been brought to the United Kingdom by General Lee to fill this position.

Among the other agencies created during the summer of 1942 were a Claims Service, the Area Petroleum Board, and an agency to operate training centers and officer candidate schools. ETOUSA had stipulated that the SOS would be responsible for the "adjudication and settlement of all claims and administration of the United States Claims Commission" for the theater. Here still another facet of the ever-present problem on the division of authority was to be revealed. The fact that the U.S. Congress had provided that claims be settled by a commission appointed by the Secretary of War complicated matters. Such a claims commission had been appointed directly by the War Department and was already working in close co-operation with British authorities. The SOS meanwhile had organized a Claims Service to investigate claims and report on them to the Claims Commission, which alone had the authority to settle them. General Lee hoped to resolve this division by consolidating the two agencies and bringing them under the SOS. Instead a circular was published strictly delineating their respective jurisdictions and authority, placing the operation of the investigating agencies under the Claims Service of the SOS, and the actual settlement of claims under the Claims Commission.

Another field in which special or unusual arrangements were necessary was the handling of petroleum products, or POL.[59] While the procurement, storage, and issue of fuel and oil was a quartermaster responsibility, there was need for an over-all agency to co-ordinate the needs of the Army, Navy, and Air Forces in the

[59] The Americans readily adopted the shorter British term POL, an abbreviation for petrol (gasoline), oil, and lubricants.

theater. Such an agency, known as the Area Petroleum Board, was created in September as the theater counterpart of the Army-Navy Petroleum Board, recently established in Washington. General Lee served as head of the joint board as Area Petroleum Officer, and was made responsible for the co-ordination of all U.S. fuel requirements with the British. The routine functions of the Area Petroleum Office were actually carried out by an assistant, who organized what eventually came to be known as the Area Petroleum Service. The Area Petroleum Office did not requisition directly on the Army-Navy Petroleum Board in Washington, but rather on British authorities. All petroleum products, regardless of origin, were held in a common pool in British storage facilities, all gasoline coming from U.S. sources being counted as lend-lease aid. Withdrawals from this pool for U.S. forces were then recorded as reverse lend-lease.[60]

The SOS was also given the responsibility for the operation of training centers and officer candidate schools. Accordingly it established a center for officer candidate and specialists schools at Shrivenham, southwest of Oxford, in August. Col. Walter G. Layman became the first commandant of the center, and the schools began to operate in September. Later in the year the Supply Specialists School and the Officer Candidate School were combined to form the American School Center. While administered by the SOS, the American School Center was open to students from all commands under a quota system.

The above indicates in general outline the staff organization of the SOS and the scope of its responsibilities. As indicated earlier, the SOS had hardly been given the complete control of supply and administration intended by War Department directive, and the division of function and splitting of staffs resulted in an unsatisfactory arrangement, which became increasingly evident as the SOS became an operating organization in the following months.[61]

Another problem with which General Lee concerned himself in the first weeks after his arrival in England was that of finding a suitable location for the newly forming SOS headquarters. Office space had been acquired initially in a former apartment building at No. 1 Great Cumberland Place in London, but it was clear that this space would be inadequate to house the entire headquarters, and it was desirable that the SOS should be more centrally located, preferably in southern England where the bulk of the American troops and installations were to be located. General Lee therefore immediately instructed General Thiele, his Chief of Administrative Services, to conduct a reconnaissance for such a headquarters location. Before the end of May General Thiele had surveyed possible accommodations in the London area and the War Office installations at Cheltenham, about ninety miles northwest of London. The latter was already under consideration by the Deputy Quartermaster General and was suggested in the First Key Plan as a suitable location.

Cheltenham was a fairly modern city of about 50,000. It had grown up around the Pittville mineral springs, rivaled Bath as a spa and holiday resort, and was a popular place of retirement for civil servants and army officers. Cheltenham's adaptability for use as a military headquarters resulted

[60] Interv with Col Elmer E. Barnes (Chief Petroleum Officer, ETO, in 1944), 20 Feb 50, OCMH.

[61] Organization and Command, I, 79–105.



HEADQUARTERS, SOS, NEAR CHELTENHAM. *Benhall Farm, above, and Oakley Farm, below.*



from the existence of two groups of buildings, one at Benhall Farm on the Gloucester Road southwest, and the other at Oakley Farm to the northeast. These temporary one-story blocks of offices had been erected by the British War Office and were intended as an evacuation point in the event that invasion or bombing made it impossible to remain in London. The members of the War Office administrative staff that occupied the buildings at this time were willing to return to London where the entire establishment could be in one place. The Cheltenham plant provided about 500,000 square feet of office space and had one obvious advantage over other sites in that it required no conversion. It had an adequate rail and road network, and signal communications facilities which could be expanded. However, it was ninety miles from London, the center of British and American planning groups, and nearer the western than the southern coast of England, and it had other disadvantages which were to be revealed later.

General Lee and his chief of staff inspected the Cheltenham facilities in the first week of June, and after conferences with War Office officials decided to establish the SOS headquarters there. Later in the month a commandant was named for the new headquarters, and plans were rushed to accomplish the move as quickly as possible. Officer and enlisted personnel for the headquarters command had been organized in the United States and upon arrival in England went directly to Cheltenham on 12 July. The shipment of supplies and equipment from London began on the 18th, and two days later a special train carried most of the London personnel to their new home. While the move was intended to be secret, rumors had it on the day before that Lord Haw Haw, a renegade Englishman whose regular broadcasts in the service of Nazism provided an amusing diversion to the British, had already promised a visit by the German Air Force, and when the special train actually left Paddington Station it was plastered with signs reading "U.S. FORCES TO CHELTENHAM." General Lee and the key members of his staff remained in London a few days for conferences and made the transfer to the new headquarters on 25 July. Some of the SOS staff remained in London and were housed in the annex of Selfridge's department store, on Duke Street just off Oxford.

The establishment of the SOS in its new location was not accomplished without discomfort or dissatisfaction, for some of the disadvantages of the area quickly became apparent. As a vacation spot Cheltenham had many hotels, some of which retained their civilian staffs and served as officers' quarters. But barracks for enlisted men were almost nonexistent, and the men had to be quartered in tented camps around the town and at the near-by Prestbury Park Race Course. Those who drew the grandstand, stables, and other buildings of the race track as billets were the more fortunate, and as one man (undoubtedly a Kentuckian) noted philosophically to his stable mate, if the commodious box stall they occupied was good enough for a £10,000 thoroughbred, a $10,000 GI shouldn't complain. The tent camps were eventually replaced by huts, but it took considerable time and work to make the area livable and to eliminate the early confusions. The War Office had made few improvements, and the autumn rains created seas of mud. For many weeks the War Office continued to operate the messes, and only British rations

were available. When an enemy plane dropped several bombs near the railway station one morning, someone tartly commented that the Germans weren't aiming at the aircraft factory at nearby Gloucester, but at the confusion factory at Benhall Farm.[62]

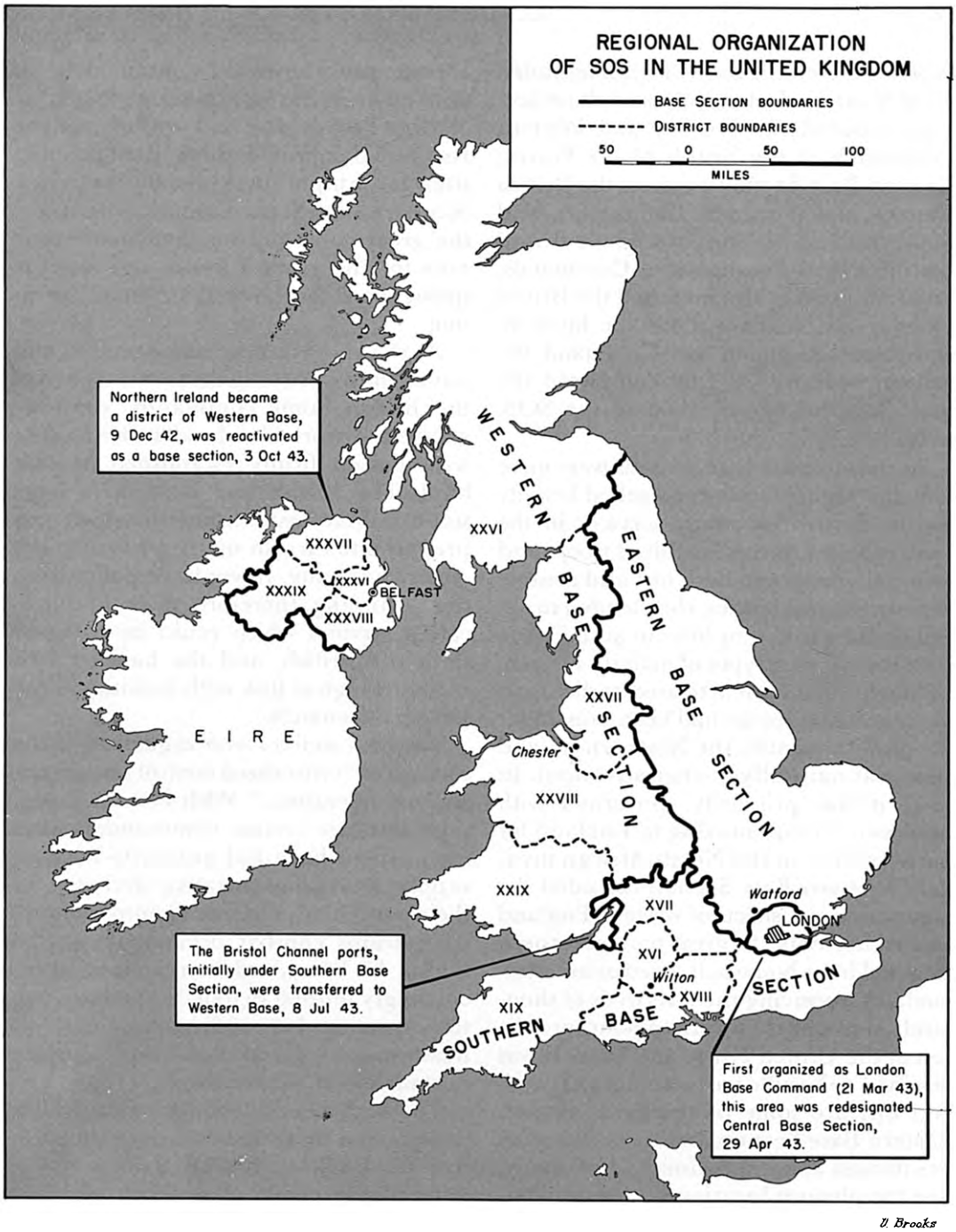
The establishment of the SOS entailed a great deal more than the selection of a staff and headquarters facilities. The real *raison d'être* of the SOS was that it become an operating concern, carrying out the various functions of procuring, transporting, storing, issuing, and so on. Its functional organization was represented by the chiefs of services, who, in addition to serving in an advisory capacity as members of the theater commander's special staff, supervised the operations of their respective services in the SOS. The chief quartermaster, for example, provided technical supervision over the operation of depots. The direct control of such operations and the command of troop units involved, however, was decentralized and, with certain exceptions (notably the Transportation Corps operation of the railways), was exercised through the base section commanders.

In addition to the functional organization, the SOS also developed a territorial organization through which service activities were actually carried out. This organization in the United Kingdom paralleled closely that of the United States, where supply and administration were also organized into area commands known as corps areas (later as service commands). In General Lee's concept, the base sections were to be small replicas of the SOS, containing representatives of all the staff sections and services in an organization which would serve as the instrumentality through which SOS policies and plans would be carried out in given geographical areas. General Lee met some opposition from the theater staff in insisting on this organizational scheme, but he was convinced that it was both feasible and necessary and succeeded in carrying it out in the summer of 1942.

One base section already existed, and consequently received first consideration for incorporation into the new system. Northern Ireland Base Command had been created to serve as an administrative command for V Corps, or USANIF, and the service troops of the base command were in fact part of V Corps. As the highest ground force headquarters in the theater, and in view of its mission in the defense of Northern Ireland, USANIF had been accorded a relatively high degree of self-sufficiency and independence. General Hartle therefore opposed transferring the base command to the control of the SOS. But he was overruled, and Northern Ireland Base Command was incorporated into the SOS.

The announcement of the regional organization of the SOS in the United Kingdom was made on 20 July. It provided for four base sections: the Northern Ireland Base Section under Brig. Gen. Leroy P. Collins, with headquarters at Belfast; the Western Base Section under General Davison, with headquarters at Chester, in Cheshire; the Eastern Base Section under Col. Cecil R. Moore, with headquarters at Watford, Hertfordshire; and the Southern Base Section under Colonel Thrasher, with headquarters at Wilton, near Salisbury. The boundaries of the sections corresponded roughly to those of the British administrative and defense commands.

[62] Tendons of an Army, pp. 3–4, 13–15; Robert Healey, personal memoir, MS (hereafter cited as Healey Memoir), pp. 22–23, ETO Adm 510.



V. Brooks

MAP 2

Northern Ireland Base Section included all of Northern Ireland; Western Base Section included the Scottish and Western Commands of the British Home Forces; Eastern Base Section covered the British Eastern and Northern Commands; and Southern Base Section covered the British Southern and Southeastern Commands, and temporarily also included the Bristol Channel ports. Except for the later inclusion of the London Base Command, the general order of 20 July completed the basic regional organization of the SOS. *(Map 2)*

At this time the base sections were mere skeleton organizations and relied heavily on the British for many services in the early months. As they acquired troops and gradually began to flesh out and assume heavier responsibilities, they tended to develop along different lines in accordance with the varying types of activity in each. Because it had been activated earlier than the others and troops had been present for the past six months, the Northern Ireland Base was naturally further advanced. In 1942 it was primarily concerned with processing troops moving to England for participation in the North African invasion. Western Base Section included the mountainous districts of western England and Wales. With the great ports of western England in its bounds, it acted as an intermediary, receiving the hundreds of thousands of troops that were to pour into the rest of the United Kingdom. Later it was destined to handle vast tonnages of cargo and operate some of the great depots. Eastern Base Section, because of its relative flatness and its proximity to Germany, was the obvious location for the airfields and became primarily an air force base. The Southern Base Section area, largely rolling terrain, but with rugged sections in Devon and Cornwall, contained in its untilled areas the best training ground, including British tank and artillery ranges. Its shore line provided excellent training sites for amphibious assault exercises. Southern Base Section eventually became the great concentration and marshaling area for the ground forces and was the springboard for the cross-Channel operation.

At the very start the base sections, laid out as they were to include one or two of the British home commands, were organized to work closely with the British, with liaison firmly established at that level. The British had built up a large static military establishment which was prepared to furnish many services to the American Army. It was basic policy from the beginning, therefore, to avoid duplicating services which could be obtained from the British, and the base sections were the logical link with facilities in the British commands.

The base sections were organized on the concept of "centralized control and decentralized operation." With certain exceptions the base section commanders were intended to have full authority over all supply and administrative activities in their particular domains. Commanders of the various combat organizations (the Eighth Air Force, and later the armies) accordingly tended to look to the base section commanders rather than to SOS headquarters for the solution of their normal logistical problems.

The exercise of such theoretically full powers on a regional basis inevitably produced a conflict with the functional operations of the chiefs of services, who attempted to control their services at all echelons of command and in the entire theater. By regulation, the chiefs of serv-

ices had authority to supervise and control technical matters, but the dividing line between "technical supervision" and actual control was difficult to draw. The chief surgeon, for example, in attempting to control all general hospitals regardless of their location, came into unavoidable conflict with the area commanders whose command authority was theoretically all-embracing. Similarly, a depot commander, caught between the instructions of the chief quartermaster and the base section commander, could not help but feel that he was serving two masters.

In the first month after creation of the base sections, the SOS attempted to define more precisely the authority and functions of the section commanders. In general, they were charged with the command of all SOS personnel, units, and installations located in their sections, and made responsible for their training, administration, discipline, sanitation, and "necessary arrangements for supply, and . . . all operations of the SOS in the base sections which were not specifically excepted by the Commanding General." The sections were to be divided into districts, and actual operations were thus further decentralized. The relationship between base section commanders and the commanders of tactical units in their areas was to be similar to that of a corps area commander in the United States to tactical commanders in the corps areas. Certain activities were to be exempted from the control of the base section commanders and reserved for the chiefs of services. These included the internal management and technical operation of the transportation service, port operations, general supply and repair depots and shops, new construction, general hospitals, and general laboratories.

The system soon revealed its defects. Dissatisfaction on the part of the base section commanders with the extent of exempted activities and with the control exercised by the service chiefs over service troops brought the entire problem up for review in a few months. The problem of reconciling functional control with regional or territorial control was as old as administration itself, and it was to plague the ETO throughout its history.[63]

(4) TORCH Intervenes

While both ETOUSA and the SOS were partially occupied with their internal organization in June and July, plans and preparations for the BOLERO build-up proceeded apace. On the operational side, meanwhile, Allied staffs were actively engaged in planning for both ROUNDUP and the emergency operation known as SLEDGEHAMMER. If there was any skepticism as to the feasibility of ROUNDUP, or any lack of conviction that a full-scale cross-Channel invasion was the best means of carrying out Allied strategy in Europe, it was not reflected in logistical plans, for the administrative planners went ahead with high hopes and expectations of building a base in the United Kingdom and preparing for the reception of the American forces. So anxious were the Combined Chiefs to push the build-up that they considered reducing shipments to the USSR of those supplies which were not essential to the fighting in 1942 in order to free shipping and accelerate the BOLERO movements. This measure was actually proposed to Mr. Molotov, the Russian Foreign Minister, during his visit to Washington early in June, with the suggestion

[63] Organization and Command, I, 108–19.

that it would speed preparations for the second front which the Russians so ardently desired.[64]

Troop movements to the United Kingdom proceeded approximately as planned in June, and by the end of the month the U.S. strength in Britain stood at 54,845.[65] Within another four weeks, however, the strategic decisions of April were reversed. In July the British and American chiefs decided on the North African operation, thus placing the entire BOLERO-ROUNDUP concept in jeopardy.

The factors which contributed most to this reversal in strategy were the growing conviction on the part of President Roosevelt that there must be some kind of offensive action in the European area in 1942, and the growing misgivings, particularly on the part of British officials, about the feasibility of SLEDGEHAMMER. On 18 June Prime Minister Churchill came to Washington with the British Chiefs of Staff, attacked both the SLEDGEHAMMER and ROUNDUP concepts, and asked instead for the reconsideration of a plan known as GYMNAST, providing for an invasion of North Africa. The Prime Minister's arguments were strengthened by the disasters which were at this very time befalling British arms in North Africa. On 13 June ("Black Saturday") Generaloberst Erwin Rommel had sent British forces reeling eastward after a tremendous tank battle, and on 20 June the Prime Minister, while in the United States, learned of the fall of Tobruk. Despite the persuasive arguments which the Prime Minister thus had for diverting the BOLERO forces to ease the pressure in the Near East, the BOLERO-ROUNDUP idea was temporarily reaffirmed, although the American planners made the concession of permitting the diversion of certain tank reinforcements and air units to the Near East.

The compromise was short-lived. It did not withstand the new setbacks suffered by the Allies in the next few weeks. A temporary lift to the morale of the United Nations had been provided by U.S. naval victories in the battles of the Coral Sea (7–8 May) and Midway (6 June), and by the first 1,000-plane raid on Cologne by the RAF (30 May). But these heartening events were soon overshadowed by reverses on almost every other front. In mid-June had come the disasters in North Africa. Early in July the Germans finally captured Sevastopol and then unleashed a drive which carried across the Don toward Stalingrad and threatened to overrun the Caucasus. In the North Atlantic, meanwhile, Allied shipping suffered its heaviest losses of the war from submarine attacks (nearly 400,000 tons in one week). For the Allies June and July were truly the darkest months of the war.

By mid-July Prime Minister Churchill and the British Chiefs of Staff had definitely concluded that SLEDGEHAMMER could not be carried out successfully and would in fact ruin prospects for ROUNDUP in 1943. Again they recommended consideration of GYMNAST. General Marshall, on the other hand, was equally convinced of the desperate urgency of a cross-Channel operation in 1942 to relieve the terrible pressure on the Red armies. The time was at hand for a showdown, and on 16 July General Marshall, Admiral Ernest J. King,

[64] Molotov agreed to report the suggestion to Marshal Stalin. In one sense the proposal was academic, however, since a reduction in shipments via the northern route was forced shortly thereafter by the inability to provide adequate convoy escorts. Robert E. Sherwood, *Roosevelt and Hopkins* (New York, 1948), pp. 569–70, 574–75; Winston S. Churchill, *The Hinge of Fate* (Boston, 1950), pp. 266–75.

[65] Progress Rpt, 4 Oct 43, Progress Div SOS, ETO Adm 345.

and Harry Hopkins left for London as representatives of President Roosevelt to settle the question of strategy. In meetings held between 20 and 25 July (sometimes referred to as the Second Claridge Conference) all thought of a cross-Channel operation in 1942 was abandoned at the insistence of the British, and the decision was made to implement the alternative GYMNAST plan—now rechristened TORCH—for an invasion of North Africa. General Marshall, with the Russian situation constantly in mind, hoped to defer a final decision until September, but President Roosevelt accepted TORCH as a definite commitment and instructed that preparations be started at once.

The decision to launch the North African operation was accepted with the full acknowledgment by the top U.S. planners that it would in all probability make the execution of ROUNDUP impossible in 1943. Planning for an eventual cross-Channel operation was to continue, but the TORCH operation immediately absorbed almost the entire effort and attention of the Allies in the European area, and ROUNDUP was all but forgotten for several months to come. The shift in strategy by no means entailed an immediate negation of the BOLERO build-up plans, for movement to the United Kingdom in fact had to be accelerated in the next few months. But it did alter the purpose of this build-up, for the decision to undertake the TORCH operation transferred the emphasis within ETOUSA from the construction of a base for operations against the Continent in 1943 to the organization of a specific force for the TORCH mission in 1942. For several months to come the long-range build-up of ETOUSA was therefore to be subordinated to the interests of the TORCH operation.[66]

Preparations for the North African operation got under way without delay. Chiefly because of the estrangement in Anglo-French relations, a product of earlier events in the war, TORCH was to be fundamentally an American expedition, and it was decided early that the commander should also be an American. Before General Marshall departed for the United States, General Eisenhower was chosen as Allied commander in chief, although this choice was not officially confirmed until mid-August. U.S. planners soon joined British planners to form a combined group at Norfolk House, providing the nucleus for what was shortly named the Allied Force Headquarters (AFHQ). General Eisenhower (now a lieutenant general) chose Maj. Gen. Mark W. Clark, who had arrived in England in July as commander of the II Corps, as his deputy commander and placed him in charge of all TORCH planning.

As finally worked out, the TORCH operational plan provided for landings in three areas on the North African coast. A Western Task Force, composed entirely of American ground, naval, and air forces and coming directly from the United States, was to land in the vicinity of Casablanca on the Atlantic coast of Morocco. A Center Task Force, also American, but sailing from the United Kingdom with British naval support, was to land at Oran. An Eastern Assault Force, predominantly British but containing some American troops and escorted by the Royal Navy, was to land at Algiers. The TORCH logistical plan provided that each task

[66] For a fuller discussion of Allied strategy in 1942 see Gordon A. Harrison, *Cross-Channel Attack* (Washington, 1951), and Maurice Matloff and Edwin M. Snell, *Strategic Planning for Coalition Warfare, 1941–42* (Washington, 1953), both in the series UNITED STATES ARMY IN WORLD WAR II.

force should be supplied initially by the base from which it was launched. The Western Task Force was to be supplied directly from the United States, the Center Task Force by the SOS in the United Kingdom, and the Eastern Assault Force by the British. Gradually, however, the entire support of the American force in North Africa was to come directly from the United States. The SOS in the United Kingdom would be relieved of all responsibility, and the North African operation would be completely separated from ETOUSA supply channels.

AFHQ exercised over-all planning and control over both supply and operational matters in connection with TORCH. For logistical planning the headquarters named Maj. Gen. Humfrey M. Gale (British) as Chief Administrative Officer and Colonel Hughes as his deputy. It would seem logical for AFHQ to have worked in close collaboration with both the SOS and ETOUSA in planning the North African operation, but it did not work out that way. Rather, AFHQ borrowed officers from both ETOUSA and SOS for planning purposes and frequently left the staffs of those headquarters out of the TORCH picture. Although the SOS staff was in general divorced from planning, the principle was followed that each national force would be responsible for its own supply and administration. The SOS was therefore responsible for implementing a supply program planned by another organization. This situation it regarded as a distinct handicap.[67]

Operation TORCH came at a critical time for supply agencies in both the United States and the United Kingdom. While it was by no means the largest operation undertaken by U.S. forces in World War II, TORCH involved for the first time the organization and equipping of task forces several thousand miles apart; it required for the first time the closest combined planning and implementation by British and American staffs; it came at the very beginning of the development of the SOS in the United Kingdom, when it still lacked adequate personnel and its supply procedures and techniques were new or untried. Moreover, the operation had to be prepared in great haste, for the time between conception and execution (three months) precluded long-range planning. As a result, TORCH was not a model of planning and preparation and necessitated many improvisations both in equipment and supply methods.

The largest single task which the SOS faced and which caused the greatest anxiety as D Day for the operation drew nearer was the equipping of the American force for the TORCH mission. For this task it found itself ill prepared and variously handicapped. Time was already short, and to make matters worse there was a long delay in the final decision on the tactical plan, and therefore in the establishment of a definitive troop basis. The British at first calculated that a total force of ten to twelve divisions was needed, half of which should be British, half American. General Marshall and General Eisenhower, however, felt that the strategic concept of TORCH was such that, once launched, it would have to be followed through with all the resources required, and the Chief of Staff warned that enemy reaction might be such as to require the diversion to the TORCH area of the bulk of the forces intended for BOLERO. General Marshall informed the theater commander that a total of seven U.S. divisions

[67] Organization and Command, I, 143–47, 158.

was committed to the operation, with three more available should they be needed. Early in September General Eisenhower estimated that approximately 102,000 American troops would be taken from the United Kingdom for the North African operation,[68] and the withdrawals eventually exceeded 150,000. The core of this force was to consist of the 1st Armored and the 1st and 34th Infantry Divisions, already in the United Kingdom.

The trials which attended the equipping of this force can be attributed to difficulties in both the United States and the United Kingdom. The SOS in the United Kingdom suddenly faced a formidable task, and because of its undeveloped facilities could not possibly expect to cope with the increasing tonnages and numbers of men and at the same time handle the marshaling and outmovement of the TORCH forces. It was therefore forced to rely heavily on the assistance of the British not only in mounting the TORCH force but in port discharge and storage operations. This was one reason why many supply details were handled through AFHQ rather than the SOS, since it was in the former that the machinery for combined operations was coming into existence. The Americans were particularly handicapped in the field of transportation, and responsibility for movement of all troops and supplies leaving the United Kingdom had to be assumed by the British Ministry of War Transport. For purposes of liaison and co-ordination the SOS established a section of the Traffic Division of the Transportation Corps, headed by Col. Donald S. McConnaughy, at the British War Office, where priorities and movement orders were arranged.

In receiving and storing supplies the Americans were likewise dependent on British aid, owing in part to the lack of personnel and in part to the fact that they were strange to British facilities and ways. The great bulk of American cargo entered Britain via the Clyde, Mersey, and Bristol Channel ports, on the west coast of the United Kingdom. Ports on the southern coast, such as Southampton and Plymouth, had sustained especially heavy damage from German air attacks, as had Belfast in Northern Ireland. Consequently the western ports had to accommodate the greater part of Britain's wartime trade, her lend-lease traffic, and now the steadily expanding stream of personnel, equipment, and supplies for the American forces in the ETO. All of the British ports were greatly handicapped by lack of adequate labor and by the urgency to clear the quays as rapidly as possible because of the threat of night bombing raids. As a result convoys were often split, and supplies were shipped inland without adequate records or segregation.

The depots were even less prepared to handle the newly arriving shipments of military stores. Since there was no time to construct new facilities, the first general depots were normally set up in warehouses or military depots turned over by the British. Base depots were activated at Liverpool, Bristol, and London in former commercial warehouses. In addition, British depots at Barry, Thatcham, Portsmouth, and Ashchurch began to receive American supplies and were gradually taken over completely by U.S. troops. Most of the early movement of supplies into the United Kingdom and the outmovements for TORCH were handled through these

[68] Torch and the European Theater of Operations, Pt. IV of Administrative and Logistical History of the ETO, Hist Div USFET, 1946, MS (hereafter cited as TORCH and the ETO), pp. 43–45.

depots. Many of them were not suited to the handling of awkward and heavy military loads, and lacked the necessary cranes and access roads for trucks.[69]

In all of them adequate military personnel were lacking. Depot G–25, at Ashchurch, which eventually grew into a great general depot for American supplies and equipment, acquired a strength of about 3,000 U.S. service troops in the summer of 1942. As in the case of the ports, operation of the depots required extensive use of British labor, which was untrained and unfamiliar with American methods and nomenclature.

The summer months saw increasing tonnages of American supplies arriving in the theater. A total of 570,000 long tons flowed through the U.K. ports in the months of August, September, and October.[70] But it became evident early in the preparations for TORCH that there would be serious difficulties in equipping and readying the U.S. forces earmarked for the North African operation. The SOS in the United Kingdom was simply unable to cope with the sudden influx of supplies in view of the condition in which they were arriving and the handicaps under which the SOS was working. More and more supplies were temporarily lost because they could not be identified or located. In some cases the arrival of unit equipment lagged seriously. In mid-August it was revealed that the bulk of the equipment of the 1st Infantry Division, including its artillery, was still in the United States, and doubts were expressed that the division could be employed as planned.[71] Not one hospital unit earmarked for the North African operation arrived in the United Kingdom with its complete equipment before the middle of October, and equipment therefore had to be drawn from hospitals established for troops in the United Kingdom.[72]

Some of the difficulties attending the equipping of the TORCH force were the result of the hurried clearance of the ports, the lack of trained personnel, the undeveloped facilities, and the general immaturity of the SOS organization in the United Kingdom. A number of them had their source farther back in the supply line, in the zone of interior. Much of the trouble stemmed from the fact that the entire overseas supply procedure had been overhauled only recently by the War Department and was not yet working smoothly. The SOS in the United States was hardly more experienced in the new procedure than the SOS in ETOUSA, for the supply techniques which later became routine standing operating procedures were still relatively untested.

By the time the United States entered the war in December 1941 the ports of embarkation and the zone of interior depots were well established. Under the system then in operation the War Department exercised a close centralized control over the shipment of supplies, and the ports of embarkation served simply as funnels through which supplies flowed to the overseas commands. With the outbreak of war in December it was realized that a decentralization of control was necessary, and in January 1942 the entire overseas supply procedure was revised. The main feature of this change was the key position accorded the ports of embarkation. Except for the control of certain critical items, both automatic supply and the editing

[69] Healey Memoir, p. 31.

[70] TC Monthly Progress Rpts, OCofT, SOS ETOUSA, ETO Adm 450–52.

[71] Harry C. Butcher, *My Three Years with Eisenhower* (New York, 1945), p. 53.

[72] ETO Medical Service History, Ch. IV, p. 10.

and filling of requisitions now became the responsibility of the port of embarkation commander, and the great bulk of supplies now flowed overseas without the necessity for War Department action. The new overseas supply plan had the objective of freeing the War Department of the normal business of overseas supply and of building up adequate reserve levels in the theater as quickly as production and shipping permitted. The War Department established the over-all policy on these levels, which were expressed in a minimum and maximum number of days for each class of supply, the maximum level normally being ninety days for most classes. On the basis of troop strengths in the overseas theaters and the reserve levels prescribed by the War Department, the port commander now recommended the minimum port reserves and zone of interior depot credits. Beyond this, the routine supply procedure—editing requisitions, calling up supplies from the depots, preparing loading plans, and estimating shipping needs—was controlled by the port commander.

At the other end of the supply chain the main responsibility of the overseas commander was to forward timely information of his requirements. Except for critical items, including ammunition, for which allocations and priorities were established by the War Department, this information was to go directly to the port commander. In the case of automatic supply items (Classes I and III, or rations and fuel) this would include the troop strength, the actual levels of these supplies in the theater, and certain other data on available storage, information which formed the basis for automatic shipments. In the case of Class II and IV supplies (mainly equipment) the theater's needs were made known in the form of requisitions, including certain data regarding the justification for the requests. In addition, periodic status reports were submitted as a basis for the supply of several types of critical items.

The port of embarkation commander had a reciprocal obligation to keep the overseas commander informed of shipments (normally by advance air-mailing of manifests) to enable him to make detailed plans for the receipt of supplies. In this respect, as in several others, the new supply procedure fell short of its aims, particularly in the early months. Overseas commanders complained, for example, that advance information reaching them was both insufficient and late. The Chief of the Chemical Warfare Service in ETOUSA noted that he had received a manifest for 120 tons of chemical equipment without any indication of the contents. In July Colonel Hughes, then the chief ordnance officer, visited the United States on supply matters, and reported in an SOS staff conference in London that he had found complete confusion among War Department personnel over requisitions from ETOUSA.[73]

Port officials in the United States meanwhile complained that overseas commanders were failing to report their levels of supply, omitted priorities for classes of supply, were remiss in properly justifying their requisitions, and in some cases even failed to submit requisitions.[74] Misconceptions and misunderstandings were very common at first, and many months passed before theater commanders and zone of

[73] Stf Conf, Hq SOS, 31 Jul 42, USFET 337 Confs 1942–44.

[74] Development of Overseas Supply and Procedure, prep by Capt Richard M. Leighton, Hist Br, Control Div, ASF, 1944, MS, Chs. I, II, and History of Planning Division ASF, prep by Plng Div, Office, Dir, Plans and Opns, ASF, 1946, MS, II, 189–91, OCMH.

interior supply officials fully comprehended the scope of their new responsibilities or the specific procedures involved in the new supply system. Until the system was set up and functioning there was a good deal of lost motion in the supply machine. One of the fundamental concepts of the new procedure—decentralization—was long in taking root. Requisitions and special requests continued to be submitted to the chiefs of services or other War Department agencies in Washington, and in July General Lutes found it necessary to remind the ETO to send requisitions through the New York Port of Embarkation and to stop duplications in Washington.

While much of the difficulty in establishing the new supply procedure was due to lack of comprehension or misconception on the part of supply officials, many of the troubles of the summer of 1942 stemmed from the lack of adequately trained personnel to assume the new responsibility thrust upon the ports. This was not only true in the offices of the New York Port of Embarkation, the port responsible for shipments to the ETO, where trained personnel were required to exercise judgment in determining whether or not requisitions should be honored, but also in the depots, where the task of packing and marking supplies became one of the most irksome and trying of all problems to plague the preparations for TORCH.

Early in the summer ETOUSA supply officials began to complain of the condition in which supplies were being received in the United Kingdom, and in July and August the theater received a veritable avalanche of equipment, much of it improperly marked and crated, some of it with no marking at all. The resultant confusion in the British ports, where segregation was impossible, and in the depots, manned for the most part by inexperienced troops, is easily imagined. Colonel Ross, chief of transportation in the ETO, described a trip to Liverpool, where he observed the unloading of a ship and personally noted the condition of cargo being discharged. He reported that 30 percent of the tonnage that came off the ship had no marking whatever and was therefore unidentifiable. Of the remainder, about 25 percent of the boxes indicated no addressee, and carried only a general designation that they contained ordnance or medical supplies. "It meant, in effect," he noted, "that after several ships were unloaded we were unable to send over half the freight to the particular depot to which the using services ordered it. The result was that all services were forced to go into a huddle and to examine practically half of the freight they received before they could distribute that freight to the people that needed it." Boxes frequently marked with only a lead pencil or paper label at the depot of origin were loaded into freight cars, and bills of lading were made out indicating simply that a car contained thirty-seven tons of quartermaster supplies. These supplies would carry the same general designation on the manifest when transferred to a ship in the New York port.[75]

Citing specific examples of the effects of such practices, Colonel Ross noted that he had seen two new engines mounted on a platform, but with no other crating, both of them badly damaged. The contents of uncrated paper cartons often took a loss of 75 percent from handling and exposure to

[75] Invasion: The History of the Transportation Corps in the ETO, prep by Hist Sec, OCofT, ETO, 1944, Vol. III (April–June 1944), Ch. I, pp. 13–14, ETO Adm 582D.

rain. Thousands of unmarked barracks bags, some of them intended for Iceland, were thrown in with other cargo, and required four or five days to retrieve. Late in July Colonel Ross made a vehement protest against these practices, strongly indicting the depots in the United States as the source of the difficulties which the SOS in the United Kingdom was now having in trying to segregate, identify, and salvage these supplies. In a letter to Brig. Gen. Robert H. Wylie, Chief of Operations, Office of the Chief of Transportation, in the War Department, Colonel Ross wrote:

> You can readily see that this environment necessitates a revision of ideas from your embarkation end. If we seem impatient at times because this baggage and equipment is not marked and sailing cables do not arrive, please remember that the few days that are being saved in New York in priming a ship are more than lost here in unscrambling the mess. . . . You must remember that all of the warehouses and some of the piers here are completely destroyed, that we must load from shipside to train and thence to depot destinations. There isn't any use in New York, or any other port, raising the human cry that they cannot spend the time on this. Either the method must be found to spend time on it, or our efforts here will collapse.[76]

There were additional reasons for the difficulties which the SOS in the United Kingdom experienced in the summer of 1942. One of them was the procedure in shipping organizational equipment overseas. Under the current practice of "force marking," each unit preparing for overseas movement was given a "task force" code number which was used to identify both the unit and its equipment. A unit's equipment was loaded on cargo ships, while the personnel traveled on transports, and the force number was intended to permit a rapid "marrying up" of the unit with its equipment upon arrival in the theater. In the trying months preceding TORCH this system did not work well. Soldiers normally made the Atlantic voyage in swift liners which carried no cargo, and their equipment frequently arrived as much as 80 to 120 days later. Even when troops and equipment departed at the same time, the units had to give up their equipment at least a month before sailing so that it could be crated, shipped to the port, and loaded, thus curtailing the unit's training.[77] Marrying up an organization with its equipment in the United Kingdom was a major task, and in the early days the depots often did not have master lists of the force-marked code numbers. In the case of TORCH units, which were spending only a short time in the United Kingdom before debarking for North Africa, frantic efforts had to be made to find organizational equipment when the unit's own equipment was not received or could not be found. New requisitions had to be placed on theater depots, with the result that normal stocks were depleted and the theater's supply level was reduced.[78]

The confusion in the U.K. depots was not helped by the inauguration in midsummer of a new shipping procedure which supplemented the force marking system. In the spring of 1942 a proposal had been made to ship equipment and supplies as fast as available shipping resources allowed, regardless of the rate of troop movements. The process of building up supplies and equipment in this manner in excess of the normal organizational and

[76] Ltr, Ross to Wylie, 28 Jul 42, ETO Adm 341A Transportation—General.

[77] Troop and Supply Buildup in the United Kingdom prior to D Day, Pt. III of The Administrative and Logistical History of the ETO, Hist Div USFET, 1946, MS, pp. 154–55, OCMH.

[78] Healey Memoir, p. 30.

maintenance needs of troops in the theater, and storing them for later issue, was known as preshipment. The new system promised undeniable advantages. It would permit the fullest possible use of all cargo shipping; it would take advantage of the long summer days when unloading time could be increased; and it would prevent interruptions in the training of units, since they would retain their old equipment until embarkation and would be issued new equipment upon arrival in the theater.[79] In the absence of definite plans for operations in 1942 the new shipping scheme had real merit. The decision to launch the TORCH operation, however, prevented the full implementation of the preshipment idea in 1942. The shortage of shipping and the desperate efforts to equip specific units for the North African operation limited advance shipment to such bulk supplies as construction materials, rations, and crated vehicles. The receipt of even this tonnage only placed an additional burden on the creaking supply organization in the United Kingdom.

Early in September the entire supply problem reached a climax and threatened to jeopardize the TORCH operation. Many units reported critical shortages and consequently were not ready for the North African operation. Colonel Hughes, the deputy chief administrative officer of AFHQ, estimated that the SOS could meet the food and ammunition requirements of 112,000 men in the North African theater for forty days, and provide twenty days of supply in many other categories. Because of unbalanced stocks, however, serious deficiencies had appeared in some categories, notably in spare parts for weapons and motor vehicles.[80] By mid-September Colonel Hughes had become more pessimistic. On the 14th he reported to General Clark that there was no assurance of an adequate ammunition supply, and he gave his opinion that the job could not be done within the time limits established.[81]

Some of the supply deficiencies reported by Colonel Hughes were absolute shortages in that insufficient quantities had been received from the United States. But the most vexing problem arose from the temporary loss of items in the United Kingdom. They had been received but could not be found. In the spring and early summer, when haste in unloading ships and speeding their turn-round were the pressing considerations, and when poor marking made identification and segregation impossible, large quantities of supplies had been thrown into warehouses and open storage without proper inventorying. Now there was a sudden demand for thousands of items and there were no adequate records indicating their location.

Since inventorying these stocks would require several months, there appeared to be only one alternative—to reorder the needed items from the United States. On 7 September the theater commander cabled the War Department, describing the situation and explaining that in many cases SOS troops did not know what was on hand. In an attempt to prepare the War Department for what was to come and thus soften the blow, he asked that it bear with him if the chiefs of the services in Washington received requests for items

[79] Memo, Brig Gen Raymond G. Moses, WD G-4, for Gen Lutes, 30 Apr 42, sub: Force BOLERO, WD G-4 BOLERO; Memo, Col Carter B. McGruder, Opns Div SOS, for Lutes, 17 Jun 42, sub: Cargo for BOLERO, Jun-Aug, ASF Plng Div A47-147 BOLERO Requirements (Strategic).

[80] Butcher, *My Three Years with Eisenhower*, p. 88.

[81] Ltr, Hughes to Clark, 14 Sep 42, sub: Estimate of Supply and Adm Aspects of Proposed Opn, USFET AG 400 Supplies and Equipment, V.

which they had already shipped. "Time is now so critically important," he added, "that we cannot always be accurate with respect to these details." [82] This communication was followed on the very next day by a lengthy cable requisitioning huge quantities of supplies which were urgently needed for the equipping and support of the TORCH force.

Naturally it came as quite a shock to the War Department to learn that much of the Class II and IV supplies already shipped to the United Kingdom could not be located and would have to be replaced. In a letter to General Lee on 12 September General Lutes noted that the War Department had already made strenuous efforts to build up stocks in the United Kingdom for the ROUNDUP operation scheduled for next spring. After the TORCH decision it was faced with the additional problem of equipping the Western Task Force and then maintaining the North African forces from the United States. Now it was being asked to duplicate much of the U.K. build-up.

> We wish to assist you in every way possible [Lutes wrote], please be assured of that. However, we have sunk a large quantity of supplies in the UK, and these supplies, together with those furnished for Lend-Lease purposes, and those lost by submarine sinkings, are putting the staff on this side in an embarrassing situation. At the moment, we are having the ammunition implications analyzed. We hope to be able to fill your requirements for the task force leaving UK, but it would be most helpful if this ammunition could be located in UK. I realize that at this great distance, it is difficult for us to fully understand your problems, but it would appear that a small group of American officers in each of the British ports could protect the American interests on the supplies and equipment we have shipped to the UK.[83]

The letter went on to point out that many of the requests made by the ETO were not clear. Units for which equipment was requested were not identified, and maintenance for field artillery units was requisitioned without indicating whether they were howitzer or gun units. Such lack of exactness, reflecting improper editing and co-ordination in the theater, only made the task of the supply agencies in the War Department and in the ports more difficult and time consuming.[84]

Additional requests continued to flow to the War Department in the following weeks. Late in September there still were misunderstandings about the length of time during which the Center Task Force and Eastern Assault Force could be maintained from the United Kingdom. In mid-October, in reply to a late request for maintenance supplies, the War Department tartly noted, "It appears that we have shipped all items at least twice and most items three times." [85]

Some organizations destined to join the North African forces had little more than 50 percent of their initial basic allowances of signal equipment only a month before the target date. On the other hand, organizations frequently did not know the status of their own equipment, and some arrived for embarkation with overages. The 1st Armored Division, for example, arrived in Glasgow with vehicles considerably in excess of allowances, and was forced to leave them scattered over the Scottish port when it embarked for North Africa.[86]

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[82] Cbl 1871, Eisenhower to OPD, 7 Sep 42, as cited in TORCH and the ETO, p. 72.

[83] Ltr, Lutes to Lee, 12 Sep 42, copy in Preparations for TORCH, prep in Hist Sec WD, MS, App. C, OCMH.

[84] For the War Department story see Leighton and Coakley, Logistics of Global Warfare.

[85] Quoted in Preparations for TORCH, p. 37.

[86] TORCH and the ETO, p. 75.



GENERAL LITTLEJOHN, *Chief Quartermaster, ETOUSA.*

Early in September, when the supply situation was most chaotic, General Eisenhower re-emphasized to General Lee his basic mission of operating the SOS so as to insure the adequate support of the American expeditionary force then being prepared in the United Kingdom. He instructed the SOS commander to spare no effort or expense to accomplish the task of sorting and cataloguing supplies that had already been received, and he urged Lee to utilize to the utmost the proffered assistance of British organizations and to exploit every possible means of avoiding unnecessary shipments from the United States. Eisenhower asked Lee to devote full personal attention to this task, authorizing him to delegate responsibility for the normal routine functions of the SOS to a subordinate.[87] General Lee accordingly appointed General Littlejohn, the chief quartermaster, as deputy commander of the SOS.[88]

Strenuous efforts on the part of both the SOS in the United States and the SOS in the ETO overcame the most critical deficiencies in the United Kingdom in the following weeks. Needed items were sought in a variety of ways: local procurement (emergency production was even started in local factories); requests on the British War Office (considerable quantities of ammunition were obtained in this way from British stocks); emergency requisition on the United States; transfer from alerted organizations with low priority or from nonalerted units; and a search of stocks afloat and of the depots, where men worked day and night, receiving, storing, and issuing supplies.[89]

Efforts were also made to alleviate some of the effects of the poor marking practices, and to remedy the fault itself. Late in September General Marshall suggested that a detachment of three or four men familiar with the cargo and loading plan be placed on each ship to follow through on the discharge and keep track of priority freight so that it would be properly dispatched. This procedure became common practice in the ensuing months.[90] Upon arrival in the United Kingdom more and

[87] *Aide-Mémoire,* Eisenhower for Lee, 10 Sep 42, SOS AG 320.2 SOS Jun 42–Jul 43.

[88] Littlejohn was relieved of his position as deputy commander and appointed chief of staff of the SOS on 19 October. But as such he continued to exercise his responsibilities with regard to routine SOS functions, and also continued as chief quartermaster, two jobs that gave him a heavy burden. Early in November, Col. William G. Weaver took over the duties as chief of staff and shortly thereafter Lee referred to the colonel as his field deputy commander. Organization and Command, I, 160.

[89] TORCH and the ETO, p. 75.

[90] Memo, Marshall for Somervell, 23 Sep 42, ASF, Chief of Staff—GS (2).

more cargo was moved immediately to inland sorting sheds which had been built by the British for use in case the ports were blitzed. In 1942 they served an emergency purpose in receiving cargo which could not be segregated, and in effect became warehouses, since there was little opportunity to redistribute cargo to its original destination. They were used to a more limited extent as sorting sheds in 1943.[91] Meanwhile an effort was made in the United States to get at the root of the cargo shipping problem. The War Department instructed the Chief of Transportation in Washington to set up an inspection service, and on the first day of action at the New York Port it turned back to the depots 14,700 pieces of freight which could not be identified.[92]

Within a month these efforts had begun to show results, and the panic subsided. Early in October General Larkin, the G–4 of the Center Task Force, reported that the loading schedule would be met and that at least nothing had developed to make the SOS situation any worse. At the same time General Hughes [93] made a tour of the depots and returned more optimistic.[94]

A month later, on 8 November, the operation whose preparation was characterized by so many doubts and uncertainties and frantic measures was launched and eventually carried to a successful conclusion. The five months between the activation of the theater and the launching of TORCH were a period of hard experience for the SOS. In implementing planning in which it had taken no part the SOS had worked under a severe handicap. General Lee later stated that one of the principal lessons learned from TORCH was that supply planning and operations must be closely co-ordinated with tactical planning and operations. This lesson was not forgotten in the preparation for the cross-Channel attack in 1944.

(5) BOLERO's Status at the End of 1942

Besides providing a school of experience for the infant SOS, TORCH left its mark on the United Kingdom in other ways. The North African operation in effect crippled the great BOLERO design, for it caused not only a sudden drain of U.S. air, ground, and service forces, supplies, and key personnel from the United Kingdom but left the European theater the low man on the War Department's priority list. As a result the entire development of the U.S. establishment in the United Kingdom was retarded, and its losses were not recouped for many months to come.

After the token shipments of the first months of 1942 the BOLERO movements of the summer slowly but steadily had built U.S. strength in the United Kingdom to a peak of 228,000 men in October. Late that month the embarkations for North Africa began, the bulk of the outmovements taking place by the end of February 1943, at which time 151,000 troops had been withdrawn. Small additional shipments in the succeeding months brought the total diversions to 153,000. Meanwhile small numbers of troops continued to flow to the United Kingdom from the United States, but the net result of the transfers to North Africa was a reduction of the American strength in the United Kingdom to 104,-

[91] Memo, Col N. A. Ryan, OCofT, for CG SOS, 20 Feb 43, sub: Sorting Sheds, EUCOM 320 Responsibilities of TC 1942; Note by Lt Col George W. Beeler, SOS, at mtg on inland sorting sheds, 8 May 43, USFET 337 Confs 1942–44.

[92] TC History, Vol. III, Ch. I, p. 14, cited above, n. 75.

[93] Promoted to brigadier general on 6 September.

[94] Butcher, *My Three Years with Eisenhower*, p. 133.

TABLE 1—TROOP BUILD-UP IN THE UNITED KINGDOM: JANUARY 1942–FEBRUARY 1943

Year and month	Arrivals [a]		End of month strength					
	Monthly	Cumulative from Jan 42	Total	Ground Forces	Air Forces	Services of Supply	Hq ETO and Misc	Allied Force [b]
1942								
January	4,058	4,058	[c]	[c]	[c]	[c]	[c]	0
February	0	4,058	[c]	[c]	[c]	[c]	[c]	0
March	7,904	11,962	[c]	[c]	[c]	[c]	[c]	0
April	0	11,962	[c]	[c]	[c]	[c]	[c]	0
May	24,682	36,644	[c]	[c]	[c]	[c]	[c]	0
June	19,446	56,090	54,845	38,699	12,517	1,968	1,661	0
July	26,159	82,249	81,273	39,386	17,654	21,902	2,331	0
August	73,869	156,118	152,007	72,100	37,729	39,280	2,898	0
September	28,809	184,927	188,497	79,757	57,752	39,527	9,618	1,843
October	39,838	224,765	[d] 223,794	90,483	66,317	40,974	18,509	7,511
November	7,752	232,517	170,227	5,656	32,227	31,698	17,640	83,006
December	9,322	241,839	134,808	17,480	40,117	32,466	6,313	38,432
1943								
January	13,351	255,190	122,097	19,431	47,325	36,061	5,672	13,608
February	1,406	256,596	104,510	19,173	47,494	32,336	5,507	0

[a] By ship. Excludes movements by air.

[b] Air, ground, and SOS personnel assigned to Allied Force at the time and earmarked for movement to North Africa.

[c] Data not available.

[d] The peak strength of about 228,000 reached in the U.K. during October is not indicated here because embarkation for TORCH began before the end of the month.

Source: Troop arrivals data obtained from ETO TC Monthly Progress Rpt, 30 Jun 44, ETO Adm 451 TC Rpts. Troop strength data for June 1942 through February 1943 obtained from Progress Rpt, Progress Div, SOS, 4 Oct 43, ETO Adm 345 Troops. These ETO strength data were preliminary, unaudited figures for command purposes and, while differing slightly from the audited WD AG strengths, have been used throughout this volume because of the subdivision into air, ground, and service troops. This breakdown is unavailable in WD AG reports.

510 at the end of February 1943.[95] (*Table 1*)

The drain of personnel was particularly noticeable in the air and ground forces. A new air force, the Twelfth, had been activated to support the TORCH operation, and was eventually constituted largely of units transferred from the Eighth Air Force, which organized and prepared the new organization for its North African mission. The Eighth Air Force initially lost about 27,000 of its men to the Twelfth and continued to serve as a replacement pool for the North African air force for several months. In addition, it was estimated that the Eighth lost nearly 1,100 of its aircraft and 75 percent of its stock of supplies to the new command.[96] So weakened was the Eighth by its contributions to TORCH that its bombing operations against the Continent virtually ceased for a time and were severely curtailed for several months because the newly activated Twelfth was ac-

[95] Progress Rpt, 4 Oct 43, Progress Div SOS, ETO Adm 345.

[96] Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II: II, Europe—TORCH to POINTBLANK, August 1942 to December 1943* (Chicago, 1949), pp. 599–600; 619; TORCH and the ETO, p. 119.

corded higher priority on equipment and personnel.

The ground forces suffered even heavier losses to the TORCH operation, reaching their lowest ebb in the history of the theater with a strength of less than 20,000. The V Corps, now transferred from Northern Ireland to England, continued to serve as the highest administrative headquarters for ground forces in the United Kingdom. But for several months the 29th Division, which had arrived in October and had assisted in the administrative preparations of the North African force, remained the only major ground force unit in the United Kingdom. Not until May 1943 did the ETO begin to rebuild its depleted forces.

The North African operation also took its toll of key officers in the United Kingdom, some of the ablest members of the ETOUSA and SOS headquarters being selected to serve in the expeditionary force. In addition to Brig. Gen. Walter B. Smith, who became General Eisenhower's chief of staff in AFHQ, Headquarters, ETOUSA, immediately lost its G–1, Col. Ben M. Sawbridge, its adjutant general, Col. Thomas J. Davis, and the antiaircraft officer, Col. Aaron Bradshaw, upon the organization of the new headquarters. Other officers in key positions were transferred to North Africa during the fall and winter months. The loss of these men, combined with the constant shifting of assignments in the United Kingdom, inevitably weakened the ETOUSA staff for a time.

While the SOS retained more stability, it also lost several of its top officers. General Larkin, who had become one of Lee's most capable assistants, first as chief of staff and then as chief engineer, became the G–4 of the Center Task Force and eventually headed the entire SOS organization in North Africa. He was replaced by the Eastern Base Section commander, Colonel Moore, who remained the theater's chief engineer for the remainder of the war. General Davison, who had come to England with General Chaney in 1941, became the chief engineer of AFHQ. Colonel Ross, the chief of transportation, went to North Africa in January 1943 but was absent only temporarily, returning to the United Kingdom in March. General Hughes, the Deputy Chief Administrative Officer, remained in the United Kingdom as deputy chief of staff of ETOUSA through the winter months and was not definitely lost to the theater until the spring of 1943. Among the other losses which the SOS sustained were its G–4, chemical warfare officer, and judge advocate. The Eighth Air Force also lost several of its key officers, including General Spaatz



GENERAL MOORE, *Chief Engineer, ETOUSA. (Photograph taken in 1945.)*



DECK-LOADED GENERAL GRANT MEDIUM TANKS, *part of a cargo shipped from the United Kingdom to Africa.*

himself. All in all, the assignments to AFHQ represented a considerable drain on the talents of ETOUSA, although some of these officers were to return in 1944 to apply the experience they won in the Mediterranean area to the preparation of the cross-Channel operation.[97]

TORCH also cut deeply into the stockpile of supplies and equipment which the ETO had built up since the first of the year. In acquiring first priority on all shipping resources, it created a famine which lasted well into 1943. In the period from October 1942 through April 1943 more than 400,000 long tons of American supplies were dispatched from the United Kingdom to North Africa. These shipments affected the services in varying degree. The Signal Corps, for example, estimated that 20 percent of the total signal tonnages received in the United Kingdom since the first of the year was shipped to North Africa. In many cases maintenance and reserve levels in the United Kingdom were seriously depleted. The dependence of the TORCH forces on U.K. stocks was intended to be temporary, of course, and the large shipments came to an end in May 1943, but the drain had been heavier than anticipated.[98]

[97] Organization and Command, I, 154–56, 160–61.
[98] TORCH and the ETO, pp. 102–09.

TABLE 2—CARGO FLOW TO THE UNITED KINGDOM: JANUARY 1942–MAY 1943

Year and month	Measurement tons		Long tons	
	Monthly	Cumulative from Jan 42	Monthly	Cumulative from Jan 42
1942				
January	411	411	108	108
February	23,065	23,476	9,222	9,330
March	34,922	58,398	11,707	21,037
April	15,859	74,257	5,078	26,115
May	102,158	176,415	46,353	72,468
June	102,677	279,092	33,720	106,188
July	193,835	472,927	75,791	181,979
August	441,256	914,183	186,281	368,260
September	597,288	1,511,471	239,747	608,007
October	362,363	1,873,834	143,830	751,837
November	165,503	2,039,337	54,228	806,065
December	140,659	2,179,996	36,927	842,992
1943				
January	117,913	2,297,909	38,562	881,554
February	75,566	2,373,475	20,373	901,927
March	65,767	2,439,242	24,719	926,646
April	111,245	2,550,487	60,784	987,430
May	87,056	2,637,543	36,593	1,024,023

Source: ETO TC Monthly Progress Rpts, Hq SOS, Statistics Br, OCofT, ETO Adm 450–51.

The support of the TORCH force was attended by its share of confusions and misunderstandings over supply procedure. General Somervell had rejected a proposal that requisitions for the Western and Center Task Forces be channeled through AFHQ and ETOUSA to the War Department. He ordered that they be sent directly from the task forces to the New York Port, with AFHQ exercising over-all control as to amounts and character of the supplies. But as long as the TORCH forces were partially dependent on the SOS in the United Kingdom there was some duplication of effort and AFHQ and ETOUSA submitted requisitions for supplies for the same units. Part of the confusion resulted from the inadequate exchange of information between the two headquarters; part of it undoubtedly reflected the general immaturity of the whole supply system and the lack of experience of all concerned in conducting a large-scale operation.[99] Here TORCH again taught a lesson which was taken to heart in the later OVERLORD planning.

Meanwhile the flow of supplies from the United States to the United Kingdom was sharply reduced upon the launching of TORCH, averaging less than 35,000 long tons in the seven lean months that fol-

[99] *Ibid.*, pp. 75–76; Organization and Command, I, 163.

lowed.[100] (*Table 2*) Likewise the flow of troops from the United States almost ceased in February, March, and April 1943, averaging fewer than 1,600 in those months. The mere trickle to which supply and troop movements to the United Kingdom were reduced belatedly reflected the relatively unimportant position to which the U.K. build-up had been relegated by the new active theater of operations. Shortly after the Claridge Conference of July the War Department decreed that supplies and equipment would be shipped and stocked no longer in accordance with the old BOLERO-ROUNDUP plan but only in quantities sufficient to meet maintenance requirements for troops that were to remain in Britain.[101] It notified the theater that all outstanding requisitions based on the BOLERO build-up were subject to cancellation.[102] The War Department was serving notice, in other words, that the BOLERO build-up would not proceed as originally planned. A few weeks later it asked ETOUSA to submit recommendations for a reduced troop basis built around a ground force of 150,000 men,[103] and shortly thereafter gave further indication of its plans for the size of the U.K. force by instructing that requisitions for the ETO tentatively be based on a total force of 300,000.[104] Late in September Headquarters, ETO, determined that a balanced force with five divisions would require a total of 427,000 men, made up as follows:[105]

Type	*Number*
Total	427,000
Ground Forces	150,000
Air Forces	172,000
Services of Supply	105,000

The War Department accepted these figures in October, and they became the basis for U.S. build-up plans in the United Kingdom for the next several months. Word from Washington soon made it clear that no equipment or supplies in excess of the maintenance needs of this force would be shipped to the United Kingdom. There would be no stockpiling for some hypothetical future operation. Finally, the War Department went a step further and reduced the authorized levels of supply for most items in the United Kingdom from 90 days to 60 or 75.[106]

Despite these signs, the hope that plans and preparations for the cross-Channel operation would continue unabated died hard in the United Kingdom. There was definitely no intention of abandoning ROUNDUP, and there was little disposition at first on the part of ETO planners to accept a slowing of ROUNDUP's counterpart—the BOLERO build-up and its companion plan for the preparation of the U.K. base. Preoccupied as he was with the coming North African operation, General Eisenhower expressed to General Marshall the belief that "we should plan deliberately" for the cross-Channel operation, and urged that the War Department "make superhuman efforts to build up U.S. strength in the United Kingdom after the TORCH requirements have been

[100] TC Monthly Progress Rpts, Statistics Br, OCofT, SOS ETO.

[101] Memo, Lutes for Technical Svc Chiefs, 26 Sep 42, sub: Shipments to American Forces in U.K., ASF Plng Div, BOLERO Requirements, Strategic, A47-147.

[102] Cbl, Marshall to USFOR, 22 Aug 42, USFET 334 Mission for Economic Affairs Progress Rpt 1944.

[103] Cbl R-248, AGWAR to ETO, 12 Sep 42, USFET AG 381, 54-40 or BOLERO.

[104] Memo, G-4 SOS for CG SOS, 17 Sep 42, sub: Status of Supply Techniques and Its Effect on This Theater, USFET 400 Supply I.

[105] Ltr, Hq ETO to CG SOS, 23 Sep 42, sub: SOS Over-all Plan, SOS AG 320.2 SOS Jun 42-Jul 43.

[106] Ltr, Somervell to Lee, 17 Nov 42, ASF European Theater 1942-43.

satisfied." [107] General Lee, fully appreciating the need for long-range supply planning, also urged that, although all effort at the moment was focused on the North African mission, planning for ROUNDUP should be resumed and its logistic needs estimated as far in advance as possible.[108]

The theater commander and the SOS commander initially also shared the view that the preparation for accommodating U.S. troops and supplies should continue. Early in October General Eisenhower decreed that all storage and hospital facilities previously planned be constructed "without interruption or modification."[109] General Lee agreed that there should be no alteration or retardation in the BOLERO construction program, on the assumption that the build-up of the first contingent would merely be the first step toward completion of the full BOLERO program as outlined in the Second Edition of the Key Plan; which, he noted, "remains the measure of the total commitment." This policy was transmitted to both General Wootten of the Combined Committee and the chiefs of services.[110]

The determination to continue U.K. preparations for an eventual cross-Channel operation found strong expression in the November revision of the BOLERO Key Plan. The Third Edition was published by the British Deputy Quartermaster General on 11 November. It reflected the unavoidable impact of TORCH on the rate of the U.S. build-up by using the troop basis figure of 427,000 as a short-term planning figure or build-up target. Beyond this, however, the Third Edition reflected a firm conviction on the part of British and U.S. planners in the United Kingdom that the original BOLERO program would be fully implemented. The object of the plan remained, as before, the development of the United Kingdom as a base from which U.S. forces could develop and sustain offensive operations, and the preparation for the reception, accommodation, and maintenance of U.S. forces in the United Kingdom. For its long-range troop basis the Third Edition used the original figure of 1,049,000.

The only essential difference between the newly revised plan and the Second Edition of July was the assumption that the million-man force would now be built up by stages, the target of the first stage being the build-up of a balanced force of 427,000 men. General Wootten hoped that the build-up of this first contingent could be achieved by May 1943, assuming that the full BOLERO rate of sailings (100,000 men per month) would be resumed in January. In this first phase the highest priority for shipping was expected to go to the air forces and to the SOS. The plan assumed that further arrivals of U.S. troops were likely to continue without pause toward the completion of the entire original BOLERO program by the end of 1943.[111]

Thus, while acknowledging the limitation which TORCH immediately imposed on the build-up, the BOLERO planners accepted it only as a temporary postponement or delay. The Deputy Quartermaster

[107] Ltrs, Eisenhower to Marshall, 7 and 12 Oct 42, OPD 381 ETO, I, 1–13, and II, 14–60.

[108] Ltr, Lee to Somervell, 30 Oct 42, ASF European Theater 1942–43.

[109] Ltr, Hq ETO to CG SOS, 2 Oct 42, sub: Modifying Plan for BOLERO, as cited in ETO Medical Service History, Ch. II, p. 46, ETO Adm 581.

[110] Ltr, Lee to Wootten, 19 Oct 42, and Memo, Hq ETO for Chiefs of Svcs, 3 Nov 42, sub: Construction Program, as quoted in ETO Medical Service History, Ch. II, p. 47.

[111] Key Plan for the Reception, Accommodation, and Maintenance of the U.S. Forces (Third Edition), DQMG(L) Paper 11, 11 Nov 42, ETO DQMG(L) Papers.

General confidently noted that the development of the United Kingdom as a base for offensive operations was therefore to continue along the lines originally envisaged. His plan underscored the following statement: "No retardation will therefore be made in the rate of provision of administrative installations etc., required in connection with offensive operations. The necessary planning and construction will continue with the maximum degree of priority."

The British Southern Command, anticipating the Third Edition by several weeks with its own interim plan pertaining to the Southern Base Section area, had also given expression to the assumption, emphasizing that the "Bolero 2nd Key Plan is not dead." It bravely asserted that, although the flow of cargo and troops would be reduced for a time, work would proceed on all new construction projects in the Southern Command under the Second Edition of the Key Plan, whether already begun or not.[112] When the Third Edition of the Key Plan appeared early in November it called for an expansion program of substantially the same magnitude as had the July plan—15,000,000 square feet of covered storage, 90,000 beds, and so on.

By that time, however, the theater commander himself began to question the advisability of carrying forward the program at the old rate or of using U.S. materials and military labor to complete the construction projects in view of the much smaller interim troop basis.[113] General Marshall and General Somervell confirmed his doubts. The heavy demands for both supplies and shipping for the North African operation prompted them to direct that neither construction nor the shipment of supplies to the United Kingdom was to exceed the needs of the 427,000-man force. They noted that any construction beyond those needs must be met from British labor and without lend-lease materials.[114] General Eisenhower had already tentatively notified the British War Office that the continuation of the hospital and depot construction program would have to be accepted "by unilateral action" on its part,[115] and the War Office was now definitely informed that any projects in excess of the revised needs would have to be carried out by British labor and materials.[116]

The decision to curtail expansion of U.S. facilities in the United Kingdom reflected an uncertainty about future action which, curiously enough, was more evident in Washington than in London. British officials had consistently pressed for the earliest possible resumption of full-scale BOLERO troop shipments, the stocking of supplies, and an undiminished construction program. Throughout this period they maintained that no alterations in the BOLERO project were admissible without a new directive from the Combined Chiefs of Staff, and that the build-up had simply been retarded.[117] For some time, therefore, a "Gilbertian" situation existed as a result of the divergent opinions

[112] Bolero 3rd (Interim) Key Plan, Oct 42, ETO DQMG(L) Papers.

[113] Cbl 4759, Eisenhower to Somervell, 11 Nov 42, CofS Papers on TORCH, 8 Nov–9 Dec 42, Smith Papers, Dept of Army Library.

[114] Cbl R-3150, Marshall to Eisenhower, 14 Nov 42, CofS Papers on TORCH, Smith Papers; Ltr, Somervell to Lee, 17 Nov 42, ETO 381 ROUNDUP Jul–Nov 42.

[115] Ltr, Hq ETO to Under-Secy of State for War, WO, 10 Nov 42, sub: BOLERO Third Key Plan, ETO AG 381 5440 May–Dec 42.

[116] Ltr, Hartle to COS Com, 19 Nov 42, sub: Revised Program for SOS Construction and Opn, Smith Papers.

[117] The Bolero Project, extract monograph prep by Q(Ops) Hist, WO, mimeo, OCMH.

held regarding the planning figures. Recent communications from the War Department hinted that the original BOLERO-ROUNDUP concept had already been modified (presumably by the deep commitment in the Mediterranean area), and the theater commander had therefore suggested that a review of the entire strategic situation was necessary in order to determine whether the present program should be modified, abandoned completely, or pushed forward aggressively.[118] It was because of this uncertainty that the theater commander had tentatively curtailed the U.S. participation in the U.K. preparations. American doubts about ROUNDUP were undoubtedly inspired by the suspicion that the British concept of a cross-Channel operation differed from that held by U.S. planners, and there was little disposition on the part of General Marshall to permit a full-scale build-up in the United Kingdom until the Combined Chiefs agreed on an operation the execution of which was not predicated on a crack in German morale. The resumption of the full BOLERO program therefore depended on a firm decision and meeting of minds on combined future strategy.[119]

By the late summer of 1942 work had started on a building program (including that of the Air Ministry) which the London Combined Committee valued at approximately $685,000,000, and which by the end of October was estimated to be approximately 18 percent completed.[120] After the launching of TORCH, in accordance with instructions from theater headquarters,[121] a resurvey was made of all U.S. requirements, including troop accommodations, hospitals, depot space, and air force installations. The smaller troop basis made it apparent that a large number of installations then under construction or planned either would not be required at all or would be improperly located. The reorientation of the ground force program was considerably more urgent than that of the air force since air operations were to continue. Ground force strength would be the last to be rebuilt.

Little difficulty had been encountered in providing troop accommodations. Some new quarters were constructed, but for the most part they were obtained either by the transfer of accommodations as they stood or by the expansion, conversion, or adaptation of existing facilities.[122] The survey of personnel accommodations in October revealed that there would be little difficulty in housing the reduced force, and a policy of deferring construction of most housing facilities was adopted.[123]

In the matter of covered storage accommodations, there likewise was little difficulty in meeting the early requirements. By the end of August the short-term target of 5,000,000 square feet had already been exceeded.[124] Early in November the Construction and Quartering Division of the chief engineer's office in a directive to the base sections confirmed the intent of the Third Edition of the BOLERO plan that depot construction would not be halted.

[118] Ltr, Hq ETO to Under-Secy of State for War, WO, 10 Nov 42, sub: BOLERO Third Key Plan, ETO AG 381 5440 May–Dec 42.

[119] Min, 322d Mtg, COS Com, 20 Nov 42, Smith Papers.

[120] Memo, Sir Findlater Stewart to Lord Pres of Council, 23 Nov 42, ETO BCC Bk 2.

[121] Ltr, Hq ETO to CG SOS, 19 Nov 42, sub: Revised Program for SOS Construction and Opn, Smith Papers.

[122] Quartering (United Kingdom), Hist Rpt 8, Corps of Engrs ETO, prep by Ln Sec, Int Div, OCofE ETO, Aug 45, MS, pp. 12–13, ETO Adm.

[123] Field and Service Force Construction (United Kingdom), Hist Rpt 7, Corps of Engrs ETO, Aug 45, MS, pp. 75, 148–49, ETO Adm.

[124] Min, 13th Mtg, BOLERO Accommodations Sub-Committee, 25 Aug 42, ETO BCC Bk 2.

The division announced that work was to be expedited on some of the depot sites and would continue on the remaining projects which had already been planned and approved. Early in December, however, the chief engineer gave the base section commanders a modified program, bringing the construction schedule into line with the immediate needs of the 427,000-man force.[125]

The medical program met much the same fate so far as American participation in construction was concerned. By the end of August almost the entire program as outlined in the July edition of the BOLERO plan was fixed, and construction had begun on two 1,000-bed hospitals and ten of the thirty-five 750-bed station hospitals. Ten 1,250-man conversion camps, later to be turned into 750-bed hospitals, were being built in the Southern Command. In addition, eleven militia camps had been turned over by the British and their conversion ordered, the expansion of five Emergency Medical Service hospitals had begun, and four British military hospitals were already occupied. Plans were ready for additional station hospitals and for another type of convertible installation known as the dual-purpose camp, designed primarily to serve as a general hospital after D Day, but so planned that the ward buildings could be used as barracks until that time.[126]

In November, however, the chief surgeon was compelled to revise the program, and the total requirements were reduced by more than half, from approximately 90,000 beds to 37,900.[127] The reduced program involved the loss of all the militia camps except 2, all of the convertible camps in Southern Command, and about 25 other planned hospitals—a reduction from approximately 130 hospitals to 45. This drastic cut was not desired by the chief surgeon and was definitely against the wishes of the British, who argued that there would not be time to carry out a large construction program after the build-up was resumed, and that medical services would therefore fall far short of demands. Construction already lagged behind schedule in the fall of 1942, and the chief surgeon became seriously concerned over the critical shortage of beds, particularly when it was learned that the United Kingdom would have to receive some of the casualties from North Africa. At the end of the year there were only 4 general hospitals, 4 station hospitals, and 1 evacuation hospital in operation in the United Kingdom, with a capacity of about 5,000 beds. No other accommodation problem caused as much concern at the end of 1942, and General Hawley repeatedly brought the problem to the attention of General Lee and the BOLERO Sub-Committee on Medical Services. Fortunately, British officials decided to continue the building program without U.S. aid, and the close friendship and understanding between the U.S. and British staffs, backed

[125] Engr Hist Rpt 7, pp. 135–36, cited above, n. 123; Memo, CofS ETO for CG ETO, Dec 42, sub: Revised Program for SOS Construction and Operation, with Ind, 21 Dec 42, USFET 600.1 Construction of Buildings.

[126] ETO Medical Service History, Ch. VII, pp. 10–14.

[127] By this time the theater surgeon had altered somewhat the basis on which bed requirements were calculated, raising those for sick and nonbattle casualties from 3 to 4 percent. This increase was justified, General Hawley stated, because the assumptions on which original estimates had been made had not materialized. Chiefly, troop accommodation standards were lower than expected, resulting in overcrowding and therefore more sickness, a convalescent hospital had not been provided as planned, and the lack of hospital ships had prevented following evacuation policies. *Ibid.*, Ch. II, pp. 44–45.

by a gentleman's agreement, made some progress possible.[128]

Air force construction plans underwent frequent changes in the first year, owing mainly to fluctuations in the planned build-up of air forces in the United Kingdom. Nevertheless, substantial progress was made in both airfield and air depot construction in the early months. By the late summer of 1942 a relatively firm agreement had been reached with the British providing for the transfer or construction of a total of 98 airfields—23 fighter and 75 bomber. To meet this requirement 61 existing fields were allotted for transfer from the RAF, many of them requiring alterations or expansion. By the end of August contracts had been let for 38 extensions, and work was then under way on about half of these, the bomber installations having first priority. Sites for new fields were being reconnoitered and selected.[129] While the Eighth Air Force was to have priority over both the SOS and ground forces in rebuilding its strength in the United Kingdom, there was little prospect that it would regain even its former size very quickly, and the air force construction program, like the others, was therefore scaled down to fit the new troop basis. In the fall of 1942 the number of authorized bomber airfields was cut from 75 to 62, and the construction program consequently underwent a revision, with 49 fields scheduled for immediate construction.[130]

British firms carried out the greater part of the construction program in the United Kingdom. Whatever construction, including air force needs, was undertaken by U.S. military labor was the responsibility of the SOS. In the case of air force requirements, planning was carried out by the Eighth Air Force, subject to the approval of the SOS which actually executed the work. The SOS controlled all engineer units, including aviation engineer battalions. The Eighth Air Force regarded this arrangement as cumbersome and tending to delay construction, and in the summer of 1942 it had an opportunity to protest. During the preparations for TORCH the British ports were hard pressed to cope with the increasing tonnages arriving in the United Kingdom, and General Lee diverted 4,500 engineer troops to alleviate the port labor shortage. Included in this transfer were certain aviation engineer units, which supposedly were taken off air force construction projects. The Eighth Air Force took the occasion to protest the whole arrangement for services to the air forces. It wanted control of the aviation engineers, which it proposed to integrate into the organic structure of the combat air elements, and based its demand largely on the argument that air units must have their own service elements as an organic part of their team in order to achieve mobility in combat operations. This goal was impossible, it argued, if the air forces were dependent on the SOS and if its service units, such as aviation engineers, could be arbitrarily diverted to other duty.[131]

Actually, the lag in air force construction was only remotely related to the diversion of aviation engineers. General Lee,

[128] *Ibid.*, Ch. VII, pp. 15-19; Min, 12th Mtg, Med Svcs Sub-Committee BCC(L), 25 Nov 42, ETO BCC(L) Bk 2; The Bolero Project, extract monograph prep by Q(Ops) Hist, WO, mimeo, OCMH.

[129] Min, 13th Mtg, BOLERO Accommodations Sub-Committee, 25 Aug 42, ETO BCC(L) Bk 2; Air Force Construction (United Kingdom), Hist Rpt 6, Corps of Engrs ETO, Aug 45, MS, p. 7.

[130] Craven and Cate, *The Army Air Forces*, II, 602.

[131] Memo, Maj Gen Walter H. Frank, VIII AFSC, for CG Eighth AF, 30 Sep 42, sub: Aviation Engr Battalions, with Inds, USFET 600.1 Construction General 1942.

while noting the reluctance with which he had temporarily transferred the aviation engineers to port duty in the emergency, pointed out that these engineers had not even begun work on air force construction projects because their equipment had not arrived.[132] Late in November the aviation engineers were returned to the air force projects, but the control of these troops remained with the SOS.[133]

The curtailment of the U.K. construction program reflects very well the low position which the BOLERO concept had reached at the end of 1942. Withdrawals of U.S. troops from the United Kingdom were not substantially completed until February 1943, when American strength in Britain was reduced to less than 105,000, but the full impact of the North African operation was evident by the end of 1942, when prospects for the BOLERO-ROUNDUP design reached their nadir. Planning for a cross-Channel invasion continued on both the operational and administrative side, but commanded little enthusiasm or urgency in the atmosphere of uncertainty that prevailed.[134] The Combined Committee virtually suspended its activities for almost three months after the launching of TORCH early in November. In no other period was the status of the BOLERO build-up and the Key Plan more uncertain or vague, and in no other period were U.S. forces in the United Kingdom so restricted in their activities.

For the most part this limitation was imposed by the lack of service forces. Early in October General Lee warned the theater commander that the service troops remaining in the United Kingdom—about 32,000—would be inadequate to operate essential installations. Furthermore, they were not balanced as to types. It was at this time—in the midst of the TORCH preparations—that the SOS commander announced his intention to use both SOS and aviation engineers for temporary relief of the labor shortage. He took this step reluctantly, realizing that vitally important construction projects would have to be stopped. The British War Office had already provided 2,600 civilians and 5,000 soldiers to meet the current emergency.[135] General Lee had foreseen these needs, and in mid-September had submitted a revised SOS troop basis to theater headquarters, urging the highest possible priority for the shipment of engineer construction troops. He now repeated this request, asking for an immediate shipment of 10,000 service troops in the priority requested and urging that units not be withheld for lack of complete training. They could complete their training in the United Kingdom, he pointed out, while performing their assigned service tasks.[136] Two months later the War Department announced a small shipment of service troops, some of them coming directly from reception centers and with barely a month's training.[137]

[132] *Ibid.*, 2d Ind, CG SOS for CG Eighth AF, 10 Oct 42.

[133] Memo, CofS for G-4 SOS, 16 Nov 42, USFET 600.1 Construction General.

[134] In order that administrative planning could be carried on, an operational plan calling for the principal landings in the Rouen–Dieppe area was used as a basis for preliminary planning by the supply services. It was highly tentative and served mainly as a planning exercise in the absence of a firm operational plan. Gen Griner, G-4 ETO, Directive for ROUNDUP Administrative Planning, 7 Oct 42, EUCOM 334 Misc RAP Papers 1942.

[135] Ltr, Lee to CG ETO, 6 Oct 42, sub: SOS Troop and Labor Situation, SOS AG 320.2 SOS Jun 42–Jul 43.

[136] *Ibid.*; Ltr, Lee to CG ETO, 17 Sep 42, sub: Troop Basis and Priorities for SOS Troops, SOS AG 320.2.

[137] Cbl R-3315, Marshall to Eisenhower, 19 Nov 42, SOS AG 320.2.

At the same time the War Department indicated that it was not satisfied that ETOUSA was carrying out its supply mission and criticized the theater for continuing to call on the British without employing its own forces to full advantage. Throughout 1942 the United Kingdom remained an indispensable source of both supplies and services for U.S. forces. General Lee reported in October, for example, that, because of the continued shortage of service troops of proper types, the British Army was feeding approximately 50,000 American troops.[138] The War Department reminded the theater that there was an extreme shortage of service troops throughout the world. The 1942 troop basis gave preference to the activation of combat units, and little progress had been made in correcting the imbalance. Furthermore, the War Department felt that on a percentage basis the ETO had its authorized quota of service troops, and it was therefore difficult to sell the War Department the idea that the ETO required immediate remedial action. A few depot companies were being dispatched, but beyond these most service units were earmarked for theaters with a higher priority than ETOUSA.[139] In a letter to all theaters in December the War Department issued a threefold admonition which was to be repeated many times: the number of service units must be kept to a minimum; the theaters were to adopt every expedient to increase the ratio of combat to service elements; the logistical organization of all forces must be critically examined with a view toward eliminating duplication of services, overlapping of functions, and top-heavy administrative overhead.[140]

In accordance with this directive General Lee ordered the base section commanders to review their entire personnel situation with the aim of effecting economies. He even suggested closing certain active installations or utilizing them for dead storage only, if necessary.[141] Less than two weeks later two of the base section commanders replied that no savings could be made, and that, if anything, there was need for an expansion rather than a reduction in the number of installations. The Southern Base Section commander, Colonel Thrasher, concluded that without adequate troops there was no choice but to close certain depots.[142] It was obviously difficult to accept the loss of priority which the United Kingdom had momentarily enjoyed. But until the implications of the North African campaign became manifest, U.S. forces in Britain were forced to retrench. The uncertainties attending the future of BOLERO were not to be dispelled for several months.

Early in 1943 the stage was set for relieving U.S. forces in the United Kingdom from all responsibility for the TORCH operation, and in February a complete break was made between the commands of the two areas. General Eisenhower's appointment as Allied Commander in Chief in August 1942 had placed him in a dual role, for he continued to be the commanding general of ETOUSA. Since TORCH was to take place outside the limits of the European theater the question

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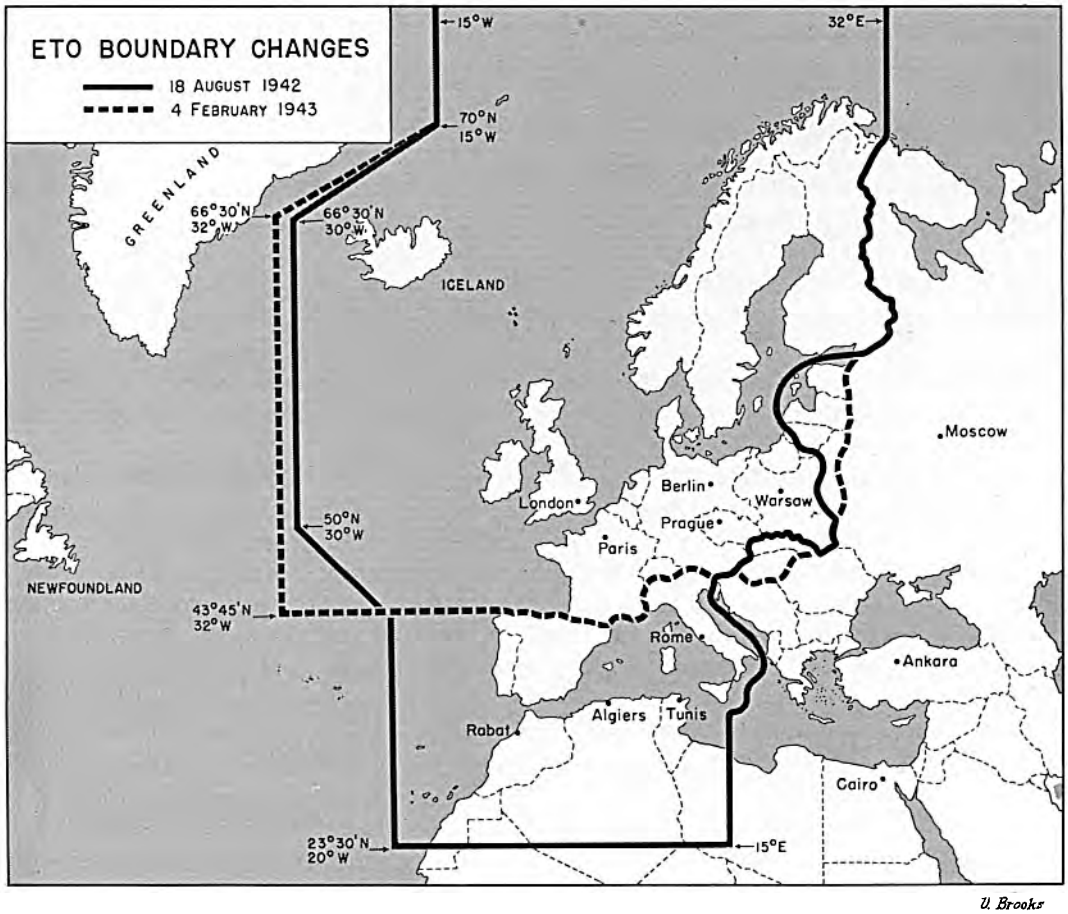
[138] Ltr, Lee to CG ETO, 6 Oct 42.

[139] Ltr, Littlejohn to Lee, 4 Dec 42, sub: SOS Troops, SOS AG 320.2 SOS Jun 42–Jul 43.

[140] Ltr, Secy War to Theater Comd, 10 Dec 42, sub: Economy of Forces, SOS 320.2 Economy of Forces, Dec 42–Jan 43.

[141] TWX, Lee to CGs Base Secs, 2 Jan 43, SOS 320.2 Economy of Forces.

[142] Ltrs, Base Sec Comdrs to CG SOS, 31 Dec 42 and 14 Jan 43, and Ltr, Lee to CG ETO, 10 Feb 43, sub: Economy of Forces, SOS 320.2 Economy of Forces.



MAP 3

arose as to whether he should continue in his dual role once the operation was launched. In August it was determined that the boundaries of the theater simply would be extended southward temporarily to include the new area of operations. For the first few months of his absence General Eisenhower proposed that General Lee be appointed his executive deputy to handle affairs in the United Kingdom, reserving for himself the right to intervene where necessary. He suggested that the North African area be detached from ETOUSA and a new theater created as soon as the TORCH force was firmly established. Estimating that the separation could be effected about two months after the landings, he recommended that General Lee then be given command of the ETO. This arrangement was agreeable to General Marshall, and on 18 August the boundaries of the European theater were extended southward to include northwest Africa. (*Map 3*) The proposed delegation of powers was eventually carried out after TORCH was launched, but on General

Lee's suggestion the appointment as deputy went to General Hartle, the senior commander in the United Kingdom.[143] In general, the deputy commander was authorized to act on all matters in the theater except those pertaining to TORCH and those which according to regulations required the theater commander's personal attention.

The organization of AFHQ soon left its mark on the U.S. theater headquarters. Just as BOLERO was subordinated to the interests of the TORCH operation, so also was Headquarters, ETO, overshadowed by AFHQ. Both General Eisenhower and his chief of staff, General Smith, were residents at AFHQ in Algiers, and since TORCH became the major preoccupation most of the important business was transacted at the Allied headquarters. ETOUSA, however, was not completely subordinated to AFHQ, and General Smith made it a point to maintain the theater headquarters as a separate organization, keeping in mind its long-range mission in the United Kingdom. It therefore continued by design to handle all routine matters for U.S. forces in the United Kingdom, while AFHQ handled TORCH matters. The relationship between the two remained somewhat vague, however, and neither ETOUSA nor SOS was brought very closely into the TORCH picture except through those officers who held dual positions on the AFHQ and theater staffs.

With the departure of General Eisenhower to Gibraltar, his first command post, a rear echelon of AFHQ under General Smith continued to handle TORCH matters for a time. By Christmas 1942, however, the rear echelon had also departed and the rear echelon functions of AFHQ fell to ETOUSA, which was considerably handicapped for the reasons mentioned above. Within another month, more or less as planned, ETOUSA began to drop out of the picture as the North African forces drew more and more of their support directly from the United States. The time had therefore come for a complete divorce of the North African area from the United Kingdom. Effective on 3 February 1943 the boundaries of the ETO were redrawn to exclude the North African area, and also the Iberian and Italian peninsulas, which were incorporated into the new North African Theater of Operations (NATO) under General Eisenhower. On 4 February the ETO received a new commanding general in the person of Lt. Gen. Frank M. Andrews, who had commanded U.S. forces in the Middle East.[144]

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[143] Interv with Gen Lee, 8 Aug 51, ETO Adm 517 Intervs.

[144] Organization and Command, I, 148–54, 156–67, 170–74.

CHAPTER III

The Build-up in Stride, 1943

(1) BOLERO in Limbo, January–April 1943

January 1943 brought renewed hope that the movement of U.S. troops to the United Kingdom would be resumed. The scale of the build-up obviously depended on a firm decision on future strategy. Late in November 1942 President Roosevelt, encouraged by the initial success of the TORCH operation, suggested to Prime Minister Churchill the desirability of an early decision, and a few days later asked General Marshall for estimates on the number of men that could be shipped to both the United Kingdom and North Africa in the next four months.[1]

OPD made a study of shipping capabilities and reported that 150,000 troops could be shipped to England by mid-April, assuming that there was no further augmentation of the North African force after the middle of January.[2] The acceleration of movements to the United Kingdom depended largely on the demands on shipping from North Africa and on the availability of adequate escorts. Demands from North Africa, coupled with a continuing shortage of shipping, had caused a drastic amendment of earlier plans for a build-up of the 427,000-man force in the United Kingdom by the spring of 1943. Current plans called for shipment of only 32,000 men in the next four months.[3]

Future Allied strategy to follow TORCH had remained undecided throughout the fall of 1942, and the War Department was not inclined to favor a large build-up in the United Kingdom even if shipping were available. In January 1943 the Allied leaders met at Casablanca to resolve this uncertainty. By that time the world outlook was considerably brighter than it had been six months before. The Red armies had frustrated the first German attempt to break through in the Caucasus and were now on the offensive; Rommel had been beaten in North Africa and the Allied vise was closing on the German forces in Tunisia; and the land and sea actions at Guadalcanal had checked Japanese expansion in the South Pacific. But whatever optimism was inspired by the more favorable situation on these fronts was sobered by the gloomy aspect presented by the war on the seas. In spite of the rising production figures of the American shipyards, Allied shipping losses continued to exceed replacements throughout 1942. In the first months of 1943 the U-boat attacks reached their full fury. The shortage of shipping consequently re-

[1] Ltr, Roosevelt to Churchill, 30 Nov 42, WDAG CofS 334 JCS; Memo, Brig Gen John R. Deane for OPD, 10 Dec 42, OPD 370.5 ETO, Sec 1, 1-63.

[2] Memo, Handy for Marshall, 18 Dec 42, sub: Shipment of Troops to U.K., OPD 370.5 ETO, Sec 1, 1-63.

[3] Memo, CofS for President, n. d., OPD 370.5 ETO, Sec 1, 1-63.

mained the severest stricture to Allied plans and prevented full utilization of the Allied war potential.

The Casablanca decisions recognized the Atlantic as one of the most important battlefields of the war by giving the fight against the submarine menace the first charge against United Nations resources. In view of the competing demands of the North African area and the Russian aid program on the limited shipping resources it was hopeless to think of a full-scale cross-Channel operation in 1943. The Allied leaders decided instead to continue the offensive in the Mediterranean. The invasion of Sicily was to be the major effort of 1943. Regarding operations from the United Kingdom, the Allied leaders gave impetus to air operations by assigning high priority to the inauguration of a combined bomber offensive, but their decisions fell somewhat short of a definitive commitment on ROUNDUP. Nevertheless, two decisions were made which confirmed the basic assumption that there would still be a cross-Channel operation. It was agreed to establish a combined command and planning staff in the United Kingdom to plan for cross-Channel raids and for a possible return to the Continent under varying conditions in 1943 or 1944, and a corollary agreement was reached to reinstate the BOLERO build-up. Both the Prime Minister and the President were anxious to build up forces in the United Kingdom, and President Roosevelt urged that a definite build-up schedule be prepared so that the potential effort of Allied forces in the United Kingdom could be estimated at any time to take advantage of any sign of German weakness.[4] General Somervell calculated that shipping capabilities would permit only small movements in the first six months, and the Prime Minister expressed disappointment that only four divisions would arrive by mid-August. But the shortage of cargo shipping made it impracticable to schedule a more rapid troop build-up at first, since, as it was pointed out, there was no point in sending units without their equipment.[5] After the middle of the year it was estimated that the rate of shipping could be vastly increased, and that a total of 938,000 troops, including fifteen to nineteen divisions, could be dispatched to the United Kingdom by the end of 1943. Added to the present strength in Britain, this would result in a build-up of 1,118,000 men.[6]

While the Casablanca Conference did not give a definite pledge regarding a cross-Channel attack, its decision to resume the BOLERO build-up on such a scale reinforced the belief that ROUNDUP eventually would take place. The estimate that nearly a million men and their equipment could be transported to the United Kingdom in the next eleven months was highly optimistic in view of the chronic shortage of shipping and the continued demands on Allied resources from the Mediterranean area and the USSR. Nevertheless, the Casablanca decision on BOLERO was welcome news to those in the United Kingdom who once before had begun preparations for such a build-up and had then seen the ETO experience a sudden bloodletting and loss of priority.

Theater officials were fully aware of the task which a revived program would present. To move nearly a million men with their supplies would mean the reception of

[4] 2d ANFA (Casablanca) Mtg, 18 Jan 43, JCS Hist Files.

[5] 3d ANFA Mtg, 23 Jan 43.

[6] CCS Paper 172, 22 Jan 43. U.S. strength in the United Kingdom on 1 January stood at approximately 135,000, but was to suffer further losses to TORCH.

about 150 ships per month in the last quarter of the year, with all the attendant problems of discharge, inland transportation, storage, and construction. General Lee had attended the conference in Casablanca, and even before leaving North Africa took the first steps to get planning under way for the task which he knew the SOS would have to shoulder. On 28 January he wrote informally to Maj. Gen. Wilhelm D. Styer, chief of staff of the War Department SOS, giving him advance notice of some of the requests for service troops which he expected to make shortly through official channels.[7] A few days later he informed General Littlejohn, who was acting for Lee in the latter's absence, of the decision to resume the build-up and instructed him to study the implications with Lee's British opposite, Gen. T. S. Riddell-Webster, the Quartermaster General.[8] Before departing for North Africa General Lee had instructed his staff to draw up two supply and accommodation plans, one based on the current troop basis of 427,000, and another for the then hypothetical force of a million men.[9]

The renewed confidence which the SOS now felt for the build-up of the ETO was expressed on 5 February in the announcement that planning for the movement of a large force to the United Kingdom would no longer be considered as a staff school problem, but would be worked out as a firm program as expeditiously as possible. Complete plans on personnel, storage and housing, construction, transportation, and supply were to be developed, with the G–4 co-ordinating all plans.[10] The reinstatement of BOLERO also brought the BOLERO Combined Committee of London together for the first time in several months.[11]

The year 1943 found the ETOUSA and SOS staffs considerably better prepared to plan for the reception and accommodation of U.S. forces than they had been six months earlier. Their experience in the summer of 1942 had made them more aware than ever of one essential prerequisite to such an undertaking—the advance arrival of sufficient service troops to prepare the necessary accommodations and facilities. This was even more imperative in 1943 than it had been earlier because of the unavailability of British labor. British officials had pointed out at the Casablanca Conference that the proposed shipments (150 ships per month at the peak) could be handled only if U.S. dock labor and locomotives were forthcoming.[12] There was also a shortage of depot space. The British had stopped construction because of their own manpower shortages and because of the reduced requirements for the smaller 427,000-man troop basis. They therefore urged that U.S. service personnel be included in the earliest arrivals.[13] It was precisely this problem that General Lee had in mind when he wrote to General Styer from North Africa late in January. He asked for 30 port battalions, 30 engineer regiments, 15 quartermaster service battalions, and about 30 depot companies of various categories. All these would be necessary in order to discharge the 120–150 ships per month, construct the needed depots, properly store and issue equipment and supplies, and carry out

[7] Ltr, Lee to Styer, 28 Jan 43, ASF CofS ETO 1943, I.

[8] Cbl 8833, Lee to Littlejohn, 4 Feb 43, USFET 381 54–40 BOLERO.

[9] Ltr, Hq SOS to Chiefs of Svcs and Stf, 15 Jan 43, sub: SOS Plng, SOS 381 SOS Plng, Jan–Feb 43.

[10] Hq SOS, Basic Plng Dir 1, Personnel, 5 Feb 43, ETO 381 Opns Data, Basic Plng Dir 1.

[11] BCC(L) Min, 18 Feb 43, ETO Preinvasion 322.

[12] CCS 172, 22 Jan 43.

[13] CCS Min, 65th Mtg, 21 Jan 43.

the airfield construction program. He pointed out that the U.S. forces had been caught short of service troops in the summer of 1942 and had got by only by the emergency use of British labor and even combat units. This remedy could not be tried again. U.S. forces must become more self-sufficient and the SOS portion of the revived BOLERO program must be larger. Lee punctuated his argument with a lesson from history, quoting General Pershing who in 1918 had made a similar appeal for advance shipments of SOS troops for the necessary construction projects. With the experience of August and September 1942 fresh in his memory, General Lee noted that the SOS had learned the hard way in the past seven months, and he was determined that there should not be a repetition of the frantic efforts of the previous summer.[14]

These arguments were readily seconded by General Lee's staff in the United Kingdom. General Littlejohn pointed out to the new theater commander that the support of the new program necessitated the expansion and acceleration of the SOS construction program and supply operations. For this purpose he urged General Andrews to ask for a stepped-up shipment of SOS troops. There was sufficient reason for such a plea at this time. The SOS was already a reduced and unbalanced force as a result of the losses to TORCH. The hospital and airdrome construction programs were seriously behind schedule.[15] Finally, the British could not be expected to provide labor on the scale they had maintained in the summer of 1942, and it was predicted that they would insist that SOS troops arrive well in advance of combat units.[16]

After the Casablanca decision the SOS staff members in the United Kingdom had immediately been instructed to figure their troop needs, which were to be used in formulating a service troop basis for presentation to the theater commander. Ever conscious of the repeated admonitions from the War Department and theater headquarters to keep service troop demands to a minimum, the service chiefs felt a strong compulsion to offer the fullest possible justification for their stated requirements. They had two favorite and seemingly indisputable arguments. Almost without exception they were able to show that percentagewise they were asking for fewer troops than the SOS of the AEF in 1917–18. The SOS portion of the AEF on 11 November 1918 had been 33.1 percent. On the basis of a total build-up of 1,118,000 men by December 1943, they argued, the SOS should therefore have a troop basis of 370,000. The chief of engineers, for example, maintained that on the basis of the practice in World War I, in which 26.9 percent of the SOS consisted of engineer troops, the present SOS should have 99,500 engineer troops. He was asking for only 67,000. The service chiefs further reinforced their claims by pointing out that the present war was making much heavier demands on the services of supply. There had been a great increase in mechanized transport, in air force supply, and in the fire power of weapons; there were new problems of handling enormous tonnages of gasoline and lubricants, and of constructing airfields. Furthermore, in the

[14] Ltr, Lee to Styer, 28 Jan 43.

[15] Ltr, Littlejohn to CG ETO, 9 Feb 43, sub: SOS Manpower Requirements, ETO SOS Manpower Program.

[16] Ltr, Ross to Lee, 6 Feb 43, SOS AG 320.2 SOS Jun 42–Jul 42. Approximately 58,000 laborers were at this time directly employed either on construction projects for U.S. forces, or as stevedores. Ltr, Littlejohn to CG ETO, 17 Feb 43, sub: Current BOLERO Plng, SOS AG 320.2 Jun 42–Jul 43.

war of 1917–18 the U.S. Army had operated in a friendly country where port and transportation facilities were already available. Operations in Europe would now require landing supplies over beaches and restoring ports and railways. Thus, World War I was not even a fair basis of comparison so far as service troop requirements were concerned.[17]

By mid-February General Littlejohn had assembled sufficient data on the needs of the various services to present the theater commander with a tentative troop basis calling for a total of 358,312 men. By far the largest components were those of the Corps of Engineers, the Quartermaster Corps, and the Medical and Ordnance Departments, accounting for more than two thirds of the total. In presenting the needs of the SOS to General Andrews, General Littlejohn noted that every practicable measure had been taken to reduce SOS needs, and he again reviewed the limited possibilities of utilizing British labor. If it became necessary to reduce the SOS troop basis further, he continued, army and corps service units should be brought to the theater and made available to the SOS. The need for service units was so urgent that he even recommended securing the required manpower by breaking up organizations in the United States. The SOS desired the highest possible shipping priority for its units and asked for a rapid build-up to a strength of 189,000 by the end of June. The most pressing need was for engineer construction units, and these were therefore given a priority second only to air force units for the bomber offensive.[18] But the air units were to be followed by service troops to support the bomber offensive, and by additional service troops for the BOLERO program.

It was only a matter of days before the hopes for this program were dashed. On 19 February General Marshall wired the theater that the decision to resume the build-up was not firm, and that the schedules set up in September 1942 would be followed until a definite decision was reached.[19] Three days later this bad news was confirmed by a cable from OPD notifying the theater that there were indications that shipping for the U.K. build-up would be "nothing for the months of March and April because of the urgency of the situation in another theater." The "other theater" was North Africa, which continued to make unexpected demands on both troops and cargo. Immediately after the Casablanca Conference the War Department had been asked to prepare a special convoy with urgently needed vehicles and engineer and communications equipment. Only a few days later General Eisenhower asked for an additional 160,000 troops to arrive by June. These demands were superimposed on the requirements for the planned Sicilian operation and entailed a great increase in cargo shipments to the Mediterranean.[20] The results for BOLERO were inescapable. Meeting these demands meant not only a drain on troops and matériel but the

[17] Memo, Lt Col V. A. Rapport, Progress Div SOS, for CG SOS, 7 Feb 43, sub: Comparison of SOS in 1917–18 and Now, ETO Opns Data, Basic Plng Dir 1, Sec II, SOS Troop Program; Ltr, Littlejohn to CG ETO, 9 Feb 43.

[18] Ltr, Littlejohn to CG ETO, 17 Feb 43, sub: Current BOLERO Plng, SOS AG 320.2 SOS Jun 42–Jul 43; Ltr, Littlejohn to CG ETO, 9 Feb 43; Basic Plng Dir 1, Annex 4; Cbl 7234, ETO to AGWAR, 13 Feb 43, SOS AG 320.2.

[19] Cbl R–5983, Marshall to Andrews, 19 Feb 43, SOS AG 320.2.

[20] [Richard M. Leighton] The Problem of Troop and Cargo Flow in Preparing the European Invasion, 1943–44, prep in Hist Sec, Control Div, ASF, 1945, MS (hereafter cited as Problem of Troop and Cargo Flow), pp. 15–16; OCMH.

diversion of the limited shipping resources. The battle of the Atlantic reached its height in these months, and the competing claims of Russian aid, the support of operations in the Mediterranean, and the British civil import program on shipping simply precluded an immediate implementation of the Casablanca decision on BOLERO.

The inability to rebuild the U.K. forces as planned in January was a bitter pill for the planners in England. General Andrews thought it would do no harm as far as ground forces were concerned, since theater planners had not even been able to arrive at a practical plan upon which to set up a ground force troop basis. In fact, upon reflection, he thought there was one aspect of a slower build-up which might be a partial blessing. Because training areas and firing ranges were inadequate in the United Kingdom, it was preferable that American troops get as much training as possible in the United States. A delayed build-up would also allow the SOS to build a firmer foundation.[21] But the setback in building a bomber force was a serious blow. Andrews noted that units needed between forty-five and sixty days to prepare themselves for combat after arriving in the theater, and it had been hoped that every available unit in the United States might be brought over early in the year to take advantage of the favorable summer months.[22] Air force units in England were suffering from both combat losses and war weariness. Lacking replacements, some groups were reduced to a strength of 50 percent, and progressive attrition was seriously lowering morale among the crews that remained.[23]

Cancellation of the build-up had an unavoidable repercussion in the United Kingdom and cast a pall of uncertainty over all planning. General Andrews appreciated fully the desirability of proceeding with planning for cross-Channel operations. In anticipation of a Combined Chiefs directive, based on the agreement at Casablanca, he urged that joint planning should again be resumed, emphasized particularly the importance of having a firm troop basis and a schedule of arrivals, so that U.K. planners would know what they were dealing with, and underlined the necessity of arranging for production and procurement of vast quantities of equipment, a task which would require many months.[24] In its never-ending attempts to get more specific commitments and precise data on which to base its own preparations, however, the SOS was again frustrated. The G–4 of the SOS submitted a list of questions to the G–4, ETOUSA, early in March concerning future operational plans, the over-all troop basis, and levels of supply. The ETOUSA supply officer was helpless to offer any specific information on the size, place, extent, and timing of future offensive operations. He could only reply that the Casablanca program evidently had not been discarded but only delayed, and added hopefully that directives were expected from the War Department which would "permit planning to proceed beyond the present stage of conjecture."[25]

[21] Ltr, Andrews to Handy, 3 Mar 43, ETO 312.1 Andrews Correspondence 1943.

[22] Ltr, Andrews to Marshall, 26 Feb 43, ETO 312.1 Andrews Correspondence 1943.

[23] Ltr, Gen Eaker to Andrews, 27 Feb 43, and Ltr, Andrews to Gen Handy, 3 Mar 43, ETO 312.1 Andrews Correspondence 1943; Craven and Cate, *The Army Air Forces*, II, 309.

[24] Ltr, Andrews to Gen Ismay, 17 Mar 43, ETO 385 Methods of Conducting War.

[25] Ltr, Hq ETO to CG SOS, 13 Mar 43, sub: Questions Concerning Operational Requirements, SOS AG 381 Plans.

The SOS meanwhile continued to analyze its troop needs with a view toward paring its demands even further. Late in March it completed a troop basis and flow chart calling for approximately 320,000 service troops based on a total force of 1,100,000 men. In submitting it to the theater commander General Lee asserted that it was the result of an exhaustive study by the chiefs of services and represented the minimum requirements. The reduction of 40,000 in the troop basis was made possible largely by the decision to use certain service elements of both the ground and air forces for administrative purposes.[26] At the same time the SOS continued to plead for shipments of service troops in advance of combat units, underlining this need in every communication with higher headquarters.

For the moment these plans were largely academic, for the shipping situation made it impossible to implement the Casablanca decision on the scale expected. In the first three months of 1943 only 16,000 of the projected shipment of 80,000 men were dispatched to the United Kingdom, and 13,000 of these had already left the United States at the time of the Casablanca Conference. The main effect of the diversions to North Africa was felt in February, March, and April, when the flow of troops to the United Kingdom averaged fewer than 1,600 per month.[27] The effect on troop movements was most pronounced because troop shipping was even scarcer than cargo shipping at this time. But in cargo shipment the record was similar. In the same period the monthly cargo arrivals averaged only 35,000 long tons (84,000 measurement tons).[28]

At this rate the ETO was barely maintaining its strength after the losses to TORCH, to say nothing of mounting an air offensive. Worried by the almost complete neglect of the United Kingdom, General Andrews in his last weeks as theater commander pleaded with the War Department not to let the build-up die. If necessary BOLERO should be retarded, he maintained, but not halted. There should be a steady building up of American forces in Britain for an overseas operation in 1944. At the least it was important to maintain the impression that American troops were arriving in large numbers and to say and do nothing which would appear inconsistent with this conception. General Andrews felt that any appreciable slowing down of BOLERO might even compromise an operation in 1944, since preparations were already behind schedule.[29] Fortunately the question of the build-up was soon to be resolved.

(2) The Troop Build-up Is Resumed, May–December 1943

The uncertainty regarding the United Kingdom build-up was finally largely dispelled in May 1943, when Allied leaders met at the TRIDENT Conference in Washington. Plans for the defeat of the Axis Powers in Europe were embodied in three major TRIDENT decisions: to enlarge the U.S.-British bomber offensive from the United Kingdom; to exploit the projected Sicilian operation in a manner best cal-

[26] Ltr, Lee to CG ETO, 22 Mar 43, sub: Proposal—Troop Basis and Flow, SOS Troops, SOS AG 320.2; Memo, Lt Col Edgar T. Fell, G-1 SOS, for CofS SOS, 9 Mar 43, sub: Ground Force Units for SOS Use, Basic Plng Dir 1, Sec II, SOS Troop Program.

[27] Progress Rpt, Progress Div, SOS, 4 Oct 43, ETO Adm 422.

[28] TC Monthly Progress Rpt, Statistics Br, OCofT SOS, ETO Adm 450-52.

[29] Cbl 8869, Andrews to Marshall, 17 Apr 43, ETO Eyes Only Cbls 1943-44.

culated to eliminate Italy from the war; and to establish forces and equipment in the United Kingdom for a cross-Channel operation with a target date of 1 May 1944.[30]

The resolution concerning a cross-Channel attack was not an unequivocal commitment, as it turned out, and Allied strategy was to be reargued within another few months. Nevertheless, the naming of a date and the designation of the size of such an operation made it the most definite commitment yet accepted for the attack which American planners had supported for the past year. The likelihood that the BOLERO build-up would now be carried out was strengthened by a definite allocation of resources: twenty-nine Allied divisions were to be made available in the United Kingdom for the operation in the spring of 1944; and there was to be no further diversion of resources to the Mediterranean. In fact, four U.S. and three British divisions in the Mediterranean area were to be held in readiness after 1 November for movement to the United Kingdom.[31]

By May 1943 an additional factor was enhancing prospects for the U.K. build-up. After the near-record shipping losses in March (768,000 tons from all causes),[32] the battle of the Atlantic took a sudden turn for the better. Beginning in April, with the increasing use of long-range and carrier aircraft, and of improved detection devices and convoy practices, the Allies took a mounting toll of U-boats. And as shipping losses fell off, the increasing output of the shipyards was reflected in the net gains in available tonnage. This turn of events was undoubtedly one of the most heartening developments of the war, and soon made it possible to plan the logistic support for overseas operations with considerably more confidence and on a greatly magnified scale. Together with the freezing of resources in the Mediterranean, it promised to create a tremendous potential for the U.K. build-up.

The TRIDENT planners scheduled a build-up of 1,300,300 American soldiers in the United Kingdom by 1 May 1944. Of these, 393,200 were to be air force troops, and 907,100 were to be ground and service troops, including eighteen and one-half divisions. By 1 June 1944, the planners calculated, a force of 1,415,300 (twenty-one divisions) could be established in Britain.[33] These figures did not necessarily constitute a troop basis, nor did they reflect actual shipping capabilities. It was noted that there were actually more divisions available than were scheduled for shipment, and the rate of build-up was based on what the British indicated could be processed through their ports, not on shipping capabilities. The balanced movement of troops and their cargo was actually limited by the quantity of cargo which could be accepted in the United Kingdom, the maximum practical limit being 150 shiploads per month except in absolute emergency. From this time on British port capacity was to be a despotic factor governing the build-up rate. Once more, therefore, the Combined Chiefs emphasized the necessity for the early arrival of port battalions to aid in the discharge of ships, and engineer construction units to complete the needed depots. The wisdom of such a policy could hardly be disputed, and at the close of the conference Headquarters, ETO, was notified that the shipment of service troops was to be given

[30] CCS 242/6, 25 May 43.

[31] *Ibid.*

[32] Samuel E. Morison, *The Battle of the Atlantic* (Boston, 1947), p. 412.

[33] CCS 244/1, 25 May 43, Annex VII.

a priority second only to the air force build-up.[34]

The ETOUSA planners welcomed the green light which the TRIDENT decisions constituted, although they had not been idle despite the failure to implement the earlier Casablanca decisions. In the early months of 1943 the SOS staff had continued to plan for the eventual flow of troops and cargo, and had assembled a mass of logistical data covering all aspects of the build-up, such as manpower, storage and housing, transportation, construction, and supply. This information was issued in what were known as Tentative Overall Plans which were kept up to date by repeated revision. To implement the TRIDENT decisions in the United States, the BOLERO Combined Committee in Washington was now reconstituted as the BOLERO-SICKLE Combined Committee, the word SICKLE applying to the air force build-up, which was now planned independently of the ground and service components. As before, the Combined Committee of Washington was set up as a subcommittee of the Combined Staff Planners (of the CCS) with the mission of coordinating the preparation and implementation of the BOLERO-SICKLE shipping program.[35] Although the London Committee had never been formally disbanded, it had not met since February after the abortive revival of BOLERO. On 20 July it once more met under the chairmanship of Sir Findlater Stewart. Headquarters, ETOUSA, had made some new appointments to the committee and the entire group assembled at this time primarily to introduce the new members. Direct contacts had long since been established between appropriate American and British services and departments, and there was no longer any pressing need for regular meetings of the entire committee. The July meeting consequently proved to be the only formal session under the new program, although small *ad hoc* meetings and informal conferences were called from time to time, and the various specialized subcommittees continued to meet to solve particular problems.[36]

British and American officials in the United Kingdom had already taken cognizance of the reception and accommodation problem posed by the new program, and had recognized the necessity for bringing older plans up to date. But it had been impossible to publish a new BOLERO Key Plan earlier because of the tentative status of the troop basis.[37] Early in July Headquarters, ETO, submitted to the War Office new build-up figures and data to be considered in the distribution of U.S. forces in the United Kingdom. These planning figures approximated the TRIDENT shipping schedule, indicating a build-up of 1,340,000 men by 1 May 1944. The War Office was asked to use this total to plan the maximum accommodations.[38] On the basis of this figure the BOLERO Key Plan underwent its last major revision, the Fourth Edition being issued by the Deputy Quartermaster General on 12 July 1943. The British Southern Command had already anticipated the changes and had issued its own

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[34] Cbl R-8870, AGWAR to ETO, 26 May 43.

[35] Note by Secy, Principal Adm Officers Com of War Cabinet, 18 Jun 43, sub: BOLERO-SICKLE Combined Com, ETO BOLERO File 1943.

[36] Memo for CofS, 8 Jul 43, sub: Info on BOLERO Coms, ETO BOLERO File 1943; BCC(L) Min, 2d Mtg, 20 Jul 43, ETO Preinvasion 322.

[37] Ltr, Hq ETO to CG SOS, 12 May 43, sub: Distribution of U.S. Ground Force, SOS AG 320.2 SOS Jun 42-Jul 43.

[38] Ltr, Hq ETO to Under-Secy of State for War, 7 Jul 43, ETO 381 Troop Basis 1943.

plan for the U.S. Southern Base Section area two weeks earlier.[39]

During the summer of 1943 the ETOUSA, SOS, and Eighth Air Force staffs devoted a large portion of their time to the all-important problem of obtaining a definitive troop basis for the ETO. No single other problem was the subject of so many communications between the various headquarters and between ETOUSA and the War Department. Solving it was perhaps the most important initial task after the strategic decisions of the Combined Chiefs which assigned the theater its mission. Not only was it essential that the War Department determine the total allotment of troops to the theater. It was necessary to come to an agreement with the theater over the apportionment of this over-all allotment between the air, ground, and service forces to create a balanced force, and decide on the specific numbers of each of the hundreds of different types of units. In one of the first staff conferences held by the SOS to discuss the implications of the TRIDENT decisions it was pointed out that the over-all troop basis—air, ground, and service—together with the priorities for shipment, was a basic factor in the preparation of an accommodation, maintenance, supply, and construction plan, and therefore a necessary prerequisite to the revision of the BOLERO Key Plan.[40]

Had the ETOUSA planners awaited the approval of a firm troop basis, however, little progress would have been made in preparing for the build-up in 1943, for the troop basis continued to be a subject of negotiation with the War Department for several months to come. Fortunately, ETOUSA and SOS planners had begun calculating the theater's requirements before the TRIDENT Conference, and on 1 May General Andrews had submitted to the War Department a list of the units, totaling 887,935 men, which he desired shipped to the theater by 31 December. It was admittedly only a partial list, but provided sufficient data to the War Department for the employment of shipping for the remainder of the year. A complete troop basis was hardly possible at the time, since an operational plan had not yet taken shape to determine the precise troop needs.[41] ETOUSA later submitted new priority lists, and by the end of the month shipments were beginning to be made on the basis of the interim 888,000-man troop list and the theater's latest priority requests.[42]

Submitting the partial troop list was one of General Andrews' last acts as commanding general of the European Theater. On 3 May, barely three months after assuming command, he was killed in an airplane crash while on a tour of inspection in Iceland. General Andrews was an air force officer, and his loss was therefore particularly regrettable in view of the plans then being formulated for an intensified aerial offensive. Lt. Gen. Jacob L. Devers, commander of the Armored Force at Fort Knox, was appointed his successor and arrived in England on 9 May 1943.[43] To him now fell the task of bringing to

[39] Joint BOLERO Key Plan (Southern Command), 30 Jun 43, ETO BOLERO Second Key Plan.

[40] Min, SOS Stf Confs, 1 Jun 43, ETO 337 Confs 1943, I.

[41] Ltr, Andrews to OPD, 1 May 43, sub: Troop Basis and SOS Priorities, ETO 381 Troop Basis 1943.

[42] Min, 20th Mtg, BOLERO Combined Planners (Washington), 4 Jun 43, Annex A, Background on BOLERO-SICKLE Buildup, 3 Jun 43, ASF Planning Div, Series II, A46-183.

[43] During the interim period of six days the theater was commanded by Maj. Gen. William S. Key, the Provost Marshal, as the senior officer in the theater.

fruition the long-drawn-out and detailed work on a definitive troop basis.

For the first time it was possible to develop the troop basis with somewhat more specific missions in mind. The air force troop basis was now formulated on the basis of the Combined Bomber Offensive, which was in the process of acceptance by the Combined Chiefs of Staff early in May. The ground force troop basis, while based on a still nebulous plan for a cross-Channel operation, was nevertheless firmly related to the plans which were now being formulated by the new Allied planning staff established in April in accordance with the decision made at Casablanca in January. Under the leadership of Lt. Gen. Frederick E. Morgan (British), who had been named Chief of Staff to the Supreme Allied Commander (designate), or COSSAC, this group had taken the place of the old ROUNDUP planning staff and was already putting into shape an outline design for continental invasion.

The first of the troop bases to be developed in detail and submitted to the War Department was that of the air force. For this purpose General Arnold sent a special mission to the United Kingdom, headed by Maj. Gen. Follett Bradley, Air Inspector of the Army Air Forces, to study the personnel needs and organization of the Eighth Air Force and to prepare a troop basis adequate to the contemplated mission of the air force in the United Kingdom. General Bradley arrived in England on 5 May, at the very time that the command of the theater was changing hands. After three weeks of studies and conferences he submitted his plan to the War Department at the end of May, calling for an allocation of 485,843 men, including 113 groups, to be built up by June 1944. The proposal was approved by General Eaker, who had assisted in its preparation, and by General Devers, although with certain reservations. On the assumption that the VIII Bomber Command was to be built up at maximum speed and to its maximum strength for its new mission, the plan had been developed with little relationship to the theater's other requirements. General Devers thought the air force troop basis was too large compared with those of the ground and service forces then under study in his headquarters, and he also opposed the speed of the build-up which the Bradley plan called for. He believed that the proposed build-up could be carried out only at the expense of SOS and ground troops, since there was not enough shipping to go around. He warned that the air could not operate without SOS support, and that the brunt of any reduction in movement schedules would therefore have to be borne by the ground forces.[44]

The War Department approved the Bradley plan as a basis for planning, but with important exceptions. In particular, it opposed certain organizational features of the plan and insisted on reductions in headquarters and service personnel, for which the plan had made a generous allocation of 190,000 men in a total of less than 500,000. Despite protests from the Eighth Air Force, a sizable reduction was eventually made in its troop basis. At the direction of the War Department a second group of officers went to England in October to make a new study of air force needs, and pared the allocation to 466,600. After a further review by the War Department, and the decision to

[44] Ltr, Bradley to CG AAF, 28 May 43, sub: Organization of Eighth Air Force, with Inds, OPD 320.2 Security, Sec II.

divert certain groups to the Mediterranean, the troop basis of the Eighth Air Force was finally established at 415,000, with a build-up of ninety-eight and a half groups to be achieved by June 1944.[45]

Meanwhile Headquarters, ETOUSA, and the SOS completed their studies of ground and service force needs, and the troop bases for these two components were submitted to the War Department in the month of July. On the 5th General Devers requested approval of a ground force troop basis of 635,552 (to include eighteen divisions), and on the 18th he submitted the SOS troop basis calling for 375,000 men. In both cases these figures represented only the "first phase" requirements—that is, the forces required to launch an operation on 1 May 1944 aimed at securing a lodgment on the Continent. General Devers carefully pointed out that additional units in all categories would have to augment this force in order to support continuing large-scale operations.[46] Troop bases for the "second phase" were then being studied and were to be submitted within a few weeks.

As in the case of the Bradley plan, both ground and service force troop bases for the first phase came under careful scrutiny in the War Department. For the most part the ground force allocation was not seriously challenged, although questions were raised regarding the ratio of various types of troops.[47] Most of the criticism was reserved for the SOS troop basis, just as the service troop allocations in the air force plan had also been subjected to the heaviest criticism. It was generally conceded that the supply and maintenance situation in the ETO before the actual start of operations was considerably different from that in a normal overseas theater. The construction program for camps, airdromes, and other installations, the receipt, storage, and issue of preshipped supplies and equipment, and other factors all tended to create a unique logistical problem. At the same time, the War Department staff noted, from the standpoint of economy it was not desirable to ship units merely to meet this abnormal situation if such units would not be needed when the peak load had passed at approximately D Day. As the SOS troop basis made its way through the War Department staff sections it was generally agreed that savings could be made. The G–3 specifically listed certain guard units, military police, and Ordnance and Transportation Corps units for elimination; and he cast a suspicious eye on certain other special units, the need for which was not considered to be critical, or whose functions could be performed by other units.

[45] Ltr, Eaker to CG ETO, 15 Oct 43, sub: Implementation of Bradley Plan (Revised), OPD 320.2 Security, Sec II; Note for record, 3 Nov 43, sub: Troop Basis Air Forces ETO, OPD 320.2 ETO, Sec IX–A. See also Craven and Cate, *The Army Air Forces*, II, 635–38.

[46] Ltr, Devers to CofS WD, 5 Jul 43, sub: Ground Force Troop Basis ETO, ETO 381 Troop Basis 1943; Ltr, Devers to CofS WD, 18 Jul 43, sub: SOS Troop Basis ETO, OPD 320.2 ETO, Sec V.

[47] The chief of staff of the Army Ground Forces noted, for example, that only 49 percent of the ground force troops in the ETOUSA troop basis were combat troops, while in the North African theater the percentage was 59. The War Department G–3 took exception to the ratio of allotments to the various supporting arms. He estimated that the allocation of antiaircraft troops should be 19 percent of the total number in the nondivisional supporting arms, while the ETOUSA planners had allowed an allocation of 33.9 percent. At the same time the ETOUSA troop basis revealed a smaller allowance of field artillery than was considered adequate by the War Department. The G–3 recommended a more "normal" ratio of combat support than was indicated in the ETO basis. Memo, Brig Gen James G. Christiansen, CofS AGF, for CofS WD, 28 Aug 43, sub: Troop Basis ETO, and Memo, Brig Gen Ray E. Porter, G–3 WD, for ACof S OPD, 11 Aug 43, sub: U.K. Troop Basis, OPD 320.2 Security, Sec III.

Among these were forestry companies, gas generating units, fire fighting platoons, utility detachments, model maker detachments, bomb disposal companies, petroleum testing laboratories, museum and medical arts service detachments, radio broadcasting companies, and harbor craft service companies.[48] The G–3 was emphatic in his assertion that nonessential units should not be approved for the ETO or any other theater. It was imperative, he noted, that combat and service units be required to perform, in addition to their normal duties, certain services for which they were not primarily organized or trained, for example, fire fighting. The current manpower shortage made it extravagant in his opinion to provide service troops enough to meet peak loads which might occur only infrequently. The eight-hour day and the "book figures" for normal capabilities of service units simply had to be abandoned.[49]

The analysis of the ETOUSA troop basis was by the War Department's own admission a highly theoretical matter, for Washington lacked detailed knowledge of operational plans and exact information on the type of operations to be undertaken. The War Department's study was largely a statistical analysis, based on a comparison of the ETO's requests with the allotment of various types of units in the over-all War Department troop basis, and on a comparison with a hypothetical thirty-division plan worked out in the War Department, supposedly with a cross-Channel operation in mind. There was great variance between the calculations made in the theater and in Washington, and the War Department was at a loss to make very many specific demands for reductions. On 25 August it returned the troop basis to the theater with the characteristic "approved for planning purposes," but with the injunction to effect economies in the use of service troops. Most of its recommendations were of a general nature. The theater was instructed to reduce to a minimum the number of fixed logistical installations in the United Kingdom with the idea that certain of these installations would eventually be required on the Continent. As a temporary reinforcement of the SOS it was asked to utilize to the maximum the service units whose regular assignment was with the ground forces, and, if necessary, even to employ combat units where training would not suffer too seriously. Before making more specific recommendations the War Department preferred to await the development of a more detailed operational plan and also asked to see the theater's administrative plan.[50]

The return of the troop basis to the theater was followed in a few days by letters from both Brig. Gen. John E. Hull, the acting chief of OPD, and General Handy, the Deputy Chief of Staff, re-emphasizing the serious manpower situation in the United States. The shortage of men was placing a definite limitation on the size of the Army, with the result that the War Department had been charged with sifting all theater troop demands. It therefore requested additional information on which to base its consideration of ETOUSA's troop needs, and again asked

[48] Memo, WD G–4 for G–1 and OPD, 5 Aug 43, sub: U.K. Troop Basis, and Memo, Gen Porter for ACofS OPD, 11 Aug 43.

[49] Memo, Gen Porter for OPD, 16 Oct 43, sub: Restudy and Restatement of Troop Basis for 1st Phase, OPD 320.2 Security, Sec III.

[50] Ltr, Secy War to CG ETO, 25 Aug 43, sub: Troop Basis, Ground and Svcs of Supply, ETO, ETO 320.2 Strength and Troop Basis, I.

the theater specifically to submit an outline administrative plan for the cross-Channel operation.[51]

To these comments and injunctions ETOUSA could only reply that it had already taken into consideration precisely those economy measures which the War Department had listed. Every effort had been made to keep to a minimum the number of fixed installations. The War Department, it noted, was apparently unaware of conditions in the United Kingdom, for the logistical setup there was far from optimum. The British had long since dispersed most installations because of the threat of air attack. These had been accepted for use by the Americans largely because the shortage of both labor and construction materials precluded extensive building of new and larger depots. The rail distribution system and the limited capacity of the highways also favored more numerous, smaller, and dispersed installations, all of which tended to increase the need for service units. ETOUSA further assured the War Department that it had already counted on the use of service units of the ground forces wherever possible in formulating the SOS troop basis. ETOUSA admitted certain minor changes in its troop lists, but for the most part justified its requests. The submission of an administrative plan it regarded as impractical at that time.[52]

The problem of striking an adequate and at the same time economical balance between service and combat troops was a perennial one. Since the War Department's 1942 troop basis had not provided adequate service troop units, it had been necessary to carry out piecemeal activations in order to meet the requirements for overseas operations. In 1943 the number of available troop units continued to fall short of the demands of the overseas commanders. The desire to place the largest possible number of combat units, both air and ground, in the field inevitably resulted in subjecting the service troop demands to the closest scrutiny. Increasingly conscious of the limited manpower resources, the War Department General Staff in November 1942 not only reduced the total number of divisions in the over-all troop basis, with corresponding cuts in the service units organic to the combat elements, but also took steps to reduce the over-all ratio of service to combat elements. There was no formula for economy which could fit all the varied circumstances of a global war, and it was difficult at best to prove that logistical support would be jeopardized by eliminating one or two depot companies or port battalions. In general the view persisted in the War Department that the ratio of service to combat troops was excessive, and it had become normal to regard the demands of the service forces with a certain suspicion, at times with some justification.[53] Pressed by the manpower situation in the United States the War Department apparently felt doubly obliged to question the theater's demands.

It should be noted that the original SOS troop demands had already suffered a very sizable cut. The chiefs of services had originally submitted to the theater com-

[51] Memo, Hull for CG ETO, 7 Sep 43, sub: Theater Troop Basis, ETO 320.2 Strength and Troop Basis, I; Memo, Handy for CG ETO, 11 Sep 43, sub: Plng Info Requested by Cbl, P&O 381 1943-45. See Kent Roberts Greenfield, Robert R. Palmer, and Bell I. Wiley, *The Organization of Ground Combat Troops*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1947), on the U.S. manpower problem.

[52] 1st Ind to WD Ltr of 25 Aug, Hq ETO to WD, 25 Sep 43, OPD 320.2 Security, Sec III.

[53] Problem of Troop and Cargo Flow, pp. 55-58.

mander a list of requirements totaling 490,000 men, each chief maintaining that he had asked for only the minimum number considered essential to do an efficient job. General Devers had taken issue with these demands, and had given a command decision limiting the total service troop basis to 375,000 and assigning the various services specific percentages of this total. The service chiefs consequently had little choice but to recalculate their needs and bring them within the prescribed allotments. Reductions were naturally made where they involved the least risk. The number of hospital beds was reduced by refiguring casualty estimates. Requirements for port battalions were refigured on the assumption that greater use could be made of civilian labor on the Continent, and for railway units on the assumption that railways would not be restored as rapidly as previously planned. In this way 115,000 bodies were lopped off the original "minimum" estimates. The 375,000-man troop basis which General Devers eventually submitted to the War Department in July was based on an allocation of 25 percent of the over-all theater troop basis to the SOS.[54] This was certainly not exorbitant considering World War I experience and the enlarged services which the SOS was expected to perform. Whether a force thus limited by fiat would prove adequate to support the ground and air elements remained to be seen. At any rate, the theater stood firm on its July troop basis for the SOS, and it was eventually accepted by the War Department without important changes. While the various component troop bases underwent minor alterations from time to time, by November the ETOUSA first-phase troop basis for 1 May 1944 had reached relative stability with the following composition: [55]

Type	*Number*
Total	1,418,000
Services of Supply	375,000
Ground Forces	626,000
Air Forces	417,000

In the meantime work had also progressed on the troop basis for the second phase, the terminal date for which at first was designated as June 1945 and later moved forward to 1 February 1945. On 5 August General Devers submitted the ground force requirements, totaling 1,436,444,[56] and on 26 September the theater notified the War Department that its second phase service troop needs would total 730,247 men.[57] Added to the air force total, which did not change since it was to achieve its maximum build-up by 1 May 1944, the troop basis for the second phase thus totaled approximately 2,583,000. The second phase figures represented the cumulative build-up to 1 February 1945 and therefore included the first phase totals. They represented the estimated needs for extended operations on the Continent after seizure of a lodgment area, and were prepared at this time primarily to serve as a guide to the War Department in its activation and training program. As before, the War Department made a careful examination of ETOUSA's stated

[54] Telephone Conversation, Col Royal B. Lord with Gen Weaver, 10 Jul 43, SOS AG 320.2 SOS May 43–Jan 44; Memo, Lt Col George W. Beeler, Chief of Svcs ETO, for Col E. M. Jones, G-5 ETO, 12 Jul 43, sub: SOS Troop List—375,000-man Basis, SOS AG 381 Troop Basis and Strength 1943.

[55] Memo, Lt Col L. B. Meacham, SOS, for Col Beeler, 25 Nov 43, ETO 320.2 Strength and Troop Basis, I.

[56] Ltr, Devers to CofS WD, 5 Aug 43, sub: Field Forces Troop Basis, 1st and 2d Phase, ETO 381 Troop Basis 1943.

[57] Ltr, Maj Gen Idwal H. Edwards, CofS ETO, to WD AG, 26 Sep 43, sub: Second Phase Troop Basis, OPD 320.2 Security, Sec III.

TABLE 3—TROOP BUILD-UP IN THE UNITED KINGDOM IN 1943

Month	Arrivals [a]		End of month strength				
	Monthly	Cumulative from Jan 42	Total	Ground Forces	Air Forces	Services of Supply	Hq ETO and Misc
January	13,351	255,190	[b]122,097	19,431	47,325	36,061	5,672
February	1,406	256,596	104,510	19,173	47,494	32,336	5,507
March	1,277	257,873	109,549	19,205	51,566	34,244	4,534
April	2,078	259,951	110,818	19,184	53,561	33,886	4,187
May	19,220	279,171	132,776	19,204	74,205	34,028	5,339
June	49,972	329,143	184,015	22,813	107,413	49,444	4,345
July	53,274	382,417	238,028	24,283	132,950	73,831	6,964
August	41,681	424,098	278,742	39,934	152,548	79,898	6,362
September	81,116	505,214	361,794	62,583	168,999	120,148	10,064
October	105,557	610,771	466,562	116,665	200,287	148,446	1,164
November	[c]173,860	784,631	637,521	197,677	247,052	191,208	1,584
December	133,716	918,347	773,753	265,325	286,264	220,192	1,972

[a] By ship. Excludes movements by air.
[b] Includes 13,608 men assigned to Allied Force for this month only.
[c] A large portion of these arrivals consisted of units redeployed from North Africa.

Source: Troop arrivals data obtained from ETO TC Monthly Progress Rpt, 30 Jun 44, ETO Adm 451 TC Rpts. Troop strength data obtained from Progress Rpt, Progress Div, SOS, 4 Oct 43, ETO Adm 345 Troops, and Progress Rpts, Statistical Sec, SGS, Hq ETO, ETO Adm 421–29. These ETO strength data were preliminary, unaudited figures for command purposes and, while differing slightly from the audited WD AG strengths, have been used throughout this volume because of the subdivision into air, ground, and service troops. This breakdown is unavailable in WD AG reports.

needs. Once more it gave its tentative approval, but again pointed out the manpower ceiling under which the War Department was working, noting that the ETO's troop basis would have to be compared with those of other theaters and weighed against over-all manpower availability. It returned the troop basis with recommended alterations and requested that ETOUSA make certain reductions, particularly in service units.[58] In November, after restudying the theater's needs, General Devers made his counterrecommendation, restoring some of the cuts, but accepting a reduction of more than 125,000 service troops. At the end of November the theater's over-all troop basis, first and second phases combined, calling for a build-up of forty-seven divisions as of 1 February 1945, stood as follows:[59]

Type	*Number*
Total	2,377,000
Services of Supply	604,000
Ground Forces	1,356,000
Air Forces	417,000

The actual initiation of troop movements did not depend on the final approval of the various troop bases, and the BOLERO build-up had started on the basis of flow charts and priority lists worked out

[58] Memo, Handy for CG ETO, 21 Oct 43, sub: U.K. Troop Basis, 1st and 2d Phase, ETO 320.2 Strength and Troop Basis, I.
[59] Memo, Meacham for Beeler, 25 Nov 43.

earlier in the year. The ETOUSA air force had made a negligible recovery in the early months of 1943 despite the high priority accorded it at the Casablanca Conference. In April it was able to operate only six heavy bomber groups with a daily average strength of only 153 planes.[60] Upon the approval of the Combined Bomber Offensive plan the build-up of the Eighth Air Force assumed a new urgency and the means were now finally found to carry out the movement of both personnel and cargo roughly as planned. The resumption of the BOLERO build-up first became evident in the month of May, when nearly the entire shipment to the United Kingdom (20,000 men) consisted of air units. The air build-up in fact continued to be favored for most of the summer, and from May through August accounted for approximately 100,000 or three fifths of the 165,000 men shipped to the United Kingdom. *(Table 3)* By the end of the year the air force had achieved a remarkable growth from 16 groups, 1,420 planes, and 74,000 men in May to 46 groups, 4,618 planes, and 286,264 men.[61] The movement of air combat units actually proceeded ahead of the estimated shipping schedules set up at TRIDENT.

The SOS and ground force build-up also achieved an encouraging record, but only after a serious lag in the early months. Ground force strength in the United Kingdom remained almost unchanged from January through May, with fewer than 20,000 men (comprising only one division, the 29th), and made only negligible gains in June and July. By December it was built up to 265,325 men. This was far short of the build-up which the theater commander had originally requested in May (390,000 by 31 December), but the shortage was not serious in view of the fact that large-scale ground combat operations were not contemplated until the following spring.

The progress of the service troop build-up gave far more cause for concern, particularly in the early months. The SOS force in the United Kingdom, like the ground forces, had remained almost stationary, with a strength of about 34,000 throughout the first five months of 1943. In June the theater repeated a request which had been heard many times before—to speed up the arrival of service troops in order to take advantage of the long summer days and good weather to advance the construction of the needed facilities in the United Kingdom. There now were additional reasons for a more rapid build-up, for the decision to reinstitute the preshipping procedure resulted in heavy advance shipments of cargo, and it appeared that there would be insufficient British labor to handle more than about seventy-five ships per month. The theater was already employing Medical Corps, ground combat, and air force troops alongside British civilian labor in depots and ports, and the shortage of labor was already adversely affecting certain British services to the U.S. forces, such as vehicle assembly, tire retreading, and coal delivery to North Africa. At one time during the summer the theater commander considered using the entire 29th Division as labor.[62]

From June through August the theater received fewer than 46,000 service troops. The lag resulted in part from diversion of shipments to another area, in part from the unavailability of the desired types of

[60] Craven and Cate, *The Army Air Forces*, II, 311.

[61] Progress Rpt, Progress Div, SOS, 4 Oct 43; Craven and Cate, *The Army Air Forces*, II, 639.

[62] Problem of Troop and Cargo Flow, pp. 69–71.

units. Despite the earlier restrictions which the Combined Chiefs of Staff had placed on any further diversion of resources to the Mediterranean, the Sicilian operation had met with such brilliant success, and prospects for an Italian collapse were so favorable that the decision was made in July to invade Italy. Once more, therefore, operations in the Mediterranean area asserted a prior and more urgent claim to available resources. In response to requests from General Eisenhower approximately 66,000 troops were diverted to the North African theater, and only 37,000 troops (mostly air units) out of a projected 103,000 could be shipped to the United Kingdom in August.[63] Theater officials expected that the net loss would be even greater, and would have a cumulative effect on the total BOLERO program, since the postponement of the SOS build-up would necessarily delay the ETO's readiness to accept ground and air force units.[64]

General Lee and the Combined Committee of London learned of the prospective diversions early in July.[65] The SOS commander immediately protested, warning the War Department that any further postponement or curtailment of the SOS troop arrivals would jeopardize the cross-Channel operation itself, for the theater was losing unrecoverable time through its inability to undertake the necessary preparations for the later ground force arrivals.[66] The inability of the War Department to ship service units of the required types was essentially the fruit of its earlier neglect of the SOS troop basis. Although the activation of service units had been greatly expedited since the fall of 1942, it had been a struggle to obtain from the General Staff the men needed to fill out the units authorized in the 1943 troop basis, and the SOS units had had to be activated earlier than had been anticipated to meet ETOUSA's requirements.[67] So urgent did the need become in the summer of 1943 that the War Department finally resorted to the expedient of diverting partially trained ground and air personnel to the Army Service Forces (formerly the War Department SOS, renamed in March) for training as service troops.[68]

Shortages in the United Kingdom were particularly acute in the category of engineer construction units needed to complete the program for airdromes, hutments, storage, hospitals, shops, and assault-training facilities. General Lee noted that standards had already been lowered from those recommended by the chief surgeon for shelter and hospital beds, and airdrome standards were also below those of the RAF.[69] The SOS commander had asked for twenty-nine engineer general service regiments by 30 September. Late in July the War Department informed him that only nineteen could be shipped unless certain unit training was waived. The theater, as in 1942, was willing enough to train units in the United Kingdom, and therefore accepted the partially trained troops.[70] Much the same

[63] *Ibid.*, p. 73.

[64] Memo, Ross for Lee, 16 Jul 43, sub: August Troop Lift, SOS AG 320.2 SOS May 43–Jan 44.

[65] Ltr, Lutes to Lee, 9 Jul 43, ETO 381 Opns Data, Basic Plng Dir 1, Transportation; Cbl Black 7, BSCC(W) to BCC(L), 15 Jul 43, ASF Plng Div, BOLERO-SICKLE Com, Series II, A46–183, Item 22.

[66] Memo, Lee for Secy War, 22 Jul 43, sub: BOLERO-SICKLE Build-up, SOS AG 381 BOLERO Combined Com.

[67] Ltr, Lutes to Lee, 12 Jun 43, SOS 381 Troop Basis and Strength 1943; Ltr, Lutes to Lee, 9 Jul 43, ETO 381 Opns Data, Basic Plng Dir 1—Transportation.

[68] Problem of Troop and Cargo Flow, p. 72.

[69] Memo, Lee for Secy War, 22 Jul 43, sub: BOLERO-SICKLE Build-up.

[70] Note for record, OPD, 30 Jul 43, OPD 320.2 ETO, Sec VI.

situation obtained with regard to air force service troops, and as a result the build-up of combat units took place at the expense of service troops, creating a serious lack of balance in the summer of 1943. In October the Air Forces began shipping thousands of casuals to the United Kingdom, where the Eighth Air Force planned to give them on-the-job training and organize them into various types of service units.[71]

Beginning in September the shipment of service units improved appreciably. In the last four months of the year the SOS almost tripled its strength in the United Kingdom, rising from 79,900 to 220,200. The Combined Chiefs meanwhile had raised the sights for the U.K. build-up. In August the Allied leaders met in the QUADRANT Conference at Quebec for a full-dress debate on strategy for 1944. By that time the tide of war had definitely turned in favor of the Allies. Italy was at the very brink of collapse; the German armies had already been ejected from the Caucasus and the Don Basin, and were now being forced to give up the last of their conquests east of the Dnieper. For the most part the Quebec meeting resulted in a reindorsement of the TRIDENT decisions so far as operations in the European area were concerned. It again gave the air offensive from the United Kingdom the highest strategic priority, approved the first product of the COSSAC planners—the OVERLORD plan for cross-Channel attack in May 1944—and directed that preparations should go forward for such an operation. As a result of the diminishing scale of shipping losses it was also possible to raise the target for the BOLERO build-up. Troop movement capabilities were now increased from the previous TRIDENT figure of 1,300,300 to 1,416,900 by 1 May 1944.[72]

Troop shipments in the remaining four months of the year did not quite achieve the QUADRANT estimates, although the theater received record shipments of air, ground, and service troops from September through December. In October the arrivals topped 100,000 for the first time, and in November rose to 174,000. At the end of the year ETOUSA had a total strength of 773,753 men (as against a cumulative build-up of 814,300 projected at Quebec), which represented slightly more than half of the authorized first phase troop basis. General Devers was acutely aware of the limited port and rail capacity in the United Kingdom, and had hoped for a heavier flow.[73] It was obvious at the end of the year, however, that there would have to be heavy shipments in the first months of 1944.

(3) The Flow of Cargo in 1943

The flow of supplies and equipment to the United Kingdom under the revived BOLERO program got under way somewhat in advance of the personnel build-up, largely because of the more favorable cargo shipping situation. As a result of the gradual elimination of the submarine menace and the record-breaking production of shipping, the total tonnage lost from all sources by the Allies and neutrals since September 1939 was more than replaced during 1943. In that year the tonnage constructed was four times the total lost in the same period.[74]

Cargo shipping had been allocated on the basis of a build-up of 80,000 men in

[71] Craven and Cate, *The Army Air Forces*, II, 640; Cbl, Handy to CG ETO, 27 Sep 43, and Note for record, 27 Sep 43, OPD 320.2 ETO, Sec VII.

[72] CCS 329/2, 26 Aug 43.

[73] Cbl W-2154, Devers to Marshall, 20 Jul 43, SOS AG 320.2 SOS May 43-Jan 44.

[74] U.S. Fleet Anti-submarine Bulletin, I (Feb 44), 8.

the first three months, and 169,000 in the second quarter. The subsequent cancellation of troop movements to the United Kingdom freed approximately 150,000 ship tons per month from hauling the equipment of these units, and left the Army Service Forces (ASF) with the problem of finding cargo for the space.

To both ETOUSA and the ASF this situation was ready made for the reinstitution of the preshipping procedure which had been attempted on a limited scale in 1942. ETOUSA in particular wanted equipment to arrive in advance of troops so that it could be issued to them on their arrival and loss of training time could thereby be avoided. Preshipment would also preclude telescoping heavy shipments in the months immediately preceding the invasion, when British port capacity was expected to be a decisive limiting factor.

In February and March General Andrews repeatedly urged the War Department to adopt this procedure. Early in April he came forward with a detailed proposal requesting that shipments arrive thirty to forty-five days in advance of troops, or, as a less desirable alternative, that organizational equipment be shipped force-marked and arrive at least simultaneously with the arrival of troops. The War Department General Staff gave the request a cool reception. Recalling the unhappy experience with preshipped supplies in the summer of 1942, when much equipment had been temporarily lost in the U.K. depots, the General Staff feared that this situation might be repeated. Theater officials were fully aware of the danger, and it was for precisely this reason that they were at the same time urging the early shipment of service troops. There was also a question as to whether equipment should be shipped in bulk or in sets for "type" or specific units. Because of the habit of shipping equipment force-marked, precedent indicated the latter method. But the instability of the troop basis in the spring of 1943, and the impossibility at that time of accurately forecasting troop arrivals, reduced to guesswork the planning of advance shipment for specific units. Bulk shipment, on the other hand, would allow the build-up of depot stocks in the United Kingdom with less regard for lists of specific troop units and could thus proceed with relative disregard for changes in the troop basis.[75]

At the urging of both ETOUSA and the ASF, the General Staff gave a cautious approval to the preshipment concept on 16 April. As authorized at that time, the plan provided for the shipment of organizational equipment, force-marked, thirty days in advance of the sailing of units. In effect, this was not preshipment at all as envisaged and proposed by the theater, for it meant that equipment would arrive, at best, at approximately the same time as the units. Moreover, it adhered to the old force-marking practice by which sets of equipment were earmarked for specific units and therefore did not embody the idea of shipments in bulk. Advance shipment was applied only to a selected list of items—combat maintenance, boxed general purpose vehicles, and Class IV supplies (items such as construction and fortification materials, for which allowances are not prescribed)—in which production at this time exceeded current requirements. Established priorities then in force also limited the application of the program, since North African operations, training requirements in the United States, the bomber offensive in the United Kingdom, and two major operations in

[75] Except as otherwise noted, the discussion of shipping procedures is based on the monograph, Problem of Troop and Cargo Flow, Chs. I and II.

the Pacific all had more urgent call on supplies. Applying the force-marking principle even made it difficult to compute requirements because of the unstable troop basis. In general, then, preshipment was accorded hardly more than lip service at this stage, reflecting both the War Department's reluctance to go further and the theater's continued low priority position.

Unsatisfied with this half-hearted acceptance of the preshipment idea, the ASF immediately exerted efforts to obtain a fuller implementation of the concept. On 16 May it succeeded in getting OPD's approval of an amended procedure which overcame one of the most restrictive features of the original directive. To circumvent the difficulty of computing requirements for the very tentative troop basis then in existence, it was decided that equipment would not be shipped for specific units, but rather for "type" units. While shipments were ostensibly computed from the troop basis, the troop basis was recognized as largely fictitious, and equipment was to be shipped for type infantry divisions, antiaircraft battalions, port battalions, and so on, on the safe assumption that the theater would eventually need and get these types of units. The equipment was to be stockpiled or pooled in U.K. depots for issue to such units upon their arrival. Thus, while having a definite relationship to a troop basis of tentative dimensions, equipment was to be shipped in bulk and not earmarked for particular units.

Even this amendment did not permit a full blossoming of the preshipment idea as originally conceived. Supplies intended for advance shipment still were to be drawn only from excess stock or production. They not only held a priority below that assigned to normal shipments to the United Kingdom, which was already near the bottom of the priority list of overseas theaters, but were far down on the priority list of units in various stages of training in the United States. Only after all the prescribed training allowances of units had been filled as they moved upward in the priority scale in preparation for overseas movement could supplies be made available for advance shipment purposes.

The preshipment procedure therefore began under heavy handicaps. Other theaters, the training allowances of troops in the United States, and high priority operations all took precedence. In fairness to those who worked out the emasculated version of the scheme it should be said that this was probably the highest position preshipment could be accorded at the time. It was wholly consistent with current strategic aims, for the cross-Channel operation was to remain in doubt for several months to come. The immediate aim of preshipment, after all, was not to guarantee an unlimited build-up for BOLERO, but to obtain sufficient cargo to fill the available shipping space in the next few months. In the four months from May through August the "surplus" of space over the normal requirements of troops moving to the United Kingdom was expected to total 784,000 measurement tons. Beginning in September the heavier troop flow was expected to absorb all available tonnage for the cargo which would normally accompany units. In fact, cargo shipping space would fall short of requirements in the fall, and the preshipment program was therefore anticipating the heavy cargo requirements of later months. These expected developments gave the proposal an unassailable logic.

Even in the context of its limited objec-

TABLE 4—CARGO FLOW TO THE UNITED KINGDOM IN 1943

Month	Monthly shipments (measurement tons)	Received			
		Measurement tons		Long tons	
		Monthly	Cumulative from Jan 42	Monthly	Cumulative from Jan 42
January	129,694	117,913	2,297,909	38,562	881,554
February	92,948	75,566	2,373,475	20,373	901,927
March	115,856	65,767	2,439,242	24,719	926,646
April	134,950	111,245	2,550,487	60,784	987,430
May	251,832	87,056	2,637,543	36,593	1,024,023
June	542,001	348,900	2,986,443	176,033	1,200,056
July	779,906	670,024	3,656,467	292,701	1,492,757
August	730,300	753,429	4,409,896	324,308	1,817,065
September	906,981	778,102	5,187,998	302,914	2,119,979
October	1,018,343	956,888	6,144,886	395,359	2,515,338
November	848,054	790,754	6,935,640	322,757	2,838,095
December	910,482	1,008,150	7,943,790	378,078	3,216,173

Source: Shipment data from [Richard M. Leighton] Problem of Troop and Cargo Flow in Preparing the European Invasion, 1943–44, prep in Hist Sec, Control Div, ASF, 1945, MS, p. 154, OCMH. Receipt data from TC Monthly Progress Rpts, Statistics Br, OCofT, SOS ETO, ETO Adm 450–51.

tive, however, preshipment did not achieve its goal. Despite strenuous efforts, sufficient cargo could not be found to fill the space released by the reduction in troop movements. A total of 135,000 measurement tons was shipped to the United Kingdom before the end of April, but this left approximately 100,000 tons capacity which could not be filled and was therefore turned back to the War Shipping Administration.[76] The same inability to fill available shipping space continued in varying degree throughout the next four months. Approximately 1,050,000 tons of shipping were made available for May and June, but less than 800,000 tons of cargo were dispatched. (*Table 4*) In July 780,000 tons of an allocated 1,012,000 tons of space were utilized, and in August only 730,000 tons were shipped as against the available 1,122,000. Of the 2,304,000 measurement tons shipped to the United Kingdom in the four-month period from May through August, slightly more than 900,000 tons, or 39 percent, represented preshipped cargo. This was a large proportion, but hardly represented a spectacular achievement in preshipment. The percentage was this high only because troop sailings to the United Kingdom were small in these months and the normal accompanying equipment and supplies accounted for a relatively small portion of the total cargo space. Preshipment was actually failing to achieve its immediate purpose, which was to utilize

[76] A measurement ton, in contrast to a long ton, is a unit of volume rather than weight, reckoned at 40 cubic feet. Since the density of cargo varies greatly, there is no fixed conversion factor between measurement and long tons, but in shipments to the ETO over a long period one long ton was equivalent to approximately 2.6 measurement tons. The terms "ship ton" and "measurement ton" are interchangeable.

all available shipping. Furthermore, full advantage was not being taken of the long summer days when British ports were at their maximum capacity and relatively free from air attack.

The failure to achieve even the narrow aims of the preshipment program is not too surprising in view of the status of Allied plans in the summer of 1943. Fundamental to the failure was the low priority accorded preshipment cargo. This in turn reflected in part the doubts that surrounded future strategy. Even the TRIDENT Conference, with its resolutions on the Combined Bomber Offensive, cross-Channel attack, and the accelerated build-up, did not resolve these doubts. The temptation still remained to commit Allied resources more deeply into the Mediterranean, and throughout the summer the possibility remained that there might be no cross-Channel operation after all. Late in June came the request from North Africa for additional personnel, which further upset planned troop flow to the United Kingdom, and in July there were indications that the entire European strategy would be reconsidered.

In view of the wavering strategic plans, preshipment definitely involved risks. Tying up additional equipment in the U.K. depots might actually make it difficult to equip a force for a major operation elsewhere except by reshipping the stocks from the United Kingdom. Logistic plans had been mapped out at TRIDENT to conform with strategy; but with the strategic emphasis subject to change, logistic plans could hardly be stable. Nothing demonstrated so pointedly the necessity for firm objectives if the logistic effort was to be effective.

The instability of preshipment plans was best exemplified in the Chief of Staff's directive of 8 July ordering the advance shipment suspended after 15 August until the strategic situation was clarified. By early August most of the equipment for troops scheduled to reach the ETO by the end of 1943 had been shipped, and it was necessary to reach a decision on preshipment of equipment for troops sailing after the first of January. Fortunately the air had cleared somewhat by this time, and the list of ground units scheduled to sail before 1 May 1944, completing the first phase troop basis, was complete. On 13 August came approval of preshipment on the extended troop basis, thus allowing advance shipment of supplies to continue.

It was only a few days later that the QUADRANT Conference at Quebec reaffirmed earlier decisions on operations in Europe, dispelling much of the fog of the past two months and incidentally reaffirming the validity of preshipment. The conferees again recognized the all-important problem of U.K. port capacity, which had a significant bearing on the entire cargo shipping program. British officials had already called attention to the problem at Casablanca and at TRIDENT, noting that the maximum practical limit was 150 shiploads per month, even with the help of U.S. dock labor. At the TRIDENT Conference in May they had agreed to a quarterly schedule of sailings to meet U.S. requirements averaging 90 ships per month in the third and fourth quarters of 1943, and 137 per month in the first and second quarters of 1944. By August, however, it had become evident that the slow rate of troop and cargo movements during the spring and summer would force a tremendous acceleration of movements in the fall and winter, which would be beyond the capacity of U.K. ports. British officials were particularly

concerned about the pressure in the months immediately preceding the invasion, when ports would also be taxed by out-loading activities. The primary cause of this limitation was the shortage of labor, and measures were already being taken to dispatch additional U.S. port battalions to the United Kingdom in anticipation of the deficits.

At Quebec British officials insisted on a revision of the earlier sailing schedules, calling for an increase to 103 shiploads per month in the fourth quarter of 1943, and a reduction to 119 per month in the first and second quarters of 1944.[77] Advancing the heavier shipments to the fall of 1943 was obviously indicated to relieve the strain in the early months of 1944, and also to make up for the lag during the summer of 1943. The schedule revision meant a net reduction of 77 ships for the nine-month period, however, and placed a ceiling on U.K. reception capacity which was considerably below the quantity of ships and cargo the War Shipping Administration and the ASF could provide. So far as preshipment was concerned, the remaining months of 1943 were to be crucial, since the equipment accompanying the heavy troop unit movements in 1944 would certainly absorb the bulk of the available shipping after the first of the year. Efforts were therefore bent toward finding cargo to fill the available shipping in the remaining months of 1943.

Cargo shipments to the United Kingdom in August totaled only 730,300 measurement tons, and well reflected the numerous logistical problems which could affect the carrying out of BOLERO. Rearmament of additional French divisions in North Africa, first of all, had drawn off about 250,000 tons. In addition, August had seen the diversion of U.S. personnel to North Africa, resulting in smaller troop movements to the United Kingdom and, in turn, relatively small normal cargo shipments. Consequently, of the 730,200 tons shipped that month, an abnormally large proportion—about 48.7 percent—represented preshipped cargo, even though the total tonnage was not large. Shipments in September and October were considerably larger, totaling 906,981 and 1,018,343 measurement tons, respectively. In these months, however, troop sailings were so much heavier that preshipped cargo accounted for only 40.4 and 36.5 percent.

November shipping also felt the effect of outside logistic factors. The decision had been made at TRIDENT, and reaffirmed at Quebec, to transfer four American divisions from the Mediterranean to the United Kingdom. This redeployment was largely carried out in November and had its repercussion on the U.K. build-up by diverting troop shipping and cutting deeply into the planned troop sailings from the United States. Once more the ASF was suddenly faced with the problem of finding equipment to fill the cargo shipping released by this cancellation of troop movements. The result was evident in the tonnage figures for November. Less than 850,000 tons were shipped that month, but of this total 457,868 tons, or 54 percent, were preshipped equipment, the largest advance shipment yet achieved in both actual tons and percentage of total cargo. Even this figure was misleading, however, for three of the four divisions transferred from North Africa had to be equipped from stocks established in the United Kingdom. In December a total of 910,482 measurement tons was shipped to

[77] CCS 329/2, 26 Aug 43, Annex VII.

the United Kingdom. Because of the considerably heavier troop sailings with their accompanying equipment, however, preshipped cargo totaled only 318,314 tons, or 35 percent. A comparison of actual ship sailings with those scheduled in May and August is given below: [78]

Date	*TRIDENT*	*QUADRANT*	*Actual*
3d quarter 1943 . . .	259	——	241
4th quarter 1943 . . .	280	308	273

Actual sailings, therefore, did not even achieve the ceilings established at the TRIDENT Conference, much less the accelerated schedule agreed on at Quebec for the last three months of 1943. A comparison of total tonnages shipped with tonnage allocated likewise reveals the inability to allocate sufficient cargo to fill the available shipping. In the eight-month period from May through December approximately 1,400,000 tons of shipping were allocated in excess of the ASF's ability to provide cargo. The result foreboded serious trouble, for the mounting troop movements of 1944 were bound to turn the surplus tonnages of 1943 into deficits.[79]

At the heart of the supply build-up problem was the system of priorities which had been necessitated by the inability of U.S. production facilities to fill all requirements simultaneously. Existing priorities relegated ground force cargo for the European theater to eighth place (priority A–1b–8) and gave advance shipments to the theater an even lower rating. Fully aware of the priority handicap, the ASF in the early stages of the preshipment program had suggested a revision of priorities for equipment as applied to units in training in the United States, but met strong opposition from the Army Ground Forces. In September the ASF again raised the question, this time with strong backing from the theater. ETOUSA was particularly worried about certain critical shortages and pointed out that even minimum requirements of engineer and signal equipment had not been met. There was need for 125,000 long tons of organizational equipment for troops arriving in October alone, and in view of the time required for distribution, supplies were neither arriving sufficiently in advance nor keeping pace with the personnel build-up.[80] Yet no action was taken to change priorities, and in September and October sufficient cargo was again lacking to fill available shipping space.

In November the ASF finally succeeded in persuading the General Staff to accord cargo for preshipment the same priority as normal theater shipments (that is, A–1b–8 for ground forces and A–1b–4 for air forces). But this proved to be a minor concession. At the end of November, when the new priority went into effect, it was already apparent that available cargo space could not be filled for that month.

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[78] These figures are valid only for purposes of comparison. The number of sailings was actually expected to be greater and was in fact considerably greater than indicated above. These figures represent tonnages converted to ships with uniform capacity of 10,000 tons. The total cargo ship sailings actually exceeded 600 in the fourth quarter of 1943, for example, many of them with loads of less than a thousand tons.

[79] Actually, the world-wide shipping situation was much tighter than is indicated by the allocations to the ETO. The "surpluses" for U.K. shipment were surpluses only in terms of the available cargo, which was insufficient to utilize the space made available for the BOLERO shipments. For greater detail on the whole shipping situation see Leighton and Coakley, The Logistics of Global Warfare.

[80] Ltr, Lee to WD, 25 Sep 43, sub: BOLERO Supply Program, and Memo, Col Lord for Lee, 25 Sep 43, sub: Evaluation of Supply Program and Present Supply Status, ETO 390.1 BOLERO Supply Program.

More important, by this time troop movements to the United Kingdom had increased to such a scale that the bulk of available tonnage was taken up by the normal equipment accompanying troops. In other words, the flow of personnel was now beginning to catch up with the flow of cargo, and it was no longer possible to advance-ship large tonnages. The stock of preshipped equipment in the United Kingdom was beginning to melt away. Of the estimated 1,040,000 tons of preshipped equipment in the United Kingdom on 1 November, almost half was to be issued to arriving troops within two months. Some question even arose as to whether an adequate flow of cargo could be maintained to support the scheduled flow of troops. There certainly were doubts about the possibility of meeting the critical shortages under existing priorities.

By the end of the year, then, the nub of the problem was the theater's priority, which it now became imperative to raise. Early in December the ASF asked OPD to raise ETOUSA's priority for air force equipment from 4 to 1, and that for ground force equipment from 8 to 2. It requested the same priority for advance shipments. The General Staff approved this plan and put it into effect before the end of the year. In the remaining months before D Day ETOUSA was therefore to enjoy the highest priority for all items required. Enormous tonnages still remained to be shipped to meet the requirements of the 1 May troop basis and the many special operational needs of the cross-Channel invasion.

The mounting tonnages of supplies which began to arrive in British ports in 1943 naturally placed a tremendous burden on the growing SOS organization. Fortunately, there was to be no repetition of the unhappy experience of 1942. The Services of Supply was a much more experienced organization by this time, and 1943 had witnessed a steady improvement in shipping and receiving techniques and procedures. The goal of the shipping program was of course to put down in the United Kingdom adequate supplies in such a way that they could be properly stored and distributed. To achieve this objective posed problems for the theater and the zone of interior which were closely related. The extent to which cargoes were to be segregated in the U.K. ports, for example, had a direct bearing on the marking and manifesting procedure of the port of embarkation and the zone of interior depots. Likewise, the marking and documentation system and the degree to which cargoes could be broken down when vessels were unloaded largely determined the nature of the depot system in the theater. Because of the many restrictions on the handling of supplies in the theater, however, the theater SOS in most cases was left with little choice in its methods, thus placing on the zone of interior the burden of accommodating itself to these difficulties.

The importance to the theater of having cargo properly marked and manifested had already been demonstrated. Preparations for TORCH had served as an object lesson: the theater must be properly notified of the status of its requisitions and shipments, and cargo must be adequately marked. Nothing so stultified plans for future action as not knowing what resources could be counted on.

The need for adequate advance information was fully recognized. Standing operating procedures provided for an elaborate reporting system intended to

keep the theater informed of the status of its requests at every stage. The key document in the series was the manifest, which contained the first detailed information for overseas port agencies regarding a cargo's contents and stowage, making it possible to plan unloading and distribution. Until the end of 1942, however, this system of notification had proved inadequate. The manifest was often incomplete, lacked uniformity, was illegible, used a haphazard nomenclature, and even though sent by air mail, frequently did not arrive ahead of the cargo.

The second aspect of the problem—proper identification of cargo—was even thornier. Some of the worst marking practices had been eliminated after the frustrating experience in connection with the TORCH preparations, but the marking system still fell short of the theater's needs. As it evolved in 1942, the system of shipment identification provided only three or four elements of information: a shipping designator in the form of a four-letter code name which indicated the theater or area to which the cargo was addressed; an abbreviation of the supply service making the shipment; and the Roman numeral indicating the class of supplies. For example, UGLY–QMII was used to mark a crate of quartermaster Class II supplies going to the United Kingdom. This marking was unsatisfactory to the ETO, for it failed to allow the identification of separate items of shipment with the corresponding items of the requisition. The theater desired a series of symbols by which each item in a shipment could be matched with corresponding items on all the supply papers and reports, such as the requisition, shipping papers, availability notices, packing lists, manifests, loading cables, and so on.

The theater's need for such an elaboration of the marking system was dictated largely by conditions in the United Kingdom. ETOUSA had originally planned, in accordance with normal practice, to have cargo shipped from the port areas to central base depots in the United Kingdom. There it would be segregated and then reshipped to advance or branch depots, which would distribute supplies to using units. This system was too extravagant in the use of transportation and depot facilities. British railways were heavily burdened, and depot space was always at a premium. To avoid the cross-hauling and back-hauling, and to save labor in the repeated handling of supplies which this system involved, ETOUSA desired a marking procedure which would so completely identify specific items of a shipment with the original requisition that they could be routed directly from the port to specific depots.

In 1942 the War Department instructed the various theaters to work out their own codes for this purpose, and ETOUSA officials gave the problem careful study. By December 1942 the SOS staff had worked out a plan, and two of its authors, Col. E. C. Goodwin and Maj. Charles Case, were sent to Washington to urge its adoption. The UGLY system, as it was called, simply expanded on the original identification procedure, adding the necessary code symbols so that each item of shipment could be matched with the original requisition and corresponding items on all supply documents. The specific requisition was indicated by a letter and a three-digit number. Each service was allocated a block of numbers. The Quartermaster Corps, for example, could use any number from 001 to 099, and increased the possible number of combinations by adding

a letter to indicate the series of requisitions. B019, for example, was the nineteenth in series B of QM requisitions, and in submitting requisition B019 the theater would request that all shipments made against it be marked UGLY–QMII–B019. This included the basic ingredients of the marking code and provided a complete oversea address. It was to be stamped on all containers in a shipment against a particular requisition, and thus permitted the identification of a particular item, case, or crate of supplies with the requisition requesting it.

There were other refinements and elaborations. When more than one shipment, or shipments from two or more depots, were made against one requisition, additional letter and number symbols were added to indicate the depot making the shipment and the number of the shipment. When the New York Port received a requisition from London it frequently made extracts for filling for the various depots where the supplies were stored, and instructed these depots to add the necessary code and number to the marking to identify its part of the original requisition. The Raritan Arsenal, for example, might mark its shipment as follows: UGLY–ORDII–B320RA6. Each of the other ordnance depots filling a portion of the B320 requisition would add its appropriate letter code and shipment number. Additional abbreviations could be inserted to indicate specific convoys, priorities, advance shipments, and so on. From the theater point of view this plan not only provided a satisfactory means of marking shipments and matching shipments with requisitions, but overcame the persistent difficulties of keeping the theater informed of the status of its requests. The manifest procedure was uncertain at best; the proposed system provided brief, simple code symbols for each shipment, which could be transmitted by cable as soon as a shipment had been loaded. It virtually assured the theater of receiving a complete listing of the items in a shipment before it even left the New York Port, and eliminated all nomenclature references, on which there was such confusing lack of uniformity. Finally, upon a vessel's departure the cargo loading cable gave the theater even more exact information on the tonnage of cargo for each requisition number and partial shipment.[81]

The War Department did not receive the ETOUSA plan with open arms. All agencies concerned subjected it to an exhaustive examination and, while admitting its advantages, raised strong objections. The Transportation Corps in particular was critical. The inauguration of the new system involved a complete reorganization of supply procedures, it claimed, and a complete reindoctrination of supply personnel. Furthermore, the Transportation Corps had recently put into effect a more detailed manifest breakdown which it hoped would meet the past criticism by the theater, and desired that it be given an opportunity to prove its worth. Early in January General Lutes therefore asked the theater to withhold the new plan, but promised to put it into operation should the improved manifest fail to meet ETOUSA's needs. A few weeks later General Lee held a conference of his service chiefs, as a result of which he reported to the War Department that the new manifest was proving unsatisfactory. The figures compiled by the service chiefs indicated that the system had actually de-

[81] This description of the marking problem is drawn primarily from Chapter V of Problem of Troop and Cargo Flow.

teriorated. The manifests still lacked the type of information needed to indicate the status of requisitions or to show what supplies were afloat or en route. They were often arriving too late to be of any use to the overseas port commander in giving disposal instructions.

Once more the authors of the UGLY plan were sent to Washington, and the experience of December was repeated. The War Department appeared more opposed to the ETOUSA plan than ever. It insisted that further improvements had been made in the manifest, meeting the theater's objections, and it now questioned the entire basis for the detailed system which the theater was demanding. General Lutes felt that the ASF was being asked to accommodate all of its shipping procedure to the U.K. depot system. The theater was asking for a detailed advance documentation of shipments so that it could plan the final disposition of every package even before its arrival, and so that it could make a minute breakdown of cargo at the port and forward it to the branch and issue depots in a direct single haul. According to General Lutes, this would put the ASF into the "retail business." He thought there was great danger of becoming bogged down in such detailed documentation of supplies for the support of a million or more men. The ASF had in mind a more "wholesale" handling of supplies, whereby cargo could be broken down by service near the port and then moved to interior depots. Since distances were short in the United Kingdom, the ASF assumed that much of the redistribution of cargo could be handled by trucks.[82]

The theater avoided using motor transport for that purpose, however, until the rail lines became hopelessly burdened. The narrow and winding roads of the United Kingdom were not meant to be used by the large vehicles of military convoys. So far as the breakdown of cargo in the port area was concerned, this was impossible unless cargo was adequately marked. The SOS had met this problem partially by the use of inland sheds where supplies were segregated and sometimes stored until shipped to the branch and general depots. But General Lee opposed the establishment of a complete branch storage system in the vicinity of the ports because it entailed a far heavier construction program than could be sustained. He held to the original SOS proposal for a marking and forwarding procedure which would be adaptable to the United Kingdom's storage and transportation system and which would facilitate the distribution of supplies *within* the theater, even if it meant changes in zone of interior procedures. If this could be accomplished through a more efficient manifest system, well and good. General Lee recognized some good features in the existing manifest system and thought it could be improved even further by the inauguration of a new high priority courier service, but it was obvious that ETOUSA did not care to place its faith in a system which had been found so wanting in the past.[83]

Late in March the War Department approved and put into effect some of the most important features of the UGLY plan in connection with cargo shipments to the United Kingdom. Its application at this time represented a compromise, since it was intended mainly to supplement the

[82] Ltr, Lutes to Lee, 6 Mar 43, USFET AG 400.161 Marking of Supplies 1942–43.

[83] Ltr, Lee to Lutes, 1 Apr 43, USFET AG 400.161 Marking of Supplies 1942–43. See also SOS ETO Tentative Overall Plan for Supply and Administration, 12 Apr 43, Revised Editions of 20 Jun 43 and 1 Jan 44, ETO Adm 369.



MOTOR CONVOY *waiting to board landing craft during a training exercise, Falmouth, England, December 1943, above; convoy moving along road in England, below.*



manifest system and therefore to facilitate the notification of the theater about coming shipments and in the immediate handling of cargo upon its arrival. It did not implement those portions of the plan which would have given the theater information on exactly what portions of its requisitions had been filled, on partial shipments on the same requisition, and on the shipping depot. The result was that stock control and record keeping remained very complicated and constantly in arrears.

The problem of stock control and adequate supply records concerned the ASF as much as the theater and was intimately related to the problem of transmitting adequate information about shipments to the theater. Partly because of the continuing unsatisfactory system of overseas supply records, and partly because of the increasingly obvious advantages of the UGLY system, the ASF extended the ETOUSA plan late in May. Under its fuller application the procedure now provided that separate shipments made against particular requisitions would be completely identified by the symbols in the third portion of the overseas address already described. In fact, this particular feature of the procedure was specifically emphasized by the new title which the ASF now gave it—"Identification of Separate Shipments to Oversea Destinations" (later referred to simply as ISS). In effect, the system now embodied virtually the entire UGLY plan.

Meanwhile the theater persuaded the ASF to accept still another refinement in the shipping procedure which further facilitated the handling of cargo in the United Kingdom by relieving the strain on British transportation. Until the spring of 1943 cargo was loaded on available ships in the United States without much regard to destination in the United Kingdom. Upon arrival of the ships in U.K. waters the Ministry of War Transport, in so far as possible in accordance with the wishes of the SOS service chiefs, allocated vessels to the ports best suited to serve the destinations of the bulk of the cargo in a particular ship. The long rail hauls frequently required to move cargo from the port to its ultimate destination thus placed a burden on British internal transportation facilities. It would obviously not do to continue this wasteful practice when the rate of the BOLERO build-up increased to 150 or more ships per month.

Early in 1943 representatives of the British War Office, the Ministry of War Transport, the British Railways, the War Shipping Administration, and the SOS met to study the problem and worked out a plan designed to eliminate much of the cross- and back-hauling involved in the current practice. This was the zoning system which the War Department approved in April and implemented three months later. By this plan the United Kingdom was at first divided into two zones for the receipt of cargo. Zone I, designated by the code word SOXO, included the entire area north of a line of county boundaries drawn through London and Banbury, and thus embraced the Clyde and Mersey River ports (chiefly Glasgow, Liverpool, and Manchester) and also the Humber River ports of Hull and Immingham on the eastern seaboard. Zone II, known as GLUE, included the southern portions of England and Wales, and the ports of the Bristol Channel and Plymouth, Southampton, and London. A third area, Zone III, comprising Northern Ireland and named BANG, was added later. It was intended that each zone should be served by

its own ports alone and that there should be a minimum of hauling from the ports of one zone into another.[84] Service chiefs in the United Kingdom were to requisition for a particular zone, and ships were to be loaded in the United States so far as possible with cargo for that zone. Most cargo henceforth bore the shipping designator SOXO, GLUE, or BANG, depending on the group of ports to which it was directed, instead of UGLY, which was now used only on cargo not intended for any particular port group in the United Kingdom. Based on an estimated maximum 160 ship arrivals per month, the space and facilities were allocated to handle 65 vessels in Zone I, 85 in Zone II, and 10 in Zone III. By the end of the year the ports of the three zones were handling 41 percent, 53 percent, and 6 percent respectively of the incoming cargo, approximately according to the planned loads.[85]

Using data from the various shipping documents, such as the manifests, and the cargo loading cables which were dispatched from the United States upon the departure of the ships, the chiefs of services indicated the depots to which they wanted particular supplies delivered. With this information Transportation Corps representatives attended the meeting of the Diversion Committee of the Ministry of War Transport at London shortly before the arrival of a convoy in British waters and decided on the basis of available berths, handling equipment, size of the ships, and type of cargo at which port each vessel was to be discharged. Once these decisions were made, the information was passed along to the service chiefs, who then determined the final destination of each item of cargo. By the time a vessel berthed, the port commander was supposed to have in his hands precise knowledge of the size, weight, and location of all cargo in the ship and the ultimate depot destination of every item. This information also enabled transportation officials to have the required rolling stock available for movement inland. Clearance of the ports always had a high priority on the British railways and roads so as to prevent backlogs and congestion in the port areas, which were frequent targets for the Luftwaffe. As the British freight wagons left the ports, depot commanders were immediately notified by telephone so that they could make preparations to receive the supplies.[86]

The procedure described above was, in theory at least, the scheme for the shipment to and receipt of cargo in the United Kingdom as gradually worked out in 1943. The system at first appeared highly complex, especially to the ASF, which in the eyes of the theater did not fully comprehend the peculiarities of supply problems in the United Kingdom, and the ASF was understandably reluctant to undertake the overhauling of its supply procedures and reindoctrination of thou-

[84] Some of the cargo entering the Clyde ports was to be transferred by coaster to the Mersey River ports in Zone II.

[85] Ltr, Lee to CG ASF, 5 Apr 43, sub: Zoning of U.K. for Receipt of U.S. Army Cargo, and Memo, Hq ASF for CofT *et al.*, 27 Apr 43, sub: Zoning of U.K. for Receipt of Cargo, ETO 381 Opns Data, Basic Plng Dir 1, Transportation; Memo, Lt Col W. D. Holland, Asst to CofS ASF, for Devers, 7 May 43, with Incl, Rpt, sub: Résumé of Conf between Gen Devers and Representatives of CG ASF, Chiefs of Supply SOS, *et al.*, 7 May 43, ETO Adm 337 1943 Confs; Troop and Supply Buildup in the United Kingdom to D Day, Pt. III of The Administrative and Logistical History of the ETO, prep by Hist Div USFET, 1946, MS (hereafter cited as Troop and Supply Buildup), pp. 192–94, 244, OCMH.

[86] History of the Transportation Corps ETO, prep by Int and Hist Br, Plng Div, OCofT ETO, 1944, MS (hereafter cited as History of the TC, ETO), I (1942–43), 12–13, ETO Adm 582.

sands of its personnel. But the new system quickly proved its worth and earned the almost unanimous approval of all theaters. In the fall of 1943 the Transportation Corps added still another improvement to the procedure. It perfected its so-called date-line system, scheduling each step in processing requisitions and planning shipments by a series of deadlines, all actions being geared to a fixed convoy sailing date. The result was an integration of the several processes into a synchronized operation which eliminated many of the last-minute changes which had characterized the preparation of shipments before. The addition of still another symbol—the time priority or convoy cycle symbol—to the overseas address removed still more of the uncertainty for theater supply officials.[87] By the end of 1943, when the tremendous cargo shipments to the United Kingdom were getting under way, the ISS, bearing many of the features of the originally proposed UGLY plan, was fully developed and in operation.

(4) Troop and Cargo Reception

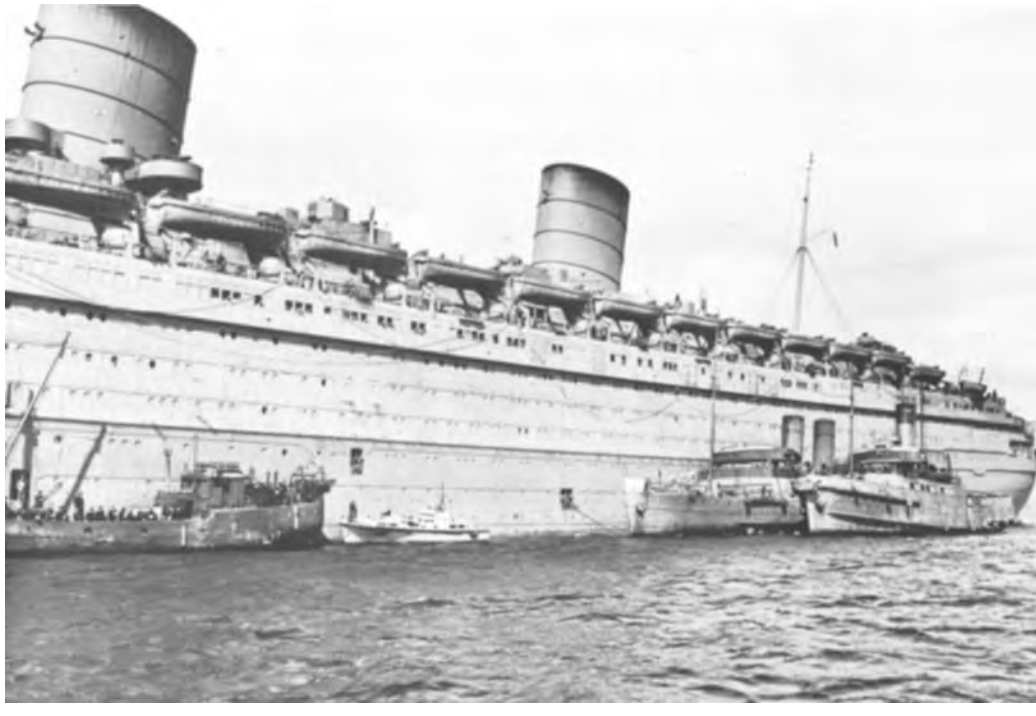
The peculiarities and limitations of British facilities influenced logistic operations along the entire supply pipeline, reaching back to the depots and even the factories in the zone of interior. In England every service and facility groaned under the burden of wartime demands and was subjected to the closest control. For personnel and cargo arriving in the United Kingdom this first became evident in the field of transportation. Two agencies, both under the Ministry of War Transport, exercised a tight control over all water and land transport. Sea Transport at first controlled the entire working of vessels from berthing to unloading, although the U.S. Transportation Corps by 1943 was given full control of American ships in the ports. Movement Control directed all transportation inland.

By far the most important of the points of entry for American supplies and personnel were the Clyde and Mersey River ports and those of the Bristol Channel. The Humber River ports (Hull and Immingham), London, and the southern ports of Southampton and Plymouth, while important in peacetime, were for a long time unsafe because of both enemy submarine and air attacks, and were not extensively used on American account until the avalanche of supplies began late in 1943. The Clyde ports—consisting of Greenock, Gourock, and, fifteen miles up the river, Glasgow—were the main points of debarkation for American troops. At all three ports troops were debarked by tender, in midstream at Glasgow, and in the broad, deep anchorage known as the "Tail of the Bank" at Greenock and Gourock. They immediately entrained at quayside for their assigned destinations. Glasgow possessed excellent dock facilities, including the necessary cranes. But the Clyde area was relatively removed from the principal U.S. lines of communications and was used mainly for troop reception, accounting for more than half, or 873,163, of the 1,671,010 U.S. debarkations to 30 May 1944.[88] It accounted for only about 8 percent—1,138,000 measurement tons, or 226,000 long tons—of the total U.S. tonnage discharged in the United Kingdom through May 1944.

The Bristol Channel ports—Swansea, Cardiff, Newport, and Avonmouth—and

[87] See Oversea Supply Policies and Procedures, prep by Richard M. Leighton, ASF Historian, 1945, MS, Ch. IV, Sec. 3, OCMH.

[88] Statistical Progress Rpt, OCofT ETO, 30 Jun 44.



TENDERS ALONGSIDE THE QUEEN ELIZABETH *at Gourock, Scotland.*

the Mersey ports—Liverpool, Garston, Manchester, and Birkenhead—were located nearer the center of U.S. activity and tended to specialize in freight discharge. The two groups of ports accounted for 9,750,000 measurement tons (3,800,000 long tons) or 70 percent of all tonnage brought into the United Kingdom for American troops through May 1944. Most of the heavy equipment and supplies, such as tanks, guns, and ammunition, were brought through these ports, although often with great difficulty. Much of the equipment at these ports was outmoded and inadequate for unloading directly from ship to rail, or rails were so constructed that it was impossible to follow the American practice of moving cargo by means of pallets and fork-lift trucks or tractor-drawn trailers. Many improvements were made in cargo-handling methods, however, including the use of special slings for lifting explosives, and the construction of floating cranes for handling tanks and tractors. With the mounting tonnage receipts in the summer of 1943 these ports were hard pressed to prevent the formation of backlogs, but by one expedient or another they managed to keep their quays cleared. The Mersey ports, in addition to discharging about 4,500,000 measurement tons of freight, debarked more than a half million U.S. troops.

American cargo imports constituted only a fraction of the total volume of freight which flowed through the British ports. Throughout the war years Britain

required an import program to meet its civil needs and sustain its war effort which ran to about 25,000,000 tons per year. In 1943 U.S. imports into the United Kingdom added another 2,500,000 tons to this volume of traffic. The capacity of the ports to handle these enormous tonnages was limited as much by labor difficulties as by the inadequacies of the physical plant. The fighting services had long since drawn off the younger and more able-bodied men, leaving a labor force both smaller and less efficient. The average age of dockers at Liverpool, for example, was 52.[89] Port operations were also plagued by prevailing employment practices in the United Kingdom. Before the war British dock work was conducted under a system of casual labor, with workers shifting from dock to dock and from one employer to another. In the summer of 1940 dock laborers were required to register and submit to compulsory transfer to any port where they were needed. The bombing of the southern and eastern ports threw an increasingly heavy load on the safer western ports and made it imperative to bring these ports to the fullest efficiency, and therefore also required revisions in the employment system which still prevailed.

In 1941, before the Americans came on the scene, the entire system of dock employment became more regularized, and the National Dock Labour Corporation was formed to take over as the employer of all stevedores. Nevertheless, British labor practices still brought many frustrations. In Northern Ireland, for example, port labor was controlled by the stevedoring concern of G. Heyn and Son, Ltd., called HEADLINE, which provided workers upon request of the port authorities. For this service it received a 20 percent commission on the gross payroll. Under the terms of the contracts it was against the interests of both the employer and employees to discharge vessels quickly or in those ports where handling equipment was superior, and the company even attempted to dictate the port where ships were to be berthed. In 1943 this unsatisfactory situation was resolved by new contracts whereby it was to HEADLINE's advantage to accomplish a rapid discharge and therefore assure a quick turnround of vessels.[90]

The labor problem in Belfast was further complicated by the existence of rival Catholic and Protestant unions, one of which worked coasters and the other ocean-going vessels. Since much of the cargo discharged at Belfast was transferred to English or Scottish ports by coaster, a strike started by the union handling coasters would also tie up discharge of ocean-going freighters since there was little storage space in the port itself. All in all, the situation was highly volatile, and disputes over pay and other matters frequently involved American port officials in wildcat strikes or threats to strike, and at times delayed the scheduled discharge of ships. Until the summer of 1943 the British unions restricted the use of military labor to those periods when civilian workers were unavailable. By that time, however, the flow of cargo rose to huge proportions and resulted in an acute labor shortage, and the ban on the use of military labor was lifted. In the Bristol Channel area the U.S. port commander had foreseen this shortage and had anchored a ship at Penarth to train a new

[89] Ltr, Col Walter D. McCord and Lt Col Leo J. Meyer to CofT WD, 18 Oct 43, sub: Report, AG Records 320.1-353.9 England 1943.

[90] History of the TC, ETO, I, 28-29; The Local Procurement of Labor and Supplies, U.K. and Continental, Pt. X of The Administrative and Logistical History of the ETO, Hist Div USFET, 1946, MS, pp. 45-47.

group of fifty Transportation Corps soldiers in unloading methods every two weeks. This scheme paid off well when the critical labor shortages developed in 1943. At the height of the BOLERO build-up in the spring of 1944 fifteen U.S. port battalions of approximately 950 men each were engaged in the discharge of cargo from U.S.-controlled vessels.[91]

The task of moving personnel and cargo inland in the United Kingdom fell chiefly to the railways. In addition to the limited capacity of their rolling stock the British railways suffered from other handicaps, such as limited head space and inadequate tunnel clearances, which impeded the free movement of tanks and other awkward equipment. Colonel Ross, chief of transportation in the ETO, had reported after his first look at U.K. facilities in 1942, that the country was "so cramped and small, the railroad equipment so tiny, the roads so small and crooked and methods so entirely different" that a complete reorientation of operating methods was required.[92] By comparison with the railroads of the United States the British system was indeed in many ways a Lilliputian one. Nevertheless, it accomplished a prodigious feat although dangerously overburdened, and by the tightest control handled traffic approaching the crowded schedules of the New York subways.

With the first inauguration of the BOLERO build-up in the summer of 1942 a question immediately arose as to the role of U.S. Transportation Corps personnel in the U.K. organization. The British desired that American troop units should be absorbed into the existing system. Colonel Ross objected to such complete integration, and quickly established trained traffic control personnel in the British rail transportation offices in the regional commands to learn the British system of control. With continental operations in mind, when U.S. Transportation Corps units would have to operate their own lines of communications, he felt it was his duty to develop an organization capable of functioning independently. He therefore insisted that the Transportation Corps in the ETO be allowed to assume full responsibilities in transportation operations as rapidly as permitted by available personnel. At the same time he organized a refresher course for transportation officers, referred to by some as a "deflation school," since it was suspected of having been designed as much to deflate any latent chauvinism which U.S. officers might have about U.S. transportation facilities and procedures as to orient them in British railroading methods.[93]

The development of a completely separate U.S. transportation system was hardly feasible, and ETOUSA agreed with British officials to establish a joint control. Under this arrangement the American traffic control system paralleled the British, American personnel working closely with British transportation officials and assuming a full share of responsibility in the control of movements. By early 1943 American traffic officers were handling all their own transportation in areas where U.S. troops were preponderant, and American Rail Transportation Officers (RTO's) became familiar figures in the many stations along the British rail lines. Railway operating units meanwhile trained by performing switch-

[91] History of the TC, ETO, II (Jan–Mar 44), Marine Operations; Memo, Col Meyer for Hugh M. Cole, 30 Jul 51, sub: Critique of MS, Sec. I, p. 13, OCMH; Ltr, Col McCord and Col Meyer to CofT WD, 18 Oct 43, sub: Report.

[92] Ltr, Ross to Gen Wylie, 28 Jul 42, ETO Adm 314A Transportation—General.

[93] I. Ross, "Ross of ETO," *Army Transportation Journal*, I (April, 1945), 32–36.

ing service at the depots and operating for short distances on the main lines. American units first took over the operation of switchyards at the Ashchurch, Sudbury, and Thatcham depots in the fall of 1942, and in November for the first time operated a "goods" train on a British main line, between Sudbury and Egginton.[94]

Since distances were short, no attempt was made to establish the normal staging system for troops arriving in the United Kingdom. By careful scheduling of troop trains (up to seventy per day) to meet convoys, worked out in advance by representatives of the British railways, Movement Control, and the Office of the Chief of Transportation, ETOUSA, troops could be marched directly from boatside to train and dispatched to their destinations without delay. The entire movement had to be highly synchronized because passenger cars were in short supply, normal civilian rail traffic had to be accommodated, and rail facilities at the ports were limited. RTO's at the port supervised the transfer of troops from portside to trains, and others along the route made arrangements for refreshment halts.

Supplies were moved under the same general system of control, with regional transportation officers working in close collaboration with British Movement Control. As with troop movements, the local RTO's were responsible for issuing the necessary shipping documents, notifications of departure, and so on.

As indicated earlier, the British railways were desperately short of locomotives, and in 1942 arranged for the shipment of 400 engines (known as Boleros) from the United States. These 2-8-0's were the equivalent of the British "Austerity" class engines. They had been designed in co-operation with the British, the principal consideration being simplicity of design and construction and the necessary ruggedness to stand up under combat conditions, since they were eventually intended to be used on the Continent. The first of these utility locomotives arrived with ceremony befitting their importance at Cardiff, Wales, in November 1942. The program was later extended, based on an estimate that some nine hundred locomotives would be needed on the Continent in the first six months of operations, and joint stockpiling of Boleros and British Austerities was begun. In 1943 the American-built engines began to arrive at the rate of about fifty per month.[95] A freight car building program was also undertaken. Large numbers of cars designed for use on the continental railways were shipped knocked down to save shipping space and were assembled in England, principally at the Hainault Railway Sheds and Siding, excellent shops constructed just before the war at Chigwell, Essex, a few miles northeast of London.[96]

Motor transport moved little cargo until the fall of 1943 mainly because of the difficulties of operating large trucks over rural roads and through the often narrow streets of English towns. By that time the flow of cargo swelled to proportions which the railways could not handle, and motor transport therefore came into increasing use, operating under the Motor Transport Division of the Transportation Corps and under the same regional control system as

[94] History of the TC, ETO, I, 7-8, 49; Troop and Supply Buildup, pp. 111-12, 119-24, 201.

[95] Memo, AACofT Plng for Col K. F. Hausauer, 8 Dec 43, sub: Locomotives and Port Battalion Requirements for BOLERO and ROUNDUP, SHAEF G-4 381 BOLERO I 44.

[96] History of the TC, ETO, I, 49-51.



U.S.-BUILT LOCOMOTIVES *stockpiled in Wales, above. Locomotives, tank cars, and freight cars are checked at an Army railway shop before being stockpiled for use on the Continent, below.*



was used in co-ordinating movement by rail. In the final eight months of the build-up, from October 1943 through May 1944, trucks of the Transportation Corps carried approximately 1,100,000 long tons (averaging 140,000 tons per month) or one third of all supplies cleared from the ports.[97]

Limitations of manpower, construction materials, and transportation facilities all influenced the type of depot system which the SOS was to have in the United Kingdom. Early SOS plans contemplated the establishment of two types of depots: one to store reserves to meet invasion requirements and sited with a view to outmovement to the Continent; the other to store maintenance supplies. This arrangement was soon found to be impracticable, and reserve and maintenance supplies were therefore stored in the same depots. Plans for base or wholesale and advance depots were also abandoned when it was found more desirable to route incoming supplies directly from ports to their ultimate destination. The only concession to the idea of wholesale depots for the purpose of segregating supplies was the expedient of the sorting shed, which prevented the clogging of ports.

Control of the U.S. depots in the United Kingdom was first vested in a General Depot Service under the theater G–4. This arrangement was short-lived, however, and in accordance with the trend to decentralize SOS operations the depots eventually came under the direct command of the base section commanders in whose particular area they were located. Planning storage requirements naturally took place at a higher level. The responsibility for consolidating the needs of all the services belonged to the chief quartermaster, and the task of providing the necessary space was that of the chief engineer. The chief quartermaster exercised staff supervision over all the general depots—that is, depots which stored and issued the supplies of more than one service. Branch depots, which handled the supplies of only one service, came under the technical supervision of the respective service chiefs.

To meet a variety of requirements, depot installations necessarily took a variety of forms, ranging from the general and branch depots to the large vehicle parks and special storage facilities for such items as petroleum and ammunition. Suitable storage space was almost always at a premium because of the lag in construction, the necessity of revising early estimates (a larger amount of covered storage was required because of the damp climate and poor packing of supplies), and the unsuitability of some of the facilities turned over for American use.

In the first flush of the BOLERO build-up in 1942 there was no time to construct new supply installations. The early needs of the U.S. forces were met by taking over British depots or various types of warehouses. The first installations were established in former commercial warehouses in Liverpool, Bristol, and London, and in existing depots at Barry, Thatcham, Portsmouth, and Ashchurch. The acres of newly constructed Nissen hut storage did not appear until the middle of 1943. As in the case of the ports, much of the warehousing turned over by the British was hard to adapt to modern storage methods. Materials-handling equipment was lacking, space was often poorly arranged, ceilings were too low, doors too narrow, and in many multistoried warehouses

[97] Troop and Supply Buildup, p. 204.



ROADSIDE STORAGE *of ammunition and vehicles in England.*



elevators were either in poor working order or nonexistent. Fairly typical of the facilities taken over in the first year was the fourteen-story Stanley Tobacco Warehouse in Liverpool, which became the site of Depot G–14 (the *G* indicating a general depot). Its elevators were old and slow, access to the loading bays was restricted, and all traffic was funneled down Dock Road, which also bordered Liverpool's miles of quays. A picturesque feature was provided by the widespread use of dray horses, which clattered up and down the main thoroughfare day after day with their wagonloads of supplies.

Finding enough civilian labor to aid in the operation of the depot was a perennial worry. The U.S. Army at first hired recklessly at American wage scales. British officials pointed out the serious consequences of such a policy and offered to provide workers under reciprocal aid payments. The return to British civil service rates naturally caused some bad feelings. The eventual arrangements for unskilled labor, such as dock gangs and warehousemen, have already been mentioned. Skilled workers, such as clerks and supervisors, were thereafter administered and paid by British Pay and Establishment Officers, although many British civilians at higher headquarters continued to be paid at American rates through the U.S. Army Finance Office.[98]

The problem of pilferage added to the irritants of G–14 in the early months and was a source of trouble at other depots as well. The Liverpool depot received large quantities of tempting items such as cigarettes, candy, towels, and canned food. In the confusion of 1942, when records were poor and guarding was inadequate, thefts of these commodities by both civilians and soldiers continued for several months. Investigations that followed the discovery of this situation in the fall of 1942 apparently did not solve the problem. In March of the following year General Somervell himself wrote to General Andrews, noting that he had had reports of losses of shocking dimensions through theft. The theater commander assured him that measures had been taken to reduce such losses to a minimum, and took the opportunity to point out that the trouble obviously was not all at the theater end, for investigation of some shipments had disclosed that pilferage had taken place before their arrival in the U.K. ports.[99]

G–14 at Liverpool was an example of the conversion of commercial facilities to meet the requirement for a general military depot. A more model installation could be seen in the depot turned over to the Americans at Ashchurch, only a few miles north of Cheltenham. Located in the heart of the Bristol Channel port area, and adjacent to the Birmingham-Bristol line of the London, Midland, and Scottish Railway, this installation became one of the key general depots of the SOS network. It had been recently built by the British and organized as a Royal Army Service Corps establishment, primarily as an automotive depot. In accordance with policies laid down in the BOLERO plan, the transfer of the Ashchurch installation was a gradual process. The first SOS units were attached in June 1942 to receive motor vehicles discharged at the ports. British troops were gradually replaced by U.S. units, and a few months later the command of the depot passed from the

[98] Healey Memoir, pp. 30–35.

[99] Ltr, Somervell to Andrews, 23 Mar 43, and Ltr, Andrews to Somervell, 6 Apr 43, ETO Adm 391 Andrews Correspondence; Healey Memoir, pp. 33–34.



GENERAL DEPOT AT ASHCHURCH, *above. Engineer construction materials stored at another depot, below.*



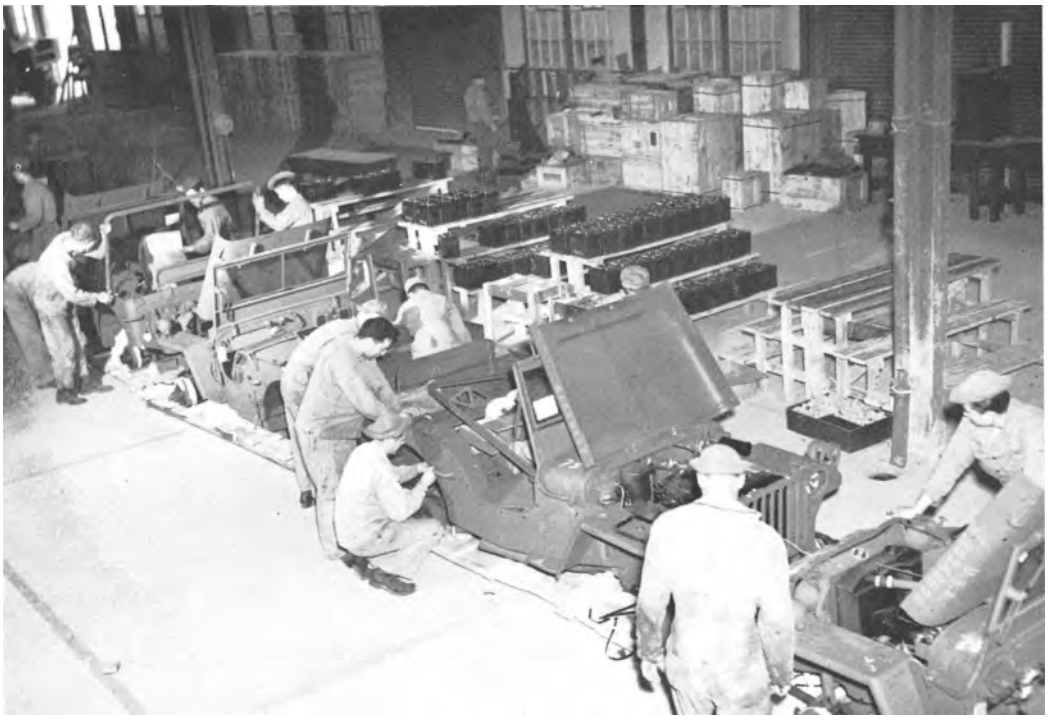
British to the Americans. In August 1942 the depot had a U.S. strength of slightly under 3,000 men and consisted of 158 permanent buildings, including 10 hangar-type and 5 smaller warehouses. Despite the capacity and size of the installation many improvements and additions were necessary. American troops at first had to live in bell tents at a site near the depot called Camp Northway, which was devoid of all normal comforts. U.S. engineers set to work immediately to build a hutted camp. Another project that received high priority—extending the network of rail spurs—eventually gave the depot an excellent system that provided rail access to about one third of the buildings and 90 percent of the open storage areas.[100]

The Ashchurch installation was a general depot, receiving, storing, and issuing equipment and supplies for five of the seven services—Ordnance, Quartermaster, Signal, Engineer, and Chemical Warfare. But its principal activities continued, as under British operation, to be in the field of ordnance supply, and all its commanders were either quartermaster or ordnance officers. The depot's Ordnance Section was responsible not only for the receipt, storage, and issue of ordnance general supplies, all types of general, special purpose, and combat vehicles and artillery, but also for fourth and fifth echelon maintenance of ordnance equipment. The latter responsibility required the establishment of a base shop capable of completely rebuilding all types of engines and heavy units. To meet this need a regular assembly line was organized. The General Motors schedule for this line called for a daily production of 80 engines, 40 transmissions, 40 transfer cases, 40 rear-axle assemblies, 40 front-axle assemblies, and varying capacities for about a dozen other minor assemblies such as starting motors and generators, although the "Little Detroit," as the base shop was called, for various reasons never achieved these output figures. Before D Day the shop reached its highest production rate in May 1944, when it turned out 854 engines.

Tire repair was another of the Ordnance Section's duties. The first tire repair company arrived in the United Kingdom in the summer of 1942. Lacking equipment and supplies, however, the unit was utilized for miscellaneous ordnance duties for many months, and could not begin the work for which it was trained until July 1943. After its facilities were expanded in the fall, the tire repair shop achieved a rate of more than 3,000 retreads and 6,000 section repairs per month. Just before D Day the two tire repair companies operated on a twenty-four-hour basis.

In 1943 the Ordnance Section at G–25 undertook another important task—vehicle assembly. Vehicles were shipped to the theater either wheeled, boxed, or cased. Wheeled vehicles were sent directly to parks and depots and, after a little servicing, were issued for use. Boxed vehicles came packed in one crate or box and required only the addition of wheels and minor assembly and servicing before issue. Cased vehicles, however, came either in twin unit packs (TUP), two vehicles in from one to five boxes, or single unit packs (SUP), one vehicle in one or two boxes, and required considerably more assembly work. General Motors and Studebaker 2½-ton trucks, for example, were shipped in TUP's, two vehicles in four cases;

[100] The description of G–25 is based on History of G–25, U.S. General Depot G–25 at Ashchurch, England, 11 July 1942–6 June 1944, prep by Hist Sec ETO, MS, ETO Adm 512.



JEEP ASSEMBLY LINE *at an ordnance depot, September 1943.*

Diamond T cargo trucks and wreckers and Dodge 1½-ton trucks were packed two vehicles in three cases; jeeps came in SUP's, one per box. Arrangements had been made with the British in 1942 to have civil contractors assemble all vehicles shipped under BOLERO program. By the summer of 1943, however, British plants had been able to achieve a rate of only slightly more than 4,000 assemblies per month, with no prospect of handling vehicles at the expected rate of import,[101] and the SOS therefore proceeded to establish its own assembly facilities. On 7 August the theater's chief ordnance officer instructed Col. Clarence W. Richmond, an ordnance officer who had assumed command of Depot G–25 only a few weeks before, to begin the assembly of vehicles by 16 August. The task of actually constructing the assembly lines fell to Maj. William R. Francis, commander of the 622d Ordnance Base Automotive Maintenance Battalion, which was then operating the base shop. Lacking units specifically trained in assembly work, lacking the proper tools, and having little information from higher headquarters, Major Francis, after a look at the British Austin Motor Works, nevertheless went ahead with plans. Assisted by M. Sgt. Leroy Beil, a shop foreman and mechanic, and by Pvt. George Phillips III, a time and motion expert formerly with the Bethlehem Steel Corporation, Major Francis succeeded in getting an assembly line built

[101] Min, Mtg of BOLERO Transport Sub-Committee, 5 Aug 43, ETO BOLERO File 43.

and in operation by his own battalion by 18 August. A second line was brought into operation three weeks later, employing a newly arrived heavy automotive maintenance company. Production was at first confined to seven General Motors models, and the assembly of additional types was undertaken later. In December the plant undertook the assembly of combat vehicles, artillery, and motorcycles, as well as general purpose wheeled vehicles. Before D Day the plant assembled 8,500 vehicles and 5,800 miscellaneous units such as trailers and antiaircraft guns. Its best day on the truck assembly line was 26 October 1943, when it turned out 128 General Motors 2½-ton trucks.

Something of the range and complexity of activities at G–25 is suggested by the fact that Ordnance alone handled more than 320,000 items of supply, ranging from tiny jewels for wrist watches to 10-ton wreckers. The formidable inventory and stock control problem was incalculably complicated in 1942 by a change-over to a different automotive parts identification scheme after the responsibility for supply and maintenance of motor vehicles was transferred from the Quartermaster Corps to the Ordnance Department. Coming in the midst of the hurried preparations for TORCH, the change created an almost hopeless confusion, necessitating as it did the retraining of thousands of supply personnel and civilian workers. The derangement within the depots plagued SOS supply personnel well into 1943. The accounting and inventorying practices of ETOUSA were a source of embarrassment for a long time and were the subject of more severe censure from the War Department than was any other shortcoming.[102]

With the acceleration of the BOLERO build-up in the summer of 1943 G–25 handled an increasing volume of supplies and stood out as one of the great general depots in the SOS structure. At the peak of its capacity the depot had 1,750,000 square feet of covered storage space and more than 2,000,000 square feet of open storage. It had a strength of over 10,000 men. G–25 employed a relatively small number of civilians—under 500—partly because of the location of the depot and the resultant shortage of skilled workers. Many of those who were employed at the depot had to be transported by U.S. Army buses from Cheltenham, Tewkesbury, and other nearby communities. Ordnance activities continued to dominate the business of the depot, although its duties were diversified. On 1 June 1944, 6,500 of the 10,000 men belonged to Ordnance units, of which there were a total of 43 companies organized under 8 battalions and 2 group headquarters. From a small beginning in 1942 the warehouse handling equipment of the Ordnance Service alone grew to include 32 cranes (up to twenty tons capacity), 64 fork lifts, 35 prime movers, and 38 tractors, and the service also supervised a pool of conveyors, 475 flat cars and auto trailers, and 5 narrow-gauge diesel locomotives. In the months just preceding the invasion the depot processed nearly 5,000 ordnance requisitions per week.

By the end of 1943 the SOS depot system comprised 18 general and 46 branch depots, in addition to 11 vehicle parks and 22 petroleum and 8 ammunition depots.[103] Vehicle parks, many of them

[102] Min of Conf, Washington, CG ASF and Chiefs of Supply and Adm Svcs, 7 May 43, USFET 337 Confs.

[103] SOS ETO Installations and Operating Personnel in United Kingdom, 1 Jan 44, ETO Adm 449.

established on the grounds of large British estates, with their row after row of tanks, armored cars, and trucks, gave a particularly impressive picture of massed might. Most of the depots likewise gave such an impression. But G–25 was one of the largest and had by that time become something of a model installation. Because of its proximity to Cheltenham it became the showplace of the SOS and was regularly placed on the itinerary of visiting dignitaries. In characteristic army fashion, work frequently came to a standstill and many man-hours were lost while brooms were wielded to prepare for "inspections" by high-ranking visitors.

(5) Command and Organizational Changes in 1943

The problem of developing an efficient logistical organization with a workable delineation of authority between the various staffs and command echelons continued throughout 1943. The initial attempt by the SOS to take over theater-wide supply and administrative functions had resulted in an unsatisfactory compromise with ETOUSA, providing for a division of responsibilities between the two headquarters, creating overlapping agencies, and permitting considerable wasted effort and confusion.[104]

The crux of the problem from the start was the position of the special staff and the split of the services between London and Cheltenham. The first attempted clarification of the relationship of the two staffs, shortly after General Eisenhower's assumption of command, was admittedly a makeshift arrangement and not intended as permanent. It solved nothing in the fundamental conflict for the simple reason that it did not give the SOS control of all theater supply and administration. Partly because of this unsatisfactory definition of relationships and powers, and partly because the SOS was split between Cheltenham and London, the hodgepodge of agencies, duplication of effort, and confusion continued.

Preoccupation with the TORCH preparations prevented a remedying of this unsatisfactory situation and allowed it to worsen. But once the North African operation was launched General Lee and his staff again took up the struggle to bring the SOS into what they conceived to be its proper relationship to ETOUSA—that is, to secure for it control of all theater supply and administration. In November 1942, on the basis of an analysis of the existing organization made by the head of his Progress Branch, General Lee proposed a reorganization which would have made him responsible for all supply and administrative functions in the theater and thus "free the Theater Commander of [these] details." The plan would have permitted the senior officers of the various services to continue on the theater staff, but proposed that they be under the direct command of the Commanding General, SOS, and that all but a few of the chief administrative officers, such as the adjutant general, inspector general, theater judge advocate, and provost marshal, also be stationed at the SOS headquarters. The theater staff flatly rejected Lee's proposal, asserting that there were certain responsibilities for administration, discipline, and training which the theater commander could not delegate.[105]

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[104] See above, Ch. I, Sec. 5, and Ch. II, Sec. 3.

[105] Organization and Command in the ETO, I, 194–97. The entire discussion of the organization and command problem is based on this monograph.

Nevertheless, the existing arrangement was recognized as defective and caused dissatisfaction in all quarters. The division of functions between ETOUSA and the SOS had its obvious disadvantages, which were accentuated by the physical separation of the two headquarters between London and Cheltenham. As an example, the over-all supervision of military police activities was the province of the provost marshal at ETOUSA; but the military police officers in the various districts were appointed by and were responsible to the SOS provost marshal. The question of jurisdiction became particularly involved in the matter of the issuance of directives on the regulation of highway traffic, since it involved the prerogatives of base section commanders, the chief of transportation, the military police, the SOS as a whole, and the theater.

There was an even more inherent danger in the separation of logistical planning for future operations from normal SOS operations, the one being carried out by the theater staff and the other by the SOS, for under this arrangement there was the strong possibility of repeating the error made in the preparations for TORCH, in which the SOS was largely left out of supply planning, although called on to execute logistical plans. The difficulties of operating under this arrangement became increasingly evident during the winter of 1942–43, and the service chiefs in particular realized the need for integrating functions and concentrating authority in one place. But while the need for reorganization was widely recognized, there was little agreement as to what the changes should be, probably because any fundamental alterations inevitably involved surrender of authority by one headquarters or another.

At the time General Lee's proposal was being considered at theater headquarters another plan for the organization of the theater was offered by Col. Royal B. Lord, an officer who then was assigned to the Office of the Chief Engineer. His proposal had the same objective—that is, to bring all supply and administrative functions under the control of the SOS—but would accomplish it in a somewhat different manner. Colonel Lord envisaged a division of the theater into three subtheaters, one for North African operations, one for air operations, and a combined SOS-Communications Zone. The salient feature of the scheme was the proposal that the theater commander's staff concentrate on operational planning, while the SOS-COMZ command take over all planning and operational aspects of supply and administration. While this plan does not appear to have been officially presented to the theater headquarters, it is worth mentioning at this point in view of the key positions in the SOS which its author was later to have, and in view of the fact that he subsequently was instrumental in bringing about a reorganization along the lines of the basic principle he advanced at this time.

Throughout these months the organizational problem was complicated by the fact that North Africa still came within the boundaries of the European theater. With the severance of the TORCH area in February 1943, North Africa no longer entered into these considerations, and the ETO once more resumed its independent development, although subordinate in importance to the more active theater of operations.

Within a month after General Andrews assumed command of the ETO General Lee submitted another plan for reorgan-

ization. Basically, it had the same objective as before, but it embodied a more radical change in proposing that the Commanding General, SOS, be designated Deputy Theater Commander for Supply and Administration and that the theater G–4 be placed under him. The proposal thus closely resembled British practice, wherein the theater commander's deputy exercised direct control of the lines of communication. This arrangement, General Lee asserted, would remedy one of the most serious defects of the existing setup, for it would permit the proper co-ordination of broad operational planning with logistical planning and operations by providing for "the proper presentation of the Air and Ground Force needs to the SOS," and by insuring "that the capabilities of the SOS are considered in the preparation of operational plans." [106] With the TORCH experience in his memory, General Lee was obviously concerned over the role of the SOS in future operational and logistical planning. His latest proposal was intended to insure that future planning would be properly co-ordinated, in addition to bringing all supply and administration under the control of the SOS. General Lee's plan was a significant landmark in the history of command and organization, for it presented for the first time the idea of a Deputy Theater Commander for Supply and Administration, which was eventually adopted, and also pointed up the fundamental issue of the ETOUSA G–4's position vis-à-vis that of the Commanding General, SOS.

General Andrews was not unaware of the faults in the existing organizational structure and indicated a willingness to see some changes brought about along the lines of concentrating more authority for supply and administration in the hands of the SOS. But he did not accept the proposal to name General Lee Deputy Theater Commander, nor the idea of placing the theater G–4 under him. General Andrews believed that the SOS commander already had sufficient authority to carry out his mission without being named Deputy Theater Commander; and he regarded the proposal with regard to the G–4 as administratively unsound, for it would have placed the chief of a general staff division at theater level under a subordinate headquarters and therefore in a very difficult position. General Andrews thought that it was necessary for the ETOUSA G–4 to guide the SOS "according to broad phases of theater and higher plans," and that the necessary co-ordination of logistical planning with the SOS could be accomplished through normal staff channels if the SOS and the ETOUSA G–4 maintained close liaison. To achieve better co-ordination he suggested rather that the chiefs of the services should move back to London and spend at least part of their time there.

The theater commander thus rejected the more radical innovations embodied in General Lee's proposal. But the discussions nevertheless led to certain improvements in the organizational structure. On 21 March theater headquarters redefined the whole ETOUSA-SOS relationship. General Order 16, which replaced General Order 19 of July 1942, reiterated the basic principle that the theater headquarters was the superior authority regarding the determination of policies, objectives, priorities, and the issuance of orders affecting two or more commands. Beyond this, it described the SOS as its instrumentality for administration and supply in the thea-

[106] Ltr, Lee to Andrews, 3 Mar 43, as quoted in Organization and Command, I, 201.

ter. The powers and responsibilities of the SOS were detailed in a separate letter of instructions. On the vital matter of the position of the administrative and supply chiefs, the order assigned all these to the SOS, with the exception of the inspector general, adjutant general, theater judge advocate, provost marshal, and a few miscellaneous agencies. As if to leave no doubt regarding the extent of the SOS's authority over these services, the order placed them under General Lee for "coordination, supervision, operational control, and direction," thus using the entire constellation of magical terms which were such favorites in the military jargon and subject to such frequent misinterpretation. The order also specified that Headquarters, SOS, and the chiefs of services were to be established in London, where the latter would be better available to the theater commander and his staff. In addition, the London Base Command, until then under ETOUSA, was turned over to the SOS for administration, and became Central Base Section. Its commander, Brig. Gen. Pleas B. Rogers, was also named Headquarters Commandant of ETOUSA.

The theater's new order by no means fully met the desires of the SOS. Certain of the administrative services still remained with the theater headquarters, against General Lee's wishes. But the difficult position of the technical service chiefs was considerably improved, for the system of maintaining senior representatives at theater headquarters was eliminated. Headquarters, SOS, and the chiefs of services now moved to London, where each service chief established a planning division, and an over-all SOS planning echelon was established. SOS planning was now carried out in London, close to the theater staff, while SOS operations continued to be handled from Cheltenham. This division of function in the SOS became permanent, and led to the appointment in April of Brig. Gen. William G. Weaver as deputy commander of the SOS in charge of operations.

The reorganization of March 1943 was undoubtedly a step in the direction desired by General Lee, although it did not completely resolve the conflict between the theater and SOS headquarters. The ETOUSA staff in general disapproved the SOS's pretentions to power and its insistence on a large general staff. General Lee had asked for one major general and twenty-nine brigadier generals for the SOS staff and base sections. The request did not sit well with the ETOUSA staff, and evoked an acrid remark about the "high pressure salesmanship" exerted by the SOS to provide general grades for its staff positions.[107] On the other hand, the SOS could not see why ETOUSA should retain any of the administrative services, and desired to bring the entire special staff under its control. One explanation for ETOUSA's tenacity in retaining certain purely administrative functions for itself was the fact that the theater's functions were still limited mainly to administration and supply. The ETO was not yet really a theater of "operations" in the sense that it was conducting combat operations (except for limited air operations), for the North African invasion was directed by an Allied organization; it was rather in a sense merely an extension of the zone of interior. In this relatively static situation there was consequently a tendency on the part of the ETOUSA staff to want control over administration and supply, the principal matters that concerned the theater at the time. Even planning for a cross-Channel

[107] Organization and Command, I, 212.

operation was still in an academic stage because of the remote prospects of actually carrying out a major invasion of the Continent.

The March reorganization also left unsettled the whole matter of the relationship of the SOS to the ETOUSA G–4. In General Lee's view, the theater G–4 duplicated functions which were rightfully the province of the SOS. General Andrews, however, held that logistical planning must be carried out at the same level as operational planning, and that a G–4 on his own staff was vitally necessary to co-ordinate all matters relative to administrative support for future operations. The result was that, in planning, the service chiefs were in effect under the direction of the theater G–4, and the SOS, although now controlling most of the special staff positions, was left with something less than the complete control of all aspects of supply and administration which it had sought. That the possibility for conflict was contained in this arrangement was immediately foreseen, for the G–4 would have to maintain the closest possible contact with the service chiefs of the SOS. To guard against any infringement of the authority of the Commanding General, SOS, ETOUSA therefore issued a memorandum cautioning its staff to observe the proper channels of communication and not to short-circuit the SOS commander in communicating with the chiefs of services. In the relationship between the theater general staff divisions and the SOS service chiefs the old problem of maintaining the distinction between "command" and "technical" matters thus took another form, with each headquarters guarding its own prerogatives.

The reorganization effected under General Order 16 was short-lived. To General Lee the position of the theater G–4 outside the SOS was an anomalous one and made impossible the accomplishment of his goal—complete integration of all supply and administration in the theater. What General Lee apparently desired was an organizational setup similar to that in the zone of interior, where General Somervell's ASF had also gained wide authority over matters of procurement, supply, and administration, and had all but absorbed the War Department G–4's functions. Efforts to secure a more acceptable organization therefore continued, and with the assumption of the theater command by General Devers in May General Lee made another attempt. This time he was more successful, for General Devers was more receptive to General Lee's proposals. On 27 May a new general order (33) was issued redefining the relationship between the SOS and ETOUSA. It resolved the problem of the theater G–4 by abolishing the position, the duties of the G–4 being assumed by the Commanding General, SOS. In addition, the SOS acquired control of still more of the administrative services, chiefly the Claims Commission, the newly created Area Petroleum Service, and the offices of the theater judge advocate and the provost marshal.

These changes strengthened the SOS immeasurably, combining the planning and operational functions of supply for the first time in one agency. They gave General Lee great satisfaction, and he later wrote that "this was the first constructive move towards the elimination of the separate theater staff and vested in the SOS complete supply responsibility for the theater." [108]

To accommodate itself to its enlarged functions the SOS now also underwent an

[108] Memo, Lee for Col S. L. A. Marshall, Theater Historian, 15 Oct 45, as cited in Organization and Command, I, 215.

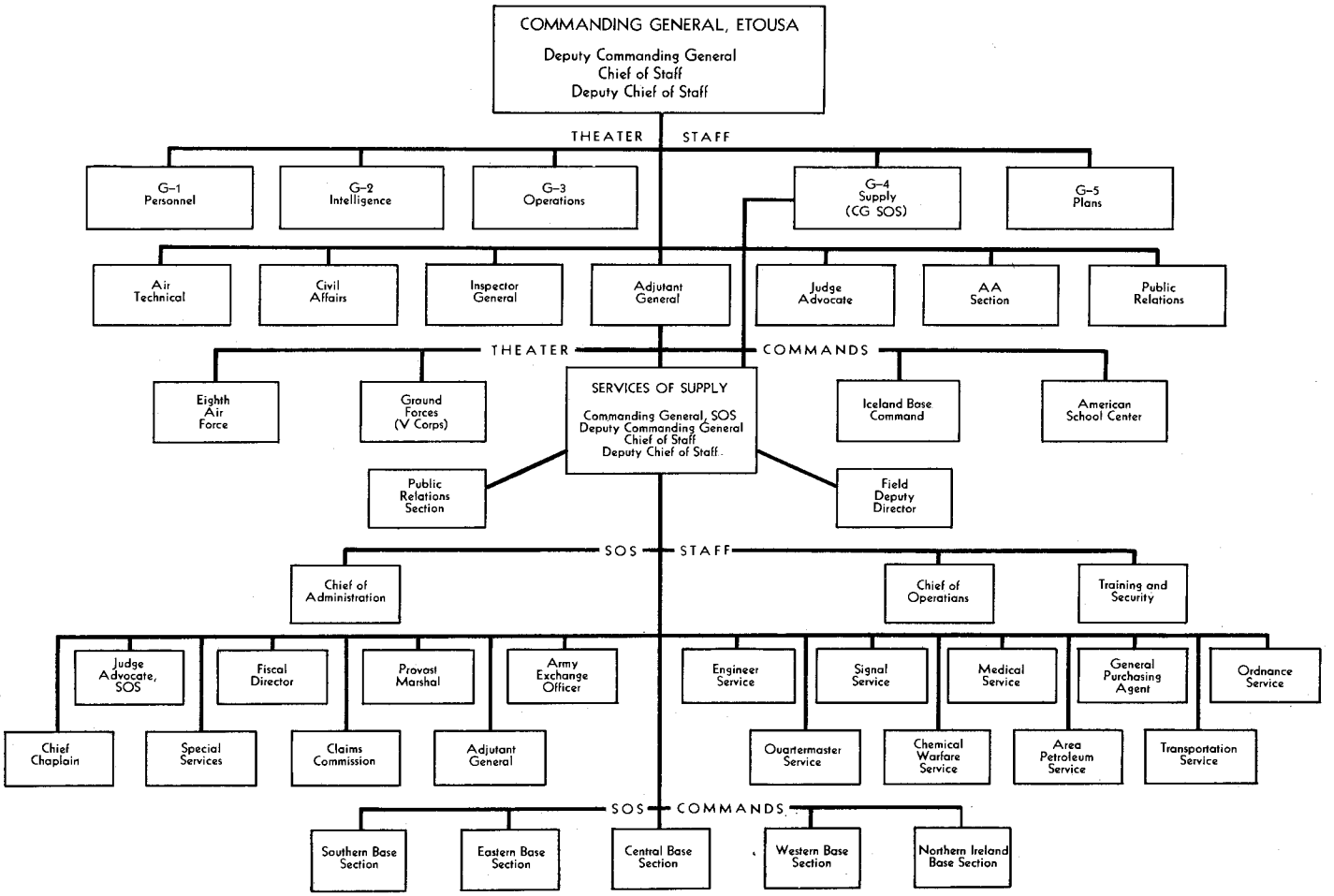
internal reorganization. The old general staff divisions were eliminated and the activities of the SOS were organized along functional lines. In place of the SOS G–4 a Chief of Services was now named, taking over all supply services in both their planning and operational aspects, and in place of the G–1 a Chief of Administration was designated to do the same with regard to the administrative services. A new Training and Security Division replaced the G–2 and G–3. The Chief of Administration, Col. Edgar B. Fell, had charge of all the administrative services now operating under the SOS, including the Claims Commission and the services of the judge advocate, army exchange officer, chief finance officer, special services officer, provost marshal, and chief chaplain. Colonel Lord became the Chief of Services, and took under his supervision all the supply services, plus the General Purchasing Agent and the Deputy Area Petroleum Officer. His office was the most important under the new arrangement, and was organized into three echelons to provide over-all supervision and co-ordination of supply planning and operations—one at Norfolk House, for planning with Allied planning agencies; one at Cheltenham for the supervision of supply operations; and one at SOS headquarters in London to exercise general over-all supervision. General Weaver, who had become General Lee's chief of staff, continued as deputy commander.

Within two months the SOS carried out still more internal changes. Certain inconsistencies already existed in the SOS personnel assignments as a result of the May reorganization. Colonels Fell and Lord were both junior to many of the officers serving under them, and Colonel Lord was for various reasons not acceptable to at least part of the staff,[109] although he had the complete confidence of the SOS commander. In view of the intensified preparations which would now certainly attend the revival of BOLERO and COSSAC's planning for cross-Channel attack, both General Styer, the ASF chief of staff who was in England in June, and General Devers recommended that another officer be brought to the ETO for a key role in the SOS. In accordance with their recommendations Maj. Gen. Robert W. Crawford, a senior officer destined to hold a high staff position in the Supreme Allied Headquarters, was ordered to England from the Middle East, where he had been in charge of supply activities. On 24 July he was appointed deputy commander of the SOS and Chief of Services, replacing both General Weaver and Colonel Lord in those positions.

Colonel Lord temporarily assumed the job of Deputy Chief of Services for Planning, and General Weaver retained only the position of chief of staff to General Lee. Once General Crawford had oriented himself on SOS operations, however, he established his office in London and concentrated his efforts on logistical planning, becoming chief of staff to Lee as well as deputy commander. General Weaver continued in charge of operations at Cheltenham and was now officially designated Field Deputy Commander. In the final shakedown of SOS staff assignments Colonel Lord ended up as Chief of Operations, a new name for the Chief of Services, in which position he was responsible for staff co-ordination of operations, while General Weaver, as Field Deputy Commander, exercised actual supervision over field operations, making inspections and co-ordi-

[109] Ltr, Styer to Somervell, early Jun 43, ASF, Somervell Files, CofS 42–43 (6).

Chart 4—ETOUSA and SOS Command and Organizational Structure, August 1943





GENERAL CRAWFORD *receiving the Distinguished Service Medal from General Devers.*

nating the activities of the base sections. Finally, Colonel Fell was replaced by Col. Earl S. Gruver, whom General Crawford had brought with him from the Middle East, and the office of the Chief of Administration was moved to London. The entire reorganization was formalized in a series of SOS general orders appearing between 19 and 25 August 1943. *(Chart 4)*

The chief effect of all this shuffling of assignments and titles was that General Crawford assumed the planning responsibility, thus taking over the function formerly held by the theater G–4, but now carried out within the SOS. With the CCS approval of the OVERLORD plan at Quebec in August, this aspect of SOS activities gained increasing importance, and the work of all echelons was intensified in the late summer and fall of 1943 with the greatly accelerated flow of American troops and supplies to the United Kingdom. As a result of the stepped-up tempo of planning for the cross-Channel operation there was a tendency to bring more and more of the SOS organization to London. Despite the division of SOS activities between two headquarters the system appears to have worked fairly well, and periodic staff conferences were held at both Cheltenham, attended by the base section commanders, and London. At one of these conferences, on 23 August, General Lee expressed considerable satisfaction with the new system. "For the first time," he stated, "an American Army has . . . what we regard as sound organization, bringing together the G–4 and SOS functions." [110]

Even this arrangement did not last. Early in October the chief innovation of the August reorganization was temporarily canceled when the position of G–4 at the theater level was restored and supply planning was shifted back from the SOS to ETOUSA. Partly because of a personality clash General Crawford left the SOS, having served less than two months as deputy and chief of staff to General Lee, and moved up to occupy the G–4 position on the theater commander's staff. While the channels of control were changed, however, the system seems to have functioned much as before. Moreover, the retransfer of the planning function was only temporary. In December General Crawford moved to COSSAC, which eventually was transformed into Supreme Headquarters, and with this change in assignment General Lee once more took over the duties of theater G–4. Several other changes in assignment were also

[110] Stf Conf Notes, SOS, 23 Aug 43, as cited in Organization and Command, I, 223.

made within Headquarters, SOS, the chief one being the appointment of Colonel Lord as chief of staff and deputy commander of the SOS. Colonel Lord thus became General Lee's right-hand man and an influential voice in all future activities of the SOS.

While the changes brought about in May and August 1943 undoubtedly represented an improvement in theater organization it was partially illusory. The modifications of August had never completely stopped the duplication of function or conflict over administrative matters between the SOS and ETOUSA, and relations between the two headquarters continued to be afflicted with trouble. Earlier in the year General Lee had been empowered to issue orders within the scope of his authority, using the familiar authentication "by order of the Theater Commander." In July the Eighth Air Force challenged this practice when the SOS published a circular charging the base section commanders with responsibility for control of all troops outside ports and camps and authorizing them to detail men from ground and air force commands to temporary military police duty. The Eighth Air Force contended that this was an infringement on its authority and raised the old issue of the right of a co-ordinate command to issue such orders. General Devers upheld the air force in this test of strength, asserting that commanders had no authority to issue orders in his name outside their own commands. The authority of the SOS to issue such orders was accordingly revoked, and the SOS's instructions were amended forbidding it to "infringe upon the command responsibilities of other major commanders." Henceforth, when the SOS found it necessary to issue instructions to co-ordinate commands (the Eighth Air Force and V Corps) which affected their command responsibilities, it was to submit these instructions to ETOUSA for approval and issuance. In accordance with this new procedure the circular which had offended the Eighth Air Force was therefore submitted to ETOUSA and republished word for word over the name of the theater commander.



GENERAL LORD, *Chief of Staff, SOS. (Photograph taken in 1944.)*

This affair demonstrated clearly that the SOS did not yet have the full authority which it thought it had acquired, and forcibly pointed up the vexing difficulties attending the attempt by a subordinate command to assume theater-wide supply and administrative functions. The SOS was obviously displeased with this curtailment of its authority and did not accept it without protest. Its thinking was reflected in a study of the whole SOS position writ-

ten by Col. Charles R. Landon, General Lee's adjutant general. Colonel Landon asserted that it was necessary that the SOS continue to issue instructions in its own name to the entire theater if it was not to be reduced to the position of a minor staff section of a huge G–4 office. He admitted the necessity of avoiding delicate matters which other commands might consider an infringement of their rights, but it would be intolerable to have the service chiefs, for example, in their theater capacity pass on recommendations from the office of their own superior, the Commanding General, SOS. Colonel Landon therefore recommended that the SOS continue to issue instructions within its province to the entire theater in the name of the Commanding General, SOS. This procedure was adopted, but it resulted only in an increase in the number of matters which had to be submitted to the theater staff for review, and therefore increased the duplication of effort in the two headquarters.[111]

The attempt to bring the supply and administrative activities of the entire theater under the control of one headquarters thus remained a dilemma which seemed to defy solution. In the fall of 1943 the preparations for OVERLORD, including the creation of a new Allied command, cast a new light on the entire problem of SOS-ETOUSA relations. The subsequent changes in the theater's command and organization were closely tied up with these developments, and the account of these changes is best postponed to a consideration of their relationship to the command developments on an Allied level.

In the course of the difficulties over its relationship with ETOUSA the SOS also made certain adjustments in connection with two other aspects of organization and command. One pertained to the development of its territorial organization, the base sections, and the other concerned its supply and administrative responsibilities to the Air Forces.

It will be recalled that in the original organization of the regional command system in the summer of 1942 the base section commanders had been granted fairly broad powers, although certain activities, such as transportation and the operation of the ports, had been exempted from their control. In general, the base section commanders possessed complete authority over activities confined to their own command, but were restricted in matters which were "interstate" or theater-wide in nature. The chiefs of services therefore possessed certain powers in addition to the "technical supervision" which they normally exercised in matters affecting their particular service, and supervised these activities through representatives who were members of the base section commanders' staffs.

This entire arrangement came up for review in October 1942, only two months after it had been established. The source of greatest dissatisfaction was the extent of the exempted activities. Base section commanders complained that the chiefs of services had encroached on their authority, especially with regard to the control of service troops. The whole problem was discussed at an SOS staff and command conference on 24 October, at which General Collins of the Northern Ireland Base Section was outspoken in his criticism of the system, asserting that the service chiefs had abused their powers and that it would have been impossible to operate in Northern Ireland if existing regulations had been carried out. Despite these complaints

[111] Organization and Command, I, 227–231A.

no basic change was made in the original division of responsibilities and authority at that time.

The solution of this basic conflict between functional and regional control was by no means clear, and the vague delineation of authority of the base section commanders and chiefs of services persisted for a long time. Colonel Weaver, then chief of staff to Lee, thought the difficulties could best be resolved by better co-operation between the two. He emphasized the obligation of the service chiefs to keep the base section commanders informed of their activities. He thought that the base section commanders would seldom find fault with anything the service chiefs tried to do on technical matters, but the base section commanders naturally resented being bypassed or kept in the dark about those activities. He therefore urged that the chiefs of services, so far as possible, issue their directives on technical matters through their representatives in the base sections; and a new SOS circular on 31 October admonished the service chiefs to keep the base section commanders "continually informed." [112] General Lee was a firm believer in the base section system and was desirous that it be made to work. Relations between the base section commanders and the service chiefs did in fact improve after this, although the exempted activities and "interference" by the service chiefs were a continued source of annoyance.

The year 1943 brought certain changes in both the territorial structure of the SOS and in the division of authority. Four base sections had been activated in the summer of 1942—Western, Southern, Eastern, and Northern Ireland. In 1943 the number was first reduced to three and then increased tc five, the situation in Northern Ireland accounting for most of the changes. After the TORCH operation, Northern Ireland became primarily an air force base, and most of the activities there were handled by the new VIII Air Force Composite Command. When V Corps moved to England, SOS activities in Northern Ireland were even further reduced, and in December 1942 Northern Ireland Base Section was therefore inactivited and the area was incorporated into Western Base Section as a district. The number of base sections in the United Kingdom was thus reduced to three. In the fall of 1943 Northern Ireland again became important as a troop concentration area as American units began to flow to the United Kingdom in large numbers. Northern Ireland Base Section was therefore re-created on 2 October 1943, and General Collins returned from Western Base Section to assume command. In the meantime another base section had been added when the London Base Command was turned over to the SOS in March 1943, as already mentioned. It was officially designated the Central Base Section on 29 April. With this addition and the re-creation of Northern Ireland Base Section the SOS therefore consisted of five base sections at the end of 1943: Southern Base Section (Colonel Thrasher); Western Base Section (Col. Harry B. Vaughan); Eastern Base Section (Col. Ewart G. Plank); Northern Ireland Base Section (General Collins); and London Base Section (General Rogers). *(See Map 2.)* [113]

[112] Stf Conf Notes, SOS ETO, 24 Oct and 16 Nov 42, and Cir 41, SOS, 31 Oct 42, as cited in Organization and Command, I, 119–21.

[113] Organization and Command, I, 231A–36, 238–39. The only boundary change occurred on 8 July 1943, when the Bristol Channel port area was established as a separate district and transferred from Southern Base Section to Western Base Section.

Important developments took place in 1943 toward the solution of the problem of the division of powers between the base section commanders and the chiefs of services. In the first six or eight months of operations there had been an increase in the number of exempted activities, which continued to be a thorn in the side of the base section commanders. Beginning in the spring of 1943 this trend was reversed. At the end of May the internal management of exempted activities was given to the base section commanders, and the service chiefs were left with only the normal technical controls. Three months later the system of exempted activities was officially ended, and the base section commanders were charged with responsibility for "all SOS operations" in their sections.[114] This development had the effect of removing the control of the service chiefs over their representatives on the base section staffs, since these officers had been responsible to the chiefs of services for exempted activities. Base section commanders were also given a more complete control of personnel assignments.

The result of these changes was to enhance considerably the powers of the base section commanders at the expense of the service chiefs. Base section commanders now possessed virtually complete control over personnel and depot operations. Each base section was a miniature SOS duplicating the organization at SOS headquarters, and the operating instrumentality of the SOS. Its functions included issuing supplies to all troops in the base section, providing complete hospitalization, policing the entire base section area, handling train and road movements in co-operation with British agencies, providing entertainment and recreational facilities, constructing the necessary accommodations, acquiring quarters, and receiving supplies and American troops through the ports. In the pyramidal structure of the SOS the base sections now operated substantially according to the principle which General Lee had enunciated—"centralized control and decentralized operation." The chiefs of services retained technical control of their services in the base sections, exercising this through their representatives on the section staffs. Since technical control was always subject to conflicting interpretation, however, service chiefs and base section commanders continued to complain about interference and infringements of authority. Thus, a fundamental conflict remained, and the comments which General Weaver—then a colonel—had made in October 1942 still applied. Co-operation between the base section commanders and the service chiefs was still the key to successful operations.[115]

The problem of the division of function within the structure of the SOS was in many ways duplicated in the SOS's relations with the Air Forces. The Air Forces from the very beginning of the theater's organization insisted that its supplies, because of their peculiar nature, receive special handling. An agreement had been reached in the summer of 1942 by which supplies and equipment common to all the services should be provided by the SOS. Supplies peculiar to the AAF, however, were to be handled by its own service organization, the VIII Air Force Service Command, and were to be requisitioned directly from the United States. Beyond this the Air Forces had also hoped to secure control over construction of all air-

[114] Cir 36, SOS, 30 May 43, and Cir 49, SOS, 24 Aug 43, Organization and Command, I, 240.

[115] Organization and Command, I, 240–46.

dromes, over local procurement of air force supplies, and over the handling of air force supplies at ports of debarkation. Against its wishes the responsibility for the construction of airdromes was assigned to the SOS, and the control of aviation engineer construction battalions also remained with the SOS. Local procurement was to be handled in the same way as for the other services, that is, Air Force requests would be cleared through the General Purchasing Agent. As far as discharge at the ports was concerned, the original agreement provided that the SOS control all port facilities, although AAF liaison officers were to supervise the handling of air force supplies. This proved unsatisfactory to the Air Forces, which claimed that the SOS was too slow in dispatching cargo, and the Air Forces soon established intransit depots at the ports to assure proper and expeditious handling of its supplies.

Actually, the Air Service Command wanted to establish its own independent supply pipeline all the way back to the zone of interior, and continued to fight toward this goal. Throughout 1943 the Air Forces urged increased control over its own supplies, charging the SOS with delays and with requiring too many justifications for Air Force requisitions. Early in 1944 an Air Service Command board, after studying the entire supply system, proposed that certain common supply items be furnished the Air Forces in bulk without detailed justification. This idea was rejected. But the SOS agreed that the existing system had faults and made certain concessions in the requisitioning procedure. These changes still did not meet the Air Forces' objections, and early in February the Air Force Service Command again asked that certain supplies be earmarked for the AAF before shipment from the United States. This would have established an independent supply line to the zone of interior for the Air Forces and was consistently opposed by the theater. Except for the earlier concessions, therefore, the supply procedure remained as before, to the dissatisfaction of the Air Forces. As in the controversy between the base section commanders and service chiefs, successful accomplishment called for a large measure of mutual understanding and co-operation.[116]

[116] *Ibid.*, I, 250–53.

PREPARING FOR CONTINENTAL INVASION

CHAPTER IV

The Inception of OVERLORD and Its Logistic Aspects

(1) Early Planning for Cross-Channel Operations

The plan by which Allied forces successfully launched a cross-Channel invasion and captured a lodgment on the European Continent eventually bore the name OVERLORD.[1] Planning for a return to the Continent was begun by the British shortly after their withdrawal from France in 1940. But the scope of such planning as could be undertaken in the next year or two was severely restricted by the meager resources available, and could hardly go beyond such limited-objective schemes as large-scale raids aimed at aiding the USSR by diverting enemy forces from eastern Europe, or plans for a rapid movement to the Continent to take advantage of the enemy's collapse. Plans for a return to the Continent in force had little practicality until the United States entered the war, and even then were long in coming to fruition.

The first major impetus to cross-Channel planning after U.S. entry into the war came with the approval of the Marshall Memorandum in London in April 1942.[2] Commanders of the ground, air, and naval services of both the British and U.S. forces in the United Kingdom started holding formal conferences on invasion plans the following month and set up both operational and administrative planning staffs to begin the study of tactical and logistic problems involved in a cross-Channel operation. As already indicated, the plan for a full-scale cross-Channel invasion was at first referred to as ROUNDUP, the name which the British had already used to designate earlier plans for a continental operation. As envisaged in 1942, ROUNDUP called for landings on a wide front between Boulogne and Le Havre in the following spring.

ROUNDUP planning had hardly been initiated when the decision was made to invade North Africa, and as the preparations for the North African landings progressed that summer it became obvious that offensive operations in northwest Europe in 1942 were out of the question, since all available forces and equipment were committed to TORCH. In fact, the ROUNDUP planners foresaw little possibility of a major operation against the Continent even in 1943, and outlined their proposed planning with only limited ob-

[1] The code name OVERLORD eventually came to apply only to the general concept of a cross-Channel invasion in 1944. For security reasons an additional code name, NEPTUNE, was adopted early in 1944 to refer to the specific operation, and involved a special security procedure known as BIGOT.

[2] See above, Ch. II, Sec. 1.

jectives in mind for that year—raids to provoke air battles, capture of a lodgment or a beachhead preliminary to possible exploiting operations (in the Cotentin, for example), and a return to the Continent to take advantage of German disintegration. It was important, nevertheless, that planning continue for large-scale operations against the Continent in 1944.

For this purpose the ROUNDUP plan continued to be used as a basis for administrative planning, since it was realized that the logistic preparations for such an operation would be tremendous, and would have to be developed far in advance of the detailed operational planning.[3] The ROUNDUP planning staffs were to a large extent sponsored and guided by the British, although their numerous subcommittees contained both American and British representatives. They had no permanently assigned staff with the exception of a secretariat. The various committees met as the need arose and published their plans and proceedings in a series of reports. On the national level, planning in ETOUSA headquarters was initially the responsibility of the G–3. The special staff sections of theater headquarters in London at first did nearly all of the logistical planning for invasion. The SOS was little concerned with this planning in 1942, for it was not originally assigned such responsibilities by higher headquarters. Moreover, it lacked a strong agency on the general staff level to guide over-all planning, and its planning activities were limited by the preoccupation with current service of supply operations in the United Kingdom, and by a shortage of planning personnel. Among the unfortunate circumstances was the persistent lack of an official troop forecast, always considered essential to proper planning.[4] Nevertheless, the ROUNDUP staffs continued planning for operations in northwest Europe throughout the fall and winter of 1942, although mainly with limited objectives in mind. They accomplished a great amount of spadework and assembled invaluable information relating to a cross-Channel attack.

At the Casablanca Conference in January 1943 the Combined Chiefs of Staff were occupied in the European area primarily with operations in the Mediterranean in 1943.[5] Because of the demands of TORCH, plans for an all-out cross-Channel operation remained outside the scope of practicality for 1943. Allied fortunes had taken a decided turn for the better, however, and the Combined Chiefs at that time made a decision which proved tremendously reassuring to the future prospects for cross-Channel invasion. They agreed that a combined staff of British and American officers should be organized, preferably under a Supreme Commander, but if such an appointment was not immediately feasible, under a chief of staff, in order to give the necessary impetus and cohesion to planning for future operations. The mission of this staff was to include planning for "an invasion in force in 1944."[6]

The reference to planning for large-scale operations on the Continent in 1944 occupied little space in the minutes of the Casablanca meetings. But the decision to

[3] Combined Commanders Papers (42) 82, 3 Oct 42, Annex 1, OPD.

[4] Organization and Functions of the Communications Zone, Gen Bd Rpt 127, p. 3, OCMH.

[5] CCS 170/2, 23 Jan 43, Rpt by CCS to President and Prime Minister, SYMBOL Conf, SHAEF SGS, SYMBOL Conf 337/5.

[6] *Ibid.*; CCS 169, Proposed Organization of Command, Control, Planning, etc., 22 Jan 43; CCS Min, 67th Mtg, 22 Jan 43.

create a planning organization was implemented within the next few months. Late in April 1943 the British Chiefs of Staff issued the directive establishing the combined staff under General Morgan with the title Chief of Staff to the Supreme Allied Commander (Designate). An American, Brig. Gen. Ray W. Barker, was appointed as his deputy. The staff which General Morgan gathered around him came to be known as COSSAC, from the abbreviation of his title.

The acceleration of planning which now took place at the Allied level was also reflected on the national level. The SOS established a planning echelon in London to maintain close contact with higher headquarters, and the chiefs of the principal technical services thenceforth divided their time between London and Cheltenham. Planning was at this time transferred from the G–3 Section, ETOUSA, to a newly organized G–5 Plans Section, headed by General Barker. This new general staff section was charged with the co-ordination of all U.S. planning, both operational and administrative. Its main preoccupation, however, was planning at the Allied level, and the G–5 Section was for all practical purposes the U.S. component of COSSAC.[7]

COSSAC was assigned several missions. It was to evolve deception plans to keep alive the expectation that an attack was imminent in 1943 and thus pin down German forces in the west; it was to plan for a return to the Continent in the event of German disintegration. But its principal mission proved to be the creation of a plan for "a full scale assault against the Continent in 1944." [8]

First of all, the COSSAC planners had to determine precisely what resources the Allies would have available in the United Kingdom for operations against the Continent. To get such figures the COSSAC staff presented estimates of the needs for an invasion at the Washington (TRIDENT) Conference in May. The proper size of the assault force was a much-discussed subject and one on which no final conclusions could be reached at that time. Allied resources at the moment, and even the resources estimated to be available at a later date, were appallingly meager for the type of operation envisaged. The Combined Chiefs of Staff nevertheless gave tentative approval to the idea of an invasion in northwest France in 1944 and provided the planners with the first estimates to work with in formulating a more detailed plan. Uncertainty as to the availability of landing craft was already casting its shadow over all operational planning.[9]

Late in June a five-day conference (known as RATTLE) was held in Scotland to consider the many problems of cross-Channel invasion. It was presided over by Vice Admiral Lord Louis Mountbatten, Chief of Combined Operations (British), and attended by COSSAC members and the commanders of the principal Allied forces in the United Kingdom. Detailed discussions were held on such subjects as suitable assault areas, weapons, tactics, and enemy defenses. General Morgan had already drawn up an outline plan for cross-Channel invasion and presented it to the 21 Army Group commander, the Air Officer Commanding-in-Chief (Designate) of the Allied Expeditionary Air Force, the Naval C-in-C (Designate), and the Commanding General, ETOUSA, for

[7] Organization and Functions of the Communications Zone, p. 3; Logistical Buildup in the British Isles, Gen Bd Rpt 128, pp. 11–13, OCMH.

[8] COSSAC (43) Min of Stf Conf, 1st Mtg, Annex II, 17 Apr 43, SHAEF SGS.

[9] COSSAC Papers (43) 13, 28 May 43.

their consideration.[10] In July COSSAC prepared a digest of its plan, which received the approval of the British Chiefs of Staff. In the following month it was presented to President Roosevelt and Prime Minister Churchill and the Combined Chiefs of Staff at the Quebec (QUADRANT) Conference. There the OVERLORD plan was definitely accepted as the principal U.S.-British effort against Germany in 1944. In some respects the outline plan or digest presented at Quebec was more properly a staff study and was so regarded by the planners. Not until after the Cairo (SEXTANT) Conference in November–December 1943 did General Morgan feel confident enough about the future of the operation to emphasize to his staff that there was now at last a firm determination that the operation would take place at the agreed date. OVERLORD and ANVIL (the supporting operation to be launched in southern France) were to be the supreme operations for 1944. "Nothing," it was emphasized, "must be undertaken in any other part of the world which hazards the success of these two operations. . . ."[11] While the detailed planning still remained to be done, and while there still were many unanswered questions, particularly regarding the scale of the assault and the availability of the means, the plan that COSSAC presented at Quebec in August 1943, refined and amended in the next nine months, was the plan finally executed as Operation OVERLORD in June 1944.

(2) Logistic Considerations in the Evolution of the OVERLORD Plan

The continental operations of 1944–45 have frequently been referred to as a battle of logistics—a contest between the industrial capacities of the Allies and the war-organized economy of Nazi-dominated Europe. The purpose of the cross-Channel operation itself suggested the vital role which logistics was to have in the course of the battle: the object of OVERLORD, in the words of the plan itself, was to "secure a lodgment on the Continent from which further offensive operations can be developed."

The objective of the OVERLORD operation was not to bring about the defeat of the enemy in northwest Europe, but to seize and develop an administrative base from which future offensive operations could be launched. The OVERLORD plan did not even contemplate a decisive battle west of the Seine. Its objective was a limited one, therefore, determined by the essential logistic consideration that the Allies would require an administrative base with all the facilities, such as ports, depots, and transportation, necessary for the build-up and support of forces on the scale required for subsequent offensive operations.

For U.S. forces the preparation for such an operation entailed, first, transferring a huge force and its equipment to the British Isles across a submarine-infested sea route, and, second, funneling this force, against determined enemy opposition, into a narrow beachhead on the Continent, and adequately maintaining it. By the summer of 1943 the first of these tasks was finally well under way.

Once the decision was firm that an all-out invasion of the Continent should be made, two problems of overriding importance faced the planners: (1) determining the scale of the initial assult; (2) pro-

[10] COSSAC (43) 9th Rpt, 16 Jun 43.

[11] COSSAC (43) Min of Stf Confs, 38th Mtg, 17 Dec 43; COSSAC Papers (43) 88, Decisions at SEXTANT Conf, 9 Dec 43.

viding an adequate build-up and maintenance. That these fundamental logistic considerations weighed heavily is evidenced in the earliest discussions. The second problem—that of an adequate build-up and maintenance—soon resolved itself into the problem of choosing an assault area. The ROUNDUP planners had emphasized from the start that the first phase of operations would be devoted to securing a lodgment area, the essential feature of which had to be sufficient discharge capacity—that is, facilities for the reception of personnel, vehicles, and supplies. The primary need, therefore, was port facilities. Indeed, one of the first estimates and drafts of the OVERLORD plan prepared by the Principal Staff Officers of COSSAC in June 1943 gave as the mission of the operation the securing of a lodgment on the northwest coast of France "in order to gain sufficient deepwater ports to accommodate the landing of large forces from the U.S." [12] This estimate was strengthened by the conviction that German defense policy was based on holding the coast line and, above all, the major ports, at all costs. The enemy appreciated that, if all major ports could be denied to the Allies, the already difficult task of building up and maintaining forces able to defeat armies backed by an excellent road and rail system would become impossible.[13] In any assault on the Continent it was essential that the Allied rate of build-up should match or exceed the rate at which the enemy could bring up reserves.

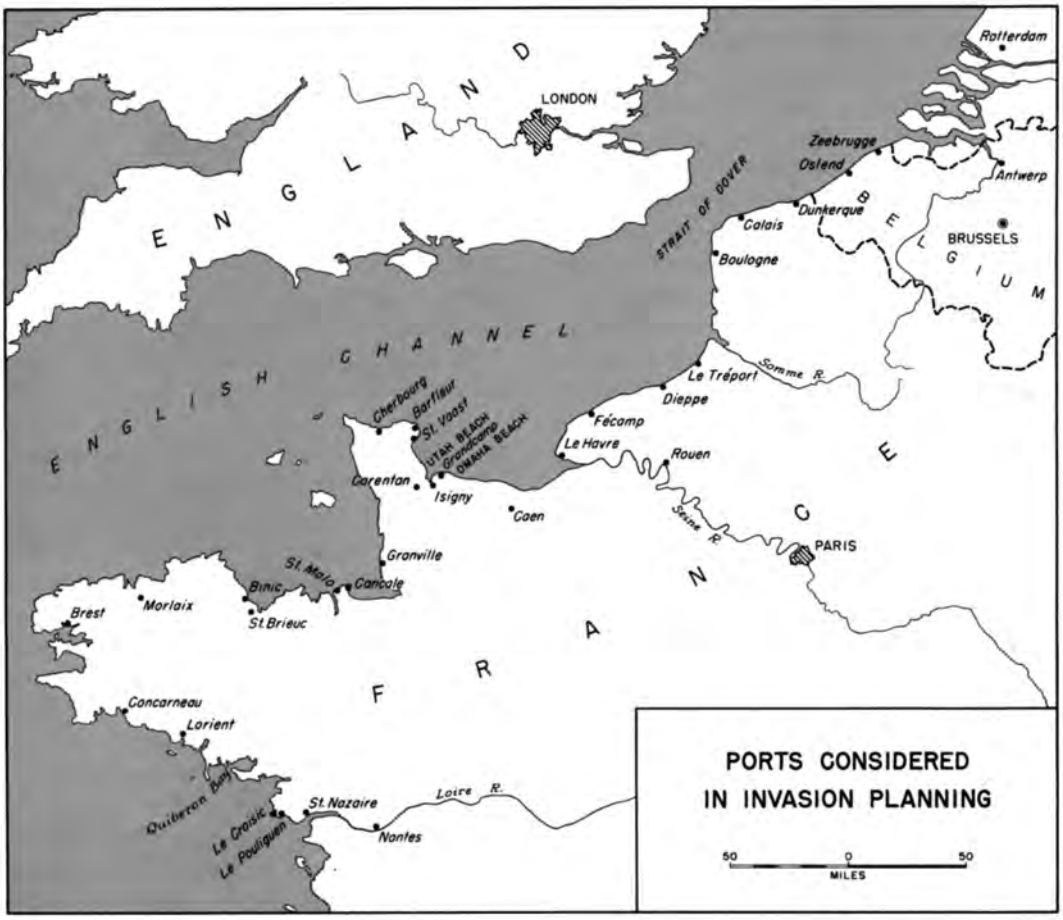
Selection of an assault area had been the main planning consideration all through the winter of 1942–43, and port capacities were almost invariably the starting point for the discussion of any area. For purposes of study the planners normally divided the coast of northwest Europe into "port group" areas. The designation and boundaries of these groups varied somewhat, but in general there were five: the Belgian group (Dunkerque–Antwerp), the Pas de Calais group (Boulogne–Calais), the North Seine (Dieppe–Le Havre–Rouen), the Cherbourg or Norman (Caen–Granville), and the Brittany group (St. Malo–Nantes). *(Map 4)*

The ROUNDUP plans of 1942 were generally based on an assault on a wide front, extending roughly from Calais to Le Havre, with an additional landing west of the Seine, and the possibility of an assault on the Cotentin Peninsula. Late in the year there was a noticeable shifting away from these plans for multiple assaults toward the idea of a more concentrated attack on a narrower front.[14] It was argued that if the assault was made in two or more widely separated areas simultaneously or on a particularly wide front, German reserves would be in action even more quickly. A larger number of routes would be available to them and there would probably be some reserves close behind each assault area. A faster Allied rate of build-up would be required. An assault on a narrower front was therefore preferable. Reinforcing this conclusion at the time was the belief that, even if unlimited landing craft were available, the capacity of ports and loading points on the south coast of England would restrict the size of the force which could be embarked and sailed on any one day.

[12] COSSAC Papers (43) 22, PSO's Draft, 22 Jun 43, Operation OVERLORD, Estimate of the Situation (British appreciation).

[13] *Ibid.*, Annex B.

[14] See stf studies, sub: Notes on Factors Affecting Selection of Assault Areas and Method of Attack in a Major Opn in Northwest Europe, Dec 42 to Feb 43, SHAEF G-3 370-43, Opn OVERLORD Main Appreciation, Dec 42, with comments.



MAP 4

An examination of the discharge capacities of each port group revealed that no group or combination of groups could maintain large forces when ports were first opened, and that a large number of ports would be required after thirty days' development, even if they could all be captured simultaneously. After three months, however, it was estimated that any two adjacent groups would meet the needs of a large force, and that the Brittany group alone might suffice for a smaller force.

Assuming that the operation was to be carried out by a large force, the planners concluded that two groups of ports were required. The Normandy (or Cherbourg) and North Seine groups together possessed the maximum capacity in the least number of ports. The Normandy and Brittany groups together had a larger total capacity, but were considered to be less economical to develop. The other two groups—the Pas de Calais and Belgian—figured less favorably in the considerations primarily

because they constituted the very pivot of the enemy defense system. It followed therefore that of the possible combinations the Normandy–North Seine and the Normandy–Brittany groups were preferred. Since the Normandy group was common to both these combinations it was evident that if the Allies captured that area they could later choose between attacking either of the others. These considerations constituted a powerful argument for the choice of the Normandy coast for the assault.

An important additional determinant in the selection of an assault area was the need for suitable beaches. The Combined Commanders' studies had shown that the required forces could not be maintained entirely through ports until approximately D plus 90 and that some maintenance would have to be carried out over the beaches throughout the first three months, supplemented when possible by air supply. The selection of the main assault area therefore depended as much on the characteristics of the beaches as on proximity to a group of ports. This would be the case, it was felt, even if the landings were unopposed, for the enemy was certain to demolish the ports before withdrawing.

Several factors had to be kept in mind in the search for suitable beaches. Of paramount importance was their capacity to accept and pass vehicles inland, for it would be necessary to put the force ashore at a rapid rate. To meet this prerequisite they had to be sheltered from prevailing winds and have sufficient width. Of varying importance were such features as the gradient, the tide range, the beach exits, and the terrain overlooking them. With these requirements in mind the planners concluded that the most favorable beaches lay in the Caen sector of the Normandy area. There the beaches were of large capacity and sheltered against westerly and southwesterly winds, permitting a large force to be put ashore rapidly and maintained over them.

The possession of beaches did not eliminate the necessity of opening a port quickly. No fully equipped force could achieve real mobility for more than a limited period while maintained solely over beaches. Furthermore, the bulk of the vehicles and stores would require a quayside for discharge if landing craft were limited in number and the larger Liberty ships had to be used. Consequently it was felt to be imperative that one major port be captured quickly. The only port of any importance in the Normandy area was Cherbourg, and to facilitate its capture the planners recommended that an assault in the Caen area should be extended to the eastern beaches of the Cotentin peninsula. A decision would later be necessary on whether to take the Seine or the Brittany ports.

These were by no means the exclusive considerations in the selection of an assault area. The enemy's beach and coastal defenses, his probable rate of reinforcement, the feasibility of providing fighter cover in the assault area and of opening airfields in the beachhead, inland terrain and communications, and the naval problem—all figured in the study of possible landing areas. But the problems of logistic support occupied a pre-eminent place in every discussion.

The logistic problems of a cross-Channel invasion held continuing prominence in the 1943 planning. While considering the possibilities of carrying out a limited bridgehead operation against the Cotentin in 1943, or the chance of exploiting such an operation, the British Joint Planning

Staff emphasized at the Casablanca Conference in January that success hinged largely on the possibility of augmenting the limited port capacity of Cherbourg by the capture of additional facilities so that adequate forces and supply reserves could be built up. Even if German opposition was negligible, it noted, progress would be slow owing to the Allies' limited resources in vehicle-carrying craft suitable for landing over beaches.[15]

The problem of continental discharge was again underscored after COSSAC took over the study of invasion problems in April 1943. In a memorandum to the British Chiefs of Staff General Morgan reiterated the argument that, in any amphibious operation against opposition, the rate at which Allied forces could be built up after the initial assault must play a decisive part in the outcome. In the special case of a cross-Channel operation this would depend mainly on the volume of supplies and equipment, especially vehicles, that could be landed from LST's and LCT's.[16] Full use of these specialized ships and craft could be made only if adequate facilities existed for unloading them on the French coast. General Morgan was not satisfied that the berthing facilities on the far shore were adequate, observing that if the beaching of landing craft was relied on until ports were captured and put into use the turn-round period would be considerably longer than necessary, and ships would be unnecessarily exposed to attack. Furthermore, the whole operation would be excessively dependent on favorable weather. In June General Morgan asked his administrative planners to re-examine the problem with a view toward augmenting port capacities by the use of floating piers and other equipment at the beaches. He also mentioned the possibility of creating sheltered anchorages.[17] These were details, he noted, "on which the result of the entire operation in 1944 may turn."[18]

The whole problem came into prominence at the end of June at the RATTLE Conference, at which Commodore John Hughes-Hallett, chief naval planner on the COSSAC staff, proposed that the Allies prefabricate their own ports and tow them to the far shore. Preliminary experimentation along these lines had already been undertaken by the Chief of Combined Operations, the Director of Transportation, and the Admiralty, and the concept of artificial ports as they later developed gradually began to crystallize. The RATTLE conferees recognized the need of detailing one officer to co-ordinate the planning for this project,[19] and COSSAC made such a recommendation after the conclusion of the conference.[20]

The findings and conclusions of the planners finally found formal expression in the outline or digest of the OVERLORD plan presented by COSSAC representatives to the Combined Chiefs at Quebec in August. In general the plan echoed the results of the previous months' planning with respect to the choice of an assault area, the importance of the availability of sufficient landing ships and craft, and the capacities of beaches and ports in the lodgment area. Among its conclusions

[15] CCS 167, 22 Jan 43, SYMBOL Conf, Rpt by British Joint Plng Stf on Continental Opns in 1943.

[16] Landing Ships, Tank, and Landing Craft, Tank.

[17] COSSAC (43), 11th Rpt, 26 Jun 43.

[18] Memo, COSSAC for COS Com, sub: Disembarkation Facilities on Continental Beaches, COSSAC (43) 18, Draft and Final Copies, SHAEF SGS 800.1 MULBERRY I.

[19] COSSAC (43), COSSAC Stf Conf, 13th Mtg, 2 Jul 43.

[20] Min, PSO Com Mtg, 5 Jul 43; COSSAC (43) 12th Mtg, 6 Jul 43, SHAEF G-4 825.1 MULBERRY I 44.

concerning the main conditions affecting the success of the operation it noted that the provision of sheltered waters by artificial means and of special berthing facilities were matters of paramount importance.[21]

The plan provided for assault landings by three divisions over the Normandy beaches in the vicinity of Caen. Airborne forces were to seize that city with the line Grandcamp–Bayeux–Caen as the D-Day objective. After the beachhead gained sufficient depth and additional troops became available, Allied forces were to execute a turning movement into the Cotentin to capture the major part of Cherbourg. The magnitude of the logistic problem was indicated by the calculation that eighteen divisions would have to be maintained over beaches during the first month of operation, and twelve during the second month, while every captured port, large and small, was being used. The construction of two prefabricated ports (known as MULBERRIES) eventually became a key feature of the final OVERLORD plan.

The planners had also come to a tentative conclusion about subsequent operations to obtain an additional group of ports. They anticipated that after the capture of Cherbourg the Supreme Commander probably would have to make a choice between the Seine ports and the Brittany group as the next major objective. Much would depend on where the enemy concentrated his strength in reaction to the initial landings. Driving east to the Seine ports was regarded as a more ambitious undertaking and an unlikely choice, for it would necessitate forcing the line of the Seine, capturing Paris, and advancing as far as the Somme River in order to cover the development of the Seine ports. To make this attempt prematurely with relatively small resources would be to run the risk of defeat. It was more likely that the Supreme Commander would find it necessary to capture the Brittany and Loire ports first. The latter course would open up sufficient port facilities and permit a build-up of forces, adequately maintained, in preparation for capturing Paris and forcing a passage of the Seine. The successive steps after the initial assault would therefore be to capture Cherbourg, then to drive the enemy as rapidly as possible far enough eastward to secure the left flank of the beachhead, and under this cover to seize the Brittany peninsula.[22] This course would make the most economic use of Allied resources. It was important, the planners added, that the Allied forces not outrun their lines of communication, and it was anticipated that after capturing the lodgment they would be forced to halt or limit their operation eastward in order that the lines of communications could be properly established, additional airfields could be restored or built, and considerable quantities of engineer materials sent forward.

Equal in importance to the problem of a rapid build-up and adequate maintenance was the matter of the scale of the assault. Misgivings over the inadequacy of the force were expressed initially at the Quebec Conference in August. Prime Minister Churchill asserted that the scale of the assault was too small and should be strengthened.[23] Whether he meant by this augmenting the assault waves or the total force lifted was not at first clear. At any rate, any attempt to enlarge the invasion

[21] Opn OVERLORD, Rpt and Appreciation, Jul 43, SHAEF 381, OVERLORD I (a).

[22] Opn OVERLORD Plan, COSSAC (43) 28, 15 Jul 43.

[23] COSSAC (43) Min of Stf Conf, 23d Mtg, 30 Aug 43.

force had to contend with the most persistent limiting factor of the entire war—the shortage of landing craft. This problem had come into sharp focus when the COSSAC staff attempted to formulate detailed plans for the size of the assault and build-up forces for OVERLORD. General Morgan had found that barely enough craft would be provided to mount the three assault divisions properly, and that the immediate follow-up force would be most inadequately loaded. He was seriously concerned over a dangerous gap on D plus 1 because of the nonavailability of landing craft and the impossibility of combat loading in normal shipping. The hazards of an inadequate follow-up had been demonstrated at Salerno. He felt that there was already "too high a proportion of our goods in the shop window," and that there was no provision for a floating reserve formation in the real sense of the term. General Morgan's proposed solution therefore was to strengthen the follow-up ("stocking the back premises" he called it) rather than the assault, and he presented figures on the additional craft needed.[24] For several months, however, the COSSAC planners were unable to obtain specific commitments as to the resources which would be made available. Late in September General Morgan complained that the CCS directive placed at his disposal a quantity of landing craft which bore little or no relation to the actual requirements of the proposed operation.

Late in the year the OVERLORD plan was subjected to additional scrutiny by Generals Eisenhower and Montgomery, the newly designated Supreme Commander and ground force commander for OVERLORD respectively. Both were dissatisfied with the proposed scale of the assault, and at the Supreme Commander's conference on 21 January 1944 General Montgomery pressed for an attack on a wider front. In addition to tactical reasons, there was the all-important need for the early capture of the port of Cherbourg. In considering the approaches to Cherbourg the 21 Army Group commander pointed out that under the currently proposed scheme the marshes and rivers at the base of the Cotentin provided a natural defensive barrier which would undoubtedly delay the drive on the port. It followed that a plan to capture Cherbourg quickly must provide for a landing on the northern side of the barrier (the Douve River). For this reason the area of assault should be extended to include additional beaches on the east Cotentin. It was desirable to widen the landing front for the additional reason that the beachhead was likely to become badly congested. The strongest arguments against this proposed change were put forward by the Allied Naval Commander-in-Chief, Admiral Sir Bertram H. Ramsay, who feared that strengthening the assault would lead to serious congestion in the southern English ports and would also put a heavy tax on naval resources.[25] General Eisenhower had already come to the same conclusions as Montgomery, however, and immediately recommended to the Combined Chiefs an extension of the front and an increase in the assault force from three divisions to five.[26]

Broadening the attack only created additional demands for shipping, and thus

[24] COSSAC Papers (43) 57 (Final), 30 Sep 43, sub: Supply of Landing Craft for Opn OVERLORD.

[25] Min, Supreme Comdr's Conf, 21 Jan 44, SHAEF SGS 337/11.

[26] Cbl, Eisenhower to CCS, 23 Jan 44, SHAEF 381 BIGOT, OVERLORD-ANVIL.

further aggravated the already chronic shortage in landing craft. Allied planners now estimated that an additional 231 ships and craft would be required to permit the desired widening and enlargement of the assault. The extra shipping could be made available in three ways: cutting down the scales of vehicles carried in the assault and follow-up to provide lift for additional units; postponing the target date one month to allow for additional production; and drawing shipping from the Mediterranean or other sources.

The enlargement of the assault had its most profound impact on plans for launching the ANVIL operation from the south, planning for which was already under way. Since the supply of landing craft was critical in all theaters, and requirements had been figured closely for all needs, it was likely that any appreciable increase in lift for OVERLORD would have to be made at the expense of the southern France operation. ANVIL was designed primarily to assist OVERLORD by creating a diversion to draw off or hold enemy strength, and the possibility of weakening or eliminating it was a matter of strategic import. General Eisenhower hoped to avoid either prospect, since he regarded the operation as an integral part of the OVERLORD invasion design. It was obviously desirable to apply the fullest possible weight of Allied power against the enemy, and the cancellation of ANVIL would mean that seven American and seven French divisions would lie idle in the Mediterranean.[27] While the Supreme Commander was fully aware of these implications, he also felt the need for a five-division assault in the north as a minimum to give a favorable chance for success. Experience in Italy had confirmed the conviction that the OVERLORD landing force must be strong enough to achieve quick success, particularly in capturing ports.[28]

Without attempting an immediate solution of the landing craft problem the Combined Chiefs of Staff at the end of January approved the enlargement of OVERLORD and postponed D Day by one month. Early in February the plan therefore called for an assault by five seaborne divisions on a widened front including the east Cotentin beaches. The U.S. portion of the assault was to be made by the First Army in co-operation with the Western Naval Task Force, one regimental combat team landing between Varreville and the Douve River (UTAH Beach), and two regimental combat teams landing between Vierville and Colleville-sur-Mer (OMAHA Beach). One airborne division was to drop behind UTAH in the initial assault. The first major objective was the capture of Cherbourg.

General Eisenhower was unwavering in his conviction that OVERLORD must be strong enough to preclude any risk of failure, regardless of the effect on ANVIL. Nevertheless, he clung to the hope that the resources might yet be found to launch that operation, directing the planners to work out a compromise shipping plan which would permit the simultaneous launching of the two operations, and postponing a final decision until the middle of March. By that time it became evident that any loading plans employing the available lift were too inflexible for safety and that OVERLORD itself would be endangered by attempting to carry off both operations at the same time. Late in the

[27] COSSAC (44) Min of Stf Confs, Mtg convened by Supreme Cmdr, 21 Jan 44.

[28] Cbl, Eisenhower to Marshall, 6 Feb 44, SHAEF SGS 381 OVERLORD-ANVIL.

month the Supreme Commander reluctantly recommended that the southern operation be canceled as then planned, and some of the shipping in the Mediterranean was transferred to England so that OVERLORD could be mounted in the desired strength. ANVIL did not die, although its future was highly uncertain for the next few months. Despite that uncertainty the boundaries between the European and North African theaters were shifted in March to place southern France within the North African theater's jurisdiction and responsibility. Switzerland, Hungary, and Austria as well as Vichy France were detached from the ETO. After the Normandy invasion, when the pressure on the available shipping resources was removed, a way was finally found to launch the operation in southern France.[29]

The OVERLORD plan was revised from time to time until the very date it was launched. Two further amendments are worth noting because of the influence of logistic considerations. One change, made almost concurrently with the extension of the assault area to the east Cotentin, dealt with the employment of airborne forces. General Marshall had voiced an objection to the wide dispersion of airborne forces provided for in the earlier plan, and at a meeting at 21 Army Group headquarters in mid-February this objection was seconded by the top American and British ground force commanders. It is evident from their discussion that the importance of the port problem was firmly riveted in their minds. General Bradley considered that the main object of the early stages of OVERLORD must be to seize Cherbourg as soon as possible and argued that nothing should be allowed to deflect from that aim. His stand was reinforced by General Montgomery, who pointed up the necessity of capturing Cherbourg and then the Brittany and Loire ports in order to secure a lodgment area with an assured maintenance. The attainment of the first objective dictated the greatest possible concentration of strength in the Cotentin, and the final plan accordingly provided for the employment of two American airborne divisions in the Cotentin to facilitate the early capture of Cherbourg. In Montgomery's view this would be the "main battle."[30]

A second revision in the OVERLORD design emphasized even more pointedly the planners' preoccupation with the farshore discharge problem. While Cherbourg enjoyed a necessary priority in the port development plans, it was the Brittany group that U.S. forces expected to rely on after the first months on the Continent. The second major objective of OVERLORD was the capture of the Brittany peninsula under the cover of the main body of Allied forces on the left (east) flank. The initial OVERLORD plan anticipated as the first step in the capture of Brittany a thrust southward across the base of the peninsula to seize the ports of Nantes and St. Nazaire at the mouth of the Loire River, followed by operations westward with Brest and the smaller ports of the peninsula as the main objectives. In April 1944 this scheme was revised by the adoption of a supplementary plan known as CHASTITY, under which the capture of Nantes and St. Nazaire was to be deferred. Instead, a major port of entry for U.S.

[29] See Forrest C. Pogue, *The Supreme Command,* UNITED STATES ARMY IN WORLD WAR II (Washington, 1953), and Harrison, *Cross-Channel Attack*, for fuller accounts of the controversy over ANVIL.

[30] Note of Mtg at 21 A Gp Hq, 18 Feb 44, SHAEF SGS 373/2 Employment of Airborne Forces in Opn OVERLORD, I.

forces and supplies was to be developed at Quiberon Bay, a large well-protected inlet on the south coast of Brittany approximately midway between the Loire estuary and Lorient.

Several factors influenced this change in plan. In one respect CHASTITY was a further strategic-economic amendment to OVERLORD in that it precluded the necessity for an extensive crossing of a major obstacle, the Loire, and the establishment of a protective bridgehead south of the river, which would have been necessary if the ports of St. Nazaire and Nantes were to be utilized. The capture of such a bridgehead would have required a large number of troops, and would have involved maintenance over a restricted road line of communications from the northern ports. CHASTITY would allow a more economic use of resources which, at best, would be limited in the early phases.

The Quiberon Bay project was also seen as the solution to another major logistic problem. A restudy of port capacities on the Continent revealed that the requirements of the build-up simply would not be met; discharge facilities had to be augmented in some way, particularly in the post-OVERLORD phase, after D plus 90. Nantes and St. Nazaire would in all probability be destroyed. Furthermore, the Normandy beaches were expected to be useful for only a limited period and would be completely abandoned with the advent of bad weather in the fall. Most serious of all would be the inadequate facilities for discharging Liberty ships. Quayside discharge of deep-draft ships such as the Liberties would become a growing necessity as the operation progressed, for it was planned that much of the shallow-draft coaster tonnage would be withdrawn about D plus 42. This would force the use of Liberties, which in turn imposed the necessity of discharging nearly all of the cargo by lighters and amphibious vehicles between D plus 42 and 90. It was essential therefore to have facilities with characteristics required for lighters or berths for deep-draft ships.

The Quiberon Bay area appeared to offer a better solution to the problem than did any other location on the northwest coast of France. Preliminary studies revealed that the area had over 3,000 yards of hard beach of required slope, a sheltered anchorage capable of accommodating about 200 Liberty ships, and four minor ports within easy reach suitable for high-line discharge at first and for deep-water piers later. Furthermore, the Allies could make maximum use of personnel and equipment by concentrating the discharge of cargo in one area instead of dispersing it, and by shortening the haul, thereby decreasing the turn-round of vehicles and increasing their daily tonnage capacity. An excellent road and rail network was known to exist within easy reach of many discharge points around the bay; and the shortened line of haul from the bay direct to army maintenance areas would increase carrying capacity and relieve the overworked network of roads and railways from the Normandy region.

The Quiberon Bay project had certain tactical disadvantages, particularly from the point of view of air and naval protection, but the strategic-logistic advantages of the project outweighed them all, and administrative planners of all the agencies involved became convinced that it was a vital military necessity. The shortage of rail and motor transportation, the practical certainty that the rail net from Brest would be destroyed beyond hope of early repair, the limited capacity of the rail lines

leading southeast from Cherbourg, the unavailability of the Loire ports until a bridgehead was established on the south bank of that river, and the certainty of inadequate port capacity at D plus 90 under the earlier plans all impelled Supreme Headquarters to give its blessing to the scheme, and operational plans were altered to provide for capture of the area by the Third Army.[31] Adoption of the Quiberon project in April constituted the last major amendment to the cross-Channel invasion plan.

Adoption of the plan by no means minimized the importance of Brest. It was intended rather to obviate both tactical and logistic disadvantages of earlier plans, and to boost the total port discharge capacity of the Brittany area. The Brittany ports were believed to be so vital logistically that Allied planners began to study the possibility of amphibious and combined amphibious-airborne operations to capture St. Malo, Brest, and Quiberon Bay in the event U.S. forces were unable to advance beyond the neck of the Cherbourg peninsula.[32]

The evolution of OVERLORD clearly reveals the extent to which logistical factors determined the scale of the assault, the choice of the lodgment area and initial objectives, and the speed of attainment of those objectives. The supply of shipping and the capacity of continental discharge facilities were the most recurrent of the limiting factors, and served as common denominators in all the deliberations over the cross-Channel invasion design. Their importance was clearly evident in the discussions of the Quiberon Bay project. Once the invading forces had secured a foothold on the Continent the most important single strategic objective was to be the capture and development of major ports. These plans had a larger objective, of course—the destruction of enemy forces—but the adequate build-up and proper maintenance of Allied forces were prerequisite to that end.

While the final OVERLORD plan bore strong resemblance to the outline which the COSSAC planners presented to the Combined Chiefs of Staff at Quebec in August 1943, it had undergone important revision through enlargement and strengthening. As finally executed the plan called for amphibious assaults by five divisions on the Normandy coast between the Orne River and the Carentan estuary and on the east coast of the Cotentin peninsula, preceded by airborne landings by one British division near Caen and by two U.S. divisions in the Carentan–Ste. Mère-Eglise area several hours earlier. *(Map 5—inside back cover)* American seaborne forces were to land on UTAH Beach, on the east coast of the Cotentin in the vicinity of Ste. Mère-Eglise, and on OMAHA Beach, in the vicinity of St. Laurent-sur-Mer. Assault landing craft were to transport three British divisions with attached Commando units, and two U.S. divisions with attached Ranger units. Landing craft and ships for two additional

[31] Ltr, Hq FECOMZ to CG FUSAG, 30 Mar 44, sub: Development of Bay of Quiberon; Ltr, Admiral Ramsay to CAO SHAEF, 13 Apr 44, sub: Port capacities, Northwest Europe–Quiberon Bay; Ltr, Gen Crawford, G-4 SHAEF, to Cof S SHAEF, 22 Apr 44, sub: Adoption of Quiberon Bay Project; Ltr, Gen Smith, CofS SHAEF, to Admiral Ramsay, 24 Apr 44, sub: Quiberon Bay Project. All in SHAEF SGS 800.4 Quiberon Bay Project. See also History of 12th Army Group, I, 348–57. The plan that eventually evolved differed substantially from the original concept, however. See below, Ch. VII, Sec. 3.

[32] See below, Ch. XI, Sec. 6, for reference to plans BENEFICIARY (St. Malo), HANDS UP (Quiberon Bay), and SWORDHILT (Brest). Third Army Outline Plan, 12 May 44, and Ltr, 21 A Gp to FUSA, 28 Apr 44, SHAEF G-3 GCT 370–291 Plans.

divisions afloat were to be provided for the follow-up on the second tide of D Day. Heavy air and naval bombardment of enemy forces was to precede the seaborne landings.

OVERLORD called first for a rapid advance inland and in the west the early capture of Cherbourg, to be followed by an eastward expansion of the beachhead to the Eure River from Dreux to Rouen and thence along the Seine to the sea, and the simultaneous seizure of Chartres, Orléans, and Tours. Meanwhile U.S. forces were to drive south to cut off the Brittany peninsula and pave the way for the opening of the Brittany ports and development of Quiberon Bay. Clearance of the area south to the Loire was to complete the mission announced in the OVERLORD plan—the establishment of the lodgment. This was expected to require three months (to D plus 90). The plan made an additional assumption which was to prove historically significant so far as logistic operations were concerned: a pause would probably be necessary upon the completion of the operation to permit the development of the administrative base in preparation for an advance beyond the Seine.

CHAPTER V

Command and Organization—and the Assignment of Planning Responsibilities

January–June 1944

(1) Formation of the Major Commands

One result of the increasing tempo of invasion planning in the fall and winter of 1943–44 was that decisions on command and organization took a more definite turn. Efforts had continued throughout 1943 to work out a satisfactory delineation of authority in supply and administration, but the repeated reorganizations had left the problem far from solved. Merged with this struggle late in the year was the need to work out a command and organizational arrangement for the cross-Channel invasion both on the national and Allied levels, and to assign responsibilities for the detailed planning of the operation. These problems were closely related, since the necessity for an adequate command structure for continental operations had a direct bearing on the duties and authority of the SOS and its relationship to other commands. The efforts of the SOS to improve its position eventually culminated in the consolidation of its headquarters with that of ETOUSA. To understand how this came about it is necessary to see first how the major commands of the theater developed after the planning for OVERLORD began in earnest.

In August 1943 ETOUSA had three major subordinate commands: the Eighth Air Force (air forces), the V Corps (ground forces), and the Services of Supply (service forces).[1] The Eighth Air Force was already carrying on operations against the enemy. The SOS had long been active in the field of administration and supply, and its importance was naturally enhanced by the accelerated build-up which now began in preparation for the cross-Channel operation. The V Corps continued to serve as the highest ground force headquarters in the theater.

As the various planning and training organizations were formed, it became important to develop a ground force command for the assault, and plans for a

[1] There were two other commands directly under Headquarters, ETOUSA, but of less importance to this discussion—the Iceland Base Command and the American School Center.

higher headquarters began to take form early in the year. The knowledge that the British were intending to organize an army headquarters during the summer influenced these plans. General Andrews recommended that the Americans do the same, partly to help promote the deception that an Allied attack was being planned for 1943. General Devers pushed the idea further when he assumed command, asking that Lt. Gen. Omar N. Bradley, then commanding the II Corps in Sicily, be sent to the United Kingdom to replace General Hartle, and also asking that an army commander be assigned to initiate planning for the invasion operation.[2]

The idea received further impetus in July when the British proceeded with the skeleton organization of their entire ground force command for OVERLORD, activating two armies and the 21 Army Group. In notifying General Devers of this development General Morgan suggested that the Americans also create a skeletonized army group headquarters in addition to an army headquarters. Anticipating approval of the OVERLORD plan in the following month he believed that these headquarters should be established so that they would familiarize themselves with their duties, prepare to undertake detailed planning for the invasion, and eventually take over command of the operation.

General Devers was in accord with this idea and again urged it on the War Department, but without immediate success. Action was finally forthcoming after the Quebec Conference. General Bradley was relieved of his command in the Mediterranean early in September and, after conferences in Washington, arrived in the United Kingdom early the next month. He immediately undertook the organization of both an army and an army group headquarters. Within the month both were activated, the 1st U.S. Army Group (FUSAG) at Bryanston Square, London, and the First U.S. Army (FUSA) at Bristol. After the latter took over operational control of all ground forces in the United Kingdom from V Corps on 23 October, all ground force troops were assigned to First Army rather than V Corps for administration and training. Included in the change was the Assault Training Center, which was the most active agency training U.S. troops for the D-Day assault.[3] General Bradley exercised command of both First Army and 1st Army Group.

The relationship of the army and army group vis-à-vis ETOUSA and SOS was to be a matter of considerable confusion, and produced many conflicts over responsibilities and authority in both the planning and execution of the continental operation. The problem was to come to a head later in the year when the whole subject of command and organization in the theater came up for review. Meanwhile 1st Army Group devoted itself mainly to planning with 21 Army Group, while First Army assumed the position of over-all U.S. field force headquarters in the United Kingdom, although it was also to have planning functions connected with its operational mission. The air forces in the United Kingdom also expanded in size and evolved a command organization in anticipation of the OVERLORD operation. For a long time the Eighth Air Force acted as the highest air force headquarters in the theater, paralleling the V Corps as the highest ground force command. It recovered more quickly than the ground

[2] Organization and Command, I, 270–71.
[3] *Ibid.*, I, 271–78.

forces from the losses to TORCH, and developed rapidly during 1943. By August it was carrying on a full-scale air war against Germany. The emphasis within the Eighth from the start was on bombing, and its operations were carried on in close collaboration with the British, though no combined command was set up for the purpose.

Aside from the question of a combined command for strategic bombing, the projected invasion of the Continent raised the problem of an air command for close support of ground operations. Experience in North Africa had indicated that the air forces in a theater should be divided into strategic and tactical commands, and General Arnold in August 1943 recommended such a division of the ETOUSA air forces. General Eaker had already foreseen the desirability of this arrangement and had organized the VIII Air Support Command to operate alongside the VIII Bomber Command, both of them under his command.

The matter of separate air commands for tactical and strategic purposes became prominent within a few weeks as a result of the decision of the Combined Chiefs of Staff at the Quebec Conference to set up a tactical air command on the Allied level. The U.S. tactical air forces were to be considerably augmented for the cross-Channel operation, and General Arnold at this time decided to send Maj. Gen. Lewis H. Brereton and the headquarters of the Ninth Air Force, which he then commanded in the Middle East, to the United Kingdom to form the U.S. command component of the tactical air forces for OVERLORD. The headquarters of the Ninth actually moved to the United Kingdom in September and October, and General Brereton arrived early in October to take command. Tactical air units previously assigned to the VIII Air Support Command were now assigned to the Ninth, and with the aid of personnel transferred from the Eighth Air Force the Ninth began planning and carrying out preinvasion operations in the United Kingdom.[4] In order to co-ordinate the work of the Eighth and Ninth Air Forces and to keep control of both in the hands of General Eaker, an over-all U.S. air command known as the United States Army Air Forces in the United Kingdom (USAAFUK) was set up.

This new headquarters was almost identical with the old Eighth Air Force, and the VIII Bomber Command eventually became for the most part the new Eighth Air Force. Furthermore, the general staff of USAAFUK for the moment at least was the same as that of the Eighth Air Force, and its special staff the same as that of the VIII Air Force Service Command. The struggle over control of supply and administration at theater level had been largely duplicated within the air forces, and the same transition had taken place as within Headquarters, ETOUSA. In October 1943 the functions of the A–4, Eighth Air Force (corresponding to G–4, ETOUSA) had been transferred to the Commanding General, VIII Air Force Service Command (corresponding to the Commanding General, SOS), and the special staff sections of the Eighth Air Force were placed under the service command. Called the VIII Air Force Service Command, the organization in effect

[4] At the same time, the VIII Air Force Service Command was divided to form a mobile air service command for the Ninth. Brig. Gen. Hugh J. Knerr remained in command of the VIII AFSC, and Maj. Gen. Henry J. F. Miller was named to command the IX Air Service Command.

became an over-all air service command and a part of USAAFUK. As in the theater command, therefore, the desire to concentrate all administrative and supply services in one command, and the adaptation to continental operational conditions in anticipation of the invasion, had an inevitable influence on the organization and control of the U.S. air forces.[5]

Equally important as a factor in shaping the organization of ETOUSA and its major commands was the development of the top Allied command for OVERLORD. The principle of unified command in each area of operations had been agreed upon even before the United States entered the war, and the idea had already been carried out in Southeast Asia and North Africa. The question of such a combined command for the European operation was broached as early as July 1942. But there was no urgency about the matter at the time, nor was there agreement on the powers and functions of such a command. The subject was again discussed at Casablanca in January 1943, and, while a supreme commander was not designated, the principle was definitely agreed to. Shortly thereafter the first step was taken in the creation of such a command with the establishment of a provisional staff (COSSAC) pending his appointment. The main questions that remained in 1943 were those of naming the commander, defining his powers, and determining the organization of the Allied forces under him.

The organization of the major combined commands which were to function under the Supreme Commander actually preceded his appointment. Three major commands were organized during the summer and fall of 1943. These were the Allied Expeditionary Air Force (tactical air forces), the 21 Army Group (ground forces), and the Allied Naval Expeditionary Force (naval forces). The air and naval commands were decided on at the Quebec Conference and were organized while the choice of the supreme commander was still being discussed. In fact, the development of an air command had begun in June 1943, when Air Chief Marshal Portal of the RAF proposed to General Devers that a tactical air commander be chosen and his powers defined. Air Marshal Sir Trafford Leigh-Mallory was already tentatively slated for the position, and at the Quebec Conference he was definitely named to command the Allied Expeditionary Air Force (AEAF) in OVERLORD. COSSAC's directive in November defining the commander in chief's powers gave Leigh-Mallory control over all the Allied tactical air forces supporting the invasion. These were to consist of the RAF Tactical Command and the U.S. Ninth Air Force. Administrative control of the latter remained with USAAFUK. Efforts on the part of the U.S. Chiefs of Staff to have the strategic air forces placed under an Allied command met with opposition from the British, and a decision on this problem was postponed.[6]

An over-all naval command was also decided on at the Quebec Conference. Since the bulk of the naval forces in OVERLORD were to be British, it was a foregone conclusion that the naval commander would also be British. Admiral Ramsay was appointed Commander-in-Chief, Allied Naval Expeditionary Force (ANCXF), in October with complete command of the naval forces in the operation under the Supreme Commander.

[5] Organization and Command, I, 279–86.
[6] *Ibid.*, I, 295–99.

Operational control of U.S. naval forces thus passed from ETOUSA to the Allied command. As with the air forces, administration and supply remained with national agencies.[7]

The Allied ground force command differed from the naval and air commands in that it was to be only temporary. In November 1943, 21 Army Group was finally designated as the over-all ground command, but it was decided that the commander-in-chief of 21 Army Group would be in command of Allied ground forces only during the early stages of OVERLORD, or until such time as the build-up of American forces warranted the introduction of a U.S. army group as an over-all ground command for American forces. Thereafter the ground forces were to operate under their respective national commanders, subject of course to the Supreme Commander, who was to exercise direct command on the ground. Gen. Sir Bernard L. Montgomery was designated commander-in-chief of 21 Army Group and took command late in December.

Fundamental to the whole problem of Allied command and organization and coloring all the deliberations over it was the question of whether the Supreme Commander should be British or American. While Prime Minister Churchill had laid down the principle at Casablanca that the nation having the preponderance of forces should also have the command, a final decision on the choice of a commander was not to be made till late in the year. Because the British had had more operational experience than the Americans, and because they were more active in the planning carried on by COSSAC, there was a strong tendency at first to assume that the Supreme Commander would be British. All early thinking in ETOUSA on the subject was predicated on this assumption, and in attempting to work out a suitable theater command and organization in anticipation of the eventual creation of an Allied command General Devers was constantly on guard lest a command be set up in such a way as to endanger American interests.

General Devers' guiding principle was what he called the Pershing Principle of 1917, the essence of which was that the integrity of U.S. forces should be preserved. One outstanding example of this thinking can be seen in his insistence that the Supreme Commander should not report to the Combined Chiefs through the British Chiefs of Staff, which was a feature of some of the early proposals on a combined command. General Andrews had insisted earlier that this would be detrimental to U.S. interests, especially if the Supreme Commander were British. The central feature of General Devers' later proposals was the assurance that the senior U.S. officer in the theater should retain enough power to protect American interests. Without knowing what the nationality of the Supreme Commander would be, he felt that the senior U.S. commander in the theater should command the U.S. field forces and at the same time continue as Commanding General, ETOUSA, for in the latter position he would have a direct channel of communication with the U.S. Chiefs of Staff and would be on a level with the British Chiefs of Staff. Devers also suggested that the Commanding General, ETOUSA, delegate all nonoperational matters to a deputy commander in London so that when his field headquarters was estab-

[7] *Ibid.*, I, 299–300.

lished the theater headquarters would be his rear echelon under his deputy.

Most of these proposals were carried out in ETOUSA organization, although they were based at this time on the assumption that the Supreme Commander would be British. Drafts and redrafts of papers outlining the proposed command setup continued to be passed about all through the summer and fall of 1943. The problem of nationality was decided at Quebec in August; the actual choice of General Eisenhower as Supreme Commander was finally made in the course of the Cairo–Tehran Conferences early in December. General Eisenhower arrived in England to take command of Allied forces on 16 January 1944, his headquarters being designated Supreme Headquarters, Allied Expeditionary Force, or SHAEF.

The establishment of the combined air, ground, and naval commands thus antedated the creation of an over-all Supreme Command, although SHAEF had a predecessor in the COSSAC organization which formed the nucleus of the new headquarters. COSSAC had been originally established mainly as a planning staff. As the combined commands began to take shape in the fall of 1943, it began to assume more and more of the characteristics of a supreme headquarters organization. In September it changed from a purely planning agency to an executive one and began to issue directives to the recently named air and naval commanders on their responsibilities in the coming invasion. Basic directives on OVERLORD planning were issued at the end of November. By mid-January 1944 COSSAC had served its purpose, and with the arrival of the Supreme Commander it was transformed into the Supreme Headquarters.[8]

(2) Consolidation of ETOUSA and SOS

The formation of the 1st U.S. Army Group and the various components of the Allied command was to have a decisive impact on theater headquarters organization. The assumption of an increasing share of both the planning and operational responsibilities by COSSAC and the combined commands gradually reduced ETOUSA's role. ETOUSA's planning function was definitely on the wane. The G–5 Plans Section was discontinued in October and its chief, General Barker, was permanently transferred to COSSAC. The new combined commands stripped ETOUSA of other officers in order to meet the increasing rank and ability requirements for their American components. Over-all control of planning for the ground forces was delegated to 21 Army Group in November, and the position of 1st Army Group and First Army was also prescribed by COSSAC.

The lines of operational control were also rapidly being withdrawn from ETOUSA. Theoretically ETOUSA was to retain operational control of all U.S. units until the Supreme Commander received his directive in February 1944. But real control was rapidly slipping away to the Allied commands. First the naval command was withdrawn, and in mid-December the operational control of the Ninth Air Force also passed from it. The transfer of over-all control of U.S. forces from a strictly American command to an Allied command raised an obvious question: what was to be done with the organi-

[8] Organization and Command, I, 286–300. The development of the Allied command structure and the selection of the Supreme Commander are treated more comprehensively in Pogue, *The Supreme Command.*

zation Headquarters, ETOUSA, and what was to be the command role of its commanding general? There remained the field of supply and administration, which was to be left under national commanders. Furthermore, it was generally felt that some over-all U.S. headquarters should be maintained. The question of whether this headquarters should be ETOUSA was complicated by the introduction of the 1st Army Group, for it was assumed by some that the army group would become an over-all American GHQ, replacing ETOUSA.

General Marshall made known his conception of what the eventual theater organization should be in a letter to the ETOUSA commander in September. In it he laid down the principle that there should be a continuing over-all U.S. headquarters, although he did not definitely settle whether it was to be Headquarters, ETOUSA, or an American GHQ set up on the Continent. Further, the letter seemed specific in designating the army group as subordinate to ETOUSA or the GHQ, but the idea continued to persist in some ETOUSA circles that 1st Army Group eventually might become the GHQ. In any event it appears that the formation of any U.S. headquarters was to await the naming of the Supreme Commander. But by the time General Eisenhower arrived in the United Kingdom steps were already under way to form the ETOUSA-SOS headquarters, which was maintained as theater headquarters.

The new 1st Army Group's pretensions in the field of supply and administration had further complicated the whole question of theater organization. General Bradley had taken command of 1st Army Group on the assumption that his organization was to take over direction of all planning for the operation, logistical as well as tactical. This was bound to produce a conflict with the SOS over the control of supply and administrative support of the armies, a conflict which carried over into the period of active operations on the Continent.[9]

For the time being ETOUSA resolved the dispute by delineating the planning responsibilties. It charged 1st Army Group with all planning for operations on the Continent by U.S. forces other than air, including administrative planning. The Commanding General, SOS, was instructed to initiate such planning as was required by 1st Army Group, First Army, and the U.S. air forces for the logistical support of operations, and the SOS was also charged with planning the mounting of the operation. One point at least was settled in the field of administrative planning in these developments of October and November: 1st Army Group was to control planning by the SOS for the operation, but ETOUSA outranked 1st Army Group and could review the latter's plan.

There now began an interplay among the various staffs involved in the command developments of late 1943—1st Army Group, ETOUSA, and the SOS—as to the disposition of the theater's functions. Both SOS and the 1st Army Group appeared desirous of taking over as many of these functions as possible. Apparently visualizing the declining role of Headquarters, ETOUSA, General Devers requested the assignment as commanding general of 1st Army Group for himself, suggesting at the same time that supply and administration of the theater could be controlled most effectively by the army group. But General Devers did not receive this command. Upon General Eisen-

[9] Organization and Command, I, 306–11.

hower's appointment as theater commander in December, Devers was given command of the North African theater and left the United Kingdom early in January. Had he been given command of the army group it might have developed along the lines he indicated.

With the impending transfer of tactical functions to the Allied command the future of ETOUSA headquarters seemed to depend on its role in the field of supply and administration. But it was also obvious that in the administrative field ETOUSA soon would only be duplicating SOS functions, or would be relegated to a relatively minor position vis-a-vis the army group if over-all control of supply were turned over to the latter. That ETOUSA should continue to duplicate the activities of the SOS was obviously inadvisable. The main question to be resolved, therefore, was whether there should be an over-all control of supply and administration from a theater headquarters with a deputy commander for supply and administration, or from the field force headquarters—in essence, whether SOS or army group should exercise the control. It seems almost inconceivable now that the transfer of these functions should have been contemplated. The SOS had carried on most of the supply planning which had been done for OVERLORD, and was at the time the main agency carrying on active supply and administrative activities in the theater. Nevertheless there were at this time three possible solutions to the question of future theater organization and the fate of Headquarters, ETOUSA: General Devers' conception, with 1st Army Group as the main headquarters; the formation of an over-all GHQ; and the continuation of a theater headquarters by consolidation with the SOS.

The commanding general of ETOUSA was still in a position to decide what the future organization was to be, and it was the last solution which was to win out—a consolidated ETOUSA-SOS, with the over-all direction of supply and administration from that headquarters. Confronted with the loss of its tactical functions, the ETOUSA staff naturally preferred what amounted to absorption by the SOS to delegation of most supply and administrative functions to the army group.

The final solution was not arrived at as directly as logic seemed to dictate. But it was crystal clear in all minds that the organization known as ETOUSA was soon to lose all tactical functions, concerning both planning and operations; and it became increasingly clear to all that the ETOUSA and SOS headquarters were maintaining many officers doing approximately the same work and producing a great deal of delay and confusion in staff channels. The division of functions and duplication of work were acutely summarized by the ETOUSA adjutant general, Brig. Gen. Ralph Pulsifer. In a memorandum to the chief of staff in November, he pointed out that of the six major responsibilities of the theater commander the SOS was performing two, First Army one, 1st Army Group another, and the remainder were divided between SOS and ETOUSA with "exceedingly indistinct lines of demarcation." In discharging the divided responsibilities the SOS was using some 750 officers and ETOUSA 400.[10] An indication of the trend of thinking is provided by the fact that some ETOUSA staff officers who had previously opposed consolidation now began to urge it.

[10] Memo, Pulsifer for Brig Gen David Barr, 17 Nov 43, as cited in Organization and Command, I, 320.

During the closing weeks of 1943 the staffs of SOS, ETOUSA, and 1st Army Group all considered the problem of division of functions in the theater, and numerous memorandums were written and many conferences held on the subject. An increasing number of voices began to argue for consolidation. One of the most cogent summaries of the problem was presented by Brig. Gen. Henry B. Lewis, the adjutant general of 1st Army Group, in a memorandum to the G–1 of the same headquarters on 16 December:

> There are two separate headquarters (ETO and SOS) with the same special staff. Although certain services are placed under the SOS, they remain ETO staff sections. The CG, SOS, is responsible for the coordination, supervision, operational control and direction of these services, but he cannot issue instructions in the name of the theater commander to accomplish these duties. He is authorized to issue instructions which will not "affect command responsibilities of commanders." This appears to be a confusing and meaningless gesture since *all* military instructions affect command responsibilities. As a result, observation indicates that often instructions are prepared by a service, approved by the CG, SOS, and sent to ETO. There they may be approved and returned for issue by SOS, or issued by ETO itself. On the other hand they may be revised in ETO with or without concurrence of the service concerned or Headquarters, SOS, or simply disapproved. Informal correspondence (carrier sheet) on detailed operation is conducted between SOS staff and services, and between ETO and SOS staffs, as well as through command channels, entailing delay, by-passing and duplication. Such procedure appears to indicate a faulty division of responsibility between the two headquarters.[11]

The plans which were offered as solutions to the problem reveal clearly that a new conflict in the field of supply and administration was growing up to replace the old one between ETOUSA and the SOS. These two headquarters now appeared agreed that consolidation had become necessary, but they felt that the new headquarters should be the over-all coordinating agency in theater supply and administration and not subordinate to 1st Army Group or a GHQ, as the army group plans proposed. The feeling of 1st Army Group was that complete control of supply in the combat zone should be turned over to the field force headquarters and that the SOS (later the Communications Zone) should not be superior to it in administrative matters. This conflict was to continue throughout the history of the theater.

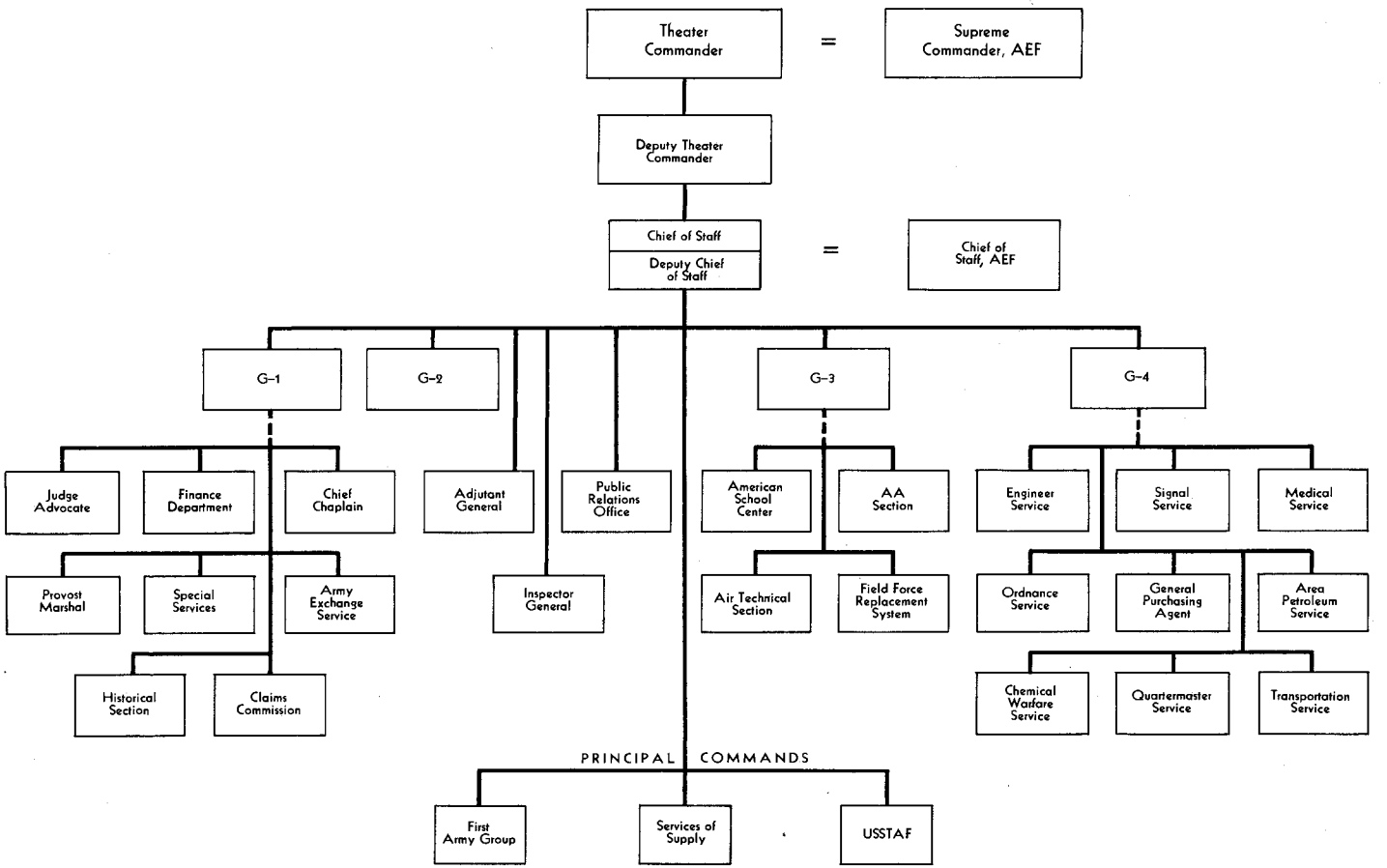
For the time being the proponents of a combined ETOUSA-SOS won out, and the plan of reorganization as finally carried out favored ETOUSA-SOS as a higher headquarters than 1st Army Group. The plan was worked out in detail while General Devers was still commanding the theater, but General Eisenhower had been kept fully advised on the proposed consolidation through General Smith, who had preceded the Supreme Commander to London, and it was finally made with his complete knowledge and approval.[12] The reorganization was announced on 17 January, the day after Eisenhower's assumption of command. (*Chart 5*)

The general order announcing consolidation of the two headquarters appointed General Lee deputy commander of the theater for supply and administration in addition to his duties as Commanding General, SOS. As SOS commander his

[11] Memo, Gen Lewis, AG FUSAG, for G–1 FUSAG, 16 Dec 43, sub: Proposal for Realignment of Adm Procedure in this Theater, as cited in Organization and Command, I, 322.

[12] Interv with Gen Barker, OCMH.

CHART 5—ETOUSA'S ORGANIZATION AFTER THE CONSOLIDATION OF 17 JANUARY 1944



duties included command of the Communications Zone, successor to SOS upon the commencement of operations, and continued operation of administration and supply for U.S. forces in the United Kingdom and on the Continent. To fulfill these duties General Lee was authorized to act in the name of the theater commander in all appropriate matters. General Smith, whom General Eisenhower had brought with him as chief of staff of SHAEF, was also named chief of staff of ETOUSA, while Colonel Lord was named ETOUSA deputy chief of staff in addition to his duties as chief of staff of SOS. The reorganization consolidated the separate staffs of ETOUSA and SOS into one theater staff with the customary general and special staff sections, thus eliminating the duplication of work in the two headquarters on supply and administrative problems.[13]

The consolidation resulted in an interesting and somewhat complicated organization. While the two headquarters were officially consolidated, the fiction was kept up of the existence of two separate headquarters. As Commanding General, SOS, General Lee published general orders, circulars, and directives to SOS installations (mainly the base sections). As deputy commander of the theater he issued directives applying to the theater as a whole. Of particular significance was the authority which the SOS now possessed to issue its administrative instructions in ETOUSA circulars without infringing on the sovereignty of other commands, as it had in the past. And while there no longer were two headquarters, staff officers now acted in a dual capacity—for both ETOUSA and the SOS.[14]

Temporarily at least, the consolidation settled the position of ETOUSA-SOS as the over-all U.S. administrative headquarters in the ETO, though the possibility still remained that an American GHQ at SHAEF might take over administrative functions once continental operations began. As it turned out, the January settlement endured. The decision to continue the already existing ETOUSA headquarters as the highest U.S. echelon in the theater was an important one and gave continuity to the administrative setup, though in the end it was to place the theater headquarters in a somewhat peculiar position. Theoretically the consolidation placed the new headquarters and General Lee as the deputy theater commander in a position to control all supply and administration in the theater, and to this extent it was a triumph for General Lee's ideas on centralization of those functions. But the fact that this theater headquarters consisted almost entirely of officers from the old SOS staff also left it in the position of being a headquarters co-ordinate with the 1st Army Group and the air forces, and the latter resented looking to it as a higher headquarters. Furthermore, being physically separated from the theater commander, who was resident at SHAEF, the old ETOUSA-SOS group was to have some difficulty in asserting its authority, for ground and air commanders were inclined to look to SHAEF as the next highest command echelon. Although the consolidation thus brought new complications in its train, the old conflict between ETOUSA and the SOS had ended and the theater entered a new period. While the transformation was in part the culmination of the struggle dating from the origins of the theater, the formation of the

[13] Organization and Command, II, 1–3.

[14] *Ibid.*, II, 4–5.

Allied high command had finally forced a complete alteration in the nature and functions of the theater command, which was now to be subordinate to Supreme Headquarters. The SOS component of the new headquarters had at the same time achieved what it had always regarded as its rightful position and function.[15]

A concomitant to this reorganization of ETOUSA was the almost simultaneous transformation of COSSAC into SHAEF on 15 January 1944. Four weeks later, on 12 February, General Eisenhower received the formal directive on his duties as Supreme Commander. This climactic development of the Allied high command had a profound effect on the position of ETOUSA headquarters, since from this point onward SHAEF was to exercise control of all tactical planning and operations, except for strategic bombing. It left ETOUSA headquarters in a position quite different from the one it had had for the past year and a half. Fundamental to the new setup was the fact that the official ETOUSA headquarters was not in practice the headquarters of the theater commander, General Eisenhower, who resided at SHAEF. And while the ETOUSA general and special staffs were in theory his staffs, they actually were General Lee's, and they functioned for him in the supply and administrative field. General Eisenhower could of course call on them directly for advice, but he normally operated on the Allied level at SHAEF and therefore operated mainly through the SHAEF staff. The many high-ranking U.S. officers on this staff, organized on the principle of opposite numbers, tended to drift into what ETOUSA thought was its territory. The theater commander was at SHAEF and the major decisions were made there. For U.S. forces, SHAEF in some ways, especially on tactical matters, supplanted the old theater headquarters.[16]

In the field of supply and administration General Eisenhower had delegated his functions to General Lee as the deputy theater commander. ETOUSA-SOS also remained the theater commander's vehicle of communications with the War Department on administrative matters, and the authorizing agency for the activation of all American commands which were to operate under SHAEF. It was the one U.S. organization not under the command control of SHAEF, but it was nevertheless under the control of General Eisenhower as theater commander.

If this setup is difficult to understand, some consolation may perhaps be derived from the knowledge that it was not always completely understood by the people involved in it and that in practice it often became somewhat difficult to operate. After the invasion there was a tendency for SHAEF to assume more and more the aspect of an American theater headquarters as well as an Allied one, and for General Lee's headquarters gradually to become a purely Communications Zone headquarters. But during the preparatory phase, from January to June, the consolidated ETOUSA-SOS headquarters was definitely the theater headquarters, supreme in the supply and administrative field under the direction of the deputy theater commander.

Certain wrinkles had to be ironed out before the consolidated ETOUSA-SOS headquarters could function smoothly. The two staffs had to be integrated, for example. At first the general staff of the new headquarters contained a mixture of

[15] *Ibid.*, I, 328.
[16] *Ibid.*, II, 8.

ETOUSA and SOS officers. There were some changes in the next few months, however, and the consolidated headquarters then achieved a stability in personnel which it had not previously enjoyed, for there had been constant shifting in the preceding year. The special staff had already been functioning for the most part under the SOS and continued without important changes. For the first time the integrated general staff could be set up in closer accord with standard staff organization and procedures as set down in army manuals. Proper co-ordination of functions had been impossible under the old organization where they were divided between two or more headquarters. The new consolidated arrangement proved a much more satisfactory one for handling the supply and administrative affairs of the theater, and in the United Kingdom at least the central command for supply and administration appeared a sound and logical arrangement. The larger problem to be faced was that of transferring this organization to the Continent and adapting it to conditions where the field forces were operating in combat.[17]

One other reorganization and the activation of an additional combat command must be considered to complete the treatment of the U.S. command structure as it stood at the end of January 1944. Concurrently with the theater reorganization the air forces underwent a very similar transformation. When General Eisenhower went to the United Kingdom in January, the need had arisen for an over-all strategic bombing command to control operations from both the United Kingdom and Italy. A command known as the United States Strategic Air Forces (USSTAF) was formed, made up of the Eighth Air Force in England (now under Maj. Gen. James H. Doolittle) and the Fifteenth Air Force in the Mediterranean (Maj. Gen. Nathan F. Twining). USSTAF also took over administrative control of the Ninth, and thus completely replaced the headquarters known as USAAFUK. Command of the new over-all U.S. air organization went to Lt. Gen. Carl Spaatz, who had served as top airman in the Mediterranean and whom General Eisenhower had taken with him to the United Kingdom. General Eaker went to North Africa with General Devers. USSTAF now became the top command of the American air forces in the theater, controlling the Eighth for operations and administration, the Ninth for administration, and the Fifteenth for operations. The Fifteenth maintained its own administrative organization in the North African theater. General Eisenhower, as Supreme Commander, had control of all the Allied tactical air forces through the AEAF, but he did not yet have control over strategic bombing and its co-ordination with the land forces for OVERLORD, although as theater commander he of course controlled USSTAF. The strategic bombing campaign (Operation POINTBLANK) was still being directed through the Combined Chiefs of Staff.

Within the over-all air force command a division of function between supply and operations was now effected comparable to the changes at the ETOUSA level. The VIII Air Force Service Command had been in much the same position with relation to the Eighth Air Force and USAAFUK as the SOS had been with relation to ETOUSA. Brig. Gen. Hugh J. Knerr, the commander of the Air Service Command, had been striving for the same type of organization which General Lee

[17] Organization and Command, II, 18–20.

had been seeking for the SOS. Like General Lee, he had already succeeded in transferring the A–4 and special staff sections from USAAFUK to the Air Service Command, and he now succeeded in bringing about a centralization of supply and administrative function similar to that effected in ETOUSA-SOS. Headquarters, USSTAF, was now organized under two deputy commanding generals, one for operations and one for administration and logistics, the latter position being held by General Knerr. Like General Lee, General Knerr continued in a dual position, as deputy commanding general of USSTAF (for administration and logistics) and as commanding general of the Air Service Command. The VIII Air Force Service Command headquarters, which had also served as the Air Service Command headquarters for USAAFUK, now served as the headquarters for the USSTAF Air Service Command.[18]

Meanwhile, another major combat command was to be added to the U.S. organizational structure. American ground force organization in January included only the 1st Army Group and the First Army. In order to complete the headquarters necessary for the invasion it was necessary to introduce another army headquarters into the United Kingdom, since 1st Army Group was scheduled to control two U.S. armies when it became operational. This second army headquarters was the Third U.S. Army (TUSA), which was constituted late in January at Knutsford in Western Base Section under the command of Lt. Gen. George S. Patton. The haste with which the Third Army was activated was indicative of the speed with which new divisions were pouring in, and of the need for an additional army headquarters to administer them as well as to initiate planning for the operations in which it was scheduled to take part when 1st Army Group became operational. Third Army was soon busily at work under the supervision of the army group. With its activation the combat command organization of U.S. forces for OVERLORD was virtually complete.[19]

(3) Assignment of Command and Planning Responsibilities

One of the major factors in the evolution of the organizational structure for OVERLORD was the growing necessity to assign command responsibilities and get on with the detailed planning for the operation. By the end of January 1944 the command plan at the top Allied and national levels was almost complete, although important additions and changes were made later. On the tactical side the Supreme Command (SHAEF), through its subcommands AEAF, ANCXF, and 21 Army Group, was to exercise complete control of the operation with the one exception of strategic bombing. General Eisenhower desired that strategic bombing also be brought under his control in order to co-ordinate it with ground operations in OVERLORD. Although he met with some opposition in this endeavor he was finally given command of the strategic air forces in April.[20]

In the meantime COSSAC had also worked out the method by which the tactical command would operate in the succeeding stages of continental operations. Plans made in November 1943 provided for joint responsibility for planning and operations by the commanders in chief of

[18] *Ibid.*, II, 21–25.
[19] *Ibid.*, II, 40–43.
[20] Organization and Command, II, 28–29.

AEAF, ANCXF, and 21 Army Group (usually known as the joint commanders), and provided that the initial assault was to be carried out under the command of the First U.S. Army, with the necessary British or Canadian units attached. A British army was to become operational when British units had been sufficiently built up, at which time the 21 Army Group was to take over control of the operation. When the number of U.S. forces justified the introduction of a second American army headquarters, 1st Army Group was to assume active direction of U.S. forces, responsible directly to SHAEF.

This plan was later amended and amplified in several respects. The increase in the size of the assaulting forces eliminated the stage during which the First U.S. Army was to control the operation. A second command directive in January stipulated that a British army headquarters would be operational from the beginning, controlling its own troops, with command of the two armies resting with 21 Army Group. The 1st Army Group was to take over active direction of American forces when the build-up justified the introduction of a second American army headquarters. In general these were the command lines as they eventually were followed.[21]

Fixing the command lines in administrative matters was more difficult. SHAEF first outlined them in detail in a letter of instructions to the joint commanders in March. In accordance with tactical command arrangements, 21 Army Group was charged with command of all ground forces engaged in the operation until such time as the Supreme Command assigned an area of responsibility to the 1st U.S. Army Group. In this initial period the First U.S. Army and the necessary service troops organized as an advance communications zone section were to be attached to 21 Army Group, and 1st U.S. Army Group was to furnish a staff to the British army group to provide for their administration. The Commander-in-Chief, 21 Army Group, was to have over-all direction of the line of communications until 1st Army Group was allotted an area, and was responsible for the logistic support of all the forces under his command. The initial development of the American communications zone [22] was therefore to be under the 21 Army Group.

There were to be three stages in the evolution of command. The 21 Army Group was to be the directing ground force headquarters in the first two phases. In the first or assault phase, however, the First U.S. Army and the Second British Army were to operate somewhat independently and handle their own logistic affairs. In the second phase the 21 Army Group was to take active control of tactical operations and of administrative and supply operations, exercising control of the latter through the attached staffs of 1st Army Group and the deputy commander of the Communications Zone. In the third phase the 1st Army Group was to be allotted an area of responsibility and SHAEF was to assume active direction of the two army groups.[23]

The assignment of planning responsibilities generally corresponded to the division of command described above, although this proved more difficult in the administrative field than in the operational. Since administrative matters were to be handled as far as possible through national agen-

[21] *Ibid.*, II, 29–32.

[22] All the territory in the theater outside of the combat zone—that is, back of the army rear boundary.

[23] Organization and Command, II, 32–35.

cies, they involved ETOUSA command channels as well as SHAEF. Administrative planning for the combat zone obviously belonged with the headquarters responsible for such a zone, but there still remained the question of the communications zone and of over-all administrative planning for the U.S. zone as a whole, which was the responsibility of ETOUSA. Complicating the whole problem was General Lee's dual position as deputy theater commander and commander of the SOS.

At the Allied level SHAEF acted as the over-all co-ordinating headquarters, determining interservice and inter-Allied administrative policy, but leaving the detailed implementation of its decisions to its subcommands and national agencies. It was to allocate material resources in short supply, co-ordinate policies on requisitioning and purchasing, determine policy on petroleum supply, co-ordinate movement and shipping, and in general determine Allied administrative and logistic policy. COSSAC had already laid down policy on planning in these various fields in the fall of 1943.[24]

A more active and direct role in administrative planning was to be played by SHAEF's ground force subcommand, 21 Army Group. As the highest ground force command in the early stages of the operation, 21 Army Group was also the highest administrative headquarters for U.S. forces. It discharged its responsibilities in administrative matters by delegating certain functions to 1st Army Group and the First Army in planning for the various stages of the operation. First Army, as the highest U.S. headquarters on the Continent initially, was to be in undisputed charge of planning and operations, including the logistical, for the first two or three weeks on the Continent. Planning in administrative matters from that time forward was the responsibility of the 1st Army Group, which was to supervise the planning by the SOS for the early development of the communications zone.

ETOUSA-SOS had to be brought into the picture, since it was to be responsible for the detailed development of the communications zone and over-all logistical planning for maintenance of all U.S. forces. ETOUSA-SOS had enormous responsibilities in connection with the forthcoming operation. It was already operational in a sense that the ground forces were not, for it was deeply engaged in the logistic build-up in the United Kingdom, receiving and stockpiling supplies, operatting ports, railways, and depots, quartering troops, and performing a multitude of other administrative duties. The SOS was also given the task of mounting the invasion force in southern England—that is, marshaling troops, moving them to the embarkation points, and loading them. Once the operation was launched, the SOS had to provide support from the United Kingdom for all U.S. forces on the Continent and arrange for continued support from the United Kingdom, the United States, and other sources. At the same time it had to be prepared to move from the United Kingdom to the Continent and organize the lines of communications there without interruption in its normal services. Fitting this ETOUSA-SOS organization into the planning setup of 1st Army Group and 21 Army Group and defining its future role on the Continent proved to be one of the biggest organizational and command problems still remaining.

[24] Ltr, Col Frank M. Albrecht to OCMH, 29 Jun 51.

The SOS was to be redesignated Communications Zone upon the launching of the invasion. The change denoted the shift from operating what was essentially an extension of the zone of interior in the United Kingdom to providing logistical support for combat operations on the Continent. Toward the end of February the term Communications Zone, or COMZ, came into increasing use in reference to the SOS, although the redesignation was not official until the time of the invasion. The new name actually appeared on letterheads as early as 21 February and came into general use at that time without benefit of christening through official orders.

While 21 Army Group was responsible for the final co-ordination of planning for the combined forces, it delegated the planning task for U.S. forces to 1st Army Group, the highest American field force headquarters. In mid-January COSSAC instructed the army group to attach a U.S. administrative staff to 21 Army Group headquarters to accomplish this planning and to carry out the administration of U.S. forces under 21 Army Group control. Shortly thereafter Brig. Gen. Raymond G. Moses, the 1st Army Group G–4, was designated Deputy Major General of Administration, 21 Army Group, and took the entire 1st Army Group G–4 Section with him to General Montgomery's headquarters, where the U.S. staff was to work closely with its opposite number, the British administrative staff.

ETOUSA-SOS representation was not immediately provided for, and General Lee therefore urged immediate assignment of an SOS liaison group to this staff, stating that full logistical support could be provided and co-ordination of communications zone activities with those of the armies could be insured only by co-operating closely during the planning period. Since the mission of the U.S. staff at 21 Army Group was one of co-ordination rather than detailed planning, and since the army, air, and communications zone commanders were to draw up their own administrative and logistical plans, it was initially felt at 1st Army Group that a small representation by the SOS at 21 Army Group would be enough to resolve any problems arising between the headquarters. It soon developed, however, that mere representation and liaison would not suffice to co-ordinate the planning of the various organizations. Early in February Generals Lee, Bradley, Smith, and Colonel Lord conferred at SHAEF and reached a decision on the matter of SOS participation in the planning at 21 Army Group. SHAEF issued a directive on 9 February which not only specified the



GENERAL MOSES, *G–4 of the 1st (later the 12th) Army Group.*

part which the SOS was to have in the planning at 21 Army Group, but also defined for the first time the command relationship between 1st Army Group and the Communications Zone, a subject of considerable controversy for some time thereafter. For this reason the directive is a basic document in any consideration of the U.S. administrative command organization.

In it SHAEF stated that General Lee, as deputy theater commander, was ex officio chief U.S. administrative officer and as such was available to SHAEF on all U.S. administrative matters. More important for the future administrative organization, a planning staff from ETOUSA-SOS was to be attached to 21 Army Group for the initial planning of the communications zone. General Lee was to designate a deputy commander of the communications zone with an adequate staff to plan, develop, and operate the U.S. communications zone on the Continent. This staff was to remain attached to 21 Army Group until such time as an area of responsibility on the Continent was assigned to 1st Army Group by the Supreme Commander. At that time the Communications Zone was to be attached to the 1st Army Group headquarters. Eventually, when the Supreme Commander established an advance echelon of the theater headquarters on the Continent, the deputy commander of the Communications Zone and his staff were to come under the command of Headquarters, ETOUSA.[25]

(4) Forward Echelon, Communications Zone (FECOMZ)

The SHAEF directive was the charter for the activation of a new organization known as Forward Echelon, Communications Zone (FECOMZ). The creation of Forward Echelon was dictated in part by the need for an agency which could plan the development of the communications zone on the Continent and co-ordinate that planning with the top U.S. and Allied field force headquarters. In part it was dictated by the command requirements of OVERLORD, which called for an executive agency to assume active direction of the communications zone's development and operations until Headquarters, Communications Zone, itself could move to the Continent. Its role on the Continent was eventually altered by events, but in planning the development of the communications zone Forward Echelon was to make an important contribution to Operation OVERLORD.

Forward Echelon was already in being when SHAEF issued its directive on 9 February. ETOUSA had activated the organization two days before, and General Lee had chosen Col. Frank M. Albrecht, who had been in charge of U.S. logistical planning with the Norfolk House group in 1943, to organize the group. Colonel Albrecht gathered the personnel for the new staff and within ten days got planning under way at his headquarters in the John Lewis Building on Oxford Street, London. A month later, on 14 March 1944, a Deputy Commander, Communications Zone, was appointed as required by the SHAEF directive, the assignment going to Brig. Gen. Harry B. Vaughan, Jr., commanding general of Western Base Section.[26] Colonel Albrecht

[25] Organization and Command, II, 44–50. The directive under discussion, Ltr, SHAEF to Chiefs of all Divs SHAEF, 9 Feb 44, is quoted in full on page 50.

[26] Not to be confused with Maj. Gen. Harry H. Vaughan, who later served as military aide to President Truman.

was officially appointed chief of staff of Forward Echelon and continued to be an active director of the new staff's planning activities.

As a planning echelon of ETOUSA-SOS, Forward Echelon was organized with staff sections paralleling those of its parent headquarters. In effect it consisted of the planning echelon of the SOS, its staff comprising the planners from each of the SOS staff sections. Throughout its history, furthermore, it was inseparably associated with the ETOUSA-SOS headquarters, not only drawing on its staff for personnel, but utilizing ETOUSA-SOS agencies wherever feasible, and carrying out its planning in closest consultation with and with constant aid from the ETOUSA-SOS staff sections. It eventually had a strength of approximately 460 officers and men.[27] Although it was not intended to be a separate command, Forward Echelon was set up to act as an operating echelon of Headquarters, Communications Zone, when the time came to assume direction of the communications zone on the Continent.

The duties of Forward Echelon were further outlined in a letter from the SOS commander on 21 February. In general, its mission was to perform and supervise both planning and operations in connection with communications zone activities for the entire OVERLORD period in close consultation with the 21 Army Group and 1st Army Group administrative staffs. Its tasks varied, however, in the three stages through which the development of administrative responsibilities were expected to pass. In Phase I—D Day to D plus 15 or 20—the First U.S. Army was to have complete tactical and administrative control in the U.S. zone on the Continent, with an Advance Section of the Communications Zone attached to provide its logistic support. In Phase II—D plus 15 to 41—the Advance Section was to be detached from the army and independently was to undertake the initial development of the communications zone. In both these phases Forward Echelon was to be engaged mainly in supervising the work of the Advance Section. It was to assume direct control and operation of communications zone activities in Phase III—D plus 41 to 90—and was responsible for the detailed planning of supply operations for that period. Forward Echelon was to plan only for the communications zone; 1st Army Group was responsible for the combat zone.

The division of the OVERLORD period into three phases was determined basically by estimates on the progress of the operation. D plus 15 or 20, marking the end of Phase I, was the approximate date at which the planners calculated that it would no longer be convenient or desirable for First Army to control logistic operations in the base area, and the date at which Advance Section should therefore begin to organize the communications zone. By D plus 41 the build-up of U.S. forces on the Continent and the advance inland were scheduled to have progressed sufficiently to warrant the introduction of a second army and an army group headquarters. In addition, the lodgment by that time was expected to be large enough to require the forward displacement of the Advance Section and the introduction of a base section to take over the port areas. The Forward Echelon of the Communications Zone would then have to be established as a supervisory headquarters. D plus 90 was the date by which the

[27] Interv with Col Albrecht, 5 Jul 51, OCMH.

OVERLORD operation was to have been completed, and the earliest date by which it was thought feasible to move either SHAEF or the COMZ headquarters to the Continent.

Since ETOUSA-SOS contemplated that Forward Echelon would eventually move to the Continent and supervise communications zone activities there, it was established in physically separate headquarters, placed under a general officer, and attached to Headquarters, 21 Army Group, where it was to work with the 1st Army Group administrative staff. With the establishment of the 1st Army Group and FECOMZ staffs at 21 Army Group the U.S. forces received the representation which they needed at the highest Allied ground force headquarters for the co-ordination of logistical and tactical plans in the period of 21 Army Group control.

It was characteristic of the entire history of the theater that directives on command and organization always seemed to fall short of clear-cut definitions of responsibility and authority, leaving much room for contention. True to form, the establishment of the 1st Army Group and COMZ staff organizations at 21 Army Group immediately resulted in disputes over their relationship during the planning period and also over their command relationship after the Communications Zone became operative on the Continent. The latter problem in particular was to be in doubt for some time, partly because of the different concepts which the two headquarters held regarding their roles and authority, and partly because of conflicting interpretations of the SHAEF directive of 9 February. The theater's complicated and unprecedented command arrangements, growing out of General Eisenhower's dual role and the position of the various Allied commands, and to a lesser degree personal ambitions and distrust, contributed to this conflict.

Fundamentally, the issue throughout was clear: who was to be responsible for over-all co-ordination of logistic support, both in planning and actual operations? Forward Echelon, as a creature of the consolidated ETOUSA-SOS headquarters reflected the ETOUSA point of view and tended to assert the over-all position of the theater headquarters. Forward Echelon was conceived of as independent and paramount in its own field (that is, planning for the communications zone) at 21 Army Group and not subject to the supervision of 1st Army Group. General Lee outlined this view in a draft letter to the deputy commanding general, stating that the relationship between the latter's headquarters and 1st Army Group was to be one of mutual co-operation and co-ordination, and that ETOUSA was responsible for supervising the staff branches and services of subordinate organizations, including 1st Army Group. Lee toned down this claim somewhat in the final version of this letter, admitting that the staff section of 1st Army Group at 21 Army Group headquarters was to exercise the required over-all general staff co-ordination between activities in the army areas and activities in the communications zone. He stated nevertheless that in order to provide for suitable channels of technical supervision in the theater as a whole the special staffs of 1st Army Group and Forward Echelon should carry out normal special staff functions in the army area and communications zone respectively.[28]

The halfhearted recognition of 1st Army Group's over-all co-ordinating posi-

[28] Organization and Command, II, 50–56; Interv with Gen Moses, 13 Aug 51.

tion did not satisfy the field forces. General Bradley, commanding 1st Army Group, believed it vital for the highest field force headquarters on the Continent to retain control of the communications zone in the interim period between the date on which 21 Army Group relinquished control and the time SHAEF arrived to take over-all command. The SHAEF directive had not been entirely clear on this point. It appeared to establish the army group's position clearly by stating that the Communications Zone would be attached to 1st Army Group when the latter was assigned an appropriate tactical command. But the directive went on to say that the deputy commander of the Communications Zone would come under the command of Headquarters, ETOUSA, when the Supreme Commander established an advance echelon of the latter on the Continent. General Bradley was not satisfied with the wording of the directive, fearing that the term, "advance echelon of ETO," might mean a forward echelon of the ETOUSA-SOS headquarters of General Lee. He believed the directive might therefore be interpreted to mean that the establishment of a small advance echelon of that headquarters (such as FECOMZ, presumably) on the Continent would be sufficient justification for removal of control of the communications zone from the commanding general, 1st Army Group, thereby depriving him of the necessary means of co-ordinating all ground forces in the U.S. sector before another commander was prepared to take over such functions.

The army group commander promptly sought clarification of this matter from the SHAEF chief of staff, General Smith, stating that it was his understanding that the Communications Zone was to be attached to 1st Army Group when the commanding general of 21 Army Group relinquished command of U.S. forces, and that the Communications Zone would be detached from the army group only when the Supreme Commander himself assumed direct command of the ground forces on the Continent. General Smith assured him that his understanding was correct and that by "advance echelon of ETO" the directive meant an advance echelon of SHAEF. It seemed clear, then, that 1st Army Group would direct the activities of the Communications Zone until General Eisenhower himself assumed command on the Continent. However, the problem of the command relationship of 1st Army Group vis-à-vis Communications Zone was not put to rest with this assurance. The issue was to be raised again, and the organization FECOMZ was always regarded with some suspicion by the field force headquarters.[29]

There were continuing causes for apprehension on the part of 1st Army Group regarding the Communications Zone's pretensions to power. When General Vaughan was appointed deputy commanding general of that organization in March a new directive was issued defining the mission of the Forward Echelon but making no mention of the 1st Army Group attachment or the relationship between the two staffs. It merely stated that Forward Echelon would be responsible for the initial planning and development of the Communications Zone under the direction of the commander-in-chief of 21 Army Group, and announced definitely that, when an army rear boundary was drawn by the First Army, Forward

[29] *Ibid.*, II, 50–52.

Echelon would actually assume command of the Communications Zone on the Continent for the period it was attached to 21 Army Group. This wording again appeared to imply that Forward Echelon and the 1st Army Group staff at 21 Army Group headquarters were co-ordinate attachments, one for the Communications Zone and one for the field forces, with 1st Army Group exercising no supervision over the former. Some of the COMZ staff even conceived of Forward Echelon as a separate command and wanted it activated provisionally as a separate headquarters. General Lee, however, preferred the arrangement whereby Forward Echelon was to be a branch of his own headquarters. As such it would have authority to issue orders in his name and, as a part of Headquarters, Communications Zone, a subcommand of ETOUSA, it would in the eyes of the Communications Zone at least enjoy equality with 1st Army Group. It was actually possible to conceive of the Forward Echelon as a headquarters even higher than 1st Army Group if viewed from General Lee's position as deputy theater commander. If such an exaggerated interpretation was accepted, Forward Echelon would be in a position to exercise even fuller powers in controlling the whole administrative organization on the Continent.

Whatever thoughts General Lee may have held about separate command status for Forward Echelon, the idea persisted in some quarters that it did have such status, and SHAEF later had to correct this mistaken notion. It clarified the organization's position by stating that the headquarters was purely and simply what its name implied—a *forward echelon* of General Lee's COMZ headquarters—and that General Vaughan, its chief, was not the commanding general of FECOMZ, but deputy commanding general of the Communications Zone.[30]

In retrospect the entire conflict takes on the appearance of a storm in a teacup. At the time, however, the points at issue had an urgent importance, particularly to the field forces, which lacked confidence in the Services of Supply and were anxious to insure that their interests would be protected so far as administrative support was concerned. Fortunately, the differences did not prevent Forward Echelon from getting on with its main task, and by early March the staff was busy with the preparation of the over-all COMZ plan of development.

(5) Advance Section, Communications Zone (ADSEC)

Equally important as Forward Echelon in the planning of the continental communications zone and, as it turned out, of much greater importance in its operations, was the organization known as the Advance Section (ADSEC). The concept of an advance section (as distinguished from a base section), organized to follow the armies, develop the lines of communications, take over rear-area supply problems, and co-ordinate these activities with the Communications Zone headquarters, was well established in field service regulations, and the need for such an organization was confirmed by recent experience in North Africa and Italy. North African experience had shown that base sections could support armies only when the supply lines were not too long. The OVERLORD operation, if successful, would result in extended lines of communications. It

[30] *Ibid.*, II, 53–60; Organization and Functions of the Communications Zone, Gen Bd Rpt 127, p. 14.



GENERAL PLANK, *Commanding General, ADSEC. (Photograph taken in 1945.)*

would therefore be necessary at an early stage to create another section between the army and base section to provide close support.

Experience in Italy had taught additional lessons. In the invasion of the peninsula an advance section had been organized and attached to the Fifth U.S. Army until the situation was stabilized at the Volturno River. But when this advance section became Peninsular Base Section and reverted to Allied headquarters (AFHQ) control the same old difficulties arose. Again the agency capable of making decisions on matters of supply was too far from the army it was intended to support. Other difficulties arose from the fact that the agency responsible for supply operations was not the one which had done the logistical planning. When a tactical headquarters handled planning for an extended operation, it tended to neglect certain logistic aspects, such as the build-up of reserves and construction materials, in favor of maintenance tonnages. Thus, the supply agency taking over from the army after the initial phase of the operation might find that it did not have the necessary supplies and equipment. This experience dictated that the service agency which was to take over support of an army must participate directly in the planning in order to assure well-co-ordinated and adequate logistical support.

In keeping with this principle, COSSAC directed the establishment of an advance section in December 1943, and the organization was provisionally established under the command of Col. Ewart G. Plank, Eastern Base Section commander, at the end of the year. The official activation of Headquarters, Advance Section, followed on 7 February 1944, and the staff shortly thereafter moved to Bristol to facilitate close co-operation with the First Army. In the interim period a party of officers designated for the new staff visited Italy and North Africa to gather information on base section operations in the Mediterranean area.[31]

The initial mission of the Advance Section was to move onto the Continent with First Army in the earliest stages and successively take over army supply dumps, roads, ports, beach maintenance areas, and railways, operating the supply installations in the rear of the combat zone until the communications zone was established. Until such time as an army rear boundary would be drawn, estimated to be between D plus 15 and 20, Advance Section

[31] Operations History of the Advance Section, COM Z ETOUSA, prep by Hist Sec ADSEC, 1945, mimeo, p. 2, OCMH; Organization and Functions of the Communications Zone, Gen Bd Rpt 127, p. 32.

was to be attached to First Army. By such attachment the Advance Section would thus be directly associated with the agency it was to supply and with which it was necessary to co-ordinate planning.

Once the Advance Section was detached from the army, it was to perform its normal missions as the most advanced regional organization of the Communications Zone. It was to take over area as well as supply responsibility immediately to the rear of the army, organizing the ground as it was relinquished by the armies, subsequently moving forward in the wake of the armies to organize new areas, and turning over territory, facilities, and installations in the rear to newly activated base or intermediate sections as they followed onto the Continent. In short, the Advance Section was to be what its name suggested, an advance subcommand of the Communications Zone in close support of the combat forces, providing them an immediate source of supply.

The Advance Section's planning tasks were determined by its responsibilities in the three phases of OVERLORD's command development: preparing for the support of First Army during the period of attachment to that organization (to D plus 15); carrying out all communications zone functions from the time the army rear boundary was drawn until the Forward Echelon took command of operations (D plus 15 to 41); and planning for the subsequent period when it was to operate, along with other base sections, under the Forward Echelon of Headquarters, Communications Zone. In defining the Advance Section's mission, however, a problem arose over the division of function with Forward Echelon, since both were to be active in planning the initial development of the communications zone on the Continent. There was no question of conflicting authority or responsibility in the first phase of operations. It was clear that in this period there would be no COMZ command operating on the Continent, for First Army, with Advance Section attached, was to be entirely responsible for all supply and administration. In the second phase, however—from the time an army rear boundary was drawn until a second army and another base section were introduced and 1st Army Group became operational—Advance Section was to be the operative Communications Zone on the Continent. For this period (D plus 15 to 41) it was obvious that Advance Section would have to write detailed plans. But Forward Echelon had been charged with over-all development of the communications zone and, according to the directive of 21 January which defined its mission, was to supervise the planning and operations of the Advance Section in this period.

Delineating the areas of planning responsibilities between the two headquarters was the subject of much correspondence and many conferences from late February through April. The answers to most of Advance Section's questions were finally provided by a FECOMZ memorandum in mid-April, after Forward Echelon had worked out planning and operational procedures with 21 Army Group, 1st Army Group, and ETOUSA-SOS. First Army, as the command which was to be in complete control of operations and supply in Phase I, was to assemble tonnage and supply requirements for all U.S. forces, including field forces, air forces, and the Navy, and submit them to ETOUSA for implementation. Thereafter 1st Army Group was to be the top U.S. field headquarters on the Continent, de-

termining and assembling over-all tonnages and supply requirements. In the stage between the drawing of an army rear boundary and the time that 1st Army Group itself assumed an active role on the Continent (D plus 15 to 41), 1st Army Group was to arrange for implementation of its requirements with ETOUSA through Advance Section. It was in this period (Phase II) that Advance Section was to have its heaviest responsibilities, for as the sole subcommand of the Communications Zone on the far shore it was to be charged with the actual operation of the communications zone facilities on the Continent. Advance Section was to develop detailed plans for this stage, therefore, with Forward Echelon exercising supervision. The latter's command role in this stage was not yet determined. However, it was to arrange for the build-up of the communications zone and the introduction of additional base sections, just as 1st Army Group was to arrange for the build-up of the combat zone and the introduction of additional armies.[32]

In Phase III (D plus 41 to 90), 1st Army Group was to continue to assemble the over-all tonnage requirements but was to implement them through Forward Echelon rather than Advance Section, since Forward Echelon was to have active control of the communications zone in that period. Advance Section was to begin its role as one of the subcommands of the Communications Zone on D plus 41, moving forward with the armies, relinquishing territory and installations in the rear to other COMZ sections. While Forward Echelon was to command the Communications Zone in this period, it was to be subordinate to 1st Army Group. Neither General Lee's nor General Eisenhower's headquarters was expected to move to the Continent till D plus 90, at which time the Communications Zone and 1st Army Group were to become coordinate commands responsible to the Supreme Commander. The Advance Section and Forward Echelon thus shared responsibility for the initial development of the communications zone, with Advance Section accomplishing detailed planning for its operations under the latter's supervision, and Forward Echelon developing detailed plans for its assumption of COMZ command after D plus 41.[33]

Advance Section had already started on its task when Forward Echelon entered the field, but it needed direction from above. Forward Echelon was the only agency other than the SOS itself where decisions could be made, since it was the agency responsible for the over-all development of the communications zone. It began to supervise ADSEC planning toward the end of February. The Advance Section's initial need was to prepare for its operations while it was attached to First Army, however, and its planning from the start was closely related to that of First Army. Forward Echelon concerned itself mainly with the problem of over-all development of the communications zone—particularly after D plus 41—review and co-ordination of plans of the Advance Section and other COMZ sections, and executive arrangements with 1st and 21 Army Groups to implement plans.[34]

[32] Organization and Command, II, 61–66.

[33] *Ibid.*, II, 66.

[34] *Ibid.*, II, 67. The General Board Report on the organization and functions of the Communications Zone questions the advisability of granting ADSEC such wide planning responsibilities. Since ADSEC had to establish supply facilities and construct installations on the Continent it necessarily had to prepare plans therefor. On the other hand, the report points out, the chiefs of services had previously worked out detailed supply requirements and co-ordinated plans

The whole U.S. administrative setup, as regards planning responsibilities, was somewhat complicated to say the least. At the risk of some repetition it may be well to recapitulate the arrangements as they stood in mid-April. On the highest Allied command level SHAEF planned the over-all administration of all forces involved in OVERLORD, controlling inter-Allied and interservice matters and exercising control over supply of items (for example, petroleum) that required over-all co-ordination at the highest level. Most of its administrative planning responsibilities were delegated to lower commands. The 21 Army Group was made responsible for over-all planning for the entire lodgment during the period when it was the highest ground force headquarters on the Continent, or until the 1st Army Group was assigned an area of responsibility.

The 21 Army Group in turn delegated its planning responsibilities for U.S. forces to the First Army and the 1st Army Group. To First Army went the responsibility for co-ordinating all U.S. forces in the initial assault, including air and naval forces. The 1st Army Group was charged with preparing plans for the employment of units other than First Army troops after D plus 15, and with responsibility for planning by the Deputy Commander, Communications Zone, for the initial development of the communications zone on the Continent. Forward Echelon was to write the over-all outline plan for the communications zone (to D plus 90); Advance Section was to be responsible for its own phase of operations as the Communications Zone on the Continent (D plus 15 to 41), and also for its role in direct support of the armies thereafter. Other COMZ sections were assigned responsibilities for planning their portions of the communications zone. ETOUSA-COMZ was to remain as a rear echelon in the United Kingdom to handle supply requisitioning, to mount U.S. forces in Operation OVERLORD, and to prepare standard service doctrine for all U.S. forces in the theater.[35]

The delineation of planning responsibilities was fairly clear by mid-April, and the bulk of the various plans began to appear in April and May, although First Army issued its plan in February. On 1 April, 21 Army Group published broad instructions on the administration of the entire zone, and a few weeks later the U.S. administrative staff at 21 Army Group issued a similar outline administrative plan adapting the army group plan to the U.S. zone. The ADSEC plan, covering its own part in operations from D Day to D plus 41, was published on 30 April. The over-all U.S. COMZ plan, covering the development of the communications zone to D plus 90, was issued by FECOMZ on 14 May. Finally, ETOUSA issued a general plan for the administrative support

for the operations and were the only agencies possessing the necessary over-all knowledge essential for working out plans with the combat echelons. In practice both FECOMZ and ADSEC were heavily dependent on the service chiefs in the preparation of supply requirements and plans, and the General Board suggests that it would have been better to give the COMZ staff responsibility and authority for making them in the first place. This would have kept the responsibility for supply plans continuously in one headquarters instead of passing it successively from First Army to ADSEC to FECOMZ to COMZ. In addition to providing continuity and eliminating an echelon of co-ordination, the report asserts, it would have placed negotiations directly in the hands of a strong, well-informed staff capable of dealing with the armies and army group on an equal basis. It admits, however, that it was necessary to keep ADSEC fully informed of all plans as a basis for operations. Gen Bd Rpt 127, p. 35.

[35] Organization and Command, II, 68–69.

of U.S. forces from the United Kingdom in the form of a standing operating procedure (SOP), the first of a series which was to be issued by the highest U.S. administrative headquarters governing the over-all supply and administration of U.S. forces. Except for the ETOUSA SOP, all these plans were the result of co-ordination by the various headquarters concerned under the general supervision of 21 Army Group headquarters. Despite the many agencies involved, the planning seems to have been fairly well co-ordinated, and, taken together, the plans gave a relatively complete picture of the projected administrative organization on the Continent.[36]

(6) Continental Base Sections

In addition to organization and planning at the staff level (Forward Echelon) and planning for the initial development of the communications zone (Advance Section), plans had gone forward to create the Communications Zone's other subcommands on the Continent—the base sections which were to take over territory surrendered by the Advance Section as it displaced forward following the armies. Planning the expansion of the continental administrative organization was also under the supervision of Forward Echelon.

Under a plan known as Reverse BOLERO or ORELOB (later renamed RHUMBA) it was contemplated that most of the U.S. logistic machinery would be transferred to the Continent, so that American troops and supplies could enter France directly from the United States. This meant disbanding the base sections in the United Kingdom, replacing them with a single U.K. base section, and forming base section organizations on the Continent. One of the difficulties in carrying out this program was to form the new base sections for continental missions before SOS troops could be relieved of their duties in the United Kingdom. The rapid influx of troops and supplies into the United Kingdom kept most of the SOS troops occupied with routine service of supply functions such as port and depot operations. In the weeks just preceding D Day and for several months thereafter they were to have the additional task of handling the outflow of troops and supplies from the United Kingdom. The same men had to be used on all these activities, and there was no increase in the SOS troop allotment for carrying them out concurrently.

Diverting troops to prepare for continental operations was obviously difficult under these circumstances, and it was clear that complete base section headquarters staffs with their full complements of troops could not be constituted and assembled in advance of the operation. The general procedure, therefore, was to form only the nuclei of base section organizations in the United Kingdom, taking a commanding officer from one of the existing U.K. sections to head a planning group, and giving it an assigned task on the Continent. Troops were assigned to the new base section, although the transfer to the new headquarters was in many instances simply a paper transaction, for they continued for the most part to perform SOS functions in the United Kingdom within the existing U.K. base sections until the time came for their movement to the far shore. The commanding officers of the new sections exercised supervision over the training of these troops for their future missions, but their training was carried on through the base sections in which they

[36] *Ibid.*, II, 70–71.

were still functioning, and the newly activated sections remained skeleton headquarters organizations, the intention being to flesh them out with operating troop units as it became necessary on the Continent.

This procedure was worked out first for ADSEC troops, and then followed later in the formation of other base sections. By D Day planning was being carried on as vigorously as possible for the administrative setup on the Continent, though only two section headquarters in addition to Advance Section had been activated by that time and they were simply given numerical designations—Base Section No. 1 and Base Section No. 2.

Planning for the mission of Base Section No. 1 began several months before its official activation. Troops for the new section were to be provided through the deactivation of Eastern Base Section. Organization of the new headquarters was given increasing attention in March 1944, when Eastern Base Section made plans to disband by consolidating all five of its districts into one, which was to be incorporated into Western Base Section as a single district. This step was in line with the Reverse BOLERO program which contemplated the gradual closing out of the U.K. installations and contracting the entire administrative organization there.

Eastern Base Section was finally deactivated at the end of April and became District VIII of Western Base Section. Men no longer needed to operate district headquarters were immediately transferred to Base Section No. 1, newly activated on 1 May under the command of Col. Roy W. Grower, the former commander of Eastern Base. This new base section was to be held in readiness in the United Kingdom and called forward to the Continent shortly after an army rear boundary was drawn. The Advance Section was to release to this organization the Rennes–Laval–Châteaubriant area in eastern Brittany as soon as it was feasible, and when the armies turned northeastward the new command was to take over all of Brittany. In accordance with this assigned mission Base Section No. 1 developed a detailed plan for its operations in the Brittany area.[37]

The change in the axis of communications from north-south to east-west, expected to take place about D plus 41, was to be an important turning point in continental developments. It was at approximately this date that a second army and the 1st Army Group were to become operational, and that the Forward Echelon of the Communications Zone was to assume control of the communications zone on the Continent.

With the development of the Brittany area and the change in direction of the lines of communications the Advance Section was to displace to a position on the west-east line of advance, relinquishing to still another base section the responsibility for command and operation of the Cotentin area. Early in May it was suggested that a skeleton headquarters should be formed for this purpose with personnel drawn from the Western and Northern Ireland Base Sections, and later additions from Southern Base Section. This union of forces was not carried out entirely as planned, for the diminishing activities in Northern Ireland Base Section made both its commanding general and the necessary staff and headquarters troops available for the new organization. Late in May the headquarters of a second base section was

[37] Organization and Command, II, 84–88.

formed in Northern Ireland and was officially activated as Base Section No. 2 on 1 June under the command of General Collins, the former commander of Northern Ireland Base. Its mission was to prepare for the assumption of command and operational control of the Cotentin area when relinquished by the Advance Section. Northern Ireland Base Section was disbanded on 15 June and, like Eastern Base Section, became a district of Western Base.

In formulating the plans for the continental base section organization Colonel Albrecht, chief of staff of the Forward Echelon, suggested that a third base section be formed and also recommended that Central Base Section (then comprising the London area) prepare for a continental mission. These proposals raised the problem of finding sufficient personnel in the existing U.K. sections to staff the new headquarters and arranging for their transfer without marring the efficiency of the U.K. organizations. Both Western and Southern Base Sections were too preoccupied with the build-up and mounting tasks to surrender personnel for such a purpose. Nevertheless, the first steps were taken to organize an additional section to serve as an intermediate section between the base and advance sections, handling communications, transportation, and supplies and operating certain fixed installations. A planning staff was recruited, but its mission remained indeterminate, and the activation of an additional headquarters had to be postponed till after D Day. Nevertheless the framework of the continental administrative structure was already clear, providing for several port area base sections, an intermediate section, and an advance section, extending from the ports to the army rear boundaries.[38]

The mounting of OVERLORD was a tremendous undertaking in itself. For the most part this responsibility involved no change in the administrative organization beyond that already made by the January consolidation of ETOUSA with SOS, for the new combined headquarters furnished a centralized and integrated apparatus to carry it out. ETOUSA delegated its responsibilities in this field to First Army and the SOS. The two headquarters had to co-ordinate their work closely, both in the planning and operational stages. First Army was responsible for handling the movement of troops, embarkation, and allotment of supplies, and the SOS was responsible for maintaining all camps and installations in the American sector of southern England and providing transportation. In the mounting phase the SOS was to act as housekeeper for First Army, carrying out the mounting arrangements through the base sections and technical services. Since the base sections were most directly involved in the mounting, their commanders were designated as representatives of the Commanding General, SOS, to deal directly with each other and with First Army commander and his representatives on matters of administrative facilities and installations, such as the location, construction, and operation of marshaling, assembly, and transit areas, roads, and communications facilities. The various base section mounting plans appeared in March 1944. Their execution involved a multitude of other responsibilities which are described in a later chapter.[39]

[38] *Ibid.*, II, 84–92.

[39] *Ibid.*, II, 37; NEPTUNE: Training for and Mounting the Operation and the Artificial Ports, Pt. VI of the Logistical and Administrative History of the ETO, Hist Div USFET, 1946, MS, I, 123–25, OCMH.

(7) Final Command Arrangements

The determination of the command structure for U.S. forces continued to occupy the attention of the SHAEF and ETOUSA staffs until the very eve of OVERLORD. Most of the problems of command revolved around the question of Forward Echelon's position and the question of the future role of the ETOUSA-COMZ headquarters.

From the question of what role Forward Echelon was to play on the Continent there developed one of the most irksome problems in the whole complicated history of U.S. command and organization. The 1st Army Group had definitely been charged by 21 Army Group with supervising Forward Echelon's planning of the initial development of the communications zone, and it was clear that the COMZ plan as finally written was subject to review by the 1st Army Group administrative staff. Forward Echelon persisted nevertheless in regarding itself as an attachment to 21 Army Group co-ordinate with rather than subordinate to the 1st Army Group attachment. To complicate matters, 1st Army Group had granted authority to Forward Echelon to draw up the plans for certain detailed implementation of the 1st Army Group administrative staff's over-all plan which applied to the whole U.S. sector rather than solely to the communications zone. Forward Echelon had decided to have these matters published in ETOUSA SOP's. The 1st Army Group requested that all proposed publications on administrative plans and instructions applying to the whole sector be submitted to it for review. The request seemed clearly within its authority in view of the fact that it had been charged with responsibility for co-ordinating administrative planning and arrangements for all U.S. forces on the Continent after First Army relinquished control. Since ETOUSA was actually a higher headquarters, however, it did not consider 1st Army Group's comments binding.

This incident illustrated pointedly the vague division of planning functions between the two headquarters, and revealed a weak link in the whole U.S. command and organizational structure for OVERLORD. The 1st Army Group was clearly the headquarters for the control of U.S. forces in the Allied line of command. ETOUSA, however, was outside that Allied line of command and as an administrative headquarters exercised certain powers independently. Forward Echelon, an echelon of Headquarters, ETOUSA, also represented the consolidated ETOUSA-SOS staff since the COMZ commander, General Lee, was also Deputy Commanding General, ETOUSA.[40]

Closely related to this problem in the planning stage was the matter of Forward Echelon's future role on the Continent. It will be recalled that Forward Echelon was to supervise the initial development of the communications zone. In Phase II—D plus 15 to 41—when Advance Section was the sole Communications Zone section on the Continent, Forward Echelon was not to exercise any active control, according to the original plans. It was to remain as a staff attached to 21 Army Group, acting in an advisory capacity on COMZ matters. Not until the third phase, when 1st Army Group became operational, was it to assume active direction of the Communications Zone. Late in April, however, Forward Echelon again brought the question of its future role into promi-

[40] Organization and Command, II, 72–74.

nence when it attempted to change the plan for Phase II. It now proposed that it should take over direct control of the Communications Zone once an army rear boundary was drawn (at D plus 15), thereby eliminating the period when Advance Section would be the highest administrative headquarters on the Continent.[41]

The suggested alteration in the command plan naturally produced some consternation in Advance Section and First Army, for it conflicted with earlier commitments to First Army that no intermediate headquarters would be established between the army and Advance Section before the introduction of a second base section. The ADSEC commander, General Plank, promptly sought an explanation. General Lord,[42] the COMZ chief of staff, proposed as a workable solution that Forward Echelon be established in Phase II, as the COMZ commander desired, but that it exercise only "supervision and coordination" over Advance Section, and not enter command channels or supply requisition channels. This attempt to reconcile the opposing desires of the Communications Zone and ADSEC-First Army had all the earmarks of earlier directives; it was vague in its demarcation of authority and was bound to lead to conflicting interpretation when the test of actual operations came. For the moment the issue was not clarified, and the relationship of Forward Echelon and Advance Section was left up in the air, although there seems to have been no doubt in the minds of the FECOMZ staff members from this point on that they would assume full supervision and control of all COMZ activities at the time an army rear boundary was drawn.

The issue of Forward Echelon's role on the Continent in the second phase received some clarification by mid-May, when the COMZ plan was released. The plan (issued by Forward Echelon) substantially confirmed the scheme for planning and development of the communications zone in three phases as outlined earlier. The idea that Forward Echelon would become an intermediate headquarters between First Army and Advance Section and that it would assume control of the Communications Zone in Phase II was apparently abandoned. The plan succinctly stated that when an army rear boundary was drawn Forward Echelon would "exercise staff supervision" for the Commander-in-Chief, 21 Army Group, over the operations of Advance Section. Forward Echelon was to assume full supervision and operational control of all COMZ activities only after Advance Section and a second COMZ section became contiguous. When 1st Army Group was allotted an area of responsibility on the Continent, Forward Echelon was to be detached from 21 Army Group and attached to 1st Army Group. It finally appeared settled, therefore, that in Phase II this highly controversial headquarters was to be, as General Lord had proposed, a staff supervisory agency, operating with 21 Army Group.

This conception was once more underlined late in May as a result of an attempt by General Moses, the 1st Army Group G–4 and chief of the U.S. administrative staff at 21 Army Group, to reopen the whole matter with a new interpretation of Forward Echelon's position, denying Forward Echelon a place on the 21 Army Group staff. General Moses' views were

[41] *Ibid.*, II, 74–75; Interv with Albrecht, 5 Jul 51.

[42] Plank was promoted to brigadier general on 24 February 1944; Lord was promoted to brigadier general on 22 February 1944.

rejected, but ETOUSA now definitely abandoned any pretension that Forward Echelon would command Advance Section while the latter was the sole section on the Continent. In a letter to General Moses ETOUSA expressly stated that the Forward Echelon would act as a staff of 21 Army Group for COMZ matters and exercise general technical supervision over the sections. Following this reply to General Moses a new directive was issued to Forward Echelon officially stating these views.

Even this interpretation of the role of Forward Echelon was only temporarily accepted for, as will be seen from later developments on the Continent, it was not acceptable to 1st Army Group. The command arrangement was inherently a difficult one, and the question of the relative authority of the deputy theater commander for supply and administration (General Lee) and the commander of the field forces (General Bradley) was still only vaguely answered. Shortly before D Day General Eisenhower himself stepped in and attempted to lay down a *modus operandi* for the two headquarters. In a letter to General Lee written on 26 May and published by ETOUSA on 1 June the theater commander specified that the Commanding General, 1st Army Group, in making recommendations concerning the priority of shipment, assignment, and utilization of field forces, and concerning the allocation of supplies and equipment to units of the field forces, was to deal directly with the deputy theater commander. Any disagreements on matters of conflicting interest were to be referred to the theater commander for decision. In short, an attempt was being made to render workable by co-operation and co-ordination a command arrangement in which authority could not be precisely defined.[43]

To anticipate a bit, the relative status of the FECOMZ and 1st Army Group attachments at General Montgomery's headquarters was debated once more after D Day, and agreement was reached once and for all at the end of June. The agreement gave the 1st Army Group staff under General Moses *primary* responsibility for co-ordinating the administration of U.S. forces as between the field forces on the one hand and the service forces on the other, but specified that the FECOMZ attachment was to be consulted exclusively on matters applying solely to the communications zone, and recognized the FECOMZ attachment as the staff agency responsible for dealing directly with the various COMZ sections.[44]

Meanwhile an attempt was also made to reconcile the views held by the ETOUSA-COMZ staff and the U.S. component of SHAEF regarding the evolution of the top American command on the Continent. Linked with the concept of Forward Echelon as the controlling headquarters for the Communications Zone on the Continent in the second phase was the idea that Forward Echelon would eventually merge into an ETOUSA-COMZ headquarters to take the place of the existing ETOUSA-SOS headquarters in the United Kingdom. Headquarters, Communications Zone, envisaged the old ETOUSA-SOS as being allowed to die, with ETOUSA-COMZ taking its place to operate in the same way. Forward Echelon, according to this view, would actually be the vanguard of Headquarters, ETOUSA-COMZ, on the Continent, though it would not be officially considered as the theater headquarters until the

[43] Organization and Command, II, 76–83.
[44] *Ibid.*, II, 130–32.

Supreme Commander established SHAEF headquarters there. While the ETOUSA-COMZ group visualized a transfer to the Continent of the basic setup existing in the United Kingdom, the SHAEF group felt that the existing ETOUSA headquarters should become merely a Communications Zone headquarters. Thus the tendency, mentioned earlier, for the American staff at SHAEF to assume some of the aspects of a theater headquarters found open expression as the time came to clarify the command and organizational structure for continental operations. This development had been a product of the ETOUSA-SOS consolidation and the transformation of COSSAC into an Allied command. The result of these conflicting contentions was to be a compromise representing something of the views of both the ETOUSA-COMZ and SHAEF groups.

General Crawford, the SHAEF G–4, presented the SHAEF staff's views to General Lee in a draft proposal on 28 May. Among the salient features of Crawford's proposal was the provision, already accepted in earlier plans, that the Communications Zone was to be placed under 1st Army Group during the transitional stage before SHAEF moved to the Continent. But the controversial feature of the proposal was the provision that SHAEF should take over the functions of the theater headquarters in the final command setup both in the United Kingdom and on the Continent. The theater commander, according to this plan, was to delegate much of his administrative authority to the major subcommands—1st Army Group, the Ninth Air Force, and Communications Zone. Such powers as he retained would be exercised from his own headquarters at SHAEF rather than from General Lee's headquarters, which up to that time had been the real theater headquarters; and SHAEF's rear echelon in the United Kingdom was to exercise such theater functions in the United Kingdom as the theater commander retained under his control. Crawford further suggested that the office of deputy theater commander be eliminated, that Headquarters, ETOUSA, as it then existed be disbanded, and that as many of its personnel as were required to perform the administrative functions of the U.S. theater be transferred to SHAEF. The remainder of the staff would be available for transfer to 1st Army Group or the Communications Zone. All communications with the War Department were to be channeled through the theater commander at SHAEF, not through the ETOUSA headquarters, where General Lee had handled this burden through the planning period.[45]

The reception that this proposal received at General Lee's headquarters can well be imagined. To the ETOUSA-COMZ staff and the chiefs of services it meant a reversion to the same setup that had existed before ETOUSA and SOS were consolidated. Recalling the difficulties of 1943, most of the service chiefs felt that the separation of COMZ headquarters, where they were based, from the theater headquarters at SHAEF would put them in a situation much like the one they had unhappily known at Cheltenham. Such a setup could lead to the same kind of unfortunate conflict as existed in World War I when the American GHQ (corresponding to theater headquarters) had persisted in maintaining its superiority over the SOS (corresponding to the Communications Zone) in supply and administration and thus frustrated all attempts to

[45] Organization and Command, II, 76, 110–12.

centralize control over these activities.[46]

The ETOUSA-COMZ staff saw many reasons why the proposed solution was not feasible. Among them was the enormous amount of routine administrative matters, comprising 90 percent of the theater's correspondence with the War Department, which would have to be handled at SHAEF headquarters. The objection was also raised, with doubtful justification, that an Allied headquarters would have jurisdiction over purely U.S. matters while the British War Office would continue to handle its own administrative affairs.

Since a decision on the whole matter rested ultimately with the theater commander, General Lee formally presented his own views to General Eisenhower in an attempt to demonstrate what he conceived to be the basic unsoundness of General Crawford's proposal. In a lengthy, vigorously stated analysis of the whole problem of command he characterized the proposal as "so diametrically opposed" to the views of the Supreme Commander, and "so far reaching in its application" that he doubted whether General Eisenhower or his chief of staff, General Smith, had given it careful consideration and were fully aware of its implications. General Lee's basic argument rested on a principle which he had expounded persistently ever since his arrival in the theater, and which had found partial implementation in the consolidation of January: "Control and responsibility for the logistical support of all combat forces must be established at the highest U.S. level."[47] This he considered a basic principle, and a major lesson from World War I experience. Control of purely U.S. administrative matters, he contended, was not feasible in an Allied organization unless there was a distinct separation between Allied staffs. The complexity and magnitude of the U.S. administrative organization precluded Allied staff integration. By way of illustration he pointed to the great volume of communications processed by the Signal Service within the theater and to the War Department—something over 1,700,000 words per day—dealing chiefly with logistic matters, and to the complexity in programing, requisitioning, transportation, storage, stock control, and issue of approximately 700,000 different items of supply.[48]

In General Lee's view the best way to accomplish the administrative support of all U.S. forces, using the minimum number of headquarters and conserving the already trained staff and technical officers and enlisted personnel, was to maintain the combined ETOUSA and SOS staffs as the U.S. administrative headquarters, reporting directly to the theater commander as at present. He implied that this arrange-

[46] The whole long struggle in the ETO was in fact strikingly similar to that of 1917–18. At that time the headquarters were separated, the GHQ at Chaumont and the Line of Communications or LOC (later called the SOS) at Tours, with all the wasteful use of personnel and duplication of effort which characterized administrative and logistical operations in the ETO in its first year and a half. Until February 1918 the chiefs of services, then called bureau chiefs, actually resided at General Pershing's headquarters, the GHQ, through which all communications with the War Department were routed, and where the G-4 insisted on passing on all SOS requests. Not until July 1918 was the SOS finally authorized to deal directly with the War Department on supply and administrative matters. See Johnson Hagood, *The Services of Supply: A Memoir of the Great War* (Boston, 1927), and James G. Harbord, *The American Army in France, 1917-1919* (Boston, 1936).

[47] Ltr, Lee to Eisenhower, 29 May 44, as cited in Organization and Command, II, 114.

[48] This is a conservative figure. It is estimated that the supply services handle between 800,000 and 1,000,000 Class II and IV items alone, exclusive of air force items. The Sears, Roebuck catalogue, by comparison, lists approximately 100,000 separate articles.

ment had worked very satisfactorily; indeed, the only difficulty to date had occurred when the SHAEF staff had attempted to occupy itself with purely U.S. administrative matters.

General Eisenhower's decisions on the matter of the organization of U.S. forces in OVERLORD were made known in a final directive to the major American subcommands on 6 June. General Lee's representations on the subject apparently weighed heavily with the Supreme Commander, for the final directive met many of the objections which the SOS chief had raised. In some respects, however, it may well be viewed as a compromise between the two views involved.

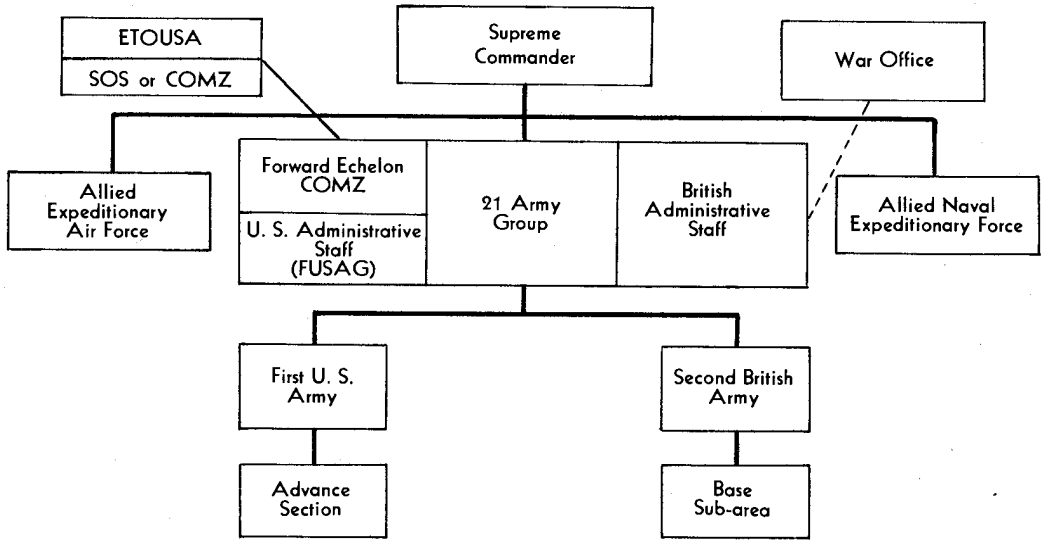
For purposes of delineating the command the directive divided the operation roughly according to the stages outlined in the COMZ plan. (*Chart 6*) During the first stage 21 Army Group was to command all Allied ground forces on the Continent, with a U.S. staff attached for the administration of U.S. troops under 21 Army Group's command. The bulk of U.S. forces, including Advance Section, was to be attached to First Army, the highest field command in this phase. The theater commander would delegate to the commanding general of First Army, "such authority and responsibility as may be practicable or desirable." Ninth Air Force was to be under the operational control of the AEAF, and under the administrative control of USSTAF. The SOS was to be redesignated the Communications Zone, and the theater chiefs of services were to be located at COMZ headquarters. Otherwise the existing U.K. organization was to be unchanged.

During the transition, or second, stage the 21 Army Group was to continue as the highest Allied ground force command on the Continent. In this period, however, the bulk of the 1st Army Group attachment to 21 Army Group was to be gradually withdrawn and the COMZ attachment, FECOMZ, completely withdrawn. Third Army would move to the Continent, and at the end of this period 1st Army Group was to be assigned an area of responsibility and assume control of the two American armies. All responsibilities previously delegated to First Army would then pass to the army group. At the same time the Communications Zone would also be extended to the Continent, and the control of Advance Section would pass from First Army to the Communications Zone. At that time General Lee would be relieved of his responsibilities as deputy theater commander. The U.K. organization was gradually to be reduced in strength. With these changes the final stage would be reached, when the more or less permanent command setup would come into operation. An advance headquarters of SHAEF would move to the Continent at that time and would assume over-all control of the ground forces, working through General Bradley as commander in chief of the Central Group of Armies (1st Army Group), and through Field Marshal Montgomery as the commander-in-chief of the Northern Group of Armies (21 Army Group). The Communications Zone would then come under the direct control of General Eisenhower as theater commander.

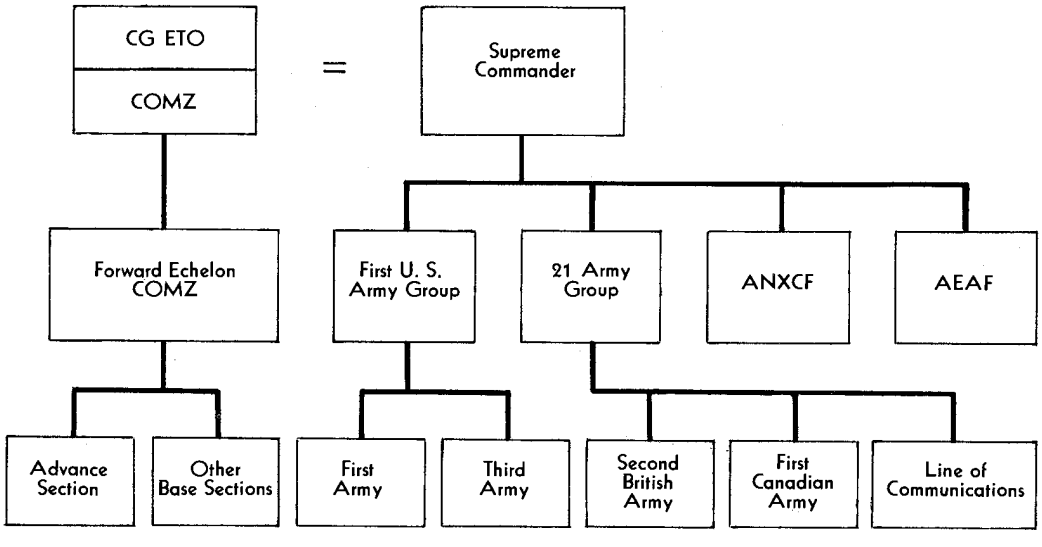
The directive also announced the theater commander's intention to delegate "all possible authority and responsibility" to his subordinate commanders: the Commander in Chief, Central Group of Armies; the Commanding General, Ninth Air Force; the Commanding General, USSTAF; and the Commanding General,

CHART 6—PLANNED COMMAND ARRANGEMENTS FOR OVERLORD

EARLY PHASES



AFTER U. S. FIRST ARMY GROUP BECAME OPERATIONAL



Communications Zone. Over such theater functions as he would personally retain he would exercise control through the U.S. element of SHAEF. But, and this was important, the COMZ headquarters was to remain the channel of communication for the theater commander to the War Department "except for those matters reserved by the Theater Commander to himself." In the United Kingdom, in accord with the liquidation program, the base sections were to be consolidated into one U.K. Base under the commanding general of the Communications Zone.

The directive was actually something of a compromise that gave concessions both to the SHAEF and 1st Army Group staff and to the ETOUSA-SOS group. For one thing, it appeared to have clearly and definitely accorded to Forward Echelon the desired and long-argued position as a staff co-ordinate with 1st Army Group at the 21 Army Group. Further, it did not provide that the communications zone would come under 1st Army Group in the transitional stage, but that it would come under the immediate control of Headquarters, Communications Zone, when Advance Section was detached from First Army. However, the Communications Zone's relationship to 1st Army Group was not entirely clarified even at this time, for 1st Army Group was to inherit all the authority previously delegated to First Army, including control of the supply and administrative support. There was still room for contention, therefore, that the communications zone would be under 1st Army Group until SHAEF arrived on the Continent. It seemed that this issue would forever elude a clear-cut solution.

Another decision that seemed unfavorable to the ETOUSA group was the termination of General Lee's position as deputy theater commander in this period. The theater chiefs of services were to remain resident at his headquarters, however, and his headquarters was to remain responsible for carrying on all routine administrative correspondence with the War Department. Actually, the functions and responsibilities of General Lee's headquarters remained the same, and the change in General Lee's position had little effect on the existing responsibilities and channels of command.

Some matters were still left in doubt. One question which might very logically arise concerned the actual location of theater headquarters. Was it at SHAEF with the theater commander, or at Headquarters, Communications Zone, where the general and special staffs of the theater resided? Apparently it was divided between the two. As was to be expected, General Lee continued to regard his headquarters as theater headquarters for some time to come, although it tended to become more definitely a COMZ headquarters instead. It might be defined legally as a COMZ headquarters charged with the performance of certain theater functions. This division of function was unique and was to call for further clarification shortly after the launching of the invasion.

Despite these deficiencies, which loom large because of the controversy they caused, the command setup for U.S. and Allied forces was well outlined by the date of the invasion. On 1 June General Eisenhower had issued a final directive outlining the command arrangements on the Allied level, but this contained no basic change. Also, on 18 May, General Bradley had at last been officially designated as commanding general of both 1st Army Group and First Army, with Lt. Gen. Courtney H. Hodges as his deputy, the

obvious intention being that Hodges should take over First Army when the army group became operational. The fulfillment of these plans which had been so long in the making was finally undertaken on 6 June, when the transfer of the U.S. organization from the United Kingdom to the Continent was begun. The operation on the Continent was soon to measure the wisdom of the command and organizational arrangements and test the work of the planners.[49]

In the final months during which the command and organizational problems were threshed out and detailed tactical and logistic plans were written, military preparations reached an unprecedented tempo in the United Kingdom. Even the smallest hamlets and rural lanes did not escape the feverish activity that characterized the operations of every depot and training area as well as of the various headquarters. A prodigious stocking of supplies and equipment took place in these months, evoking the comment that the British Isles were so weighted down with the munitions of war that they were kept from sinking only by the buoyant action of the barrage balloons which floated above the principal ports and military installations. The increasing industry was particularly noticeable in London, where the relatively subdued atmosphere of the first half of 1943 gave way to an almost frantic activity in the winter and spring of 1944. All roads led to London, for within this metropolitan area and on its fringes lay most of the principal headquarters, including those of ETOUSA-SOS; the 1st Army Group; Forward Echelon, COMZ; SHAEF; USSTAF; AEAF; and also the top British headquarters. London was therefore the nerve center of U.S. Army activity in the United Kingdom; and the Central Base Section, comprising about 700 square miles, had a larger concentration of important personnel, a greater variety of installations, and probably more problems per square foot than any other area in Britain.

The London area witnessed a tremendous growth, the strength of Central Base Section rising from about 1,000 U.S. troops in May 1942 to 30,000 in the month preceding the invasion. Nearly 10,000 of the personnel on duty in the Central Base Section were assigned to the ETOUSA-SOS headquarters.[50] In addition, London was the principal leave center in the United Kingdom, ministering to the wants of a transient population half as large as its assigned strength. U.S. forces had gradually taken over more and more accommodations in the crowded metropolitan area. In April 1942 they had occupied less than 100,000 square feet of office space, plus an officers' mess, a sales store, a garage, and several small troop billets. By May 1944, in addition to 33 officers' billets (including 24 hotels) and 300 buildings used for troop accommodations, they occupied approximately 2,500,000 square feet of space in offices, depots, garages, and shops, and a variety of installations such as post exchanges, messes, a detention barracks, a gymnasium, and clinics and dispensaries.[51]

One of the most remarkable of the U.S. installations in London was the fabulous Consolidated Officers Mess at Grosvenor House on Park Lane, only a few blocks from theater headquarters on Grosvenor Square. Occupying the Great Ball Room

[49] Organization and Command, II, 112–31.

[50] ETO Progress Rpt XCIX (12 Jun 44), Statistics Sec ETO SGS, ETO Adm 429; History of the Central Base Section, Station List, ETO Adm 587A.

[51] History of Central Base Section.



STOCKING SUPPLIES AND EQUIPMENT. *155-mm. guns and other artillery, above. Gravity rollers moving supplies in a quartermaster warehouse, below.*





INVASION EQUIPMENT. *Combat vehicles, including tanks, half-tracks, and tracked landing vehicles (LVT's) at Tidworth, above. Signal communications cables covering a field at Depot G–22, Moreton-on-Lugg, Herefordshire, below.*



of this large West End hotel, "Willow Run," as it was quickly dubbed, had been opened in December 1943 to accommodate the growing number of officers assigned to duty in London. Operated cafeteria style, with a capacity of 26 servings per minute and seating nearly 1,000 officers at a time, "Willow Run" ably lived up to its name and was a marvel of efficiency to every officer assigned to duty in the London area. Its eventual efficiency gave little evidence of the trials and tribulations which attended its opening. The payroll problem connected with its British civilian staff of between 400 and 500 was tremendous in itself, and the services of a French chef were early dispensed with when it was found that his spirit was crushed by the prospect of serving the contents of the C Ration can. The mess was eventually able to serve between 6,000 and 7,000 meals per day.[52]

While the Americans used facilities in various parts of London, the center of U.S. activity continued to be Grosvenor Square, the greater part of the buildings on three of its sides eventually being taken over. Most of the billets of the London command were located within walking distance of the theater headquarters. In nearby Hyde Park American servicemen and British civilians found mutual amusement, the Americans in listening to the daily harangues of the lunatic fringe at the Marble Arch corner, and the Londoners of the West End in "talking it up" at an American noon-hour softball game played in the shadows of the antiaircraft rocket batteries.

[52] *Ibid.*

CHAPTER VI

The Completion of BOLERO

(1) The Flow of Troops and Cargo, January–May 1944

The U.S. build-up in the United Kingdom was accomplished largely in the twelve months preceding D Day, having received its major impetus from the TRIDENT Conference of May 1943. The BOLERO operation accelerated noticeably in the fall of 1943, achieved tremendous momentum in the early months of 1944, and crescendoed, in the manner of the Ravel composition for which it was named, to its climax in May. In the five months from January through May alone the number of American forces in the United Kingdom was doubled, rising from 774,000 in December 1943 to 1,527,000 in May 1944. In cargo shipments the record was similar; upwards of 2,000,000 long tons, or 40 percent of all U.S. tonnage discharged in U.K. ports in the two and one-half years from January 1942 to May 1944, were received in the five months preceding D Day. This performance was all the more remarkable in view of the serious restriction on both troop and cargo reception imposed by the limited British port and inland transportation facilities, which in the final stages actually threatened to prevent the consummation of the build-up.

At the QUADRANT Conference in August 1943 the Combined Chiefs of Staff had agreed to have 1,416,900 U.S. soldiers in Great Britain by 1 May 1944, and shipping was subsequently set up to permit this target to be achieved. In the fall of 1943 approximately 50,000 air force troops intended for the ETO were diverted to the Fifteenth Air Force in North Africa, and at the SEXTANT Conference held by Allied leaders at Cairo in November–December 1943 the Combined Chiefs, on the basis of shipping and unit availability, lowered the U.K. troop ceiling to 1,366,000, a reduction roughly equivalent to the diversions to North Africa. Either through misunderstanding or through ignorance of this reduction ETO officials responsible for the preparation of flow charts continued to plan for and request shipments considerably in excess of the SEXTANT schedules,[1] basing their requisition on the first phase troop basis. OPD officials honored these requests at first. They even diverted some 20,000 troops from other theaters and activated additional units totaling 30,000 men, although inadequately trained, to meet the ETO's D-Day requirements. In February, however, the OPD pointed out the growing

[1] OPD officials suspected that this oversight was probably due to the fact that individuals preparing the flow charts in the ETO had not even known of the SEXTANT decisions. One OPD officer had found theater officials preparing flow charts in November without any knowledge of the QUADRANT schedules, for example, for the reason that security regulations allowed only a limited distribution of those papers. Note for Record, 29 Feb 44, OPD 320.2, Cases 210–30.

TABLE 5—TROOP BUILD-UP IN THE UNITED KINGDOM: AUGUST 1943–MAY 1944

Year and Month	Arrivals [a]		End of Month Strength				
	Monthly	Cumulative from Jan 42	Total	Ground Forces	Air Forces	Services of Supply	Hq ETO and Misc
1943							
August	41,681	424,098	278,742	39,934	152,548	79,898	6,362
September	81,116	505,214	361,794	62,583	168,999	120,148	10,064
October	105,557	610,771	466,562	116,665	200,287	148,446	1,164
November	173,860	784,631	637,521	197,677	247,052	191,208	1,584
December	133,716	918,347	773,753	265,325	286,264	220,192	1,972
1944							
January	166,405	1,084,752	937,308	343,972	317,227	273,294	2,815
February	136,684	1,221,436	1,084,057	442,474	338,317	299,710	3,556
March	124,412	1,345,848	1,199,077	488,379	375,152	325,577	9,969
April	216,699	1,562,547	1,422,276	599,425	410,562	391,994	20,295
May	108,463	1,671,010	1,526,965	620,504	426,819	459,511	20,131

[a] By ship. Excludes movements by air.

Source: Troop arrivals data obtained from ETO TC Monthly Progress Rpt, 30 Jun 44, ETO Adm 451 TC Rpts. Troop strength data obtained from Progress Rpts, Progress Div, SOS, 4 Oct 43, ETO Adm 345 Troops, and from Progress Rpts, Statistical Sec, SOS, ETO Adm 421–29. These ETO strength data were preliminary, unaudited figures for command purposes and, while differing slightly from the audited WD AG strengths, have been used throughout this volume because of the subdivision into air, ground, and service troops. This breakdown is unavailable in WD AG reports.

discrepancy to the theater and asked for additional information on the theater's needs so that adequate preparations could be made for the shipment of units.[2]

The high rate of troop shipments created no particular difficulty in the winter months, except for the problem of providing adequate accommodations in the United Kingdom. Record shipments from November through April averaged almost 160,000 men per month, and reached a peak of 216,700 arrivals in the month of April. *(Table 5)* Shipping plans for May were a more serious matter since outloading for the cross-Channel operation was to begin that month and was bound to restrict movements into the United Kingdom by limiting port and inland transportation facilities. On 20 April the War Department informed the theater that, in compliance with its requests, it was making available and had set up shipping for 167,000 men in May, 140,000 in June, and 148,000 in July.[3] The SEXTANT schedule had provided for the shipment of only 122,600 in May, 121,100 in June, and 142,800 in July. The lack of co-ordination in the troop flow planning was shortly revealed by the reply from the theater that it had planned accommodations for only 118,000. The War Department then offered to reduce the shipments for May and asked the theater which units it desired

[2] Cbl, OPD to ETO, 29 Feb 44, and Note for Record, OPD, 29 Feb 44, OPD 320.2, Cases 210–30; Memo, Handy for DCofS, sub: Availability of Units for U.K., 29 Dec 43, OPD 320.2, Sec III, Cases 65–71.

[3] Cbl WAR–25883, Marshall to Eisenhower, 20 Apr 44, OPD 370.5, Sec XII, Cases 412–47.

backlogged to later months. The SEXTANT schedule, answered the theater immediately, did not provide adequate support for the operation as then planned. It argued that at least 151,000 of the 167,000 set up for May shipment were of vital importance to the operation, since they comprised many units already overdue. In the meantime the British War Office had made it known that British port and rail capacities in May, June, and July were capable of receiving only the numbers agreed on at SEXTANT, and stood firm on those ceilings.[4]

ETOUSA asked the War Department to submit the whole matter to the Combined Chiefs for decision, with the request that it raise the shipping goal to 151,000 in May, 152,000 in June and 152,000 in July.[5] Since the problem was not one of shipping or availability of troops, and centered rather on the question of British port and rail capacity, the War Department instructed that these difficulties be taken up by SHAEF and the British Chiefs of Staff.[6] Within a few days the whole matter was ironed out, and on 28 April ETOUSA informed OPD that the British had agreed to maximum shipments of 132,000 in May, 125,700 in June, and 122,000 in July, thus raising the SEXTANT schedule somewhat for May and June. The inability of the theater to receive the troops which the War Department had made available, and the imposition of these ceilings, had the net effect of creating a cumulative deferment of approximately 75,000 troops by August, and made it necessary for the theater to respecify its priorities for shipments of units.[7]

Establishment of these ceilings did not in the end have a serious effect on the build-up. As usual, there still were certain shortages in service units, and because of an urgent need for certain types of units the theater had again reluctantly called on the War Department in April to ship partially trained units.[8] The U.S. force in the United Kingdom on the eve of D Day was therefore not as perfectly balanced a force as was desired, and the shipment of certain combat elements had been deferred. But in total numbers the BOLERO build-up had in fact exceeded the target of not only the SEXTANT but the earlier and higher QUADRANT build-up schedule. By 31 May twenty divisions had arrived in the United Kingdom, and the theater's strength stood at 1,526,965 men, approximately 50,000 more than the 1,476,300 which SEXTANT schedule had called for on that date. The composition of this force was as follows:

Type	*Number*
Total	1,526,965
Ground Forces	620,504
Air Forces	426,819
Services of Supply	459,511
Headquarters, ETO, and other	20,131

The cumulative arrivals in the United Kingdom over the past two and one-half years actually exceeded 1,750,000 men, some of whom had been withdrawn for

[4] Cbl 88589, WO DQMG (M) to BAS Washington, 21 Apr 44, SHAEF G-4 381 BOLERO I 44.

[5] Cbl E-25062, CG ETO to WD, 26 Apr 44, and Note for Record, BOLERO Personnel for U.K. in May, Jun, and Jul, 26 Apr 44, OPD 370.5, Sec XII, Cases 412-47.

[6] Cbl W-28487, OPD to ETO, 26 Apr 44, SHAEF G-4 BOLERO I 44.

[7] OPD later noted that it had actually set up 180,000 for May shipment and that the backlog was even greater. Memo, Col Alexander D. Reid, Chief European Sec OPD, for Handy, 1 May 44, sub: Revision of Troop Flow to U.K., OPD 370.5, Sec XII, Cases 412-47.

[8] Cbl WAR-26204, OPD to CG ETO, 19 Apr 44, and Cbl E-25337, Smith to Handy, 28 Apr 44, P&O Cbl Files.

the North African operation. Of this total, 1,671,010, or about 95 percent, had been transported to the theater by ship, the remainder by air. Approximately 59 percent of the total troop movement to the United Kingdom was carried out by the usual convoys of slow-moving troop transports. But in contrast with the practice of World War I, considerable use was made of fast passenger liners converted to troopships, which could cross the Atlantic unescorted, protected only by their speed, submarine and plane detection devices, and light armament. The largest and fastest of these vessels were the British Cunard White Star luxury liners, the *Queen Mary* and *Queen Elizabeth*. The two *Queens* were capable of shuttling back and forth across the Atlantic with a remarkably short turnround, each of them making three round trips per month and carrying 15,000 troops on each voyage. These two ships alone carried nearly 425,000 American troops to the United Kingdom, accounting for 24 percent of the entire build-up. Along with several other liners of large capacity, such as the *Aquitania* (a veteran of World War I), the *Mauretania*, the *Ile de France*, the *Nieuw Amsterdam*, and the *Bergensfjord,* they carried about 36 percent of the American troops going to the United Kingdom and played a significant and often dramatic role in the prologue to continental invasion.[9]

The limited port and transportation facilities in the United Kingdom were to have a much more serious impact on cargo shipment than on personnel movement, and in fact acted as an aggravating stricture which dominated the course of the supply build-up in the final months before D Day. British officials had given warning of this potential limiting factor as early as January 1943 at the Casablanca Conference. The entire problem was more fully aired in August 1943, by which time the BOLERO build-up had finally become a definite undertaking and was achieving considerable momentum. The reception and handling of cargo posed no particular problem at that time. Until early 1944, when the import program reached its peak, there was every assurance that British labor, with the help of an increasing number of U.S. port battalions, could discharge the tonnages scheduled for shipment to the United Kingdom.[10] The period of greatest danger for the build-up would arrive just before the actual movement across the Channel, the period in which the reception and inland movement of BOLERO cargo would overlap the movement of men and supplies into the marshaling camps and ports. British officials pointed out that the resulting strain on port, railway, and highway facilities might well prove unbearable. Competition for the use of those facilities would be even further aggravated, they noted, by the necessity of withdrawing coastal shipping and refitting it for cross-Channel operations, since this would divert additional traffic to the railways. Moreover, the "sterilization" of berths in the southern ports for the assembly and loading of OVERLORD vessels would divert BOLERO shipping to the northern ports, creating

[9] Troop and Supply Buildup in the United Kingdom to D Day, Pt. III of The Administrative and Logistical History of the ETO, prep by Hist Div USFET, 1946, MS, pp. 97–98, OCMH; [Harold Larson] Troop Transports in World War II, Office CofT, ASF, Mar 45, MS, pp. 20–23, OCMH. The story of troop movement techniques from the Transportation Corps viewpoint is told in Chester Wardlow, The Transportation Corps: Movements, Training, and Supply, now in preparation for this series.

[10] Memo for Info 2, BOLERO-SICKLE Combined Committee (W), Incl, Sep 43, ASF Plng Div, BOLERO-SICKLE Com, Series II, A46–183, Item 2.

an additional burden on the railways because of the longer hauls involved.[11]

The increasing strain on inland transportation facilities was later illustrated in the handling of a single convoy in March 1944, even before the tempo of invasion preparations reached its height. This convoy included eighteen fully loaded U.S. Army cargo vessels and twenty-four part cargoes loaded on regular commercial ships. It contained about 1,500 wheeled vehicles, tanks, and self-propelled mountings, 2,000 cased vehicles, 200 aircraft and gliders, and about 50,000 tons of supplies. All this cargo had to be discharged within about eight days, the planned interval between convoys. The prompt clearance of this cargo from the ports involved the running of 75 special trains with 10,000 loaded cars and the movement by highway of large numbers of wheeled and cased vehicles and aircraft. The traffic in supplies procured locally from the British, and the traffic between U.S. depots, involved the dispatch of another 8,000 cars and the running of 27 trains. The movement of U.S. Army cargo thus necessitated running a minimum of 100 special freight trains with 18,000–20,000 loaded cars weekly, many of them using routes already overburdened with traffic.[12]

The question of port capacity was primarily one of labor shortages, although the availability of berths was also a consideration. In the spring months the port labor problem would inevitably be aggravated. The British estimated that all their military labor would have to be withdrawn on 1 April for operational purposes, and southern ports would require an augmented labor force for the outloading for OVERLORD. In September British officials made it clear that civil labor could be made available to handle a maximum of only seventy-five BOLERO ships per month, and it was agreed by General Ross and General Lord that U.S. port battalions would be provided to handle all ships in excess of that number. To bring in the approximately 150 ships per month desired in the early months of 1944, U.S. port labor might therefore have to handle up to one half of all BOLERO imports at the peak of the build-up.[13]

For these reasons the British felt it imperative that the BOLERO shipments be decelerated in the spring of 1944. They asserted that the reduction would have to start not later than with the March shipments from the United States if OVERLORD was to be launched on 1 May.[14] At QUADRANT and again at SEXTANT they had succeeded in imposing a definite ceiling on the tonnages (actually expressed in numbers of ship sailings) which could be dispatched to the United Kingdom in the next several months.

In view of the inevitable limitation on the reception of BOLERO cargo in the months just preceding the invasion it was logical that an extraordinary effort be made to ship cargo to maximum capacity in the fall of 1943. Heavy shipping schedules were in fact set up for the fall and winter months, but the low priority of the European theater, which in turn was imposed by the unavailability of supplies and equipment in the United States prevented the complete fulfillment of the pre-

[11] Memo, VQMG for WO *et al.*, 12 Aug 43, SHAEF G-4 381 BOLERO I 44.

[12] Info Bull 10, Bolero Reception—Accommodation—Maintenance, Q(L) Br, 1–31 Mar 44, SHAEF G-4 381 BOLERO I 44.

[13] Memo of Mtg at WO, 14 Sep 43, SHAEF G-4 381 BOLERO I 44.

[14] Paper by Deputy Dir, Mov and Tn Br, BOLERO Repercussion on OVERLORD, 11 Aug 43, SHAEF G-4 381 BOLERO I 44.

shipment program.[15] This most pressing of the supply build-up problems—priorities—was finally settled in December 1943, when the European theater was assigned top priority for all needed items of equipment. Even so, the solution had no immediate effect in the theater. Not until February did the flood of cargo released under the new priorities begin, and even this was not reflected in the receipts at British ports until the following month. In March a record 467,824 long tons arrived in the United Kingdom for U.S. forces. Preshipped supplies now enjoyed the same priority as regular shipments, and in March the preshipment program was formally extended several months beyond the first phase troop basis, thus guaranteeing a continued ample availability of supplies and equipment.

But it was at precisely this moment that port and inland transportation limitations in the United Kingdom inexorably imposed themselves on the entire build-up program, threatening to nullify the favorable position which the theater had only recently attained in the matter of priorities and availability of cargo. A large backlog of cargo accumulated in the area of the New York Port of Embarkation, making it necessary for the service chiefs in the theater to establish priorities for movement in order to insure the shipment of cargo considered most essential for the coming operation.[16] By 1 May, it was estimated, there would be a backlog of approximately 540,000 measurement tons at the New York Port and a shortage of sixty-one ships to move this cargo, even assuming that it could be received in the United Kingdom.[17]

This development was not entirely unforeseen. At SEXTANT it was noted that the availability of heavy construction equipment, weapons, and vehicles would increase very rapidly early in 1944, creating a difficult shipping problem for the ports of embarkation as well as the U.K. ports and forcing shipments in March and April beyond the established ceilings. The situation was discussed at that time with General Lee, who advised that, if necessary, arrangements could be made to exceed the ceilings, and it was therefore hoped that, somehow, the cargo would be accepted in the United Kingdom.[18]

Realities soon had to be faced. Initially a request was made that the ceilings be lifted, and for March the allocation of shipping was first raised from 109 to 120, and then to 140. In April, as a result, a record 496,384 long tons reached the United Kingdom. *(Table 6)* But these shipments in excess of the limits agreed to at SEXTANT were made possible mainly because the cross-Channel operation had by that time been postponed a month (to June), and the pressure on port and transportation facilities was temporarily relieved.[19] Other remedies would have to be found in succeeding months.

A partial solution was found in the use of shipping to store supplies temporarily in U.K. waters until they were required either in the United Kingdom or on the Continent. The theater made a proposal

[15] Memo, Magruder for Col Witten, Control Div ASF, 18 Mar 44, sub: Shipping vs. Cargo, Plng Div ASF, A46-371, Shipping File X 44.

[16] Memo, Brig Gen W. A. Wood, Deputy Dir for Plans and Opns, ASF, to CG ASF, 13 Apr 44, sub: Status of Shipments to U.K., Plng Div ASF, A46-371, Shipping File X 44.

[17] Memo, Magruder for Witten, 18 Mar 44, sub: Shipping vs. Cargo.

[18] *Ibid.*

[19] [Richard M. Leighton]The Problem of Troop and Cargo Flow in Preparing the European Invasion, 1943-44, prep in Hist Sec, Control Div, ASF, 1945, MS (hereafter cited as Problem of Troop and Cargo Flow), pp. 160-61, OCMH.

TABLE 6—CARGO FLOW TO THE UNITED KINGDOM: NOVEMBER 1943–JULY 1944

Year and Month	Monthly Shipments (Measurement Tons)	Received			
		Measurement Tons		Long Tons	
		Monthly	Cumulative from Jan 42	Monthly	Cumulative from Jan 42
1943					
November	848,054	790,754	6,935,640	322,757	2,838,095
December	910,482	1,008,150	7,943,790	378,078	3,216,173
1944					
January	982,738	886,359	8,830,149	281,588	3,497,761
February	1,170,235	815,948	9,646,097	233,722	3,731,483
March	1,370,183	1,443,248	11,089,345	467,824	4,199,307
April	1,637,690	1,478,651	12,567,996	496,384	4,695,691
May	2,003,987	1,482,294	14,050,290	601,615	5,297,306
June	1,815,145	1,609,569	[a] 15,585,161	635,866	5,933,172
July	1,912,878	2,092,771	[a] 17,047,606	541,223	6,474,395

[a] Cumulative totals adjusted in source report with no indication of months in which corrections are applicable.

Source: Shipment data from [Richard M. Leighton] Problem of Troop and Cargo Flow in Preparing the European Invasion, 1943–44, prep in Hist Sec, Control Div, ASF, 1945, MS, p. 154, OCMH. Receipt data from ETO TC Monthly Progress Rpts, Hq SOS, Statistics Br, OC of T, ETO Adm 451–2.

to this effect in January, asking that a system of "type loading"—more commonly known as "prestowage"—be instituted. Vessels would be loaded with specified blocks of supplies for use on the Continent, each ship carrying a spread load of selected items of supply somewhat analogous to a general depot. Deck space was to be utilized for cargo destined for the United Kingdom. After this deck-loaded cargo was unloaded, the ships were to be consigned to the Continent where they could be discharged as needed. The plan had obvious advantages: it would save four handlings in the United Kingdom and would prevent the congestion of port and transportation facilities there.[20] As finally worked out, the prestowage plan provided for the dispatch of fifty-four ships loaded with subsistence, landing mats, clothing and equipage, and ordnance supplies, and eleven loads of ammunition, totaling approximately 500,000 measurement tons.

Shortly after the prestowage program was accepted, theater representatives offered a variant of it known as "commodity loading." This called for the loading of an unspecified number of ships (commodity loaders) either solidly with a single type of supply or with closely affiliated types of supply. Most suitable for commodity loading were such items as rations, ammunition, vehicles, and engineer supplies. Commodity loaders were easily and economically loaded. It was intended that they be held in U.K. waters until called to

[20] Ltr, Lee to CG NYPOE, sub: Type Loading, 21 Jan 44, ASF Plng Div, A46–371, Shipping File X 44.

the Continent, where they could serve either as floating depots or for bulk discharge. Nearly 150 commodity loaders and 54 preloaded ships were dispatched to Britain in the months of May, June, and July 1944, providing the theater with something like mobile depots which could be moved forward on call to back up any particular area. Both practices were costly improvisations in that they immobilized badly needed shipping for long periods of time. Commodity loading had a further disadvantage. If the enemy sank a ship so loaded, a heavy loss of one particular type of supply resulted. For these reasons the system was discouraged by the New York Port.[21]

In any event these expedients did not offer the final solution to the problem of cargo reception in the United Kingdom. No preloaded or commodity-loaded ships were sent to the United Kingdom in April. Meanwhile a ceiling of 140 ships had been established for acceptance in the United Kingdom for that month, representing approximately 1,310,000 measurement tons. Shipments actually exceeded this figure by some 325,000 tons, with the result that many vessels arriving in the United Kingdom were forced to stand idly by for lack of berthing facilities. In May, as fully predicted long before, the situation became even worse, for the OVERLORD mounting machinery was set in motion. The rising tide of traffic from the many depots and camps to the ports of embarkation gradually restricted all importation through these ports and taxed to the full the inland transportation system. It was inevitable, therefore, that the flow of supplies into the United Kingdom would have to be constricted even more. Against vigorous opposition from the Army Services Forces, the theater announced that the discharge ceiling for May and June would be lowered from 140 ships to 120.[22]

Meanwhile, theater officials for their part resisted pressure in the United Kingdom to cut imports any further. Early in May British officials were told that BOLERO shipments could not tolerate additional reductions for June. The provision of certain items of equipment for combat units was already critically behind schedule, and it looked at that time as though the Third Army would have only 60 percent of its wheeled equipment.[23] By the middle of the month, with the mounting process in full swing, the disparity between ship arrivals and port discharge capacity had become sufficiently serious to force a showdown on the entire problem. On 18 May SOS officials reported to the New York Port that British ports simply could not accommodate BOLERO cargoes at the rate at which they were arriving. Between 35 and 40 ships in excess of available berths were arriving in May, most of them with critically needed supplies. British officials stood firm in their insistence that BOLERO arrivals could be discharged only within the agreed-on monthly totals and that 120 ships was the absolute maximum that could be accepted in May.[24] To meet the increasing outload-

[21] Problem of Troop and Cargo Flow, pp. 154–60; Ltr, Lord to Lee, 3 Apr 44, sub: Rpt on ETOUSA Supply Mission to U.S., ETO Rpt of ETOUSA Supply Mission.

[22] Memo, Col Magruder for Gen Wylie, 14 Apr 44, sub: Ships set up for U.K. in May and Jun, ASF Plng Div, A46-371, Shipping File X 44; Problem of Troop and Cargo Flow, p. 162.

[23] Memo, Col K. F. Hausauer, Chief Movements Sec SHAEF, for Maj Gen Charles S. Napier, 4 May 44, SHAEF G-4 381 BOLERO I 44.

[24] TWX Conf, ETO with NYPOE, 18 May 44, EUCOM AG 560 Vessels I 44; TWX Conf with NYPOE, 22 May 44, EUCOM AG 337 NYPOE I 44; Ltr, Lord Frederick Leathers to Philip Reed, U.S. Embassy, 19 May 44, EUCOM AG 381 BOLERO; see also ASF file, ETO—1st half 1944.

ing requirements for OVERLORD it had already been necessary to allocate additional berths in the southern ports, which entailed handling a still greater portion of the incoming traffic in the northern ports and throwing an additional strain on the railways. Some British officials feared that the opportunity was being taken to clear U.S. ports irrespective of the congestion thus caused in those of the United Kingdom. Plans were even made to dump cargo in the streets and open spaces near the ports, where storage capacity was already taken up.[25]

Barely two weeks before D Day the impasse was finally resolved at the highest levels in the United Kingdom. On 20 May General Eisenhower appealed to the Prime Minister. Admitting that the import ceilings had been exceeded by nearly forty ships, he cited as the chief reason that it had been impossible to ship cargo in the desired quantities during the fall months of 1943 when the U.K. ports could have accepted it. These vessels contained large quantities of supplies and equipment vital to the success of operation OVERLORD. Eisenhower assured the Prime Minister that the matter was of grave importance, and stated that it was imperative that the ships be discharged.[26] As he later reported to the War Department, "We have simply developed one of those bottlenecks (for no one is at fault for it) incident to big operations."[27] A few days later the Supreme Commander met with Mr. Churchill and Lord Frederick Leathers, the Minister of War Transport, and prevailed upon them to adopt the only obvious solution—a cut in the British import program. That program had been subject to repeated changes. Now the British agreed to delay the delivery of 500,000 tons of cargo to make berths available for the BOLERO vessels, with the understanding that the United States would provide assistance later in the year to make up this loss.[28]

This adjustment averted the worst effects of the port crisis. After June the port capacity of the United Kingdom would gradually be supplemented by and eventually superseded by that of the continental beaches and ports which would receive cargo directly from the United States. But for the next few months British port capacity would definitely be limited, and the Army Service Forces was urged to adhere closely to the theater's loading requests and priority lists for the ships intended for both U.K. and continental discharge. General Lutes of the ASF, on the basis of his own observations of the congested ports in the United Kingdom, accordingly instructed the New York Port to accede to the theater's wishes in these matters so that the delivery of vitally needed equipment would be expedited.[29] By other special measures it was possible to maintain a tremendous flow of cargo to the United Kingdom in the final months preceding the invasion. The crisis over port capacities nevertheless had illustrated a very fundamental logistical paradox: the threat that the invasion forces might not be equipped in the presence of plenty. The

[25] Memo, First Sea Lord, on Trans-Atlantic Convoys, 23 May 44, SHAEF SGS 540 Shipping Problems; History of the Transportation Corps, ETO, prep by Int and Hist Br, Plng Div, Office CofT ETO, 1944, MS, Vol. III (April–June 1944), Movements Sec., p. 8, ETO Adm 582.

[26] Ltr, Eisenhower to Prime Minister, 20 May 44, EUCOM AG 560 AT Transports, Vessels, etc., I 44.

[27] Cbl S-52375, Eisenhower to Marshall, 23 May 44, Eyes Only Cbl File, ETO, 1943–45, Smith Papers.

[28] *Ibid.*; Cbl WAR-4559, JCS to SHAEF, 2 Jun 44, P&O Cbl Files.

[29] Cbl EX-29448, Lee to Somervell, 25 May 44, SHAEF G-4 381 BOLERO I 44; Ltr, Lutes to Goodman, 25 May 44, ASF Plng Div, A46-371, Shipping File X 44; TWX Confs, COMZ ETO with NYPOE, 25, 26, and 27 May 44, EUCOM 337 NYPE, I.

limiting factor of 1943—shortage of supplies in the United States—was now having its long-range effect on the ability to equip the OVERLORD forces, threatening an artificial shortage in the spring of 1944 because of a new limiting factor—the inability of the British ports to receive the cargo now becoming available.

In the final month of preparation 600,000 long tons of supplies arrived in the United Kingdom, and cargo continued to arrive in unprecedented volume for another two months. The May receipts had the following composition:[30]

Type	*Tons*
Total	599,739
Quartermaster	137,729
Ordnance, Total	296,523
Ammunition	101,523
Unassembled vehicles	73,436
Assembled vehicles and tanks	65,248
General	56,316
Engineer	55,984
Air Force	26,880
Transportation	22,518
Miscellaneous	60,105

Of the May total, 567,268 long tons arrived on 141 regular BOLERO ships, and 32,471 tons as part cargoes on 95 other vessels. By 31 May a cumulative total of 5,297,306 long tons, or 14,050,290 measurement tons had been received in the United Kingdom.

(2) Construction and Local Procurement, 1943–May 1944

For more than six months after the North African operation was launched, the limitations imposed by the War Department had circumscribed development of administrative facilities for U.S. forces in the United Kingdom. Except for the beginning made toward meeting the enlarged air force requirements, the Americans could offer little assistance in the construction program. Fortunately British officials had continued with portions of it, and in May 1943 the TRIDENT decisions injected new life into the program. In reviving the BOLERO build-up, these decisions inevitably had a corollary impact on U.K. plans for accommodating the BOLERO force. The Combined Chiefs of Staff had noted in their final report to the President and Prime Minister that "the expansion of logistical facilities in the United Kingdom will be undertaken immediately."[31]

Within a few days of the Washington Conference General Lee and others of his staff, including his Chief Engineer, General Moore, met with the British Quartermaster General, Gen. Sir T. S. Riddell-Webster, and other British officers to initiate planning for the revived BOLERO. Six weeks later, on 12 July 1943, the Deputy Quartermaster General (Liaison) issued the fourth and last edition of the BOLERO Key Plan for the reception, accommodation and maintenance of U.S. forces in the United Kingdom. The fourth edition of the plan did not differ substantially from the earlier editions except to bring them up to date by reflecting the most recent build-up schedules. It used the round figure of 1,340,000 for the build-up expected by 30 April 1944, thus allowing a small margin of safety over the figure used at TRIDENT (1,300,300).[32] Finally, in October the figure was raised to 1,446,100

[30] Info Bull 12, BOLERO, Q(L) Br, 1–31 May 44, SHAEF G-4 381 BOLERO I 44.

[31] CCS 242/6, 25 May 43.

[32] Key Plan for the Reception, Accommodation and Maintenance of the U.S. Forces, Fourth Edition, 12 Jul 43, Q(L) Paper 12, ETO, Fourth Key Plan.

in an amendment reflecting the new troop build-up schedule agreed to at the QUADRANT Conference in August.[33]

Since the scheduled U.S. troop build-up represented an increase over that used in earlier plans, the Fourth Edition also called for an enlarged accommodations plan, and therefore entailed a larger construction program. Within the U.S. Army in the United Kingdom the provision of all facilities, by construction or other means, was the responsibility of the chief engineer. The requirements of the various services were first co-ordinated and consolidated by the Installations Branch, G–4, SOS, which administered the entire accommodations plan. Once these requirements were determined, however, it was the responsibility of the Engineer Service to acquire the facilities. The Engineer Service, in turn, arranged for the construction of the needed facilities, or for the transfer of existing accommodations, with the Office of the British Quartermaster General (or Q Branch), its principal point of contact with that agency on policy matters being the Quartermaster Liaison Branch, Q(Liaison), which had been specifically set up under General Wootten for that purpose in 1942.

When adequate facilities did not exist or could not be transferred for American use, the U.S. base section engineer and the British command concerned selected a site where the accommodation could be constructed, and the Q Branch was then asked to requisition the property. Once a project was approved, the actual construction of the new facility might involve several British government departments. The Ministry of Works and Planning, which supervised the entire project and constructed the hospitals and many of the depots and camps, had to turn to the Ministry of Supply for materials and to the Ministry of Labor for workers. The Ministry of War Transport constructed railways, roads, hardstandings, and docks. The Ministry of Agriculture arranged for the clearance of land needed for the new installations.

Much of the real work was accomplished at lower levels. Within the Office of the Chief Engineer, SOS, it was the Construction and Quartering Division which was in actual charge of the accommodations program, and had direct contacts with the various British directorates under the Deputy Quartermaster General and Engineer-in-Chief, such as the Directorates of Quartering, Movement, Transportation, Fortifications and Works, and Engineer Stores. Once it was determined that the necessary labor and materials were available, details of the project were worked out between the U.S. base section engineer and the corresponding British command, and construction could then proceed. The procedure for arranging for new construction was a cumbersome one, particularly in the early stages, each project requiring the approval of several agencies in the War Office. The resulting delays often tried the patience of American authorities, for on the U.S. side construction was much more decentralized, the base section and district commanders having considerably more leeway to authorize expenditures for construction projects.[34] On the other hand, British officials were exasperated by the

[33] Amendment 1 to Fourth Edition, Key Plan, 30 Oct 43, Q(L) 1/10 Paper 13, ETO, Fourth Key Plan.

[34] Final Report of the Chief Engineer, ETO, 1942–45, prep in Office CofEngrs ETO, 1946, MS (hereafter cited as Final Engineer Report, ETO), I, 229–32, OCMH; Construction in the United Kingdom, MS, pp. 11–12, ETO Adm 506; Maj. Gen. A. G. B. Buchanan, "Bolero," *The Royal Engineers Journal*, LIX (September, 1945), 185–86.

repeated modifications in the plans of the Americans.

Virtually all construction in the United Kingdom was carried out to meet established War Office standards on such matters as space scales, types of huts, methods of flooring in hospitals, layouts for buildings, and screening and blackout facilities. U.S. scales differed from the British, and some modifications were made to meet American requirements, but U.S. standards had to be relaxed somewhat to meet accommodations requirements in the fall of 1943 when U.S. troops began to arrive in great numbers.

U.S. War Department construction designs proved of little use, for they called for a much greater quantity of wood than was available in the United Kingdom. British resources and practice dictated a much more extensive use of tile, plasterboard, sheet steel, corrugated iron, and precast concrete, and most facilities therefore took the form of steel Nissen huts, curved asbestos or prefabricated concrete huts for housing, and various types of steel huts for covered storage and shops. U.S. troop labor was not accustomed to working with these materials and required additional training. The use of these materials also resulted in the construction of more durable structures than was customary in a theater of war.

British and U.S. construction methods also contrasted because of the difference in tools and equipment. In general, U.S. engineer units were equipped with heavier-duty machinery, best suited for work on large projects such as depot and airfield construction in which extensive earth-moving jobs and concrete construction were called for. Much of the work that British labor had to perform by hand was carried out with patrol graders, bulldozers, mobile cranes, paving and trenching machines, and post-hole diggers where U.S. engineers were employed. By the time U.S. units so equipped arrived in England many of the larger construction projects had already been assigned to British labor, both civil and military, and U.S. engineers initially were dispersed over a number of minor jobs for which they were not best suited. Not until the large depots and airfields were authorized in 1943 were they utilized to best advantage.[35]

BOLERO construction policy from the beginning envisaged that all labor and materials would be provided by the British, with only incidental help from U.S. engineer units. But it was soon apparent that construction requirements would exceed British capacities. U.S. forces were therefore called on to provide a substantial contribution in materials and equipment as well as in military labor, and it became necessary to requisition items like lumber, cement, and pipe from U.S. depots.

The Fourth Key Plan, as amended in October 1943, estimated that the U.S. Army would require accommodations for 1,027,400 ground and service troops in the United Kingdom by 1 May 1944. In addition, the British War Office undertook a commitment to provide quarters for 33,000 U.S. air force personnel, the bulk of the air force requirements remaining the responsibility of the British Air Ministry. The War Office program therefore called for 1,060,400 spaces.[36]

This housing was acquired either by billeting, by the transfer of existing ac-

[35] Buchanan, *op. cit.*, pp. 185–86; Final Engineer Report, ETO, I, 232–34.

[36] Amendment 1 to Fourth Edition, Key Plan, 30 Oct 43, Q(L) 1/10 Paper 13, ETO, Fourth Key Plan.

commodations, or by new construction. Billeting of troops in British homes was avoided as long as possible and remained on a voluntary basis until the end of 1943. Requisitioning was resorted to only when the build-up reached its peak in the winter and spring months. Although some incidents caused bad feelings between civilian householders and soldiers, most of the apprehensions and anxieties regarding the effect on Anglo-American relations proved unfounded.[37] About 110,000 billets were provided for American troops, accounting for a small portion of the total personnel accommodations.

Approximately 60 percent of all troop quarters were acquired by requisition or transfer of existing facilities, the remaining 40 percent consisting of new construction. Most of the accommodations turned over by the British required additional work to bring them up to U.S. standards. Americans were notoriously wasteful in their use of water, for example, and additional facilities had to be constructed to provide an adequate supply. New accommodations took the form of tented expansions of existing camps, hutted camps, winter tented camps, and summer tented camps, and did not come into extensive use until late in 1943. Since U.S. troop labor for construction work was lacking earlier in the year, U.S. scales of accommodation were reduced to scales comparable with the British, and maximum use was made of existing facilities. Most familiar of the various camp structures was the Nissen hut, a utilitarian structure which was used for living quarters, administration buildings, hospitals, mess halls, bath houses, and a variety of other purposes. A typical 1,000-man Nissen hut camp contained 123 buildings and covered about 40 acres. Tented accommodations were built to U.S. designs and caused no great difficulty. A typical 1,000-man tented camp contained about 200 tents and covered 34 acres.

The BOLERO housing program met requirements with remarkable accuracy. Available accommodations totaled 1,206,349 at the end of May, at which time the ground and service force troop strength was approximately 1,100,000. Since only about 90 percent of theoretical capacity could be counted on because unit strengths did not exactly coincide with camp capacities, the available housing almost exactly met U.S. needs. At no time was there an actual shortage.

The Air Ministry had provided accommodations, in addition to those under the BOLERO program, for 442,170 U.S. air force troops, bringing the total to 1,648,519. Another substantial addition in the housing program over and above the BOLERO needs had been made in the spring of 1944, when it was decided to prepare for bivouac camp facilities for 171,250 extra troops that would have to be accommodated in the event of a delay in launching the OVERLORD operation. Tented facilities were built in the marshaling areas near the ports to accommodate another 200,000 troops during the mounting phases of the cross-Channel attack. The aggregate of all personnel accommodations provided U.S. troops in the United Kingdom just before D Day therefore totaled 2,021,387. The types and sources of these accommodations are summarized in the table on the following page.[38]

[37] Basic Needs of the ETO Soldier, Pt. XI of The Administrative and Logistical History of the ETO, MS, Vol. I, Ch. III, pp. 43ff., OCMH.

[38] Final Engineer Report, ETO, I, 237–39, 250, and II, App. 24; Construction in the United Kingdom, pp. 13–15.

Type	Total	Acquired or Requisitioned	Constructed by: U. S. Army	Constructed by: British
Total in United Kingdom	2,021,387	[a]	[a]	[a]
Total BOLERO Program	1,206,349	729,107	348,503	128,739
Hutted camps	665,986	612,131	50,230	3,625
Expansions to hutted camps	56,985	0	12,930	44,055
Expansions in winterized tents	59,687	0	59,687	0
Summer tented camps	192,564	0	179,064	13,500
Winterized tented camps	30,470	0	30,470	0
Accommodations at hospitals	56,437	5,386	672	50,379
Accommodations at depots	32,630	0	15,450	17,180
Billets	111,590	111,590	0	0
Total U. S. Air Forces	442,170	37,024	404,606	0
Existing facilities	37,024	37,024	0	0
Hutted camps	348,436	0	348,436	0
Tents	56,170	0	56,170	0
Total OVERLORD	372,868	[b]	[b]	[b]
Mounting accommodations	201,618	[b]	[b]	[b]
Bivouac facilities	171,250	[b]	[b]	[b]

[a] Not available because of lack of OVERLORD data.
[b] Not determined in source report.

Provision of hospital requirements did not proceed as smoothly. Hospital construction had lower priority than either depot or personnel needs. Its high building standards meant detailed supervision and greater demands for skilled labor and scarce materials. Furthermore, it was a considerably larger undertaking because existing facilities met only a small fraction of the total needs, and it was thus necessary to provide the great bulk of medical facilities through new construction. The various sources of hospital facilities have already been described. A small percentage of the eventual U.S. requirements was initially met by the transfer of certain permanent military hospitals and also several Emergency Medical Service hospitals. But the BOLERO planners had estimated that the great bulk of U.S. requirements would have to be met by the use of militia, conversion, and dual-purpose camps, and by the construction of regular station and general hospitals. In 1943 the acquisition of hospitals proceeded on the basis of the 90,000-bed requirements estimated in the Second Edition of the BOLERO plan. In order to give some stability to the hitherto uncertain construction plans, the chief surgeon announced in June 1943 that the



TYPICAL MEDICAL INSTALLATIONS: *Interior of ward, above. Nissen hut hospital, below.*



goal would be to procure facilities with 90,000 to 95,000 fixed beds.[39] This program remained fairly stable despite the fact that the Fourth Edition of the Key Plan, issued the following month, called for a larger troop build-up than before and stated a requirement for 103,690 beds.

Hospital capacities had already been altered in the Second Edition of July 1942, when station hospitals were increased in size from 750 to 834 beds, and general hospitals from 1,000 to 1,082 beds. The increased requirements were to be met largely through expansions of hospitals already planned. The first step in this expansion was taken in the summer of 1943 when the Surgeon General of the Army urged that a greater number of 1,000-bed hospital units be utilized in the United Kingdom. Such an increase of general hospitals required the expansion of the 834-bed station hospitals. Under new austerity quartering scales these station hospital plants were able to accommodate the staff personnel of a 1,000-bed general hospital with but little additional construction, and some of the station hospital units were eventually replaced or expanded to 1,000-bed units.[40]

In January 1944 plans were made to increase the patient capacity of all station and general hospitals by 30,000 beds. U.S. troop labor was to be used for the job of providing 27,750 beds in tented expansions, using standard war tents adjacent to existing hospital wards, and an additional 2,250 beds in three 750-bed, completely tented hospitals. The labor force was recruited chiefly from medical operating personnel not immediately needed in their assigned role, and the engineer service performed the necessary siting and technical assistance. Plans were also made for an additional 10,907 expansion beds to be set up in existing wards. By the beginning of June, after many changes, the hospital program called for 93,280 fixed beds and 40,907 tented expansion beds, or a total of 134,187.[41] This was a maximum program, however, and was not expected to be completed for several months. The fixed bed portion of the program was to be met as follows: [42]

Total		93,280
Existing beds		11,746
Expansions		5,597
New hospitals		47,508
35 station	29,106	
17 general	18,402	
Convertible		28,429
Militia barracks	14,929	
Conversion camps	7,500	
Dual-purpose	6,000	

The hospital construction program lagged from the beginning. As usual, the principal reason was the shortage of labor, particularly in the skilled categories required in this type of construction. Building a hospital was a considerably more complex undertaking than building a barracks or a warehouse. Special attention had to be given such matters as the installation of special electrical and plumbing fixtures, steam boilers, and hot-water generating systems. Innumerable complications attended the construction and operation of medical facilities. Mechanical dishwashers, for example, required additional construction because British-designed grease traps could not cope with the large amount of fats present in Ameri-

[39] Administrative and Logistical History of the Medical Service, Com Z, ETO, prep by Office, Chief Surgeon, ETO, 1945, MS, Ch. II, pp. 48–49, ETO Adm 581.

[40] *Ibid.*, Ch. II, p. 51, Ch. VII, p. 20.

[41] *Ibid.*, Ch. VII, p. 26; Final Engineer Report, ETO, I, 240.

[42] Buchanan, *op. cit.*, p. 187.



AERIAL VIEW OF A STATION HOSPITAL *(tented) in England.*

can foods. This also created an additional problem at the sewage disposal plants, where grease fouled up the filtering beds. Even the type of flooring used in operating rooms took on such importance as to require high-level policy decision.

The majority of the newly constructed hospitals eventually consisted of 834- and 1,082-bed installations based on standard layouts designed by British experts and approved by American engineers and medical officers, although there were deviations to meet local conditions. While some were built of brick, most hospitals utilized Nissen huts, the standard 1,082-bed installations requiring about 160 buildings and 50 acres of land. Many were located on landed estates, miles from a railway and requiring completely new water and sewage disposal systems.[43]

By D Day 59,424 fixed beds of the original BOLERO program were in operation, and 24,786 of the tented expansions were completed, bringing the available facilities at that time to 74 hospitals (43 general and 31 station) with 84,210 beds.[44] While

[43] Final Engineer Report, ETO, I, 242–43.

[44] ETO Medical Service History, Ch. VII, pp. 27–29. The Final Engineer Report, ETO, I, 43, states that only 63,389 beds were available on D Day, since it does not list any tented expansions as completed at that time. The theater medical history, however, lists 74 hospitals with specific tabulations of normal plant beds and expansion beds in each. The discrepancy is not explained.

Type	Unit	Total	Acquired or requisitioned	Constructed by: U. S. Army	Constructed by: British
Covered storage and shop. .	sq. ft.	19, 905, 070	13, 415, 735	2, 567, 351	3, 921, 984
Opening and hardstanding .	sq. ft.	43, 411, 525	5, 486, 880	22, 214, 307	15, 710, 338
Roads and railways	miles	269.80	0	86.04	183.76
POL storage	tons	173, 325	4, 005	163, 965	5, 355
Vehicle storage	veh.	48, 350	6, 100	39, 250	2, 000
Ammunition storage. . . .	tons	448, 100	148, 000	177, 000	123, 100

the completed construction thus fell short of the target of the BOLERO Fourth Edition, the deficiency was not as serious as it first appears. Shortly after D Day the evacuated militia, dual-purpose, and conversion camps were turned to hospital use. General Hawley, the chief surgeon, was satisfied, as D Day approached, that the facilities would be adequate, and had particular praise for the quality of the physical plant. British construction had maintained a high standard, and the program had been carried out at considerably lower cost than would have been possible in the United States.[45]

The depot program proved to be the best organized and best executed of all the BOLERO accommodation plans, despite the fears of 1942 that storage space would fall short of requirements. Its success was due in part to the fact that depot construction was accorded the highest priority and did not suffer as much from the shortage of labor and materials, and also to the fact that existing facilities provided more than two thirds of the required covered storage space. The Engineer Corps, either by acquisition or new construction, eventually provided almost 20,000,000 square feet of covered storage and shop space (of which only 6,500,000 square feet was new construction), 43,500,000 square feet of open storage and hardstandings, and additional facilities for the storage of 450,000 tons of ammunition, 175,000 tons of POL, and vehicle parks for nearly 50,000 vehicles. Not all of these facilities were in use on D Day. Their source is tabulated above.[46]

Insofar as possible, storage facilities, like other accommodations, were constructed according to standard layouts. A model general depot was planned and first built at Wem, near Shrewsbury in western England. It had 450,240 square feet of covered storage, 1,375,000 feet of open storage, and personnel accommodations for 1,250. Construction was begun in December 1942 and the depot was completed in June of the following year at a cost of $2,360,000. On this model five other depots, commonly known as "Wems," were then built, one each at Boughton in Nottinghamshire, at Histon near Cambridge, at Honeybourne northeast of Cheltenham, at Lockerly near Salisbury, and at Moreton-on-Lugg northwest of Cheltenham. (*Map 6*) Those at Histon and Lockerly were built entirely by U.S. troops, and all took roughly six months to complete. The largest depot of all was constructed at Sudbury-Egginton, near Burton-upon-Trent, with more than 1,000,000 square feet of covered and 9,500,000 square feet of open space. It was built entirely by the British at a cost of approximately $6,600,000.[47]

[45] Maj Gen Paul R. Hawley, The European Theater of Operations, May 44, MS, p. 10, ETO Adm 519.

[46] Final Engineer Report, ETO, I, 244-45, II, App. 26.

[47] Buchanan, *op. cit.*, pp. 186-87. All dollar values represent pounds converted at the rate of 4 to 1, which was the approximate exchange rate at the time.


U. S. GENERAL DEPOTS AND MAJOR TRAINING SITES
May 1944
GENERAL DEPOTS
ATC ASSAULT TRAINING CENTER
50 0 50
MILES
NORTH SEA
IRISH SEA
ENGLISH CHANNEL
FRANCE
EIRE
NORTHERN IRELAND
Greenock
Glasgow
Gourock
Clyde R.
Prestwick
Firth of Clyde
Langford Lodge
BELFAST
Warton
Humber R.
Hull
Liverpool
Birkenhead
Burtonwood
Manchester
Mersey R.
Garston
Boughton
Wem
Sudbury
Trent R.
Burton-on-Trent
Severn R.
Huntingdon
Histon
Honeybourne
Moreton-on-Lugg
Ashchurch
Cheltenham
LONDON
Thames R.
Shrivenham
Port Talbot
Port Eynon
Barry
Bristol
Newbury
Thatcham
Westbury
Warminster
Woolacombe
Appledore
Barnstaple
Salisbury
Lockerley
Taunton
Southampton
ATC
Exeter
Weymouth
Hilsea
Portland
Coypool
Torquay
Brixham
Dartmouth
Plymouth
Slapton Sands
Land's End
Falmouth
H Damon

MAP 6

One of the biggest problems in depot construction was locating adequate footing for open storage of the generally heavier American equipment. Soil conditions were generally unfavorable in the United Kingdom, for the water table was very close to the surface. This created special problems in drainage and surfacing before adequate hardstandings were developed. Progress was generally good on the construction program, and the British ministries made every effort to make available the needed labor and materials. Even so, it was necessary to employ U.S. troop labor to complete the program, and American engineer units in the end accounted for more than half of the total man-hours expended on new construction. At the end of May 1944 the BOLERO storage program was almost 100 percent complete, the only deficit being in POL storage. At that time the ground and service force depot structure in the United Kingdom consisted of the following major installations in use:[48]

Type	*Number*
General Depots	18
Branch Depots:	
QM Service Depots	13
POL Depots	14
Ordnance Service Depots	17
Ammunition Depots	9
Vehicle Parks	12
Transportation Corps Depots	2
Chemical Warfare Depots	1
Engineer Depots	1
Medical Depots	4
Signal Depots	3

Except for hospital facilities and a small number of personnel accommodations the BOLERO program included none of the air force requirements, for these were met almost wholly by other plans carried out by the Air Ministry and the Royal Air Force. On the U.S. side, however, the SOS was responsible for meeting the air force as well as ground and service force requirements, and this task was also delegated to the chief engineer. The only basic difference in carrying out the two programs was that in the case of air force projects the chief engineer, on behalf of the air force engineer, dealt with the Air Ministry rather than the War Office. The chief enginer of the air force prepared the statement of air force construction and quartering needs, transmitted them to the chief engineer of the SOS, who then requested the Air Ministry to provide the needed facilities, just as he also requested similar implementation of ground and service force needs under the BOLERO program.

In the Air Ministry the chief administrative officer corresponding to the Quartermaster General in the War Office was the Air Minister for Supply and Organization (AMSO). Like the War Office, the Air Ministry created a separate liaison agency as the chief point of contact with the U.S. chief engineer. It was known as the Assistant Directorate of Organization (U.S.), or ADO(US).

The procedure of implementing the entire air force construction and quartering program therefore paralleled very closely the procedure for the BOLERO program, and at lower echelons there was the same type of direct liaison, in this case between

[48] SOS ETO Installations and Operating Personnel in United Kingdom, 1 Jun 44, prep by Statistical Sec, SGS Hq ETO, ETO Adm 449. There is some discrepancy between the totals of depot space as given by this source and the Final Engineer Report. The totals given on page 248, above, evidently represent the total space made available over a period of two years. The periodic ETOUSA-SOS tabulation for 1 June indicates that only 18,000,000 square feet of covered space and 36,000,000 square feet of open space were assigned to SOS units at that date, and that only 13,000,000 square feet of covered space and 20,500,000 square feet of open space were then in use.

the base section and Air Ministry field personnel. Once a project was approved in the Air Ministry, the actual job was carried out by the Director General of Works, a civilian heading a civilian engineering and clerical staff, who executed the project through contracts with civilian firms.

As with BOLERO, it was fully intended that the British should take care of all air force needs. But it became immediately apparent that British labor, material, and equipment resources would not be sufficient. As early as May 1942 agreement was reached that U.S. forces should assume responsibility for the construction of twenty heavy-bomber airfields. Eventually twenty-four aviation engineer battalions built fourteen bomber fields and also accomplished a vast amount of construction work on other facilities, such as headquarters installations and depots.

Another early agreement provided that Royal Air Force scales would prevail in the construction of U.S. installations. For all heavy-bomber airfields the Works Directorate of the Air Ministry prepared standard layouts that specified the number and size of runways, the number of personnel accommodations and repair shops, and the storage facilities to be provided for ammunition and gasoline. Heavy-bomber stations were built at an average cost of about $4,000,000. Each required more than 400,000 square feet of covered accommodations, and had runways equal to nearly 20 miles of concrete road 20 feet wide.[49]

Rigid adherence to blueprints produced difficulties. American B–17's and B–24's put excessive strain on the six-inch concrete runways of British fields, and all runways used by the U.S. air forces had to be capped with a new eight-inch concrete slab or resurfaced with other materials. So great was the deterioration on airfield runways that approximately 25 percent of the gross labor employed was eventually expended in maintenance. The ruling that U.S. air force personnel should be provided with accommodations on scales identical with those of the Royal Air Force also resulted in certain inequities favoring air force units over ground and service force personnel, for British air force accommodation scales were higher than those for ground units.

The air force construction program was a victim of substantially the same limitations as the BOLERO projects. An acute shortage of labor hampered the program at all times; materials were in critically short supply; and British contractors for the most part lacked the heavy construction equipment with which the American engineer battalions were favored. Nevertheless, the air force program enjoyed a high priority, and was completed substantially as planned in the spring of 1944 at the height of the bomber offensive against Germany. After many revisions, air force plans as finally stabilized in November 1943 called for 126 airfields, exactly the number occupied by U.S. air forces at the end of May 1944. In addition, 6 base air depots, 11 ordnance air depots, and 11 ammunition depots, and many other installations had been made available to USSTAF, with a total closed storage and shop space of more than 10,000,000 square feet. The 442,000 personnel accommodations have already been mentioned in connection with the BOLERO program. The cost of the air force construction program came to roughly $440,000,000.[50]

With the exception of the deficit in

[49] Buchanan, *op. cit.*, p. 189.

[50] Final Engineer Report, I, 250–61, II, App. 28; Buchanan, *op. cit.*, p. 189.



U.S. AIRFIELD CONSTRUCTION IN ENGLAND



medical facilities noted above, the mammoth construction program, begun two years before, was virtually complete on the eve of the invasion. It was accomplished despite innumerable handicaps, the principal limiting factor being the persistent deficiency of of both materials and manpower. American requirements were not the only demand on available resources, and had to be integrated with British needs. Administrative difficulties, among them the lack of parallelism in British and American methods of operation, and the different standards and scales also hampered the program, although these were successfully overcome. At times there was indecision as to whether to emphasize speed or quality. In the view of U.S. forces, British labor policies made for inefficiency. British civilian workmen had a limited mobility and adhered to traditional, and often time-consuming, construction practices. The quality of their work was usually high, however, and in fairness it must be noted that the cream of British labor was in the armed services. The physical condition of troop labor, army discipline, and the advantage of more modern heavy equipment, all resulted in a higher rate of production per man where service engineer units were employed.

A summation of the accomplishment provides some impressive statistics. At the end of May there had been made available to U.S. forces in the United Kingdom accommodations for 1,600,000 persons, 30,000,000 square feet of covered storage and shop space, 43,500,000 square feet of open storage space, hospitals with a capacity of 84,000 beds, 126 airfields, and many other facilities such as shops for the assembly of locomotives and freight cars, tire, tank, and vehicle repair shops, and chemical impregnating plants. The estimated value of these installations, either transferred to or built for American use, was nearly one billion dollars. Of this total, nearly two thirds represented expenditure for new construction, the breakdown of which is shown below: [51]

Total		$664,000,000
BOLERO		200,000,000
Personnel accommodations	$59,200,000	
Hospitals	57,200,000	
Depots and shops	50,800,000	
Miscellaneous	32,800,000	
Air Forces		440,000,000
OVERLORD mounting installations		24,000,000

All facilities turned over to the U.S. forces or specifically built for them remained the property of the British and were acquired by the Americans on a rental basis.

At the peak of construction activity approximately 56,000 civilians and 51,000 troops (both British and American) were employed, the larger portion of the civilian labor being employed on air force projects. The total labor expenditure is estimated to have exceeded 400,000,000 man-hours. The breakdown of this effort is tabulated on the following page.[52]

Provision of the greater part of the personnel quarters, hospitals, depots, and airfields by no means represented the total British contribution to the logistical support of the American forces in the United

[51] Buchanan, *op cit.*, pp. 188–89. See also the Sixteenth and Seventeenth Reports to Congress on Lend-Lease Operations, Washington, 1944.

[52] Final Engineer Report, ETO, I, 249–50, 261–64, II, Apps. 24–28; Construction in the United Kingdom, p. 1.

Type	*Total man-hours*	*British*	*U. S. Troops*
Total	403, 708, 000	252, 518, 000	151, 190, 000
Housing	48, 000, 000	21, 800, 000	26, 200, 000
Hospitals	54, 340, 000	48, 600, 000	5, 740, 000
Depots	34, 500, 000	16, 300, 000	18, 200, 000
Special accommodations	6, 000, 000	4, 000, 000	2, 000, 000
Air Forces (to May 1945)	260, 868, 000	161, 818, 000	99, 050, 000

Kingdom. While details cannot be given here, it is apropos to give some indication of the quantity of supplies and services, as well as accommodations, which U.S. forces procured from British sources under reverse lend-lease.

Plans written before the U.S. entry into the war contemplated that American forces in the United Kingdom, so far as practicable, would draw their logistical support from sources outside the British Isles. A General Purchasing Board was established in Britain in 1942 on the assumption that its main function would be to plan for later procurement on the Continent. The provision of accommodations in the United Kingdom was of course a vast program of local procurement in itself. But in addition it was found that the British possessed certain commodities in excess of their needs, and that there even was surplus manufacturing and processing capacity which could be employed. An even more compelling reason for procuring supplies locally was the shortage of shipping. Both facts made it natural and inevitable that U.S. forces should draw on local resources wherever practicable. In the summer of 1942 the theater commander asserted that conservation of shipping space would be the basic consideration in determining the desirability of procuring supplies locally. The basis for such "reciprocal aid" already existed in a Master Agreement of February 1942 pledging the two nations to provide each other with such supplies and services to the extent of their capability for the prosecution of the war.

Following the practice of World War I, the theater commander in May 1942 designated a General Purchasing Agent and established a General Purchasing Board, consisting of representatives of the service chiefs, the Eighth Air Force, the Army Exchange Service, and other agencies. Together, the General Purchasing Agent and General Purchasing Board acted as a central agency to negotiate agreements with British officials, to formulate purchasing policies and procedure, and to co-ordinate and supervise the purchase of supplies by the various supply services and other agencies. Until the General Purchasing Agent stepped in and temporarily stopped almost all local purchases, there was a great deal of haphazard buying early in 1942 to fill immediate needs. Once the system of local procurement was regularized, a vast program of purchasing was begun in virtually every class of supply.

U.S. troops arriving in the United Kingdom early in 1942 lacked supplies of all kinds and relied heavily on British sources for even such basic maintenance as rations. The British ration, containing more tea, bread, potatoes, and mutton, and less sugar, beef, coffee, fruits, and vegetables than Americans were accustomed to, was unpopular, and efforts were immediately made to add the desired items. Even after U.S. stocks were sufficient for

the issue of a full American ration, however, large quantities of meats, fruits, condiments, cheese, candy, dairy products, and vegetables (including the lowly Brussels sprout, whose popularity was short lived) were procured locally to supplement the canned goods, the boneless beef, the dried eggs, and that much-derided product in the U.S. Army ration which gave the theater its nickname—"Spamland." Fresh vegetables were obtained in part through NAAFI, the quasi-official British organization which operated the canteens and post exchanges for the Royal Navy, Army, and Air Force. The British Government, through the Ministry of Food, had greatly intensified its agricultural production. In 1942, using British seed, fertilizer, and equipment, American troops aided in this program by planting 7,000 acres in and around camp areas, raising mostly corn, beans, peas, onions, and potatoes. In 1943 this acreage was doubled.

For more than a year and a half American units received all their bread through British Army and civilian bakeries, at first using wheat flour shipped from the United States. The British had for a long time been using "National Wheatmeal Flour," a blend of English and Canadian wheat with a small percentage of barley and oats, accepted as a wartime measure. In September 1942, fearing the adverse effect on civilian morale if American troops continued to eat white bread in wartime Britain, the Minister of Food requested that the American forces also adopt National Wheatmeal Flour, which they did. The bread was not entirely satisfactory in texture or taste, but experimentation in baking produced a loaf more in accord with American tastes. Not until the fall of 1943 did American units begin to meet even a portion of their own requirements. Initially they lacked equipment; then they discovered the superiority of British Army mobile bakeries and decided to adopt them for general use in the theater. By May 1944 the U.S. Quartermaster Corps in the United Kingdom had acquired fifty-two bakery sets from the British and was operating thirty-eight of them, producing about 500,000 pounds of bread daily, or about 60 percent of American requirements. The remainder continued to be furnished by British civilian bakeries and by the Royal Army Service Corps.[53]

In the first half year of the reciprocal aid program, from June to December 1942, U.S. forces procured the equivalent of 1,120,000 measurement tons of supplies and equipment from the British, with a corresponding saving in shipping. By far the largest portion of these supplies—almost 600,000 tons—consisted of quartermaster items, including subsistence, clothing, coal, and other supplies.[54] By mutual agreement woolen clothing was procured for U.S. troops in the United Kingdom while similar items were shipped from the United States to British units in the Middle East. Among the other major items provided were 1,450,000 square yards of portable airfield runways, 15,000 bombs, 70,000 rounds of artillery ammunition and several million rounds of small arms ammunition, 250,000 antitank mines, 500,000 hand grenades, 1,000 parachutes, several hundred thousand camouflage nets, plus hundreds of other items of all

[53] Basic Needs of the ETO Soldier, I, 7–8, 14–17; Troop and Supply Buildup, 363–66; Info Bull 12, BOLERO Q(L) Br, 1–31 May 44, SHAEF G-4 381 BOLERO I 1944.

[54] [Samuel I. Katz] History of the Office of the General Purchasing Agent, May 1942–October 1945, prep in Office GPA, ETO, MS, p. 37, ETO Adm 556.

classes.[55] The transfer of British equipment in some cases aided materially in equipping U.S. units in time for the TORCH operation. By the end of the year supplies procured in this way had accounted for at least a third of all tonnages received by U.S. troops in the United Kingdom.

Local procurement was plagued with many complications, not the least of which was the difficulty with the "common language." In literally thousands of items of supply and equipment the American and British terminology and nomenclature differed. Not only did the American serviceman have to learn to drive on the left side of the road and figure out the intricacies of pounds, shillings, and pence, but he had to learn to ask for petrol when he wanted gas, to refer to lorries instead of trucks, and lifts rather than elevators. To the Britisher a hot-water boiler was a calorifier, a garbage can was a dustbin, shoe tacks were tingles, burlap was hessian, cheese cloth was butter muslin, and a summer undershirt was a tropical vest. The British stenographer was puzzled to find that to her American employer the last letter in the English alphabet was "z" and not "zed," and she insisted on the British spelling of such words as "programme" and "tyres" in correspondence which she prepared in the various U.S. Army offices. Wherever Americans came into contact with Britishers, particularly in the depots and in the local procurement program, where they dealt with or actually handled supplies of both countries it was inevitable that they should at times conclude that their languages were only nominally the same.

The reciprocal aid program also brought with it a vexing problem of bookkeeping and accounting. War Department regulations initially prescribed a system of receipted vouchers for all supplies, with American and British officers agreeing on prices and, in lieu of such agreement, American officers fixing their own valuation. This proved completely impracticable and was largely ignored. British officials frequently could not furnish cost figures on delivery, and there were not enough U.S. officers qualified to make price evaluations. The result was that, where such evaluations were insisted on, prices were often pulled out of the air. In October 1942 the attempt to keep a monetary record of reciprocal aid transfers was abandoned and the War Department authorized U.S. officers in the United Kingdom to maintain only a quantitative record. For several months U.S. reports therefore indicated only the amounts of goods received, while British quarterly reports gave monetary values in round numbers.

In June 1943 the War Department once more attempted to establish a procedure of monetary evaluation of locally procured supplies, but by that time the quantity of goods supplied under reverse lend-lease had reached such huge proportions that neither the independent evaluation by U.S. authorities nor the provision of unit prices by the British was possible. The estimated monetary values of the British quarterly reports plus the U.S. records of quantities were therefore accepted by ETOUSA as the best possible temporary solution. Under other circumstances the valuation procedure followed by the British would not have been acceptable, but more serious differences did not arise at

[55] *Report to the 78th Congress on Lend-Lease Operations: From the Passage of the Act, March 11, 1941, to December 31, 1942* (Washington, 1943), submitted by Edward R. Stettinius Jr., Lend-Lease Administrator, pp. 50–51.

the time in part because of the realization that supplies furnished the British through lend-lease would far exceed the British contributions via reverse lend-lease.[56] In the heat of the build-up for invasion the important thing was to fill the largest possible portion of American needs by local procurement with the hope of effecting savings in shipping; the accounting of these purchases was a secondary consideration and could be postponed.

Reciprocal aid, like the build-up, reached its height in the months just preceding the invasion. In the first year the Air Force was one of the largest beneficiaries from local purchase, for the United Kingdom was an indispensable source of almost all types of equipment in the Eighth Air Force's early history. From June 1942 through July 1943 the American air forces drew 49 percent of all their air force supplies and equipment from British sources, in addition to quartermaster, engineer, medical, and other types of supplies received indirectly from the British through the SOS.[57] Air force supplies included huge quantities of replacement parts, hand tools, photographic and communications equipment, flying clothing, parachutes, and Spitfire fighter planes. By the spring of 1944, to cite only a few examples, the British had provided 1,100 planes plus several hundred gliders, 32,000 bombs, 7,000 sets of armor plate for heavy bombers, 5,000 rubber dinghies, 10,600 aircraft tires, 35,000 belly tanks for fighter craft, 9,600 pieces of protective body armor, 43,000 jettisonable gas tanks, 44,500,000 yards of Sommerfeld track, 50 mobile repair shops for the repair of bombers crash-landed in the United Kingdom, and unspecified quantities of heated winter flying clothing, radio equipment, and other items.[58]

The Quartermaster Corps obtained 63 percent of its requirements through 1944 by local purchase, a larger percentage of its total needs than any other service. The nature of its purchases has already been indicated. In addition to subsistence, these included camp, laundry, bakery, and shoe repair equipment, soap, office supplies, 15,000,000 5-gallon cans, 800,000 55-gallon drums, 83 mobile bakeries, toiletries, and large quantities of woolen socks, shoes, towels, blankets, and other items of clothing.[59]

Engineer supplies procured in Britain took the form of amphibious and bridging equipment, railway supplies, construction machinery, and storage tanks. The Engineer Corps was one of the largest users of locally procured supplies, acquiring 58 percent of its needs, exclusive of construction materials, in this manner.

Between June 1942 and June 1944 the services procured varying portions of their supplies in the United Kingdom, as indicated in the table below.

Quartermaster Corps	63%
Corps of Engineers	58
Medical Service	49
Chemical Warfare Service	25
Signal Corps	22
Air Forces	21
Ordnance Service	4
Transportation Corps	3

Ordnance and Transportation Corps supplies did not bulk large in actual tonnage, but British manufacturers produced almost all the waterproofing materials needed to prepare vehicles for the am-

[56] Gen Bd Rpt 128, p. 16; History of the Office of the GPA, pp. 40ff.

[57] Craven and Cate, *The Army Air Forces*, II, 611.

[58] *The Fifteenth Report to Congress on Lend-Lease Operations for the Period Ending March 31, 1944* (Washington, 1944), pp. 22–25.

[59] Troop and Supply Buildup, pp. 349, 360–61.

phibious phase of the cross-Channel operation, and British plants assembled nearly 130,000 vehicles for U.S. forces through June 1944.[60] Reciprocal aid to the Transportation Corps consisted chiefly of facilities, such as ports and rail lines, and services, such as labor employed in unloading cargo and transportation services on British railways and highways. In the first six months of 1944 alone British railways operated 9,225 special trains with over 950,000 cars to move U.S. troops and supplies.[61]

By the end of June 1944 an estimated 6,800,000 ship tons of supplies from British sources had been furnished American forces in the United Kingdom, accounting for approximately 31 percent of all supplies received by ETOUSA forces up to that time, exclusive of construction materials and gasoline. More than half of this tonnage—3,851,000 ship tons—was delivered to U.S. forces in the first six months of 1944, as is indicated in the summary below:

Total	6,799,433
1942	1,121,786
1943	1,826,701
1944, first 6 months	3,850,946

The U.S. Army in Britain received without cash payment through reverse lend-lease, or "mutual aid" as the British preferred to call it, innumerable other services, such as shoe repair, laundering, and camp utilities. The goods transferred and services rendered to U.S. forces within the United Kingdom before 30 June 1944 had an estimated value of $1,028,787,000. In addition, the British performed world-wide shipping services to U.S. forces in the amount of $356,050,000,[62] and, as summarized earlier, had expended approximately $664,000,000 on new construction. The amount of British labor employed on U.S. account fluctuated widely, but during the peak months in the winter of 1943–44 reached nearly 100,000 workers (over 90 percent civilian), including labor employed directly by the Americans and on construction projects for U.S. forces.[63]

In a special report to Congress on reverse lend-lease aid, President Roosevelt noted that "it would have taken 1,000 loaded ships to send from the United States the supplies provided to our forces by the United Kingdom."[64] In view of the acute shipping shortages during most of the build-up, these goods and services were an indispensable contribution toward the maintenance and equipment of U.S. forces preparing for the invasion of the Continent.

(3) The SOS on the Eve of OVERLORD

In the five months that preceded the invasion supply officials in both the United States and the theater were concerned not only with the over-all volume of supplies being shipped to the United Kingdom,

[60] At the peak of activity in the second quarter of 1944 the British operated thirty-nine assembly plants, 52 percent of the output going to U.S. forces. British plants continued to assemble vehicles for the Americans until October 1944, when the cumulative total of assemblies reached 145,151. Ltr, A. B. Acheson, Hist Sec, Cabinet Offices, to G. W. S. Friedrichsen, Br Jt Svcs Mission, OCCS, 30 Dec 49, OCMH.

[61] *Seventeenth Report to Congress on Lend-Lease Operations: Reverse Lend-Lease Aid from the British Commonwealth of Nations* (Washington, 1944), p. 12.

[62] *Seventeenth Report on Lend-Lease Operations*, p. 9.

[63] On 1 December 1943, 88,473 civilians and 7,258 British troops—a total of 95,731—were employed on U.S. account. Plan for SOS, ETO, Vol. I (Manpower), 1 Jan 44, Sec. 6 (Labor), Tab A, ETO, Adm 347.

[64] *Seventeenth Report on Lend-Lease Operations*, p. 10.

but also with shortages in specific items of equipment. Huge tonnages in themselves did not insure that all units would be adequately equipped. In January 1944 the Army Service Forces made a comprehensive survey of the status of the BOLERO build-up. The most striking revelation of its report was the unbalanced nature of the shipments of the past months. To cite the extreme cases, the Quartermaster Corps had already virtually completed its shipments for eighteen divisions and their supporting troops, while Signal Corps equipment had been shipped for only five.[65] Some variation was to be expected, since under the preshipment program every effort had been made to fill the available shipping with whatever supplies and equipment were available at the time, and quartermaster supplies had been available in greater quantities than those of other services. Nevertheless, the ASF report demonstrated how misleading tonnage figures by themselves could be, for despite the heavy movement to the European theater there were many shortages, and some of them persisted even to D Day. One of the principal reasons was that many items were only now beginning to become available in sufficient quantity in the United States.

At the time of the survey forecasts indicated that the principal requirements would be met by the first of May. By March, however, theater port capacity and shipping space so restricted the shipment of the mounting tonnages of cargo at the New York Port that the theater had to institute a system of priorities to insure that the most badly needed items were delivered in time. Late in March General Lord and several of the ETOUSA service chiefs journeyed to Washington and reviewed with ASF officials the entire supply picture for the coming invasion, discussing such matters as supply levels, intertheater priorities, emergency requisitions, commodity loading, and tonnage allocations. Their most immediate concern was with the critical shortages in specific items of supply and equipment. Investigating the status of every important item, they prepared a "critical item list" which included all supplies whose lack might jeopardize the success of the operation. The list established deadlines for the delivery of the necessary quantities, and production schedules, rail shipments, port receipts, and port loading of these items were thereafter followed day by day. Their status was reported to the theater by air courier, and when difficulties arose or were foreseen, the problem was immediately reviewed and remedial action was taken. Under a system of priorities established by the theater, ETOUSA thus maintained virtually complete control of the make-up of shipments to the United Kingdom in the months just before D Day.[66]

In the United States the New York Port was instructed to adhere closely to the theater priority lists for loading, and the ASF did everything possible to expedite delivery of critical supply items in the final weeks of preparation for OVERLORD. Despite these efforts, shortages of both major and minor items persisted beyond D Day. Among them were amphibious trucks, tank transporters, LVT's, mine-exploding devices, certain heavy transportation equipment, and various types of ammunition. Fortunately, none of these shortages

[65] Problem of Troop and Cargo Flow, pp. 144–45.

[66] *Ibid.*, pp. 161–62; Ltr, Lord to Lee, 3 Apr 44, sub: Rpt on ETOUSA Supply Mission to U.S., ETO Rpt on ETOUSA Supply Mission; History of Planning Division ASF, pp. 99–100, OCMH.

were serious enough to affect the initial stages of the operation.[67]

Another subject that received considerable attention at the conferences between theater and ASF supply officials in March was "operational projects," the procedure whereby the requirements of particular operations for certain supplies and equipment were met. Known also as "projects for continental operations," or PROCO, this was a method of tailoring the equipment for a particular job without reference to the quantities authorized in Tables of Equipment or Tables of Basic Allowances. Determining the requirements of Class IV supplies—those for which allowances are not prescribed—has always been difficult, there being no standard basis of procurement or issue of such supplies and equipment because the demands vary with each operation. Late in 1942 the ASF Planning Division initiated a study to determine what supplies were needed for the construction of housing and ports and the rehabilitation of railways in North Africa. Bills of materials were prepared for supplies and equipment for camps, airfields, rail bridging, and so on. While no action was immediately taken on the "project," this estimate was the forerunner of the operational projects system which was inaugurated for all theaters in June 1943. In the European theater it was obvious that huge quantities of special operational Class II and IV supplies would be needed over and above T/BA and T/E allowances for such projects as pipeline and airfield construction, the rebuilding of ports and railways, and the provision of hospitals and depots. A project prepared by the Transportation Corps, for example, based on certain assumptions regarding the destruction of French ports, called for large quantities of construction materials, cranes, barges, and dock equipment, and other TC projects called for diesel electric locomotives, shop equipment, and materials-handling equipment. The Ordnance and Engineer Services were also major users of the operational projects procedure to meet their needs for special undertakings on the Continent. The Ordnance Service alone submitted projects for more than 300,000 tons of equipment, much of it consisting of heavy automotive units such as 10-ton semitrailers and truck-tractors. The Corps of Engineers, which was responsible for all major construction projects, such as pipelines, railways, and port repair, presented bills of materials for upwards of 700,000 tons for the first eight months of operations.[68]

PROCO, like every other major logistic procedure, was attended by many snags and misunderstandings. It was especially important that requirements be estimated far in advance of actual need, since procurement of special equipment frequently took as long as eighteen and sometimes twenty-four months. The program was not inaugurated until the summer of 1943, less than a year before the invasion date. Even at that time the projects rested on rather tentative operational plans, for the OVERLORD design was not approved until August, and its details were not worked out until early 1944. This initial handicap was further aggravated, in the view of ETOUSA officials, by the interminable delays in processing operational projects

[67] Cbl S-52025, Eisenhower to CCS, 17 May 44, SHAEF AG 381-3 SHAEF to AGWAR Rpts on OVERLORD; Ltr, Lutes to Bradley, 13 May 44, sub: Supply of Critical Material, and Ltr, Maj Gen Harold R. Bull to G-4, 10 May 44, SHAEF G-4 400.192 Supply Rpts I 44.

[68] Memo, Lutes for ACofS Opns WD, 25 May 44, sub: Operational Projects for ETO, ASF Plng Div 400 History of Projects.

in the War Department. ETOUSA officials thought the procedure was inexcusably slow. In extreme cases, they noted, it required seven months before supply action was initiated on a theater project. The OPD eventually admitted that the processing cycle was too long and inaugurated a system that materially reduced the time, although it did not take effect until the spring of 1944. The theater also complained that there were wide discrepancies between ASF, New York Port, and ETOUSA records of shipments, the ASF figures indicating greater shipments than had actually taken place and been received in the theater.[69]

On the other hand the War Department found reason to charge the theater with misusing the entire PROCO system. As conceived by the War Department, operational projects were intended for the purpose of initiating procurement (that is, production) in advance for Class II items over and above T/BA and T/E, for materials-handling equipment, and for other Class IV items needed on particular operations. But the ETO had construed the intent of the system to include all requirements in excess of authorized allowances for all classes of equipment, and requirements for maintenance supplies in excess of normal combat usage factors. Under this interpretation requests were submitted to meet the losses expected from ship sinkings in the English Channel, and to meet unusually high expenditures in the early stages of the attack. Requests went in for many common items such as rations and ammunition—items the War Department had never intended to be included. Furthermore, of the 281 operational projects received from the European theater by April 1944, it was observed that 251 were of no assistance in planning advance procurement, presumably because they arrived late.

The War Department also took exception to the continuing amendments and revisions of the projects. Most of them called for increases which the Army Service Forces in many cases simply could not provide in the short time remaining. But these changes could hardly be avoided in view of the many alterations in the OVERLORD operational plan. In the end the Army Service Forces despaired of carrying out the PROCO system as originally conceived and for the most part accommodated itself to the existing situation. In an attempt to expedite the delivery of the materials which the theater requested, it often abandoned the SOP's established for processing the projects and sought informal recommendations and concurrences. Eventually it approved the use of PROCO for all requirements in excess of normal issue, consumption, and expenditure rates. While the program was not carried out in strict accordance with original intentions, therefore, it generally accomplished its purpose by providing hundreds of thousands of tons of supplies and equipment to meet the unusual demands of the OVERLORD operation.[70]

In the final weeks before D Day the theater's supply arrangements came under the searching eye of one of the top officials of the Army Service Forces. In April General Lutes, Chief of Operations

[69] Study, General Supply Situation in the United Kingdom, Pt. II, Tab 6, Procedure for Processing Projects in WD, Mar 44, ETO, Outline of Opn OVERLORD; Cbl EX-28509, Lee to Marshall, 16 May 44, and Cbl WARX-45069, OPD to SHAEF, 31 May 44, P&O Cbl Files.

[70] Memo, Col Carter B. Magruder, Dir Plng Div ASF, for Deputy Dir Plans and Opns ASF, 28 Apr 44, sub: History of Operational Projects for ETO, ASF Plng Div 400 History of Projects; Gen Bd Rpt 128, Logistical Buildup in the British Isles, pp. 18–19.

of the ASF, went to the United Kingdom and undertook a prolonged examination of the logistical situation there. His purpose was not only to check on the last-minute needs of the coming operation, but to inspect the entire supply structure in the United Kingdom and determine the efficiency of the theater's supply machinery. As the personal representative of the ASF commander General Lutes was in an excellent position to take any action necessary to expedite the administrative preparations for the cross-Channel attack; and as an outsider he was in a better position than anyone in the theater to judge objectively the efficacy of its logistical organization.

On the whole General Lutes found the supply situation satisfactory. Most important, he could report early in May that the OVERLORD assault forces were adequately equipped. The fact that plans for the shipment of maintenance supplies to the Continent were not complete beyond the first four weeks he did not consider serious, for there was still time to develop plans for the later phases of the operation.[71] He was not entirely satisfied, however, with the status of advance planning in general. While the responsibility for advance supply planning unquestionably belonged to the SOS, the delay was at least partially traceable to higher headquarters. Supply planning must be preceded by operational planning, and the latter had lagged consistently. The high-level decision on OVERLORD itself had been belated from the point of view of the Army Service Forces, which was responsible for procurement of the needed supplies and equipment. No other aspect of logistics troubled the supply services as much as getting operational decisions far enough in advance to initiate long-range procurement. The ASF and the theater SOS consistently regarded this as their chief problem and repeatedly emphasized it to the headquarters responsible for operational planning. The Army supply program had to anticipate requirements by at least twelve to eighteen months. Likewise, in the theater the operational plans of the G–3's had to be translated into items of supply and requisitions by the G–4's. In this regard General Lutes thought that SHAEF, one of whose main functions was advance planning, had been remiss, for the Supreme Headquarters had not carried its operational planning far enough forward, with the result that supply planning also lagged. Even the firming up of the operational troop basis by the 1st Army Group and First Army had been unduly delayed from the point of view of supply and movement plans. It was noted that the troop basis data on the mounting plan, already scheduled dangerously close, had been delivered to ETOUSA-SOS eleven days late, and even then changes continued to be made. All supply loading and movement plans were completely dependent on the troop basis and on the tonnage allocations provided by 1st Army Group, and both were delayed.[72]

In addition to this fundamental handicap General Lutes found certain shortcomings within the SOS itself. Most of them concerned supply operating procedures which are of too technical a nature to be described here. The SOS still lacked an adequately standardized supply records and administrative procedure. While the technical services had set up stock

[71] Memo, Lutes for Somervell, 9 May 44, ASF, ETO—1st half 1944.

[72] Memo, Lutes for Eisenhower, 13 Apr 44, sub: Interim Rpt on Supply Matters, ASF, ETO—1st half 1944; Remarks by Lutes, Stf and Comd Conf, SOS, 17 Apr 44, EUCOM 337/3 Confs, Stf-Weekly I 44.

control systems, their basic features as well as the relative efficiency of the different systems varied greatly. Nor were the documentary procedures of the depots adequate. With regard to the control of the depots, even at this late date the responsibilities of the base section commanders were not clearly defined. And in the operation of the ports the respective responsibilities of the base section commanders, the port commanders, and the chief of transportation were ambiguous and overlapping.[73] These were eternal problems for the SOS and had plagued that organization from its very beginnings, although great progress had been made since the hectic days of 1942.

The difficulties were largely internal, but they had both a direct and an indirect bearing on the relations of the SOS with other commands. Those relations were not entirely cordial. In the competition for supplies and services it was perhaps inevitable that each of the other major commands—particularly 1st Army Group and USSTAF—should suspect that it was not getting its share in view of the fact that the SOS, a co-ordinate command, controlled the allocation of supplies. In any event, both of those commands expressed dissatisfaction with the manner in which they believed the SOS was withholding supplies which they claimed were required for operations,[74] and their relations with the SOS consequently were often marred by misunderstanding and mistrust. A similar situation had developed in the Pacific, leading to a deadlock which was resolved only by the formation of a Logistical Committee with representatives of all forces. General Lutes hoped to avoid resorting to such a device in the European theater.

In this tug of war the Air Force was the most clamant in its demands. In both the United States and the theater it had often complained that the supply of its units in the theater was unsatisfactory. Specifically, it had objected to its dependence on the SOS organization for the handling of its supplies, asserting that delivery had been slow and that the SOS had made uncalled-for demands for justification for increased allowances or issues. General Knerr, the USSTAF Deputy Commander for Administration, thought the decisions by the SOS were made more on the basis of availability of supplies than on operational need. The Air Force still desired to take possession of at least 50 percent of the common items of supply and equipment before they left the United States, thus in effect establishing a separate line of communications to the zone of interior and to this extent freeing itself from theater control over its supply. The ASF had consistently maintained with unassailable logic that the theater commander must control priorities and allocations with consideration to their effect on other operations in the theater.[75] There were other reasons, such as the bottlenecks in shipping and the limited port facilities in the United Kingdom, which made the Air Force scheme utterly impracticable. In the end General Knerr backed down on his contentions.[76]

[73] Memo, Lutes for Lee, 12 May 44, sub: Stock Control, Field Opns and Depot Opns, ETOUSA, and Memo, Lutes for Lee, 24 Apr 44, sub: Supply Organization and Procedures, ASF, ETO—1st half 1944.

[74] Memo, Lutes for CG ETO, 24 Apr 44, sub: Supply, Organization and Procedures, ASF, ETO—1st half 1944.

[75] Memo, Lutes for Lee, 15 Apr 44, sub: Allocations between Air and Ground Forces, ASF, ETO—1st half 1944.

[76] Memo, Lutes for Somervell, 11 May 44, ASF, ETO—1st half 1944; Remarks by Lutes, SOS Stf and Comd Conf, 17 Apr 44, EUCOM 337/3 Confs, Stf-Weekly I 44.

In order to satisfy himself, however, General Lutes made a special effort to question the Air Force liaison officers at both the SOS and Southern Base Section headquarters, and at the various general depots which he visited. For the most part he found the Air Force accusations unfounded. Without exception he was told that Air Force requisitions for common items had been promptly filled and their delivery expedited. There had been no delays in the issue of equipment to Air Force depots when supplies were available. The Air Force complaints therefore narrowed down to the question of meeting demands for supply and equipment over and above the authorized allowances. This was a matter for allocation on the part of the theater commander and could not be charged as a delay on the part of the SOS. Regardless of the arrangements for the control of supply in the theater, there would have to be allocations on the basis of need, and the theater commander or his designated authority would have to make the decisions.[77] In the ETO General Eisenhower had assigned this function to General Lee as his deputy for supply and administration, and General Lutes felt that General Lee and his staff were as competent as any combat staff to decide on the basis of operational plans or as a result of actual combat conditions whether the armies or the Air Force or any other unit should be allocated certain items.[78]

As sound as these arguments may have been from an administrative and command point of view, the fact remained that the combat commanders would not accept a denial of their requests from the SOS staff. One explanation for this attitude lay in their resentment of the position of the SOS commander in the theater's command and organizational structure. General Lee's long campaign to gain control of all supply and administration for the SOS had culminated in triumph in January 1944 with the consolidation of the SOS and ETOUSA headquarters. In gaining for himself the position of deputy theater commander as well as Commanding General, SOS, however, Lee had assumed a role which in some respects proved an unhappy one. As deputy theater commander he spoke for General Eisenhower at the highest theater level on such matters as supply allocations; as commanding general of the SOS he also commanded one of the three major co-ordinate commands of the theater. This dual role was highly resented by the other commanders, for it was clear to them that as the deputy theater commander he could hardly act as a disinterested party on supply problems while holding his additional position as commander of the SOS. Such an arrangement left them, they claimed, with no one to go to for adjudication but SHAEF in the event of controversy.[79]

Whatever the validity of or justification for these suspicions, there was a definite lack of confidence in the SOS staff. A noticeable tension developed in the various headquarters and permeated even the lower echelons. Some staff officers at SHAEF and 1st Army Group showed open hostility toward the SOS. This lack of confidence inevitably lessened administrative efficiency. A certain amount of poor administrative practice manifested itself, noticeably in the bad liaison and co-ordina-

[77] Ltr, Lutes to Knerr, 22 Apr 44, sub: Supply of Air Force Units by SOS ETO, ASF, ETO—1st half 1944.

[78] Memo, Lutes for Somervell, 15 Apr 44, ASF, ETO—1st half 1944.

[79] Memos, Lutes for Somervell, 12 and 15 Apr 44, ASF, ETO—1st half 1944; Interv with Crawford, 5 May 48, OCMH.

tion between the SOS on the one hand and SHAEF and 1st Army Group on the other. SHAEF and 1st Army Group frequently became excited over reports of supply shortages which upon investigation turned out to be based on information from ETOUSA which was three weeks old, the shortages having been filled in the meantime. This obviously indicated that closer liaison was required within the SOS as well as between the SOS G–4 and SHAEF and 1st Army Group. Theoretically, the ETOUSA-SOS staff should have been used as a working agency of the SHAEF G–4. It should have been consulted on all important logistical matters, particularly on major allocations of supplies. SHAEF officers, however, were not always satisfied with the information obtained from ETOUSA-SOS, and there was a considerable amount of direct dealing between SHAEF and the ETOUSA-SOS technical services on matters that should have been channeled through ETOUSA-SOS headquarters.

Some of the difficulties could undoubtedly be traced to the feeling that the SOS did not have a proper appreciation of its duties toward the combat commands, and that it treated their requests purely on the basis of availability and felt no urgency about filling them. In General Somervell's opinion, there still was room for missionary work in the European theater to instill in the SOS the idea that it was in the theater for only one purpose—"to supply our customers and not to tell their customers what they want." Once the combat elements were convinced that the SOS was making genuine efforts to serve them, he felt that the friction would disappear.

Since the combat commanders resented the dual role of the SOS commander, they naturally carried their objection one step further and protested General Lee's designation as Commanding General, Communications Zone, for they assumed this meant that the existing arrangements would be carried over to the Continent. In General Lutes's view there could be no valid objection to such an arrangement. The SOS was well established as both a supply planning and operating agency, and was the source of all initial supply for the continental operation. The assignment of the Commanding General, SOS, as Commanding General, Communications Zone, insured continuity of supply responsibility and merely entailed the transformation of the SOS, until now an extension of the zone of interior, into a Communications Zone in a theater which had begun active ground combat operations. What the combat commands really objected to, of course, was the prospect of General Lee's continued authority as deputy theater commander. General Einsenhower was not unaware of the dissatisfaction with the existing arrangements and, as has been noted earlier, in the command arrangements which he later laid down for the Continent he deprived the COMZ commander, at least on paper, of the title he had held since the reorganization of January.

While the command and organizational structure of the theater thus left something to be desired, ETOUSA-SOS was vulnerable to criticism on other matters. Some of the lack of confidence in the SOS unquestionably stemmed from the lack of proper co-ordination within its own staff and between its own commands. In one observer's opinion, the SOS had been functioning without a real supply man topside to coordinate the work of its general staff. General Lee had found it necessary to spend



GENERAL STRATTON, *G–4, Communications Zone. (Photograph taken in 1944.)*

much of his time in the field, supervising the discipline, training, and field operations of the service units. General Lord, his chief of staff, was adept in dealing with other headquarters, like SHAEF, but had not had wide experience in the field of logistics. The result was that the SOS staff had not been as closely supervised and directed as it should have been, and that command decisions on supply had been "kicked about a bit."

Moreover, the members of the ETOUSA-SOS general staff were neither by training nor experience ideally prepared to co-ordinate the myriad details involved in building the logistic machine required for the unprecedented job which lay ahead. For one thing the staff had undergone many changes in assignment, and of the officers holding the G posts in the final planning period only one had had advanced staff training at the level of the Command and General Staff School. Col. James Stratton was a relative newcomer in the G–4 position and was only beginning to learn the supply job and to grasp the details of the OVERLORD logistic problems.

The special staff, by contrast, had not only had more stability of tenure and consequently more experience in both the build-up and in the planning for OVERLORD, but more formal training for the jobs it was performing. The technical service chiefs without exception had attended higher service schools, most of them having graduated from both the Command and General Staff School and Army War College. Several had attended civilian colleges and universities, although only two were graduates of the Military Academy.

The inexperience of the general staff was generally reflected in its offspring, the Advance Section and Forward Echelon, which had borrowed personnel from the theater headquarters. It was obviously too late, however, to make important changes in key positions with OVERLORD only a few weeks away, and General Lee did not favor any shifts in personnel. The responsibility for the operation now rested squarely on the shoulders of the existing group, and it was important that General Eisenhower place full confidence in the SOS, particularly in view of the tendency on the part of the combat commands to challenge and dispute its decisions. These observations, particularly as to the hostility shown by other commands to the SOS, led General Somervell to suggest that General Eisenhower might well "knock some heads together and straighten them out," and to

express the hope that his lieutenant in the theater, General Lutes, might at least be able to "make all these fellows lie in the same bed and like it." [80]

The atmosphere of the theater headquarters reflected in a large degree the attitude toward the commander of the SOS and deputy theater commander. General Lee continued to be a controversial personality throughout the history of the theater, owing in part to the anomalous position which he held. But the controversy over the SOS was heightened by his personal traits. Heavy on ceremony, somewhat forbidding in manner and appearance, and occasionally tactless in exercising authority which he regarded to be within the province of the SOS, General Lee often aroused suspicions and created opposition where support might have been forthcoming.

It appears, however, that few of his subordinates, and certainly fewer still of the persons with whom he dealt in the field commands, got to know him well. Those who did knew him to be kindly, unselfish, modest, extremely religious, and a man of simple tastes, however much this seemed to be contradicted by the picture of ostentation presented by the living arrangements of his staff and by his use of a special train for his comings and goings in the United Kingdom. General Lee has been aptly referred to as a "soldier of the old school," one who belived firmly in the dignity of his profession and wore the Army uniform with pride. He expected every other soldier, from general to private, to revere that uniform as he did. Many, without attempting to understand his rigid sense of discipline, were quick to label him pompous and a martinet. There can be no doubt that General Lee was motivated by a high sense of duty, and he expected others to measure up to his own concept of soldierly qualities.

The SOS commander was indefatigable in his rounds of inspections of field organizations, and was fully aware of the criticism generated by his use of a special train for that purpose. The acquisition of such a vehicle had been strongly urged on him by General Harbord, the SOS commander in World War I, with whom he visited in New York on his way to the United Kingdom in May 1942. The train was intended as a timesaver, and that it undoubtedly was. General Lee refused to bow to the criticism, convinced in his own mind that the train was fully justified. As attested by members of his staff, it was a work train, and an instrument of torture. General Lee set a grueling pace on his inspection trips, and it was rare indeed when a meal was served on the train during daylight hours, for most runs were made at night. The day's work, consisting of inspections and conferences, normally began at five in the morning and lasted until evening. Most of the staff members who accompanied the SOS commander considered the trips agonizing ordeals and would have avoided them if possible.

One other criticism of the SOS commander was probably more justified. Lee assigned some officers to positions of authority and responsibility whose qualifications were at times obscure. He was exceedingly loyal to these subordinates, usually placing full confidence in them.

[80] One of the major sources for the above views is the correspondence between Generals Somervell and Lutes in April and May 1944, filed in ASF, ETO—1st half 1944. See especially the memos from Lutes to Somervell, dated 12, 13, 15, 24, 26, and 29 April, and 8 and 11 May 1944, letters from Somervell of 18 April and 1 May 1944, and the memo from Lutes to Eisenhower, 13 April 1944, sub: Interim Rpt on Supply Matters.

This otherwise admirable trait sometimes put him in difficult positions, and his own reputation often suffered from their actions and unpopularity. In any event, the atmosphere at the ETOUSA-SOS headquarters was not consistently conducive to the best teamwork.

However inaccurately these circumstances may have reflected the real efficiency of the SOS, it is an inescapable fact that General Lee at least gave poor first impressions and did not always immediately inspire the confidence of the various commanders of the theater. Both General Andrews and General Devers were at first disposed to make a change in the command of the SOS when they assumed command of the theater. The former commanded the theater only a few months. General Devers, after a second look at the operations of the SOS, was satisfied that General Lee was doing a very satisfactory job.[81] General Eisenhower's reactions were similar. While he initially had doubts of Lee's ability to create an efficient supply organization and was fully aware of the complaints of the combat commanders and the tensions between the various headquarters, he finally decided to abandon at least temporarily any thought of replacing the SOS commander, to put complete faith in him, and to trust in the ability of his organization to support the American forces in the coming operation.[82] While the top-level organization and functioning of the SOS left something to be desired, and while there were shortcomings in the supply procedures within the SOS, observers from the Army Service Forces generally agreed that its field organization was functioning well and that the qualms felt by some commanders regarding the SOS's ability to support the cross-Channel operations were unjustified.

[81] Ltr, Gen Styer to Somervell, Jun 43, ASF, Somervell Files, CofS 1942–43 (6).

[82] Memo, Lutes for Somervell, 22 May 44, ASF, Somervell, Plans and Opns Files. In March 1944 the War Department promoted Lee to lieutenant general without consulting the theater commander. General Eisenhower protested this action, but made it clear that he objected only to the manner in which it was done, and not to Lee's advancement itself. He had postponed approval of such a promotion when he first arrived in England a few months before only because he first wished to satisfy himself on the efficiency of Lee's organization. Ltr, Eisenhower to Marshall, 3 Mar 44, and Cbl 254, Marshall to Eisenhower, 9 Mar 44, Eisenhower personal file.

CHAPTER VII

The OVERLORD Logistical Plan

(1) The Artificial Port

The magnitude of the cross-Channel operation is most fully revealed in its logistic aspects. Because it was to be an amphibious operation OVERLORD's supply problems were many times magnified. Moving an attacking force and its equipment across the Channel in assault formation required, first of all, a highly coordinated staging procedure in the United Kingdom, large numbers of special craft, and meticulously detailed loading plans. Following the capture of a lodgment it involved the rapid organization of the beaches as a temporary supply base, the quick reinforcement of the forces ashore and the build-up of supplies, and the subsequent rebuilding of ports and development of lines of communications so that sustained operations of the combat forces could be properly maintained.

The detailed planning for the various tasks involved did not begin until after the establishment of SHAEF and the designation of the Supreme Commander in January 1944. In the following month the plans of the various headquarters began to appear. The basic operational plan, known as the NEPTUNE Initial Joint Plan, was issued by the joint commanders—that is, the commanders of the 21 Army Group, the Allied Naval Expeditionary Force, and the Allied Expeditionary Air Force—on 1 February. First Army's plan, which constituted something of a master plan for U.S. forces in view of that organization's responsibility for all aspects of the operation, both tactical and logistical, in its early stages, appeared on 25 February. Those of its subordinate commands, V and VII Corps, were issued on 26 and 27 March respectively. On the logistical side the joint commanders' Initial Joint Plan was supplemented on 23 March by instructions known as the Joint Outline Maintenance Project. The outline of the American logistic plan was issued as the Joint Administrative Plan by the U.S. administrative staff at 21 Army Group on 19 April. This was followed on 30 April by the Advance Section plan, covering the period from D plus 15 to 41, and on 14 May by the over-all Communications Zone plan issued by the Forward Echelon. The SOS mounting plan had appeared on 20 March.

The extent to which logistic considerations had entered into the deliberations of the COSSAC and SHAEF planners has already been pointed out. In the eyes of the planners the successful invasion of France was dependent first on breaking through the coastal defenses and establishing a beachhead, and second, on the subsequent battle with enemy mobile reserves. The enemy's main line of resistance was the coast line itself, and it was known that the first objective of the enemy's defense strategy was to defeat the

invaders on the beaches by the rapid deployment of his mobile reserves. The outcome of this critical battle with enemy reserves was seen as depending primarily on whether the Allied rate of build-up could match the enemy's rate of reinforcement, and the degree to which this reinforcement could be delayed or broken up by air action or other means. The enemy's second defense objective would be to prevent the Allies from securing ports, for the capture of an intermediate port, such as Cherbourg, and of other ports, was a prime necessity for the sustained build-up of men and supplies.[1]

In the original July 1943 outline plan of OVERLORD, which served as a basis for the later planning, it was estimated that the provision of adequate maintenance for the Allied forces in the initial stages, including the building of minimum reserves, would require a flow of supplies rising from 10,000 tons per day on D plus 3 to 15,000 tons on D plus 12, and 18,000 on D plus 18. These figures were based on an assault by three divisions, a build-up to a strength of ten divisions by D plus 5, and the landing of approximately one division per day thereafter.[2] The capture of the Normandy and Brittany groups of ports was expected to insure discharge capacity sufficient to support a minimum of at least thirty divisions, and it was believed that if all the minor ports were developed this force could be considerably augmented. But frontal assaults on the ports themselves had been ruled out, and Mediterranean experience had shown that ports, even if captured shortly after the landings, would be found demolished and would be unusable for some time. The total capacity of the minor ports (Grandcamp-les-Bains, Isigny, St. Vaast-la-Hougue, Barfleur) on the front of the assault was not expected to reach 1,300 tons per day in the first two weeks. According to a later estimate, the capture of Cherbourg was not expected before D plus 14. Its capacity on opening was estimated at 1,900 tons, rising to only 3,750 tons after 30 days. In any event it was not sufficient for the maintenance of the lodgment forces. The Brittany ports would not offer a solution before D plus 60. It was clear, therefore, that the initial build-up would have to be over the beaches, and it was estimated that eighteen divisions would have to be supported over the beaches during the first month, twelve in the second, with the number gradually diminishing to none at the end of the third month as the ports developed greater and greater capacity.

The COSSAC planners considered the capacities of the beaches (which at that time did not include the east Cotentin) more than sufficient to maintain these forces, and believed that tactical developments should make possible the opening of additional beaches after D plus 12.[3] Unfortunately these capacities were largely theoretical, and in this fact lay the very crux of the initial build-up problem. The Allies had two enemies to reckon with in their invasion of the Continent—the

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[1] Memo, Army Opns Branch (US) for Head Planners, 4 Oct 43, sub: Secondary Assault on Cotentin Peninsula, SHAEF 381 OVERLORD, I (a).

[2] COSSAC Digest of Opn OVERLORD, 15 Jul 43, Annexure I to App. W, SHAEF, COSSAC (43) 28, Opn OVERLORD Outline Plan.

[3] The appreciation of July 1943 estimated the capacities of the beaches as 20,000 tons initially, increasing to 30,000 on D plus 3 and 50,000 on D plus 13. These figures were reduced considerably in the more conservative estimates in the final plans. Tonnage requirements, conversely, were later revised upward, totaling 16,500 tons per day for U.S. forces alone by D plus 18. 21 A Gp Study, Subsequent Maintenance of British and U.S. Forces—Overlord, 13 Mar 44, SHAEF G-4 Maintenance of British and U.S. Forces 153/2/GDP-I.

Germans and the weather. By far the more unpredictable of these—"more capricious than a woman," as one observer put it—was the weather.[4] Meteorological studies covering a ten-year period indicated that the month of June was likely to have about twenty-five days of weather suitable for the beaching of landing craft. The record also revealed an average of about two "quiet spells" of four days or longer per month between May and September. Forecasting more than four days of fair weather was difficult, however, and it therefore followed that from D plus 4 onward maintenance plans would have to allow for the fact that on some days beach operations would be impracticable. To compensate for these interruptions it would be necessary to increase daily discharge by some 30 percent. Furthermore, even though it might be physically possible to land the necessary tonnages, a great problem of movement and distribution forward to the depots and the troops was inherent in maintenance on such a large scale in so restricted a beachhead. It was therefore necessary to develop discharge facilities for bad weather in order to reduce the peak loads over the beaches on operable days and to even out the flow of traffic through the maintenance areas. In addition, naval authorities warned that unless steps were taken to provide facilities for the landing of vehicles, the cumulative damage to craft continuously grounding on beaches might well reduce the available lift and jeopardize the success of the whole operation. The provision of special berthing facilities was considered a matter of such paramount importance, in fact, that the naval commander in chief stated he could not undertake such an operation with confidence without them.[5]

The planners made it clear at an early date, therefore, that unless adequate measures were taken to provide sheltered waters by artificial means the operation would be at the mercy of the weather, and that a secondary requirement existed for special berthing facilities within the sheltered area, particularly for the discharge of vehicles. They estimated that the minimum facilities required for discharge uninterrupted by weather were for a capacity of 6,000 tons per day by D plus 4–5, 9,000 tons by D plus 10–12, and 12,000 tons when fully developed on D plus 16–18.

The Allied planners proposed to meet this problem by building their own harbors in the United Kingdom, towing them across the Channel, and beginning to set them up at the open beaches on the very day of the assault. While their solution was in a sense an obvious one, it was at the same time as unconventional and daring in its conception as any in the annals of military operations.

The concept of a "synthetic" harbor was not entirely a new one, although a detailed blueprint for a prefabricated port was not immediately forthcoming. There was at least one precedent for the concept of "sheltered water" created for the express purpose of aiding military operations. Mr. Churchill had proposed a breakwater made up of concrete caissons in 1917 in connection with proposed landings in Flanders.[6] In World War II Commodore John Hughes-Hallett, senior naval representative of the C-in-C Portsmouth, was the real progenitor of the artificial

[4] Rear-Adm.H. Hickling, "The Prefabricated Harbour," *The Journal of the Royal United Service Institution*, XC (August, 1945), 271.

[5] Digest of Opn OVERLORD, pp. 11, 20, and App. U.

[6] Comdr. Alfred B. Stanford, *Force MULBERRY* (New York, 1951), p. 40.

harbor, although the Prime Minister again provided much of the inspiration and the drive in working out the solution of this basic invasion problem. In May 1942 Mr. Churchill sent his oft-quoted note to the Chief of Combined Operations directing that a solution be found for the problem of special berthing facilities on the far shore. Suggesting piers which "must float up and down with the tide," he ordered: "Don't argue the matter. The difficulties will argue for themselves." [7]

Under the direction of COSSAC British engineers carried out experiments in the spring of 1943 to determine the practicability of constructing a prefabricated port, and they succeeded in building a floating pier that survived the test of a Scottish gale. But the exact form which such a port should take was not immediately determined, and the digest of OVERLORD presented by General Morgan to the Combined Chiefs of Staff at Quebec in August 1943 consequently included only the most tentative outline plan for such a harbor. The sheltered anchorage, this plan "suggested," would be formed simply by sinking nineteen blockships to form a breakwater. Berthing facilities would be provided by four pierheads, consisting of four sunken vessels, which were to be connected to the shore by "some form of pontoon equipment." The daily discharge capacity of such an installation was expected to be approximately 6,000 tons.[8] The relatively simple form of the harbor thus outlined hardly suggested the myriad engineering problems that still had to be overcome, and resembled only in its barest essentials the harbors which eventually took form.

The difficulties did indeed argue for themselves as Mr. Churchill predicted, for the magnitude and complexity of the task became more and more apparent. Many of the world's ports were "artificial" in that their sheltered harbors had been created by the construction of breakwaters. Cherbourg and Dover were both "made" ports in this sense. But whereas it had taken seven years to build the port of Dover in peacetime, the Allies were now faced with the problem of building a port of at least equal capacity in a matter of a few months, towing it across the Channel, and erecting it on the far shore amidst the vicissitudes of weather and battle. The plans as they were eventually worked out in fact called for the erection of two ports within fourteen days of the landings.

Two major requirements had to be met: a breakwater had to be provided to form sheltered anchorage and thus permit discharge operations in bad weather; piers were needed onto which craft could unload and thus supplement discharge from beached craft. Several solutions were considered in connection with the problem of providing sheltered water. In 1942 Commodore Hughes-Hallett proposed the use of sunken ships to form a breakwater. To the Admiralty this suggestion at first represented nothing but the sheerest extravagance in view of the impossible task it already faced in replacing the shipping lost to enemy submarines. The use of floating ships had the same drawback, of course, and in addition presented a difficult mooring problem.[9] One of the more novel solutions suggested was the creation of an "air breakwater." By the use of pipes on the

[7] [Clifford L. Jones] NEPTUNE: Training for and Mounting the Operation, and the Artificial Ports, Pt. VI of The Administrative and Logistical History of the ETO, MS (hereafter cited as NEPTUNE: Training for and Mounting the Operation), II, 110, OCMH.

[8] Digest of Opn OVERLORD, App. X, Annexure to App. X, and sketch SX, atchd.

[9] Rpt by Combined Adm Com, CCS, 2 Sep 43, sub: Artificial Harbors for Combined Opns, CCS 307/2, SHAEF G-4 825.1 MULBERRY I 44.

ocean floor this scheme proposed to maintain a curtain of air bubbles which theoretically would interrupt the wave action and thus provide smooth waters inshore of the pipe.[10] This idea was actually not new either. Studies along this line had been carried out in the United States forty years before, and both Russian and U.S. engineers had conducted model experiments since 1933, although without conclusive results. The bubble breakwater would have required such large power and compressor installations that it was impractical for breakwaters on the scale envisaged, and the idea was discarded as infeasible early in September 1943.[11]

Meanwhile experimentation was carried on with several other schemes. One of the earliest to receive attention was a device called the "lilo," or "bombardon." *Li-lo* was the trade name for an inflated rubber mattress used on the bathing beaches in England. A British Navy lieutenant had casually observed at a swimming pool one day that the Li-lo had the effect of breaking up wavelets formed on its windward side, creating calm water in its lee, and conceived the idea of constructing mammoth lilos for use as a floating breakwater. The idea was believed to have possibilities, and experimentation began in the summer of 1943. As first conceived the lilo—or BOMBARDON, the code name by which it was better known—had two basic components: a keel consisting of a hollow concrete tube 11 feet in diameter; and a canvas air bag above, about 12 feet in diameter and extending the entire length of the unit. The keel could be flooded and submerged while the air bag extended above water. The BOMBARDONS were 200 feet long and had a 12-foot beam and a 13-foot draft, the concrete keel alone weighing about 750 tons. The first designs called for a rubberized canvas air bag, and a few units of this type were constructed. Since they were vulnerable to puncture by small arms fire, however, later designs provided for a steel cruciform superstructure, about 25 feet in width.[12]

In essence the BOMBARDON breakwater would consist of a string of huge, air-filled, cylindrical floats, moored at each end, but laced together to form a thin screen of air which was intended to break up wave action and thus provide sheltered water. The BOMBARDONS were believed to have an advantage over sunken blockships since they could be moored in comparatively deep water and thus provide sheltered water for the deeper-draft Liberties.[13] Nevertheless, from the very beginning there were doubts about their effectiveness and feasibility, and they were never expected to do more than dampen wave action and provide anchorage supplementary to the main harbor for deep-draft ships.

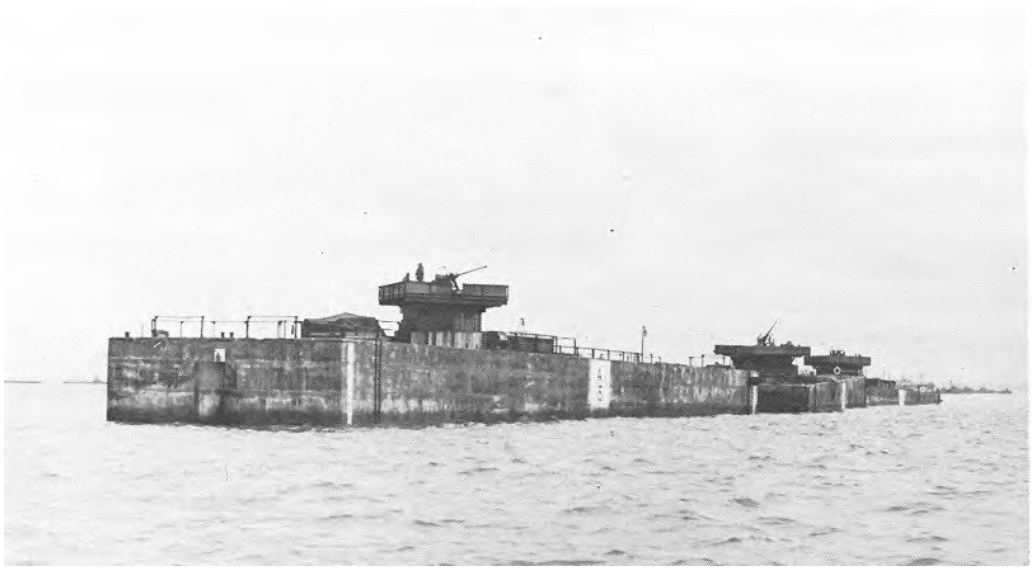
Meanwhile experimentation had gone forward on another solution to the problem—the caisson, or PHOENIX, which eventually was to constitute the main element in the breakwater forming the harbor. The PHOENIXES were huge, rectangular, concrete, cellular barges designed to perform much the same function as sunken blockships. Their main specification was that they have sufficient weight and strength to withstand summer Channel weather; at the same time they had to be towable, easily sinkable, and of simple enough design to be constructed with a

[10] Memo, Maj Gen G. R. Turner for Lt Gen A. C. G. McNaughton, 10 Aug 42, SHAEF SGS 800.1 MULBERRY I.

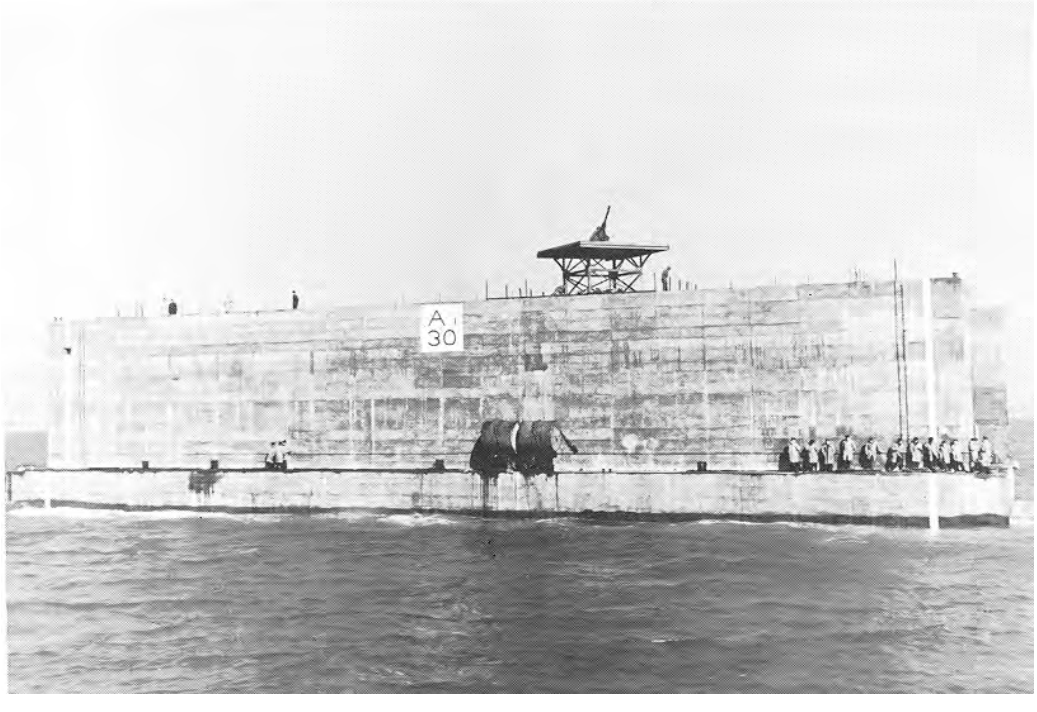
[11] Rpt by Combined Adm Com, 2 Sep 43.

[12] See photograph, p. 414.

[13] Rpt of Combined Adm Com, 2 Sep 43; Hickling, *op. cit.*, pp. 274–75.



CAISSONS, *used for MULBERRY breakwater, sunken in position off the beaches, above, and afloat, below.*



minimum expenditure of labor and materials. Five types were eventually built, varying between 175 and 200 feet in length and between 25 and 60 feet in height, the largest of them weighing 6,000 tons and drawing 20 feet of water. The PHOENIX consisted fundamentally of a reinforced base with side walls tied together by reinforced concrete bulkheads. Each was to be given a 10-foot sand filling to achieve the proper draft, then towed across the Channel, flooded, and sunk at the 5-fathom (30-foot) line. The great height of the PHOENIXES was dictated by the desire to provide a breakwater at sufficient depth to accommodate Liberty ships, which drew as much as 28 feet when loaded. The beaches selected for the assault had a very shallow gradient and tide ranges of more than 20 feet. The harbor therefore had to extend a full 4,000 feet from the shore in order to provide sheltered water for Liberty ships at low tide, and the largest caissons had to be 60 feet high in order to rest on the ocean floor and still provide a sufficient breakwater for deep-draft vessels at high tide.[14]

Experimentation on the second vital portion of the harbor—the berthing and unloading facilities within the breakwater—had begun somewhat earlier in response to the Prime Minister's directive in 1942. This was fortunate, for the engineer problems involved proved far more complex than those met in the construction of the PHOENIXES. Once again the gradient of the beaches and tidal conditions largely determined the requirement. Low tide along the Normandy coast uncovered as much as a quarter of a mile of beach, and it was necessary to go out another half mile to reach water of sufficient depth—12 to 18 feet—for the discharge of coasters.

The equipment developed to bridge this gap consisted of two basic components: pierheads, at which vessels were to berth and unload; and piers or roadways which connected the pierheads with the shore. Both were designed mainly by the British and involved an ingenious piece of engineering. The Lobnitz pierhead, as it was called, was an awesome-looking steel structure 200 feet long, 60 feet wide, and 10 feet high, weighing upwards of 1,500 tons. At each corner of the structure was a 4 x 4-foot spud leg 90 feet high, the height of which could be adjusted independently by means of winches located between the decks. These spud legs could be retracted during the towing of the structure. Once the pierhead was placed in position the legs were lowered, their splay feet digging into the sea floor to steady the structure, and their height was then adjusted to keep the pierhead at uniform height above water at all stages of the tide. The Lobnitz pierheads were intended to provide the principal unloading facilities for LCT's and LST's that were not beached and for coasters. They were so designed that any number could be linked together to form an extended berth. To connect pierheads with the shore a flexible steel roadway, known as the WHALE, was developed. The WHALE pier consisted essentially of 80-foot sections of steel bridging, linked together by telescopic spans which gave it the needed flexibility to accommodate itself to wave action, the entire WHALE structure resting on concrete and steel pontons known as "beetles." At low tide the sections near the shore would come to rest on the sand.

In the summer of 1943 the design of the artificial harbor had hardly reached the finality suggested by the above descrip-

[14] Hickling, *op. cit.*, p. 275; Stanford, *Force MULBERRY*, p. 66.



LOBNITZ PIERHEAD

tions of its various components. Because experimentation had not yet produced conclusive solutions to many problems, the plan which COSSAC submitted at Quebec in August was necessarily sketchy and vague. Nevertheless the Combined Administrative Committee of the Combined Chiefs of Staff concluded at that time that the construction of artificial harbors was definitely feasible, and approved the project in its general outline. Early in September it rejected the bubble breakwater idea, but recommended continued experimentation with all the other proposed solutions—BOMBARDONS, PHOENIXES, and sunken and floating ships—and urged the immediate construction of PHOENIXES and BOMBARDONS without awaiting the completion of trials and prototypes of the latter. These projects were given the highest priority for labor, equipment, shipping space, and supplies, and construction of the first units now began in earnest.

The respective spheres of responsibility of the United States and Britain with regard to experimentation and construction were also defined in September. By far the largest portion of the work had to be carried out in the United Kingdom, and the British consequently assumed major responsibility for the design, testing, and construction of the PHOENIXES, BOMBARDONS, pierheads, and WHALE bridging.

Trials with floating-ship breakwaters were to be carried out in the United States, and the United States was also called on to provide some of the tugs that would be required for towing purposes beginning just before D Day. The construction of BOMBARDONS and the provision of ships for the breakwater were Admiralty responsibilities; all other components were to be designed and built by the War Office.[15]

The principal units under construction or trial by late November were the BOMBARDONS, PHOENIXES, sunken- and floating-ship breakwaters, pierheads, and piers.[16] There still was no definite blueprint of the harbors at that time, for there was continuing indecision as to the form the harbor should take. The use of sunken ships was still being considered, although it was realized that they were adaptable as a breakwater only in shallow water. The use of floating ships as a deepwater breakwater received less and less favorable consideration because of the mooring problem involved.[17] The relative merits of BOMBARDONS and PHOENIXES were still being discussed, but there was continuing doubt as to the practicability of the former. Despite the indecision on these matters the final COSSAC draft of OVERLORD, published late in November 1943, specifically provided for two major artificial ports, one to be located at Arromanches-les-Bains in the British sector, with a capacity of 7,000 tons per day by D plus 16 or 18, and one at St. Laurent-sur-Mer in the American sector, with a capacity of 5,000 tons. For reasons of security the two projects had by this time ceased to be referred to as artificial ports. Late in October they had been christened with the code name by which they were henceforth known, the American port being designated MULBERRY A, and the British port as MULBERRY B.[18]

The design of the ports was more clearly established early in 1944. By January the concrete caisson or PHOENIX was definitely adopted as the principal unit of the breakwater. It was to be supplemented by sunken ships, the main reason being that sheltered waters were needed for a large number of craft in the earliest stages of the operation. Staff requirements had been amended in January to provide facilities for the discharge of 2,500 vehicles per day (1,250 at each port) by D plus 8 in addition to the tonnage already mentioned, and for shelter for small craft. The MULBERRIES were still big question marks at this time, as indeed they continued to be until the very time they began operating. In any case, naval authorities were very doubtful as to whether the harbors could be effective by D plus 4, when a break in the weather could be expected. They had therefore proposed the construction of five partial breakwaters, known as GOOSEBERRIES, each about 1,500 yards long, formed of blockships (referred to as CORNCOBS) sunk on the 2-fathom (12-foot) line at low water. There was to be one GOOSEBERRY at UTAH Beach, one at OMAHA, and one at each of the three British beaches. Seventy ships were to be used for this purpose, steaming across the Channel and going into position on D plus 1. Ballasted to draw 19 feet of water, they were to be prepared with explosive charges which would be fired after the

[15] Annex to note by Secy Jt Stf Mission to COS Com, 12 Sep 43, sub: Artificial Harbors for Combined Opn, COS 529/0, SHAEF SGS 800.1 MULBERRY I.

[16] CM&SF Monthly Progress Rpt 5, for Dec 43, 7 Jan 44, COS (44) 17 (0), SHAEF SGS 800.1 MULBERRY I.

[17] Rpt by Combined Adm Com, 2 Sep 43.

[18] Ltr, Brig Sir Harold Wernher to COSSAC, 21 Oct 43, sub: MULBERRY, COSSAC/CMSF/67, SHAEF AG 820-1 Artificial Harbors.

ships were properly planted, blowing holes below the water line so that they would sink rapidly.[19] These shallow-water GOOSEBERRIES would provide early protection for the large number of tugs, ferries, dukws, and landing craft plying between the ships and beaches and for the craft which had been beached. At OMAHA and Arromanches they would tie in with the PHOENIXES to form a longer breakwater enclosing the entire harbor.[20] The sheltered area formed by the breakwater at MULBERRY A was to provide a harbor of about two square miles, with moorings for 7 Liberty ships, 5 large coasters, and 7 medium coasters.

The plans for berthing and discharge facilities at the American installation finally called for three WHALE piers or roadways, one of 40 tons capacity (which could carry tanks) and two of 25 tons capacity. All three were to extend more than 3,000 feet out from the shore to about the two-fathom line. There they were to converge on six Lobnitz pierheads, grouped to accommodate both LST's and coasters. These installations were to give the port a capacity of 5,000 tons of cargo and 1,400 vehicles per day. This was regarded as a conservative estimate, and the capacity of the harbor was actually believed to be well in excess of this minimum.[21] In addition to these facilities, two ponton causeways were to be constructed at both OMAHA and UTAH Beaches to boost the unloading facilities for small craft such as LCT's and barges. These causeways were to be built of 5 x 7 x 5-foot ponton cells, bolted together into sections two cells wide and thirty long, and linked to form a roadway 14 feet wide and 2,450 feet long.[22] (*Map 7*)

Both the British and American MULBERRIES eventually also included a row of BOMBARDONS, despite continued misgivings as to their probable effectiveness.[23] These ungainly looking floats were to be placed about 5,000 feet seaward of the high-water mark to break the swell and form an additional deepwater anchorage for the discharge of Liberty ships. The UTAH Beach installation was to be much less elaborate. It was to have only a GOOSEBERRY breakwater, formed by sinking ten blockships beginning on D plus 1, and the two ponton causeways.

Over-all command of both MULBERRIES was given to Rear Adm. William Tennant (British). On the U.S. side Capt. A. Dayton Clark was placed in command of MULBERRY A, organized as Naval Task Force 127.1, but usually referred to as Force MULBERRY. Brigadier Sir Harold Wernher was designated to co-ordinate the work of the War Office and the civilian Ministries of Labour and Supply in the construction of the many components of the ports.

The construction and assembly of all the special port equipment proved a formidable task, and, along with the many other preinvasion preparations, taxed the resources of the United Kingdom to the

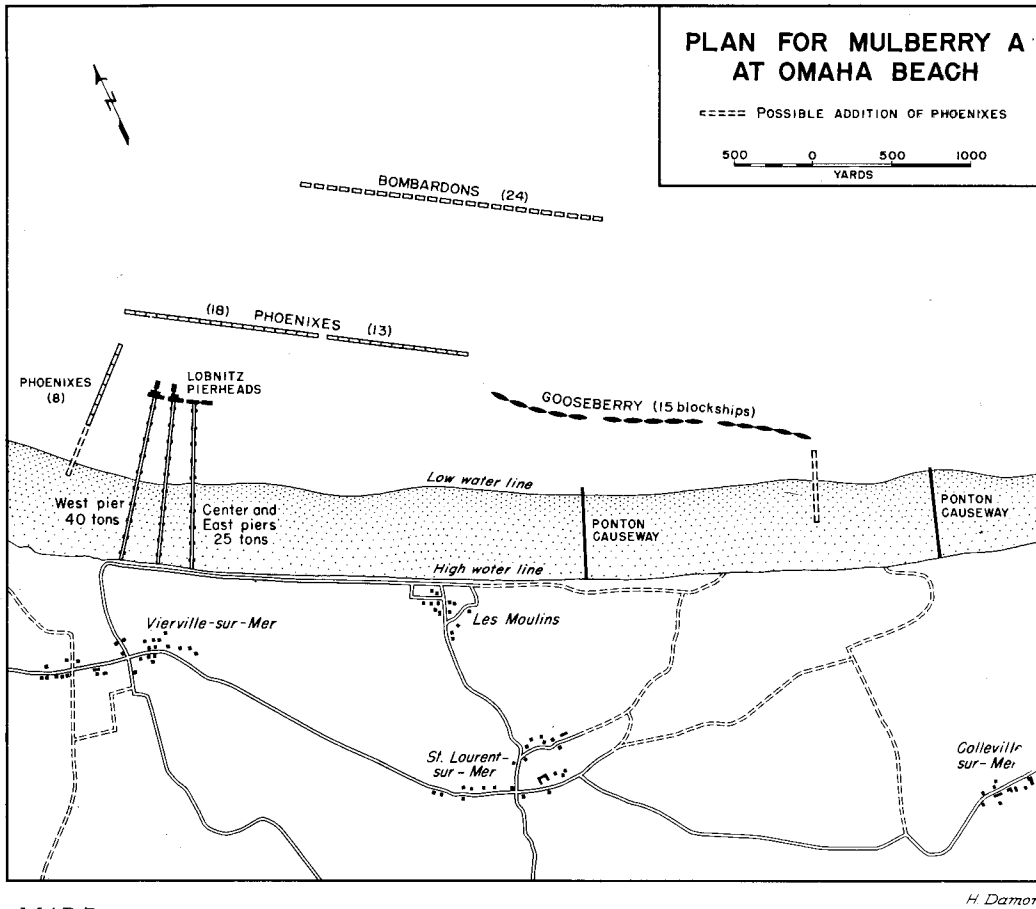
[19] Hickling, *op. cit.*, pp. 273–74.

[20] Ltr, Brownjohn to CofS SHAEF, 24 Jan 44, sub: MULBERRY Stf Requirement, SHAEF G-4 825.1 MULBERRY I 44; Incl to Ltr, Wernher to Secy of Admiralty, 12 Jan 44, sub: MULBERRY—Stf Requirements, COSSAC/CMSF/181, SHAEF SGS 800.1 MULBERRY I. See also Initial Joint Plan, and NEPTUNE: Training for and Mounting the Operation, I, 138.

[21] Rpt of Combined Adm Com, 2 Sep 43, p. 6.

[22] NEPTUNE: Training for and Mounting the Operation, II, 115.

[23] By December 1943 the rubber-type BOMBARDON had been abandoned. Meanwhile two of the steel cruciform prototypes had broken their backs in a half gale, and measures had to be taken to strengthen the remaining units under construction. CM&SF Monthly Progress Rpt 5, for Dec 43, 7 Jan 44, SHAEF SGS 800.1 MULBERRY I.



MAP 7

very limit in the last months before D Day. Many a sacrifice had to be made to permit the huge project to go forward, the Ministry of Labour giving up expert tradesmen and power equipment, the Army temporarily releasing men from the colors, the Navy foregoing frigate and aircraft carrier production. As General Morgan later observed, "Half of England seemed to be working on it and a lot of Ireland as well." [24] Despite the high priorities covering all phases of the project, planners and commanders responsible for the MULBERRIES were haunted by a thousand and one problems and fears until the ports were finally established, and they had to make many compromises with the goals originally set. Early in 1944, plans called for the construction of 113 BOMBARDONS, 149 PHOENIXES, 23 pierheads, and 6 roadways, and for the acquisition of 74 vessels for the sunken-ship breakwaters. The towing problem involved in the assembly and movement of the 600-odd major units involved was unprecedented. It was estimated at first that 200 tugs

[24] Sir Frederick Morgan, *Overture to Overlord* (Garden City, N. Y., 1950), pp. 263, 264–65.

would be needed for the task and that they would be occupied a full three months.

These requirements soon proved beyond the capabilities of U.K. resources. The construction of PHOENIXES had begun at the end of October 1943. Within two months the work had already fallen three or four weeks behind schedule, partly because the design of the caissons was altered, partly because the proper types of freight wagons to deliver steel were in short supply, and partly because contractors were unable to obtain the allocation of enough laborers, particularly in certain skilled categories. By 1 December 15,000 workers were supposed to have been assigned to the PHOENIXES, but less than half this number were on the job at that date.[25] To meet the labor requirements it was eventually necessary to hire large numbers of Irish workers—a measure that involved additional security risks. Finding construction sites alone was a tremendous problem, for each caisson was equivalent in size to a five-story building. Some of the caissons were built at the East India docks in London, but dry docks were not available for the entire project, and special basins had to be dug behind river banks along the tidal stretches of the Thames, where the work was partially completed. The banks were then dredged away and the units floated to wet docks for completion. Construction of the PHOENIXES was farmed out to some twenty-five contractors and eventually required about 30,000 tons of steel and 340,000 cubic yards of concrete in addition to other materials.[26]

In the construction of the Lobnitz pierheads, which got under way somewhat earlier, bottlenecks developed also. In December 1943 it was announced that only 15 pierheads could be delivered by D Day instead of the desired 23. Plans for the U.S. MULBERRY, which had called for 8 of these units, were therefore altered to provide for only 6. Because of prior commitments for the manufacture of landing craft and heavy engineering equipment it was necessary, as with other components, to split up the contracts among a large number of structural steel works in all parts of the country and to prepare entirely new shipbuilding sites for the launching of the pierheads. The same was true in the construction of the WHALE bridging for the roadways, and because of the wide distribution of the contracts it was almost impossible to obtain details of the manufacturing progress. About 240 firms were eventually involved in fabricating the materials for these units, using 50,000 tons of steel.[27] When construction fell behind schedule in March and April, a U.S. Naval Combat Battalion (the 108th) was assigned to assist in the manufacture of this equipment.[28]

Shortages of one type or another also forced a reduction in the number of BOMBARDONS and in the number of ships for the GOOSEBERRIES. The number of BOMBARDONS was eventually cut from 113 to 93. In the case of the blockships the orig-

[25] Memo, Capt C. R. Johnson, USN, for Jt Log Stf Com ETOUSA, 15 Dec 43, sub: U.S. MULBERRY A Progress to 15 Dec 43, EUCOM 334 Jt Log Stf Com I; Ltr, J. W. Gibson, Ministry of Supply, to Brig Wernher, 29 Nov 43, SHAEF AG 820-1 Artificial Harbors; Rpt on MULBERRY A, prep by Capt Clark and Col John R. Hardin, Deputy Chief Engr, 15 Jan 44, ETO 800.1 Harbors; Ltr, G. W. S. Friedrichsen to author, 21 Sep 51, giving data on planned construction provided by Hist Sec, Cabinet Offices, OCMH.

[26] Note by Jt Parliamentary Secy, Ministry of Supply, 30 Jan 44, COS (44) 103 (0), SHAEF AG 820-1 Artificial Harbors, 2.

[27] Memo, Johnson for Jt Log Stf Com, 15 Dec 43; Note by Jt Parliamentary Secy, Ministry of Supply, 30 Jan 44.

[28] NEPTUNE: Training for and Mounting the Operation, II, 116.

inal request for about 80 had brought loud protests from the Admiralty. When the admirals began to ponder the probable alternative, however, and visualized their landing craft smashing against the beach for lack of sheltered waters, they reconsidered, and more than 70 vessels—"mostly old crocks"—were eventually provided, about 25 of them by the U.S. War Shipping Administration and the remainder by the Ministry of War Transport.[29]

The towing problem finally proved as onerous as any of the other procurement difficulties, and in the final months before the invasion it was touch and go as to whether the lag in construction or the shortage of tugs would be the greater limiting factor. Until the end of April construction was the main worry, and in that month the Ministry of Production even provided a labor reserve to meet any emergency demands.[30] But anxiety over the construction schedule was eased somewhat in May, and all the essential units were in fact ready by the time of the invasion, although it was after the middle of May before the first operational Lobnitz pierhead was turned over to its U.S. Navy crew at Southampton. Fortunately the commander of the American Force MULBERRY ordered a thorough test of the pierhead that included discharging a fully loaded LST. The trial run disclosed numerous defects, and men struggled night and day under the relentless driving of the indefatigable Captain Clark to make the necessary modifications.[31]

No amount of last-minute effort could surmount the towing problem, and in the end it proved to be the most critical bottleneck. As each piece of equipment was completed it had to be towed, in some cases hundreds of miles, to the place of assembly on the south coast of England, and the movement of 600-odd units to the far shore within a two-week period posed the biggest tow job of all. The construction delays that developed in the spring only aggravated the problem, for the failure to complete units on schedule had the effect of compressing all towing commitments into a shorter period. There was little point in meeting construction schedules, in other words, if tugs were unavailable to tow units across the Channel. Here was another example of a single shortage or shortcoming creating a bottleneck which threatened to frustrate the successful execution of an entire plan. It was estimated in February that 200 tugs would be needed for all invasion commitments, of which 164 were required for the MULBERRY units. An allocation of 158 tugs was made for the artificial ports sometime during the spring; but despite the rounding up of every suitable vessel that could be spared in both the United Kingdom and the United States, only 125 were made available by the time of the invasion. Of these, 24 were taken for temporary service with various types of barges, leaving a bare hundred to meet the MULBERRY requirements. In light of this shortage it was necessary on the very eve of the invasion to set back the target date for the completion of the MULBERRY installations on the far shore from D plus 14 to D plus 21.[32]

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[29] Ltr, Morgan to Secy COS Com, 21 Jan 44, sub: MULBERRY and GOOSEBERRY, Annex, SHAEF SGS 800.1 MULBERRY I; Rear Adm H. Hickling and Brig I. L. H. MacKillop, Story of the Mulberries, MS, and Ltr, Friedrichsen to author, 21 Sep 51, OCMH.

[30] Ltr, Ministry of Production to Secy COS Com, 25 Apr 44, sub: Provision of Artificial Harbors, COS (44) 370 (0), SHAEF SGS 800 MULBERRY I.

[31] Stanford, *Force MULBERRY*, Ch. VII.

[32] TWX, ANCXF to SHAEF *et al.*, 2 Jun 44, SHAEF G-4 825.1 MULBERRY II 45.

In the months just before the invasion the question of how long the artificial ports were to be kept in operation received increasing attention. This matter was closely related to the estimates as to when the deepwater ports could be captured and brought into operation. The original plans for the artificial ports provided that they were to remain effective for ninety days, by which time deepwater ports were expected to be restored and able to handle the required tonnages. As early as March, however, after the tactical plan was revised, further logistical studies of the maintenance problem after D plus 90 revealed that the capacity of the ports would almost certainly have to be supplemented by that of the MULBERRIES for an additional thirty days (to D plus 120) and, unless operations went extraordinarily well after D plus 120, even through the winter months. Even if the Loire and Brittany ports were captured by D plus 45, it was concluded, the difficulties likely to be met in restoring and operating the lines of communications made it doubtful that U.S. forces could be supported entirely through those ports by D plus 90, and the British would not be able to have the sole use of Cherbourg after that date, as planned. In any case, Cherbourg and the smaller Cotentin ports did not have sufficient capacity in themselves to maintain the British forces after D plus 90. Thus, if the Seine ports were not captured and put into operation by D plus 120 it would be essential to keep the MULBERRIES operating to maintain British forces. The chief administrative officer at SHAEF, Lt. Gen. Sir Humfrey M. Gale, therefore urged that measures be taken to extend the usefulness of these ports. This entailed the construction of additional PHOENIXES as reserves and also the strengthening of the ports during the summer so that they might withstand the winter gales. General Gale also requested that spare blockships be provided to replace any that might break up. The necessity for prolonging the life of the MULBERRIES was immediately accepted, and in March construction of an additional 20 PHOENIXES was therefore approved.[33]

(2) Beach Organization

While the artificial ports represented one of the most ingenious engineering accomplishments and one of the invasion's most expensive investments of resources, they were to remain largely untried expedients and therefore unknown quantities until they were subjected to the twin tests of battle and weather off the Normandy coast. Of equal importance to the logistic preparations for the operation was the organization of the beachs, across which all equipment and supplies would have to pass in the initial stages regardless of whether they were discharged at the pierheads and brought ashore via the roadways or were discharged from landing craft at the water's edge.

Beach organization was to have special importance in OVERLORD because of the magnitude of the forces to be built up over the Normandy beaches and because of the extended time during which the beaches were to serve as major points of entry for both troops and supplies. The OMAHA and UTAH Beach areas were to be the bases for

[33] Ltr, Gale to CofS ANCXF, 9 Mar 44, sub: Construction of MULBERRIES, SHAEF SGS 800.1 MULBERRY, Case A; Ltr, Smith to Secy COS Com, Mar 44, sub: Construction of MULBERRIES, and Min of Mtg, 17 Mar 44, to consider means to prolong life of MULBERRIES into winter months, 21 Mar 44, Office of ANCXF, X/091/14, SHAEF SGS 800.1 MULBERRY I.

the first continental lines of communications. The initial organization of these areas was therefore a vital preliminary step in the transition to the normal administrative organization provided by the Communications Zone.

Responsibility for developing and operating the first supply installations on the far shore was assigned to the engineer special brigades: the 1st Engineer Special Brigade at UTAH, and the Provisional Engineer Special Brigade Group, consisting principally of the 5th and 6th Brigades and the 11th Port,[34] at OMAHA where the MULBERRY was to be located. As attachments to the First Army in the first stages of the operation these units were required to prepare plans based on the engineer special brigade annex to the First Army plan, and the brigades accordingly carried out detailed planning for the early organization of the beach areas.

In the next chapter more will be said about the origins and development of the engineer special brigades. These organizations, mothered by the necessities of the frequently recurring amphibious operations of World War II, were specially trained and equipped to handle the technical organization of the beaches. As outlined by a First Army operations memorandum, their general mission was "to regulate and facilitate the landing and movement of personnel and equipment on and over the beach to assembly areas and vehicle parks, to unload cargo ships, to move and receive supplies into beach dumps, to select, organize, and operate beach dumps, to establish and maintain communications, and to evacuate casualties and prisoners of war over the beach to ships and craft." [35] In short, it was their duty to insure the continuous movement of personnel, vehicles, and supplies across the beaches in support of a landing operation. By "the beaches" was normally meant an area known as the "beach maintenance area," which included the beach, the first segregated supply dumps inland, and the connecting road net, an area which usually did not extend more than three miles inland. At OMAHA the beach maintenance area included MULBERRY A and the minor ports in the vicinity.

The mission defined above involved a formidable list of tasks. Among them were the following: marking hazards in the vicinity of the beaches and determining the most suitable landing points; making emergency boat repairs; establishing medical facilities to collect, clear, and evacuate casualties to ships; controlling boat traffic; directing the landing, retraction, and salvage of boats; maintaining communications with naval vessels; marking landing beach limits; constructing and maintaining beach roadways and exit routes; establishing and marking debarkation points and landing beaches; unloading supplies from ships and craft; assisting in the removal of underwater obstructions; clearing beaches of mines and obstacles; erecting enclosures for guarding prisoners of war, and later evacuating them to ships; establishing army communications within the brigade and with other brigades and units ashore; constructing landing aids; maintaining liaison with senior commanders ashore and afloat; maintaining order and directing traffic in the beach maintenance area; providing bivouac, troop assembly, vehicle parking, and storage areas in the beach mainte-

[34] See below, n. 48.

[35] FUSA Opns Memo 5, 13 Feb 44, in Operation Report NEPTUNE, OMAHA Beach, prep by Hist Sec ETOUSA, Sep 44, p. lxiii, OCMH.

nance area for units crossing the beach; regulating and facilitating the movement of unit personnel and equipment across the beach and insuring the rapid movement of supplies into dumps; selecting, organizing, and operating beach dumps for initial reception and issue of supplies; selecting, organizing, and operating beach maintenance area dumps until relieved by the army; maintaining records showing organizations, materials, and supplies which had been landed; providing for decontamination of gassed areas in the beach maintenance area; maintaining an information center for units landing; operating emergency motor maintenance service to assist vehicles and equipment damaged or stranded in landing and requiring de-waterproofing assistance; providing local security for the beach maintenance area; and co-ordinating offshore unloading activities.

Many of these tasks obviously called for troops other than engineers. In this respect the name "engineer special brigade" is misleading, for while the core of the brigade consisted of engineer combat battalions, each brigade normally contained a body of Transportation Corps troops, such as amphibian truck companies and port companies, exceeding the size of the engineer component, plus quartermaster service and railhead companies, and ordnance, medical, military police, chemical, and signal troops. In addition, depending on its mission, each brigade was augmented by the attachment of a host of other units and special detachments such as bomb disposal squads, naval beach units, maintenance and repair companies, fire-fighting platoons, and surgical teams, which might raise its total strength to 15,000 or 20,000 men. The engineer special brigade was a hybrid organization, therefore, without standard composition. But it was exactly this feature which gave it the desired flexibility and permitted it to be tailored to any task in an amphibious operation.

Portions of the brigades were scheduled to follow closely on the heels of the initial assault waves. Within the first two hours of the landings they were expected to complete the initial reconnaissance and beach marking preliminary to the development of the beaches. In that period advance parties of engineer shore companies, signal teams, and naval units were to come ashore, survey beach and offshore approaches, plan the layout of beaches for landing points, roadways, and exits, install ship-to-shore signal stations, and erect beach markers. Within the next two hours additional elements of the brigade would arrive, remove mines and beach obstacles, decontaminate beach areas, lay beach roadways, complete exits, establish collecting and clearing stations, start controlling traffic, build stockades for the control of prisoners of war, assist stranded craft, control boat traffic, reconnoiter initial dump areas, and establish motor parks for first aid to water-stalled vehicles. By the end of the first day the brigade was to have established the brigade command post, a signal system, and assembly areas for troops, sign-posted all routes to the dumps, repaired roadways to the dumps, opened beach exits, organized antiaircraft defense, organized initial dumps for the receipt, sorting, stacking, inventory, and issue of supplies, and to have started unloading supplies. Initial beach dumps were to be in full operation by the end of the first day. Within the next few days supplies were to be routed to new dumps established farther inland in the beach maintenance area.

Brigade units were so grouped for the assault that they could operate independently in support of specific landing forces. Each brigade was broken down into battalion beach groups, each consisting of an engineer combat battalion reinforced with the service elements necessary to support the assault landing of a regimental combat team. The battalion beach groups were further subdivided into companies, each of which was to support the landing of a battalion landing team and operate a beach of about 1,000 yards frontage. Once a beachhead had been won and the build-up began, service troops of the battalion beach groups were to revert to their parent units and operate under brigade control. At this stage the brigades would move out of the narrow confines of the beach itself and begin to develop the beach maintenance area.[36]

The beach maintenance areas in effect would be microcosms of the future Communications Zone, for the brigades performed there most of the functions which the expanded Communications Zone later carried out in its base and advance sections. Each brigade was organized to move 3,300 tons of supplies per day from ships and craft into segregated dumps, and to provide the technicians and labor necessary to operate those dumps. As tonnage requirements increased, the capacity of the brigades was to be increased by the attachment of additional service troops, the improvement of beach facilities, and the development of local ports. As the MULBERRY was completed and the minor ports were rehabilitated, other service troops were to be utilized under brigade attachment to operate them. This initial development of the continental supply structure was to be carried out directly under the control of the First Army, which planned to relieve the engineer special brigades of responsibility for operating the dumps in the beach maintenance area as early as possible, using its own service units for this purpose. Eventually, of course, an army rear boundary would be drawn, and the rear areas and the brigades themselves would be turned over to the Advance Section, which would assume full responsibility for operating the embryo Communications Zone until the arrival of the Forward Echelon of that organization itself.[37]

The brigades were thus destined to play an essential role in initiating the development of the far-shore logistic structure. Since they were to land in the first hours of the invasion, while the beaches were still under fire, they were expected to perform both combat and service missions. That they were aware of their dual role is indicated by their reference to themselves as "the troops which SOS considers combat, and the combat troops consider SOS."

(3) Port Reconstruction

While the organization of the beaches and the MULBERRIES was important for the initial supply and build-up of forces on the Continent, the major burden of logistical support was expected to be progressively assumed by the larger deep-water ports as they were captured and restored to operation. The Normandy area had been chosen as the site of the landings not only because it possessed the

[36] NEPTUNE: Training for and Mounting the Operation, I, 141–42; Operation Report NEPTUNE, OMAHA Beach, App. A (Troop List), App. C (Jt Agreement between CG FUSA and Cmdr Task Force 122 for Amphibious Opns), and App. D (FUSA Opns Memo, 5, Engr Special Brigades Reinforced), OCMH.

[37] FUSA Rpt of Opns, 20 Oct 43 to 1 Aug 44, Annex 11 (ESB Plan), Bk. IV, p. 26.

best combination of features required for an assaulting force, including proximity to the port of Cherbourg, but also because it lay between two other groups of ports—the Seine and Brittany groups—permitting operations to develop toward one or the other. The OVERLORD planners actually expected to rely completely on the Normandy and Brittany groups to develop the required discharge capacity for the Allied forces to D plus 90, and their plans for the rehabilitation of the ports in the lodgment area were made accordingly.

Operating the continental ports was to be a Transportation Corps function, restoring them was the responsibility of the Corps of Engineers. In the final Communications Zone plan this reconstruction work was given a priority second only to the development of beach installations.[38] Planning for this task fell mainly to the Construction Division of the Office of the Chief Engineer, ETOUSA. U.S. participation with the British in this planning for port salvage and repair began in July 1942, immediately after the activation of the European theater, when American representatives attended meetings of the ROUNDUP Administrative Planning Staff. General Davison, chief engineer of the theater, suggested the magnitude of the task of rehabilitating the European ports when he said that it could "best be visualized by imagining what would have to be done to place back in operation the ports of Baltimore, Md., Portland, Me., Portland, Oreg., Mobile, Ala., and Savannah, Ga., plus ten smaller shallow-draft U.S. ports, assuming that these ports had been bombed effectively for two years by the R. A. F., then demolished and blocked to the best of the ability of German Engineer troops."[39] He recommended at that time the creation of specially organized and equipped engineer port construction companies reinforced by engineer general service regiments, and suggested that they be organized with personnel from large U.S. construction firms in the same way that American railways sponsored railway operating battalions. These proposals were forwarded to the War Department, and the theater's needs in this respect were later met by the formation of units substantially along these lines.

Shortly thereafter preliminary studies were undertaken of the problems involved in reconstructing particular continental ports. No operational plan was available at this early date, and the North African invasion intervened to detract somewhat from planning for continental operations. But the ROUNDUP planning staff continued its work throughout the winter of 1942, and early in 1943 a subcommittee on port capacities in northwest Europe was organized under the chairmanship of a British officer, Brigadier Bruce G. White. This committee eventually extended its investigations to the ports along the entire coast of northwest Europe from the Netherlands to the Spanish border.

With the establishment of COSSAC in 1943 the port committee was renamed, but its membership remained virtually unchanged. U.S. engineers still did not know definitely which ports they would be responsible for, but a great amount of preliminary planning was accomplished, and a mass of pertinent data was collected on the various ports. Procedure for the initial occupation of ports was worked out,

[38] Communications Zone Plan, issued by Hq FECOMZ, 14 May 44, Sec. XII, ETO Adm 376.

[39] Ltr, Davison to CofS ETOUSA, 13 Jul 42, cited in Port Construction and Repair, Hist Rpt 11, Corps of Engrs ETO, p. 4, ETO Adm.

and spheres of authority were defined, fixing responsibility for the Engineers, the Navy, and the Transportation Corps. In October 1943 a Joint U.S.-British Assessment Committee drew up an analysis of capacity for each port in western Europe. This included draft, tonnage, operating plant, and weather data. For example, a port reconstruction estimate for Brest, which was expected to be one of the major American points of entry as it had been in World War I, contained a full description of the port, statistics on its prewar operations, estimates of probable demolitions and obstructions and of the port's capacity, plans for reconstruction, including a timetable for such work, a schedule for the intake of cargo, and a mass of technical data, including graphs, charts, maps, and photos. The Office of the Chief Engineer eventually prepared detailed plans before D Day for eighteen ports in the Normandy and Brittany areas.[40]

The actual work of rehabilitating the captured ports was to be assigned to organizations specifically designed for this purpose—port construction and repair groups, or PC&R groups. The headquarters and headquarters companies of these groups comprised a nucleus of specialists trained in marine construction, and included a pool of heavy construction equipment together with operators. This nucleus was to be supplemented by engineer service troops and civilians to provide the necessary labor and, according to need, by dump truck companies, port repair ships, and dredges. The port construction and repair group with its attachments thus constituted a task group, tailored for the specialized mission of restoring ports, much as the engineer special brigades were organized for the task of developing the beaches.

The equipment requirements for port reconstruction were difficult to estimate in advance, and little attempt was made to analyze and determine the requirements for individual ports. Instead a stockpile of materials was created, and estimates were made of the necessary repair and construction materials for a fixed length of quay, assuming a certain degree of destruction. These estimates were used to develop standard methods of repair that would be generally applicable to all types of repair work in French ports. Apart from an initial representative list of basic materials and equipment accompanying the repair groups, reconstruction materials were to be ordered to the Continent after the capture and reconnaissance of each port.

The reconnaissance was to be an important preliminary to the rehabilitation of a port, and the composition of the reconnaissance party and its specific mission were planned long in advance. Normally the reconnaissance team was to consist of representatives of the COMZ G–4, the Advance Section, the chiefs of engineers and transportation, and occasionally SHAEF. Upon capture of a port this team had the mission of surveying it for damage to facilities, locating sunken ships and other obstructions, preparing bills of material, deciding the extent and methods of repair, determining the availability of local or salvageable materials, and arranging for the phasing in of the required PC&R units for the actual reconstruction work. The reconnaissance team would therefore determine the degree of

[40] *Ibid.*, pp. 10–11. These were Barfleur, Binic, Brest, Cherbourg, Cancale, Concarneau, Grandcamp, Granville, Isigny, Le Croisic, Le Pouliguen, Lorient, Morlaix, Quiberon Bay, St. Brieuc, St. Malo, St. Nazaire, and St. Vaast.

rehabilitation to be undertaken and the initial course of the reconstruction program.[41]

Several factors had to be taken into consideration in planning the reconstruction of a port and arriving at its estimated capacity. Among them were its prewar capacity and use, the known and assumed damage to the port when captured, and the ability and availability of Army and Navy Engineer units. The damage factor was by far the most variable and unpredictable. For planning purposes, however, certain assumptions had to be made. It was figured, for example, that up to 90 percent of the existing suitable quayage would be initially unusable. Of this, half was expected to be in such condition that it could be repaired fairly quickly or in a matter of days, and the remainder was expected to require varying amounts of work or be beyond repair in any reasonable time. It was also assumed that all craft in the harbors would be sunk, cargo-handling equipment destroyed and tipped into the water, most of the buildings in the port area demolished, road and railway access blocked with debris, entrances to ports and lock chambers blocked and all locks demolished, and water and electric services broken. In addition, it was anticipated that extensive dredging would be necessary in some cases to allow the entrance of anything but the shallowest-draft vessels into waters that had undergone four years of silting.[42]

By D Day detailed plans were complete for the rehabilitation of Cherbourg, Grandcamp, Isigny, St. Vaast, Barfleur, and Granville in the Normandy area, and of St. Malo in Brittany. (*See Map 4.*) Cherbourg was the only large port in this group and was the first major objective of the American forces. Except for Granville, all the others were very small and possessed discharge capacities of only a few hundred tons per day. Another Normandy port—Carentan—had been rejected as having a potential too meager to warrant the effort required for its rehabilitation. All were scheduled to be opened by D plus 30, and their restoration was therefore the responsibility of the Advance Section. The schedule for the opening of these ports and their estimated initial discharge capacities were as follows: [43]

Port	*Opening date*	*Tonnage at opening*
Isigny	D plus 11	100
Cherbourg	11	1, 620
Grandcamp	15	100
St. Vaast	16	600
Barfleur	20	500
Granville	26	700
St. Malo	27	900

Headquarters, Communications Zone, meanwhile made plans for the later reconstruction of the Brittany ports, the schedule for which was as follows:

Port	*Opening date*	*Tonnage at opening*
Brest	D plus 53	3, 240
Quiberon Bay	54	4, 000
Lorient	57	800

Although plans were made for phasing equipment and the required Engineer and TC units into the Brittany ports and a schedule was written for their opening, the ports of Normandy naturally enjoyed

[41] Engr Rpt 11, pp. 11, 16.

[42] ADSEC NEPTUNE Plan, 30 Apr 44, Annex 6 (Engrs), ETO Adm 377.

[43] Sources for these figures are: FUSA NEPTUNE Plan, App. I to Annex 11 (ESB Plan), in FUSA Rpt of Opns, 20 Oct 43–1 Aug 44, Bk. IV, p. 46; ADSEC Engineer Plan; COMZ Plan, App. N and Annex 13 (TC).

the first priority in development, and the plans for its six ports plus St. Malo were worked out in much greater detail before D Day.

Of these seven ports all except Cherbourg were tidal, drying out completely at low water. Most of them had a mud- or sand-bottomed basin and two or three quays which were entirely tidal, and at high water they could accommodate only vessels drawing a maximum of thirteen or fourteen feet.[44] In this respect they were typical of the French ports along the English Channel and the Bay of Biscay, where tide and weather conditions had required the construction of massive breakwaters, locked basins, and channels, in contrast with ports in the United States where such elaborate paraphernalia were unnecessary.

St. Malo was known to have a large amount of locked quayage, but it could be blocked easily and had poor rail clearance facilities. Consequently it was considered suitable only for operations employing amphibian trucks (dukws) for at least the first ninety days. Granville, on the west coast of Normandy, had somewhat better facilities than the other ports. In addition to quayage in its Avant Port, where vessels could "dry out" (that is, beach at ebb tide, unload, and then float out on the next tide), Granville had a locked or "wet" basin with berthing facilities that could accommodate seven 4,000-ton ships of 14-foot draft simultaneously. The Allies did not count on immediate use of the wet basin, for the enemy was expected to destroy the lock gates and sink blockships in the chamber. But with the removal of obstacles they planned to dry out coasters at the inner quays and to utilize Granville for the reception of coal and ammunition.[45]

Although the movement of craft into and out of these "minor" ports would be restricted by the tide, they at least offered some protection from stormy weather, and the desperate need for discharge capacity in the early phases appeared to warrant bringing them into use. The total discharge capacity of these six minor ports was not great. At D plus 30 it was scheduled to be 4,500 tons per day. At D plus 60, with the small Brittany port of Lorient added, they were to develop a capacity of 7,700 tons, and at D plus 90, 10,650 tons.[46] As for clearance facilities, all the ports had good road connections, but only Granville had first-class rail clearance. All the other minor ports would have to be cleared by motor transport.

The division of responsibilities and the procedure for restoring and operating the ports were defined in minute detail. Work of a more strictly marine nature was assigned to the British and U.S. Navies, the former assuming responsibility for minesweeping the harbors, and the latter for removing obstacles such as sunken blockships in the channels and along quays and for making hydrographic surveys. Reconstruction or enlargement of discharge facilities was an Army Engineer responsibility, and the plans for the first six weeks were written in full detail by the Advance Section. The ADSEC plan provided that a reconnaissance party should debark on D plus 3 and successively examine the condition of port facilities at all the minor ports, beginning at Isigny. As these preliminary surveys were completed, the commanding officer of the port construction and repair group was to draw up a definite

[44] ADSEC Plan, Annex 6 (Engrs), App. A (I), Six Minor Ports; Engr Rpt 11, Ch. III.
[45] ADSEC Plan, Annex 6 (Engrs).
[46] COMZ Plan, App. N.

reconstruction job schedule to meet the planned port capacity. The first repair work was to get under way on D plus 6 at Isigny and Grandcamp with the arrival of the headquarters of the 1055th PC&R Group and work parties consisting of advance elements of the 342d Engineer General Service Regiment. Upon completion of its task the entire group was to proceed in turn to St. Vaast, Barfleur, Granville, and St. Malo for similar projects.[47]

While repair and construction might continue for several months, as at Cherbourg, the Transportation Corps was to start operating the ports as soon as the unloading of cargo could begin. For this purpose the 11th Major Port was attached to the Provisional Engineer Special Brigade Group at OMAHA to handle pierhead operations at the MULBERRY and to operate the small ports of Isigny and Grandcamp.[48] It was also to furnish a detachment to the 1st Engineer Special Brigade to operate the small port of St. Vaast (and eventually Carentan, as it turned out) in the UTAH area. The operation of Barfleur, Granville, and St. Malo was to be supervised by the 4th Major Port at Cherbourg. Another major port, the 12th, was to take over the operation of Granville and the ports in the vicinity of St. Malo. The Allies hoped that St. Malo itself could be developed to a capacity of 3,000 tons per day, and the St. Malo area, including Cancale and St. Brieuc, to 6,000 tons, and thus relieve beach operations at OMAHA and UTAH. They counted on the St. Malo development to provide all the tonnage capacity necessary to sustain the Third Army, and possibly even to debark some of its personnel.[49]

Since the minor ports possessed only limited capacities and were rather uneconomical to operate, their development was never intended to be more than a stop-gap measure designed to meet a portion of the discharge requirements in the period before the full potential of the larger ports was realized. Plans for their restoration were completely overshadowed by those made for Cherbourg. This port was expected to handle 6,000 tons at D plus 30, 7,000 at D plus 60, and 8,000 at D plus 90, and was to exceed in capacity the combined tonnage of the six minor ports throughout the first 60 days. Even Cherbourg was to have but a temporary importance for U.S. forces, for plans were tentatively made to turn the port over to the British after a short time, and to route the major portion of American cargo through the Brittany ports and later through others farther up the Channel. Cherbourg, however, played a wholly unexpected role in the support of U.S. forces and eventually ranked as one of the big three of the continental ports.

The relatively high tonnage targets for Cherbourg appear optimistic in view of the port's peacetime performance. Cherbourg, home of the French luxury liner *Normandie,* had been primarily a passenger port and a naval base. It had handled an average of less than 900 tons per day, ranking twenty-second among all the

[47] ADSEC Plan, Annex 6 (Engrs), App. A (I), Six Minor Ports.

[48] A "major port" consisted basically of a port headquarters and headquarters company and a varying number of port, truck, and amphibian truck companies, but it usually also had many special units. The 11th Port, for example, consisted of a headquarters and headquarters company, 12 port companies, 11 QM service companies, 6 QM truck companies (TC), 3 amphibian truck companies (dukws), an ordnance medium automotive maintenance company, a port signal company, a harbor craft company, and a finance disbursing section. Operation Report NEPTUNE, App. A.

[49] ADSEC Plan, Annex 14 (TC).



AERIAL VIEW OF CHERBOURG. *Digue de Querqueville, 1; Naval Arsenal, 2; Nouvelle Plage, 3.*

French ports in cargo tonnage. Warehouse and storage facilities were correspondingly small, and cargo-handling equipment was in keeping with a port that specialized in passenger trade rather than freight.[50]

Built up over a period of two hundred years, Cherbourg's port facilities were essentially completed in the early 1920's, but at the outbreak of World War II they were still undergoing improvements designed to facilitate the berthing of the largest ocean liners. Cherbourg's harbor is artificial, consisting of a double set of breakwaters which form both an inner and outer roadstead, one known as the Petite Rade and the other as the Grande Rade. The only facilities in the outer harbor consisted of tanker berths along the Digue de Querqueville, the western arm of the outer breakwater, which the Allies intended to restore for the bulk reception of POL. Otherwise the outer harbor was chiefly an anchorage, affording some protection to shipping, but too rough in stormy weather to permit lighterage operations. The inner roadstead was workable in all weathers. Both had sufficient depth at all variations of the tide to receive the largest ocean liners.

The Petite Rade, or inner harbor, contained almost all of the port's berthing

[50] Cherbourg—Gateway to France: Rehabilitation and Operation of the First Major Port, prep by Hist Sec ETOUSA, 1945, MS, p. 5, OCMH.

facilities, most of which were concentrated along the western and southern sides. The entire western side of the port was occupied by the great Naval Arsenal, consisting of repair shops, drydocks, and maintenance facilities grouped around its three basins—the Avant Port, Bassin Charles X, and Bassin Napoléon III—and including additional berthing facilities at the Quai Homet and along the Digue du Homet, the western jetty enclosing the inner harbor. This area alone was expected to provide discharge facilities for 5 Liberty ships, 2 train ferries, 24 coasters, and 2 colliers.

Just south of the main arsenal installation lay the seaplane base and its three small basins—the Bassin des Subsistences, Avant Port, and Port de l'Onglet—which were expected to provide berths for 13 coasters. Adjoining this area to the southeast was a broad bathing beach known as the Nouvelle Plage, believed to be ideal for unloading vehicles from LST's. Immediately to the east of this beach and directly in the center of the harbor lay the entrance channel to the Port de Commerce, consisting of two basins (the Avant Port de Commerce and the Bassin à Flot) which jutted deeply into the heart of the city. These two basins were planned to accommodate 17 coasters and 2 LST's with tracks for the discharge of railway rolling stock.

Dominating the entrance to these basins was the large Darse Transatlantique, the deepest portion of the harbor, where the Quai de France and the Quai de Normandie provided berthing for large passenger liners, and where discharge facilities were now to be provided for 7 Liberty ships, 2 LST's carrying rolling stock, and a train ferry. A large tidal basin in the southeast corner of the port was believed to be suitable for the reception of additional vehicle-carrying LST's.

In all, the port was expected to provide berths for 12 Liberty ships, 18 LST's (6 of which would deliver rolling stock), 56 coasters, 2 tankers, 3 colliers, and 1 train ferry. In addition, the harbor of course offered alternative anchorage for other shipping which could be worked by lighters—either dukws or barges. When these facilities were fully developed the port was expected to attain a daily discharge capacity of 8,000 tons.[51]

Despite the assumption that the enemy would carry out a systematic destruction of Cherbourg before surrendering it, Allied planners hopefully scheduled the opening of the port and the start of limited discharge operations three days after its capture. The procedure for restoring Cherbourg and bringing it into operation was similar to that described for the minor ports. In the three days following its capture the Royal Navy was to sweep mines from the harbor, and U.S. naval salvage units were to begin removing blockships. Rehabilitation of the port's inshore facilities meanwhile was to be undertaken by the 1056th Port Construction and Repair Group, with attached elements of an engineer general service regiment, an engineer special service regiment, and an engineer dump truck company. A reconnaissance party of this organization was scheduled to debark at UTAH Beach on D plus 5, proceed to the port on D plus 8, and immediately establish priority of debris clearance in the port area. In conjunction with the Navy salvage party, it was to establish priority for ship salvage and removal operations for approval of the port commander. It would also decide on the

[51] ADSEC Plan, Annex 6 (Engrs), App. A (II).

schedule for initial quay repair jobs and examine locations where initial cargo discharge from dukws, barges, and LST's could begin.

The actual rehabilitation work was to begin the second day after capture (D plus 10), early priority being assigned to such projects as debris clearance from the Quai Homet area, preparation of LST landing sites on the Nouvelle Plage, and construction of a tanker berth at the Digue de Querqueville on the west side of the outer harbor. By D plus 11 progress on these first projects was expected to be sufficient to permit the unloading of about 1,600 tons of cargo by a combination of dukws and barges unloading from Liberties and coasters, the unloading of at least one docked coaster direct to a usable quay, and the discharge of 840 vehicles per day from LST's at the Nouvelle Plage. By the fourth day the Allies planned to boost unloading to about 3,800 tons, and by the tenth to about 5,000 tons. The great bulk of this discharge was to be carried on by dukws and barges working Liberty ships and coasters at anchor. In fact, only one coaster berth and four Liberty berths were expected to be in use at the end of the first month of operations, and direct ship-to-shore discharge consequently was expected to account for only a fraction of total discharge in these early weeks.

Some conception of the minute detail and scope of preparations for the rehabilitation of the ports can be gained from a glance at the engineer reconstruction plans. In sheer bulk the ADSEC engineer plan outweighed that of all other services combined, comprising two thick volumes of data on the Normandy ports. These included an analysis of their facilities, a schedule of reconstruction, and a detailed catalogue of equipment and material needs. The length and width of every quay, the depth of water alongside, the nature of the harbor bottom, the number and types of cranes, the capacities of berths, road and rail clearance facilities, all were set down in inclosures to the plan. Next, every reconstruction project was defined and given a priority, and units were phased in to undertake these jobs in prescribed order on specific days. On the basis of the above data, the ADSEC planners estimated the type and number of craft that could be accommodated and the tonnage discharge targets that should be met on each day by the beaching of vessels, by dukw, coaster, and barge discharge, and by direct unloading from either coasters or deep-draft ships. In meticulous detail they drew up lists of materials needed in the reconstruction, specifying the exact quantities of hundreds of items from bolts and nails, ax handles, valves, washers, and turnbuckles in quantities weighing only a few pounds, to heavy hoists, tractors, sandbags, and cement, weighing many tons. The ADSEC plan scheduled twenty-one projects to be started by D plus 31, establishing the days and priority in which they were to be undertaken, specifying the crews available for each job, and the time in which they were to be completed. While it was unlikely that this clocklike schedule would be followed to the minute in view of the many unforeseeable circumstances, plans nevertheless had to be made on the basis of the most optimistic forecast of tactical progress in order that logistical support should not fall short of requirements.

A picture of the personnel and equipment required to operate the ports is afforded by the Transportation Corps plan. For the beach areas alone, including the minor ports in the vicinity, the basic units

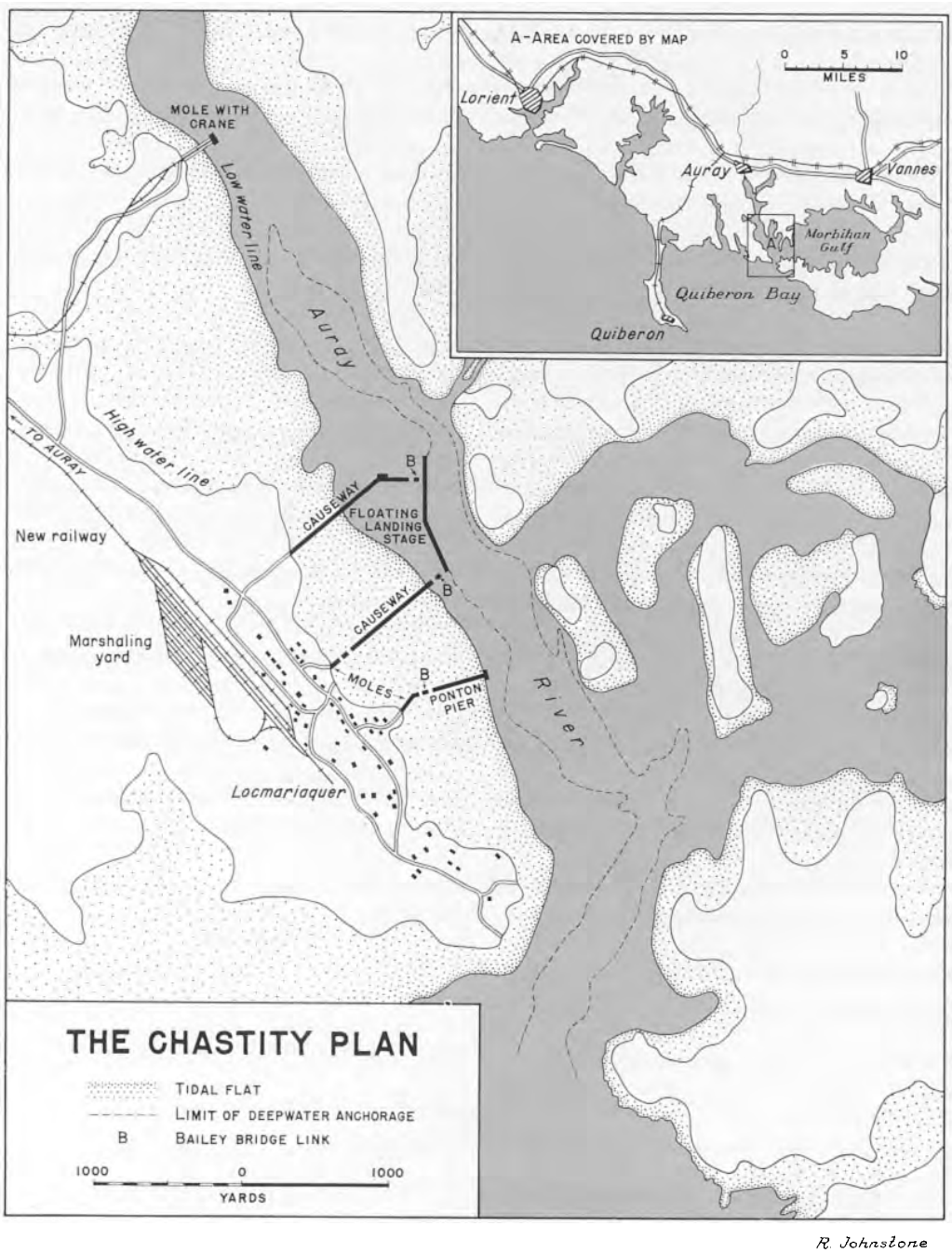
allotted included 1 major port headquarters (the 11th), 10 port battalion headquarters, 48 port companies, 1 harbor craft service company, 7 quartermaster truck companies, and 19 amphibian truck companies. Cherbourg was assigned 1 port headquarters (the 4th), 6 port battalion headquarters, 20 port companies, 2 harbor craft service companies, 1 port marine maintenance company, and 4 amphibian truck companies. Floating and nonfloating equipment needs at the beaches included 950 dukws, 16 tugs, 7 sea mules, 66 barges, and varying numbers of cranes, tractors, trailers, and various types of boats. Cherbourg was to be furnished 200 dukws, 176 barges, 38 tugs, 11 sea mules, a floating drydock, and various crane barges, landing stages, and boats. These items were solely for harbor use. On shore there were additional requirements for 69 cranes of various sizes and types, 30 derricks, plus conveyors, trailers, and tractors.[52] In addition to these elaborate plans for the development of the port's discharge capacity the Communications Zone plan scheduled the introduction of railway equipment to meet the corollary requirement of developing Cherbourg's clearance facilities.

Plans for the rehabilitation of the Brittany ports were written in far less detail, since the final decision regarding the development of that entire area was to depend on circumstances following the battle of Normandy. No specific units were named to handle reconstruction and operation of the Brittany ports, although estimates were made as to types of units and quantities of equipment needed to bring Brest, Quiberon Bay, and Lorient into operation. Plans for the Brittany ports had undergone several alterations. Before April 1944 they contemplated the development of St. Nazaire, Morlaix–Roscoff, St. Brieuc, Concarneau, and Le Pouliguen in addition to St. Malo, Lorient, and Brest. With the acceptance of the Quiberon Bay (CHASTITY) project early in April the final COMZ plans provided for the restoration of only Lorient, Brest, and St. Malo with its adjacent beaches at Cancale, and the development of Quiberon Bay. These four ports were planned to develop a daily capacity of about 17,500 tons.[53]

The plan that finally evolved for the development of Quiberon Bay differed substantially from the original concept. A study of the area revealed that while the bay itself provided ample anchorage of required depth, and while the inland transportation net could be developed to needed capacity, bad weather conditions barred the use of lighters to unload ships in the winter. The development of deepwater berths was likewise found to be impracticable since the wide tidal range and the gentle slope of the sea bottom near the shore would have required the construction of extremely long piers. The answer to the problem lay rather in the Auray River, which flows into Morbihan Gulf and Quiberon Bay from the north. This estuary had scoured a narrow channel almost eighty feet deep near the small fishing village of Locmariaquer, providing deep and sheltered water where large ships could lie alongside piers or landing stages and discharge their cargo, and anchorage from which lighterage operations could be safely conducted. (*Map 8*)

As finally evolved the plan called for moorings for thirty deep-draft vessels in the deepwater "pool," and a landing stage designed to float up and down with the

[52] ADSEC Plan, Annex 13 (TC).
[53] COMZ Plan.



R. Johnstone

MAP 8

tide providing berths for five Liberty ships at the edge of the deepwater anchorage. Two fixed-construction causeways were to extend across the tidal flat from the shore to the landing stage. In addition a floating pier, constructed of naval lighterage pontons, was planned south of the landing stage, and an existing mole with rail connections farther north was to be extended into deep water to make possible the handling of heavy lifts. These facilities were expected to give the port a capacity of 10,000 tons per day.

The CHASITY project had much to commend it. Among its attractive features was the fact that it made the most of an existing natural advantage—that is, sheltered water—and that it required only a fraction of the labor and materials that were to go into the artificial ports or MULBERRIES. Furthermore, no special design or manufacturing problems were involved, for all the components of the piers and landing stage consisted of standard materials and equipment already available.[54]

The port capacities given above were those embodied in the final OVERLORD plan, and represented substantial revisions made in March and April 1944, when it was realized that additional discharge capacity would be needed. As plans stood at that time the port situation remained very tight for both the OVERLORD and post-OVERLORD periods and imposed a considerable rigidity in logistical plans, for every port and beach would be forced to work to capacity. In fact, it was estimated in March that port capacities would actually fall short of U.S. tonnage needs at D plus 41. By that date the daily requirements would total approximately 26,500 tons, while discharge capacities were estimated to reach only 20,800.[55]

In March and April the entire problem had been restudied with a view toward making up the recognized deficiencies. The substitution of the CHASTITY project for St. Nazaire and the other minor Brittany ports was a partial solution. But the Brittany ports were not scheduled to come into use until after D plus 50. Measures were also taken in March to prolong the life of the MULBERRIES. In addition, estimates were revised, first, of the time required to capture the ports, and second, of the time required to open the ports. At the same time the estimates of their tonnage capacities were increased. Cherbourg's maximum capacity, for example, was boosted from 5,000 to 8,000 tons. Its capture was more optimistically scheduled for D plus 8 instead of D plus 10, and the time required for its opening changed from ten to three days. Cherbourg was thus scheduled to receive cargo on D plus 11 instead of D plus 20, and in greater volume. As a result of similar alterations in the schedule for the other ports the planned tonnages of the Normandy ports were increased by over 4,000 tons per day.

Two encouraging developments made these revisions possible. Experience in the Mediterranean, particularly at Philippeville and Anzio, indicated that ports could be brought into operation and capacities developed much faster than had been originally believed possible. In addition, both the British and Americans had greatly improved their equipment and engineering techniques for the reconstruction of destroyed ports. All these developments were reflected in the final plans. The Normandy and Brittany port plans as they

[54] Col. S. A. Potter, Jr., "Quiberon Bay," *Military Review*, XXXI (September, 1951), 45–53.

[55] Memo, 21 A Gp Plans, 13 Mar 44, sub: Subsequent Maintenance of British and U.S. Forces—OVERLORD, SHAEF 12 A Gp 400.402 Maintenance, Equipment, and Supplies.

Beach and Port Plans for Operation OVERLORD

Port or Beach	Opening Date	At Opening	Discharge Capacity (in Long Tons): D plus 10	D plus 30	D plus 60	D plus 90
Total	.....	.....	14, 700	27, 200	36, 940	45, 950
OMAHA Beach	D Day	3, 400	9, 000	6, 000	5, 000	5, 000
UTAH Beach	D Day	1, 800	4, 500	4, 500	4, 000	4, 000
Quinéville Beach	D+3	1, 100	1, 200	1, 200	1, 000	1, 000
Isigny	D+11	100	0	500	500	500
Cherbourg	D+11	1, 620	0	6, 000	7, 000	8, 000
MULBERRY A	D+12	4, 000	0	5, 000	5, 000	5, 000
Grandcamp	D+15	100	0	300	300	300
St. Vaast	D+16	600	0	1, 100	1, 100	1, 100
Barfleur	D+20	500	0	1, 000	1, 000	1, 000
Granville	D+26	700	0	700	1, 500	2, 500
St. Malo	D+27	900	0	900	2, 500	3, 000
Brest & Rade de Brest	D+53	3, 240	0	0	3, 240	5, 300
Quiberon Bay	D+54	4, 000	0	0	4, 000	7, 000
Lorient	D+57	800	0	0	800	2, 250

were written into the final COMZ and ADSEC plans in May are summarized above.[56]

These final estimates were regarded as adequate to meet the needs of U.S. forces in the first three months. But even these schedules were subject to last-minute revision. With the discovery in May of an additional German division in the Cotentin peninsula the tactical plans of the VII Corps had to be amended only a few days before D Day. The estimated capture date of Cherbourg was changed from D plus 8 to D plus 15, with a resultant loss of tonnage estimated to total 34,820 tons for the period D plus 11 to D plus 25.[57]

Unfortunately the anxieties and uncertainties attending port planning were not to end with the establishment of a lodgment on the Continent. Port discharge was to become one of the most frustrating limiting factors of the continental operation and was to persist as a major logistic problem for fully six months after the landings.

(4) Troop Build-up and Replacements

Closely related to the problem of port and beach capacities was the matter of the continental troop build-up. The OVERLORD operational plan prescribed that in the American zone the assault and immediate follow-up would consist of three infantry and two airborne divisions, together with the necessary supporting troops, and that additional preloaded forces were to land on D plus 1 and 2.

[56] The port capacities as estimated in the COMZ plan in May were apparently adequate to meet the needs of U.S. forces. However, the records contain many conflicting figures on the whole subject of port capacities and their estimated capture and opening dates, and there were many changes in these estimates between the time of the OVERLORD estimates of July 1943 and the final COMZ plan of May 1944. In no one place are enough figures gathered together on the estimates of U.S. tonnage requirements and port capacities to justify comparisons and conclusions as to the adequacy of the port plans for any one date. The table figures are based on the COMZ Plan, Appendix N, with the following exceptions: estimated opening dates and tonnages for the beaches and minor

Date	*Force*	*Personnel*	*Vehicles*
Total		1, 338, 900	250, 000
D Day	"O" (OMAHA)	29, 714	3, 241
D Day	"U" (UTAH)	30, 452	3, 569
D to D+1	"B" (Follow-up)	26, 492	4, 431
D+1 to D+2	Preloaded Build-up	43, 472	6, 063
D+2 to D+14	Build-up	369, 061	53, 352
D+15 to D+90	Build-up	839, 709	179, 344

Thereafter the transfer of forces to France was to be accomplished by the shuttling of ships and craft between the United Kingdom and the Continent and would be dependent on the repeated use of the same lift and on the speed with which this shipping could make the round trips between the two shores. In the first three months an American force of nearly 1,340,000 men and 250,000 vehicles was scheduled to be moved across the Channel, the build-up target calling for 12 U.S. divisions on the Continent by D plus 30, 16 by D plus 60, and 21 (14 infantry and 7 armored) by D plus 90, together with supporting combat troops, elements of two tactical air commands, and service troops.[58]

The preloaded forces were organized as follows: Forces O (for OMAHA) and U (for UTAH), approximately equal in size, constituted the initial assault forces, and together totaled about 60,000 men and 6,800 vehicles.[59] They were to be loaded in ships and craft along the coast of southern England and were to land on the French beaches on the first tide. Force B, with a strength of about 26,500 men and 4,400 vehicles, formed a follow-up force with various reinforcement units for the V Corps in the OMAHA Beach area. This force was to be assault-loaded in ships and craft in the southwestern English ports and was to land on the second tide of D Day and and on D plus 1. In addition, a preloaded build-up force of 43,500 men and 6,000 vehicles, containing units for both beaches, was to embark in the Bristol Channel ports and cross the Channel on D plus 1 and 2. A total of more than 130,000 men and 17,300 vehicles was thus loaded in all the available ships and craft before D Day.

The remaining OVERLORD forces, scheduled to enter the Continent by D plus 90, constituted the build-up proper. This movement depended on the availability of shipping. A statistical summary of the plan is given in the table at top of page.[60] After D plus 90, divisions were to arrive in France at the rate of from three to five per

ports through D plus 20 are from the more conservative FUSA figures in Annex 11, Appendix I of the FUSA NEPTUNE Plan. Data for the period D plus 21 to D plus 41 are from ADSEC Plan, the remainder from COMZ TC plan and Appendix N of the COMZ Plan. The general practice followed has been to accept the plans of the headquarters which was responsible for the particular period: FUSA for the early period; ADSEC for the intermediate phase to D plus 41; and COMZ for the subsequent period to D plus 90.

[57] Memo, Vaughan, CG FECOMZ, for C-in-C 21 A Gp, 1 Jun 44, sub: Delay in Capture of WATSON, SHAEF 12 A Gp 825 WATSON.

[58] COMZ Plan, Sec. VI (Troops); The Control of the Buildup of Troops in the Cross-Channel Amphibious Operation OVERLORD, Gen Bd Rpt 22, pp. 3–4.

[59] Airborne units are not included in these figures.

[60] FUSA Rpt of Opns, Bk. II, p. 142, for period D to D plus 14. Figures for D plus 15 to D plus 90 are from COMZ Plan, Sec. VI (Troops), and do not include 204,800 replacements.

Date	*Divs*	*Field Forces*	*Air Forces*	*COMZ*	*Total*	*Replacements*
D+5	9	172, 900	8, 500	41, 200	222, 600	6, 700
15	11	297, 200	21, 900	83, 500	402, 600	43, 600
25	[a] 11	353, 100	42, 600	142, 300	538, 000	60, 200
40	15	453, 800	79, 900	235, 100	768, 800	95, 100
60	16	532, 400	104, 500	289, 600	926, 500	138, 800
90	21	666, 400	123, 900	343, 600	1, 133, 900	204, 800

[a] Two airborne divisions withdrawn.

month, the majority of them directly from the United States.

Determining the make-up of the force and the order in which the various units should be phased into the Normandy bridgehead posed another problem. The composition of the build-up as between field, air, and service forces is shown in the schedule tabulated at the top of this page.[61] It can be seen that the most rapid build-up of divisions was to occur in the first two weeks of the operation, and that the field forces as a whole made up 75 to 80 percent of the assault and initial build-up forces through D plus 15.[62] It was natural that the assault and initial build-up forces should be composed primarily of combat units, for the first mission was to secure a beachhead. The field forces, consequently, were allotted the preponderant share of the available lift in the early stages, and whatever service forces other than those organic to the divisions crossed the Channel in these first days, such as the units with the engineer special brigades, were attached to the assaulting corps.

While the prior claims of the field forces in the early stages were fully recognized, it was obviously desirable that service forces should be introduced as early as possible. The need for them would mount rapidly as ports were captured and as tactical progress required the development of the lines of communications. In allocating the available lift there arose the ever-recurring argument as to the proper ratios of combat and service troops. One facet of this eternal conflict has already been seen in the competition between ground and service forces for larger shares of the theater troop basis. In view of shipping limitations, the competition was bound to continue in the allotment of lift and in the preparation of the build-up priority lists.

Desirous of having their forces made up of as many "fighting" elements as possible, field commanders naturally resisted the demand that a larger and larger portion of the troop basis consist of service troops. But modern warfare had brought about a relentless encroachment on the long-favored position of the combat forces in the troop basis, assigning an ever-expanding role to service troops and consequently demanding for them a larger and larger share of the "division slice." [63] Not only did growing mechanization require larger numbers of technicians and multiply the

[61] COMZ Plan, Sec. VI (Troops).

[62] The term *field forces* rather than *ground forces* is used throughout the plans to refer to all forces in the combat zone, and included service units with the combat commands.

[63] The term "division slice" is used to express the relationship between the total theater strength and the number of divisions supported, and represents the total number of men involved in maintaining a division in the field. It is determined by dividing the theater strength (minus air forces) by the number of divisions in the theater. The normal division slice of 40,000 was made up as follows: 15,000 in the division itself, 15,000 corps and army troops, and 10,000 COMZ troops.

tonnages and the number of supply items; the growing destructiveness of modern warfare, toward which the heavy bomber had made a large contribution, made it necessary to rebuild a country's lines of communications as armies moved along.

The competition between combat and service troops for the available lift was pointedly illustrated in January 1944 when the Supreme Command was considering a major alteration in the OVERLORD plan that provided for an enlargement of both the assault area and the size of the attacking forces. One of the officers at a Supreme Commander's conference at that time expressed apprehension lest, with the changes, the service forces would also request an increase in strength in the early stages. He believed such demands should be resisted. A representative of the service forces thought it necessary to re-emphasize that the requirements for service elements in the early stages must not be underestimated nor neglected. General Eisenhower recognized immediately that with a wider bridgehead the Allies would also have a wider road for the supply of the operation, and he thought it was logical that the strengthening of the assault forces should be accompanied by a corresponding strengthening of the administrative components.[64] Whatever force was placed on the Continent had to be a balanced one, and any attempt to introduce excessive combat forces without an adequate build-up of service forces and an increase in supply build-up capacity would reduce the division slice and lessen the support capabilities of the Communications Zone.

In the final plans a force of 340,000 COMZ troops as compared with about 665,000 field force troops was scheduled to be built up in the first three months. The proportion of service troop strength was actually higher, since the field forces themselves contained substantial numbers of organic service units. In the first days COMZ troops were to comprise only 16 to 18 percent of the total force landed. The build-up of service troops was to be stepped up in the second week and would comprise 21 percent of the total on D plus 15, rising to 26 percent on D plus 25 and 30 percent on D plus 40. On the eve of the invasion the troop basis provided for a division slice of 40,000 men, of which 10,000 or 25 percent comprised the COMZ portion.

Logistic planners regarded neither the current division slice nor the rate of service troop build-up as satisfactory. Acutely aware of the logistic demands of the operation, they observed that between D plus 50 and 90 U.S. service forces would be called on not only to support operations then in progress, but to establish bases and lines of communications to support future operations and increasing numbers of troops. Their tasks would include the development of port capacities, the creation of a large depot system, the improvement of roads, and the reconstruction of railways. These jobs were considered abnormally difficult in OVERLORD because of the physical shape of the area, the anticipated change in the direction of advance (south, and then both west and east), and the approach of winter weather. Because the demands on the Communications Zone would be particularly heavy, the planners recommended that in the period D plus 50 to 80 the build-up of COMZ troops should take priority over the build-up of field forces.[65]

[64] Min of Supreme Comdr's Conf, 24 Jan 44, SHAEF SGS 337/11 Supreme Comdr Conf.

[65] Adm Stf Study 11, G-4 SHAEF, 3 Jun 44, sub: Logistical Situation U.S. Forces D plus 41–D plus 90, SHAEF 12 A Gp 370 SHAEF Plans, Adm Stf Studies.

Whether such priority would actually be given depended largely on the course of operations. Meanwhile, the rate at which both combat and service units were to be shipped to the far shore was at least tentatively prescribed in what were known as Buildup Priority Lists. The U.S. forces in the OVERLORD operation consisted of several thousand units and detachments of varying size, many units being broken into two or more echelons for the movement across the Channel. Scheduling their shipment in the order best designed to meet both tactical and logistical needs was itself a vital element of the operational plan.

To prepare these lists, essentially a responsibility of the tactical commands, was a laborious task involving many considerations. The basic limiting factor governing the speed at which U.S. forces could be built up on the Continent was the available lift. Estimates on the course of operations, particularly the rate of advance, further determined the types and proportions of combat and supporting troops required on the far shore. Similarly, a forecast of areas progressively to be occupied by U.S. forces in France was a factor in determining the number of advance airfields to be established by the air forces. These estimates, by indicating the number of troops requiring logistical support, provided a basis for calculating the build-up of service units. A number of other considerations bore heavily: the initial lack of port and rail facilities called for heavy reinforcement in Engineer and Transportation Corps units; the initially independent operations of the V and VII Corps in the assault necessitated that sizable service elements be assigned to the corps in the early stages; and the threat of enemy air attack against large forces concentrated in a small area required a large number of antiaircraft units and the early establishment of advance airfields.

Many compromises eventually had to be made. In practice the field force, air force, and COMZ planners were allotted a proportion of the expected daily lift and were directed to name specifically the troop units which they desired included in each day's build-up. Finally, these requirements were arranged in a single list for priority of embarkation and movement.

Partial lists were prepared initially by the two assault corps, the V and VII. Since the assaults were to be carried out several miles apart, a more than normal responsibility for the conduct of the operation in its early stages devolved upon the corps commanders. The two corps accordingly were given considerable independence in their planning, and troops following the assault waves were to be phased so far as practicable according to priorities desired by the corps commanders. The task of integrating the two corps lists and extending them for the later build-up was performed by the planning staffs of First Army and 1st Army Group. First Army's list, called List A, established the sequence of movement only through D plus 14 and, since First Army was in complete control of the entire beachhead in this phase, included only the units assigned or initially attached to that headquarters. The list for the subsequent build-up of U.S. forces assigned to First Army, Third Army, the Ninth Air Force, and the Communications Zone, which were expected to move to the Continent between D plus 15 and 90, was prepared by 1st Army Group and was known as List B. The completed lists showed in their anticipated order of movement pri-

ority all units or portions of units which were to move separately, their personnel and vehicle strength, and their assignment. The preparation of the lists involved some of the most agonizingly detailed co-ordination of the OVERLORD planning, for there were endless changes in the designation, type, number, and composition of units. While the First Army list was firm early in April, it was not until much later that agreement with the various headquarters involved was reached on the 1st Army Group list.

Late in May the receipt of information concerning added enemy strength in the Cotentin set off a chain reaction that illustrated how last-minute changes in tactical plans could affect all aspects of logistic arrangements. Anticipating increased resistance in the VII Corps sector, the planners concluded that progress would probably be slower, that Cherbourg would be captured later than originally estimated, and that there would be a delay in developing the discharge capacity of UTAH Beach to the maximum. It was all the more imperative that communications between the two corps be established at an early date. The expected delay in the capture of Cherbourg made it possible to phase back by five to seven days the units scheduled to open that port. This in turn freed sufficient lift to permit the earlier transfer of an additional infantry division. To meet the expected need for additional combat strength, therefore, the First Army commander directed that the service troops in question be phased back and that another division (the 79th) be brought in over UTAH Beach at about D plus 8. The Advance Section opposed the change, and warned that the resultant delays in the reconstruction of Cherbourg and of the railways might seriously affect its ability to support the operation.[66] The change was made, nevertheless, and proved to be but the first of many alterations in the build-up schedule.

It was realized from the beginning that such alterations would have to be made, particularly after the operation got under way. The projected build-up was based on certain assumptions as to the course of the operation. However carefully these estimates might be made, the actual flow of troops to the Continent would have to meet the changing requirements dictated by the course of the battle, and in all probability would differ from the planned phasing. Provision for such departures from the planned build-up was made in the creation of separate control machinery known as the Buildup Control Organization, or BUCO, the planned operation of which is outlined in the next chapter. Meanwhile the staff of 1st Army Group also prepared an alternative build-up list to be used in the event that the progress of U.S. forces in Normandy was considerably slower than promised in the operational plan. This alternative list provided for the assignment of an appreciably higher proportion of the available lift to combat units and consequently a more rapid build-up of combat forces at the expense of supporting and service troops. It provided for the movement of twenty-one divisions to the far shore by D plus 65 instead of D plus 88 as scheduled in the accepted list, on the assumption that if

[66] Ltr, Col Hugh Cort, CofS ADSEC, to Deputy CG COMZ, FECOMZ, 27 May 44, sub: Effect of New Phasing of Opn NEPTUNE on COMZ Plan, EUCOM 381 NEPTUNE, I; Rpt, 21 A Gp to G-3 SHAEF, 4 Jun 44, sub: Status of Plng, SHAEF G-3 GCT Ops 'A' 21 A Gp—General; Ltr, Plank, CG ADSEC, to DCofS FECOMZ, 26 May 44, sub: Changes in Tactical Plan FUSA, 12 A Gp 370 Planning—ADSEC; ADSEC Operations History, p. 23, ETO Adm.

progress was slower the lines of communications would be shorter and fewer service troops would be required.[67]

The movement of replacements and the establishment of a replacement system on the Continent constituted an essential part of the OVERLORD build-up plan. The responsibility for drafting such a plan rested with the Replacement System, a separate theater command headed by Col. Walter G. Layman. The lack of a plan as late as the end of April caused some apprehension in higher headquarters.[68] But a plan to guide the movement of replacements and replacement installations to the Continent was published in mid-May as an annex to the Communications Zone plan. It provided for the transfer of more than 200,000 replacements to the Continent in the first ninety days.

The replacement plan followed the three-phase scheme which was common to all OVERLORD planning. During Phase I (D to D plus 14) the replacement system on the Continent was to be operated by First Army. Three separate replacement battalions were to be attached to First Army initially, one in support of each corps (V, VII, and XIX), to handle the processing of replacements requisitioned in advance. On about D plus 10 a replacement depot with two additional battalions was to cross to the Continent and assume control of all five battalions operating with the First Army. An operational reserve of 5,000 replacements was to be shipped to the depot immediately from the replacement pool in the United Kingdom.[69] In Phase II (D plus 15 to 41) the over-all control of the replacement system was to be exercised by the Advance Section. In this period an additional depot with four battalions was to be established on the Continent; two battalions were to be brought in for the support of the Third Army; and an armored force replacement battalion was to be established to form the nucleus of an armored force depot. The phasing in of the remaining replacement installations, including three more depots with eleven battalions, was to be completed in Phase III (D plus 42 to 90). All depots were not of the same type, nor in direct support of the armies. Some served as replacement stockage depots, some as reception depots, and others were for casuals or for training.[70] All were to move to the Continent according to a prearranged schedule, although this was subject to change as were all build-up plans.

Long before D Day the theater worked out a requisitioning procedure for the normal operation of the replacement system. But this procedure was not counted on to fulfill the needs of the initial stages of the invasion, for it was believed to be incapable of responding quickly enough to the demands which heavy initial casualties were expected to cause. Large numbers of replacements would be needed quickly, and the existence of a water barrier between the stockage pools and requesting units, causing both transportation and communications difficulties, was expected to create a great handicap to the expeditious filling of requisitions. Even the establishment of three replacement battalions within the first week was not expected to meet the earliest demands.

[67] Control of the Buildup, Gen Bd Rpt 22, p. 5; FUSAG Alternative Troop Priority List B, Tentative, 18 June 44, EUCOM Jt Opns Plan—Alternative Troop Priority List B, FUSAG.

[68] The Procurement and Use of Manpower in the European Theater, Pt. IX of The Administrative and Logistical History of the ETO (hereafter cited as Procurement and Use of Manpower), p. 17, OCMH.

[69] FUSA Rpt of Opns, Bk. II, p. 181.

[70] COMZ Plan, Annex 23 (Replacement Plan).

Two methods were devised to meet the problem in the first fifteen days. To provide for replacement needs in the first five days of the operation an initial overstrength of 2,500 men was authorized each assault division, and proportional overstrengths were also authorized the engineer special brigades. These overstrength increments were attached to the units in the United Kingdom and underwent training with them. At invasion time they were held in readiness on the near shore to be sent forward on a prearranged schedule.

Beginning on D plus 5, when the overstrengths were expected to be exhausted, and continuing through D plus 14, replacements were to be provided in "packages" made up in advance. Each package was to contain 250 men organized into platoons and squads and commanded by officers and noncommissioned officers who were also replacements. Members of the ETOUSA adjutant general's staff had conceived the idea, proposing that the packages be formed by arm or service, and that their make-up be based on casualty experience in North Africa. An infantry package, for example, would consist entirely of infantrymen of varying specialties, such as riflemen, cannon crewmen, mechanics, antitank gunners, heavy weapons crewmen, and so on.

The basic idea of the package system was eventually adopted, although in modied form. First Army substituted its own estimates on casualties, and rejected the idea of standardized packages. Instead, advance requisitions were submitted, based on estimated losses by unit, and replacements were then grouped into increments of 250 men for processing and shipment. The packages varied therefore, depending on the type of unit for which they were intended, some being made up entirely of infantry, others of mixed branches, and each package was earmarked for specific division or corps units. After D plus 14, replacements were to be obtained by the normal requisitioning procedure, by which they would be processed by the various replacement battalions then operating on the far shore.[71]

To stock even approximately correct numbers of each type of replacement before D Day was a difficult task, for it depended entirely on the accuracy of loss estimates. Estimates had to be made several months ahead of actual need so that the War Department could plan its training program sufficiently in advance and establish the necessary shipping priorities. Initially the War Department authorized a specific allowance in the theater troop basis in order that an adequate stockage of replacements might be on hand for the invasion. On the basis of estimated losses from all causes in the first sixty days the theater was permitted to build up its pool of replacements to 84,110 men by 1 June 1944. On that date the Replacement System actually had a total of 76,026 men plus the 5,300 allocated to overstrength increments for assault units, making a total of 81,326.

The army group commander had been called on to submit replacement require-

[71] Ltr, Hq ETO to CG FUSA, 30 Mar 44, sub: Simplified Combat Replacement Procedures, and 1st Ind, FUSA to CG ETO, 8 Apr 44; Memo, Chief Field Force Replacement System for AG Classification Div, 10 Apr 44; Memo, AG Replacement and Classification Div for G-1, 21 May 44, sub: Package Shipments of Replacements; Memo, Col R. L. Gillespie, Ex O Replacement System, for G-1 ETO, 3 Jun 44. All in ETO GFRC 370.092 Reinforcements May 44 to Apr 45. Procurement and Use of Manpower, pp. 30-33; History of the Ground Force Replacement System, ETO, Pt. I, Ch. III, ETO Adm 571.

ments for OVERLORD in January 1944. Before submitting his figures he first had to estimate casualties—a process that involved some complex calculations. The average losses of any one campaign could not be used, for example, since casualty rates fluctuated in the course of operations, with the heaviest losses occurring in the assault period. For purposes of calculation the first 150 days of the operation were therefore divided into five thirty-day periods. Among the factors involved in estimating casualty rates in these phases were the strength of the enemy and estimates of his capabilities, the type of action expected, the terrain and weather, the probable number of drownings in the first days, and the expected nonbattle casualties. Additional estimates had to be made of the percentage of men that would be killed, wounded, and missing, and of the percentage of wounded that could be expected to return to duty in 30, 60, 90, or 120 days. Finally, it was necessary to estimate the need for replacements in each branch and in each occupational specialty. Studies made in October 1943 concluded that 62 percent of all replacements would have to be infantrymen. In February 1944 this figure was raised to 64.3 percent, and shortly before D Day it was again raised.[72] Obviously the problem of determining personnel requirements was full of unpredictables, and only the experience of actual combat would test the validity of these calculations.

The replacement problem did not end with the acceptance of working estimates of casualty rates and ratios for the various branches. Obtaining the needed number of replacements was not a simple matter of requisitioning, for the supply of manpower on which the theater could draw was by no means unlimited. The War Department warned the theater in January 1944 that the manpower situation was already critical and that conservation would have to be practiced. There was a shortage of several hundred thousand men in the planned strength of the army, a shortage that had been aggravated by the tendency to discharge men who were still capable of rendering useful service. General Marshall urged at that time that men who were not physically perfect be retained in limited-assignment positions where possible and that able-bodied men be released for combat duty.[73] The kind of deficiency that had developed is illustrated by the paratroop replacement shortage. Because of the lack of qualified volunteers, two parachute infantry regiments and two glider regiments had to be deactivated in the United States in order to meet the theater's requirements in these catagories.[74]

The manpower situation saw no improvement as D Day approached. In March the War Department considered phasing back by one month the flow of replacements to the United Kingdom. But after a restudy of manpower needs the theater concluded that all personnel requisitioned would be needed if OVERLORD was to be launched as planned. In fact, the theater estimated that even with the current flow of replacements a pool adequate for only 60 days could be built up, and that the reserve would be completely exhausted in 120 days. First Army thought the flow of men should be increased rather than curtailed. Meanwhile the theater complied with War Depart-

[72] Procurement and Use of Manpower, pp. 43–47.
[73] *Ibid.*, pp. 60ff.
[74] The History of the 12th Army Group, March 1945, draft MS, I, 205, SHAEF 12 A Gp 370.2; Cbl 4335, Marshall to Eisenhower, 6 Dec 43, P&O Cbl Files.

ment directives and initiated a conservation program that stressed the economical use of manpower and extensive utilization of limited-assignment personnel.

The War Department again applied the spurs to this program in April, and in the following month both the theater and the zone of interior took further economy measures. In May all SOS replacements were frozen in the 10th Replacement Depot in the United Kingdom in order to screen out men suitable for duty with the field forces. In addition the theater commander ordered that all physically qualified infantry officers and enlisted men in noninfantry units not required for staff positions be made available as infantry replacements. At the same time the War Department cut in half the allotment of basic privates in T/O organizations to release qualified men to the replacement system. Physical qualifications were also relaxed to make more men eligible for combat duty. Replacement depots appointed boards to review the classification of all men previously listed as limited-assignment and recommended the type of assignment for which the men were qualified.[75] The first weeks of combat on the Continent were soon to reveal the inadequacy of these measures.

(5) The Supply Plan

The build-up of U.S. forces was planned with the idea that there should be put onto the Continent the maximum force that could be administratively supported under full operational efficiency. Consequently the planned build-up of troops was inseparably related to planned flow of supplies to the far shore. The size of the force that could be built up on the Continent was limited from the beginning by the scale of logistic support which could be provided. The Allies knew that for several months after D Day more divisions would be available than could be maintained on the Continent, and one student of the problem estimated that administrative considerations would govern the rate of the build-up as late as D plus 270.[76]

Essentially, the problem was to gear the build-up of troops with the flow of supplies in order to insure that both daily maintenance needs and adequate reserves were provided. Maintenance requirements alone for a division slice were estimated to total approximately 900 tons per day in the early stages. Estimates of what constituted adequate reserves were altered as the invasion day approached. The Joint Administrative Plan of 19 April 1944 prescribed that an over-all reserve of 14 days of all classes of supply except ammunition and 5 units of fire of the latter be laid down in the Communications Zone for all troops by D plus 41.[77] This objective was found to be unattainable, and subsequent modifications provided for a build-up of 7 days of supply of rations, 3 days of all other classes except ammunition, and

[75] Procurement and Use of Manpower, pp. 60–64; Ltr, WD AG to CG ETO, 23 May 44, sub: Reduction of Basic Privates in T/O Units, ETO GFRC 200.3 Personnel Requisitions, File B.

[76] Rpt, T. S. Riddell-Webster to COS Com, War Cabinet, n. d., SHAEF SGS 370.01 Rate of Build-up for Continental Opns; Memo, 21 A Gp (Plans), 15 Mar 44, sub: Build-up Policy, and Brief for CofS 1 A Gp, for Mtg, 15 Mar 44, SHAEF 12 A Gp 370 Build-up, Dec 43 to Mar 45.

[77] The term "day of supply" is defined as the estimated average daily expenditure or consumption of an item, normally figured on the basis of pounds per man per day. It is used mainly for procurement purposes and in expressing the level of supply reserves in a theater or its major subdivisions. The term "unit of fire" was an additional unit of measure for ammunition (Class V) supply. It was used for tactical purposes only, either to indicate stock levels in army de-

2 units of fire.[78] The priorities for the build-up of these levels were in the following order: antiaircraft ammunition, Class I (rations), Class V (ammunition), and then Classes III (POL), II, and IV. An additional 7 days of supply of rations and 5 units of fire were to be built up after the foregoing priorities had been met. Supply levels in the army zones at D plus 41 were to total 7 days of all classes other than ammunition, and 7 units of fire.[79]

To achieve these reserve levels and at the same time meet daily maintenance requirements plus air force supply needs and various other tonnages not included in the foregoing, such as coal and civil affairs supplies, planners estimated that receipts would have to total approximately 26,500 tons per day by D plus 41, assuming a build-up of fifteen divisions and a total troop strength of about 770,000 at that date.[80] At D plus 90, when there were to be twenty-one divisions on the Continent and a total troop strength of 1,334,000, they planned that theater reserves in the Communications Zone should be built up to a level of 21 days for most classes and 5 units of fire. Army levels were to be maintained throughout at 7 days of supply and 7 units of fire.[81]

Logistic planners at Supreme Headquarters estimated that these levels could be attained only if supplies were landed at a rate 50 percent in excess of current maintenance requirements. In other words, the build-up of the desired reserves required holding the troop build-up to a force which could currently be maintained by two thirds of the supplies landed, the balance being added to the reserve.[82] Since daily maintenance requirements were expected to average about 800 tons per division slice in the D plus 41–90 period, approximately 1,200 tons of supplies per slice would have to be landed every day for maintenance and normal reserves alone. Adding various other tonnages such as coal, civil affairs supplies, boxed vehicles, preshipped equipment, and air force needs brought the total discharge requirement to about 45,000 tons per day at D plus 90.[83]

In the detailed arrangements made to meet the above requirements, particularly in the early stages of the operation, little was left to chance. Supply shipments were prescheduled for the entire first three months in order to guarantee the delivery of the minimum requirements of supplies and equipment. Daily requisitions for these predetermined needs were made for the entire ninety-day period on the basis of tonnage allocations made to the various requisitioning headquarters. Following the

pots, or as a means of specifying the expenditure of ammunition permitted in the initial stages of an operation, and represented specified numbers of rounds of ammunition per weapon, varying with the types and calibers of weapons. For the 105-mm. howitzer, for example, it was 125 rounds, for the 155-mm. howitzer, 75 rounds, and for the 8-inch howitzer, 50. The two terms are not synonymous, and a unit of fire cannot be translated into days of supply. The former was abandoned as a yardstick after the war.

[78] Except for antiaircraft ammunition, which would be built up to 7 units.

[79] Ltr, FUSAG to CGs FUSA, TUSA, *et al.*, 19 Apr 44, sub: Allocation of Tonnages, SHAEF 12 A Gp 370.2 FUSAG Allocation of Tonnages.

[80] Draft Memo, 21 A Gp, Mar 44, sub: Subsequent Maintenance of British and U.S. Forces—OVERLORD, SHAEF 12 A Gp 400.402 Maintenance, Equipment and Supplies.

[81] COMZ Plan, App. L; Ltr, FUSAG to Armies, 19 Apr 44, sub: Allocations of Tonnages; Jt Adm Plan, 19 Apr 44; Mechanics of Supply in Fast Moving Situations, Gen Bd Rpt 27, p. 18.

[82] Adm Stf Study 11, G-4 SHAEF, 3 Jun 44, sub: Logistical Situation U.S. Force, D plus 41–D plus 90, SHAEF 12 A Gp 370, SHAEF Plans, Adm Stf Studies.

[83] Adm Appreciation, G-4 SHAEF, 17 Jun 44, sub: Post-NEPTUNE Opns, SHAEF 21 A Gp 370.2 Adm Appreciation Post-NEPTUNE Opns.

OVERLORD three-phase scheme, First Army assembled all data on its requirements through D plus 14, the Advance Section (under the supervision of 1st Army Group) assembled data on the period D plus 15–41, and the Forward Echelon of Communications Zone compiled the requirements for the remainder of the ninety-day period. The assembled requisitions were sent to Headquarters, Communications Zone, the agency responsible for preparing and shipping supplies in accordance with established schedules.

One of the major problems in this planning was the allocation of shipping. It was necessary, first of all, to co-ordinate the available tonnage lift with the estimated day-to-day receiving capacities of the beaches and ports. The capacities of the beaches were limited, and the Navy imposed certain restrictions on the manner in which shipping was used. Further, it was necessary to allocate the lift to the major commands by supply services and classes of supply. The lift originally allocated for carrying supplies was insufficient to meet the minimum requirements of the forces at the rate of the build-up allowed by the allotted troop and vehicle-carrying craft. Shipping limitations consequently forced a reconciliation of the size of the force and rate of build-up with the maintenance capacity of the supply-carrying craft. Eventually these difficulties were overcome and a balance was arrived at between the tonnage requirements of the force, the capacities of the beaches, and the shipping allocations. Requistions for supplies, phased by days, were then prepared on this basis and submitted to the SOS late in April and early in May.[84]

Most of the conditions that dictated special arrangements for the troop build-up also determined the special measures taken to insure an adequate flow of supplies to the far shore. All supply shipments in the first two weeks were to be prestowed and tactically loaded as specified by First Army. The result was a tremendous strain on depot, transportation, and port facilities, particularly the last, for cargo did not always arrive at the port in the order in which it was to be stowed, and in order to comply with stowage plans it often was necessary to hold cargo on cars in the port so that it could be loaded in accordance with discharge plans. The entire process was complicated by the necessity to assemble partial shipments from two or more depots intended for loading on one vessel. Since the holding capacity of the ports was very limited, port officials were frequently forced to depart from stowage plans.[85]

Headquarters, SOS, issued detailed instructions on supply movements early in May to insure that loading could be carried out in accordance with prepared stowage plans and that supplies would be moved to the ports with the shortest possible rail haul and the fewest bottlenecks. From D Day to D plus 8 (designated as the prestowed period) supplies were to be shipped in MT ships (Liberties adapted for motor transport hauling), coasters, LCT's, LCV's,[86] and barges. Coasters varying in capacity from 200 to 2,000 tons were to begin arriving on the second tide on D Day, and were to constitute the backbone of the lift in this period. One hundred and twenty-six of these vessels, carrying about 90,000 tons, were preloaded as directed by First Army, some of

[84] 12 A Gp Rpt of Opns, Bk. VI (G-4), p. 16; FUSA Rpt of Opns, Bk. I, pp. 31–32, Bk. V, pp. 139–40.

[85] Mounting the Operation OVERLORD, Gen Bd Rpt 129, p. 18.

[86] Landing craft, vehicle.

them solidly with ammunition, some with engineer supplies, others with ammunition and rations. In all cases composition of the cargo was kept as simplified as possible to insure immediate access to needed items and to permit rapid sorting and distribution by the shore brigades.[87] Once the supplies were unloaded the coaster fleet was estimated to have a theoretical capacity of 17,000 tons per day, but this was expected to suffer attrition from enemy action and normal marine hazards.

From D plus 9 to 21 (called the build-up phase) supply movements were to continue via MT ships and coasters, and a limited number of commodity-loaded Liberty ships were to be dispatched to the far shore. But coasters were to continue as the major carriers in this period. Complete prestowage was expected to end during this phase because of the varying capacity of ships returning from the far shore and because of the impossibility of predicting what ships would be available once the shuttle service began. Instead, tonnages would be consigned to the loading port and the stowage plan determined there by the port commander.

As handling facilities on the Continent became capable of unloading the larger ships there was to be a progressive transfer to the use of deeper-draft vessels. From D plus 22 to 41 (which the SOS referred to as the maintenance movement period) coasters were to continue to move supplies from the United Kingdom, but there would also be an increasing use of ocean-going ships, with more and more prestowed and commodity-loaded Liberties coming directly from the United States. It was also planned to commodity-load all craft leaving the United Kingdom. Finally, beginning on D plus 42 (the change-over period) ocean-going ships, largely from the United States, were to bear the main burden of the build-up, supplemented by a reduced coaster fleet from the United Kingdom.[88]

Scheduling supply requirements as much as three months in advance, and preloading the first two weeks' shipments, necessarily imposed a considerable rigidity in the entire supply movement program, just as the Buildup Priority Lists did in the movement of personnel. No one could predict with complete accuracy the precise needs of the forces ashore for even a short period. Fully aware of this weakness in the supply plan, logistic planners devised several expedients to achieve a degree of flexibility in the phasing of supplies in the early stages of the operation. They also took special measures to set up emergency reserves as an insurance against interruptions in the flow of supply.

One of the expedients devised to promote flexibility was the Red Ball Express,[89] a kind of "special delivery" service under which 100 tons of shipping space was set aside each day beginning on D plus 3 to meet emergency requests from the far shore. All supplies requisitioned under the Red Ball procedure were to be given top priority in packing, marking, and documentation, in movement to the port, and in handling and loading. Under another procedure, known as GREENLIGHT, 600 tons of ammunition and engineer fortification materials could be substituted on demand, depending on tactical needs, for scheduled shipments of engineer Class IV

[87] Ltr, Brownjohn to CAO, 26 Mar 44, sub: Emergency Supply, SHAEF G-4 400 Supplies, General, II.

[88] Hq SOS, Opn OVERLORD Supply Movement (U.S.) Instructions, 6 May 44, EUCOM 381 OVERLORD, Supply Movement; Mounting the Operation OVERLORD, Gen Bd Rpt 129, pp. 12–17.

[89] Not to be confused with the Red Ball motor transport express later established on the Continent.

supplies on any day. Requests for such substitutions were to allow six days for delivery. The GREENLIGHT procedure was not to become effective until D plus 14. As in the case of Red Ball, priority was to be given in the handling of all such shipments at the depot, in movement to the port, and in dispatch to the Continent.

Both Red Ball and GREENLIGHT provided a measure of flexibility in the type and quantity of supplies to be shipped to the far shore, although their purposes differed. Red Ball was established to provide for purely emergency shipments of items the need for which could not be foreseen in setting up scheduled movements. It was also a means of speedily replacing highly critical items lost in operations, items that the normal supply build-up could not deliver in time. GREENLIGHT, on the other hand, was based on the recognition that the prescheduled shipments of a very limited tonnage and type of supply might not meet tactical requirements.[90]

An additional degree of flexibility was provided through supply by air. Certain supplies were set up in advance for delivery on semiautomatic basis to the two airborne divisions, and parachute-packed supplies were also prestocked for emergency delivery to isolated units. In addition, as soon as continental landing fields were available, delivery of 6,000 pounds per day within forty-eight hours of request was provided for.[91]

Certain emergency reserves were also set up. Initially eighteen preloaded LCT's (of 140 tons capacity each) were to be beached at the tail end of the first tide on D Day. They were loaded primarily with ammunition and engineer bridging materials for which there was expected to be a demand early on D Day. Each LCT carried a truck and sufficient personnel to unload its supplies above the high-water mark. In addition, eighty-seven LBV's[92] (each with a capacity of 50 tons) were to begin arriving on D plus 1 for use in ferrying supplies from the coasters to the beach. They were preloaded with ammunition, POL, and engineer construction materials so that upon arrival they would be ready for immediate discharge without waiting for coasters to arrive. Since they were self-propelled they could be phased in as desired. Lastly, twenty 500-ton barges loaded with ammunition, POL, rations, and engineer construction materials were to be towed across the Channel within the first four days to serve as an additional bad-weather reserve. These provided a controlled floating reserve over and above planned maintenance and were to be beached and unloaded only in the event that scheduled shipments broke down.[93]

The above measures did not dispel all worries about the adequacy of the supply arrangements. General Moses, the G–4, was not satisfied that they would give the needed flexibility in supply movements, and he was even more concerned over the matter of building up adequate reserves on the Continent. Only a few weeks before D Day he recommended that the theater G–4 consider the establishment of ma-

[90] FUSA Rpt of Opns, Bk. V, p. 140; Mounting the Operation OVERLORD, Gen Bd Rpt 129, p. 14; 1st Ind, Stratton to U.S. Adm Stf at 21 A Gp, 15 Jun 44, EUCOM 400.22 Shipments General, I. The Red Ball procedure was specified in ETO SOP 8, the GREENLIGHT procedure in SOP 41.

[91] FUSA Rpt of Opns, Bk. V, p. 140. Procedure for air supply was laid down in ETO SOP 9.

[92] A landing barge which could carry either supplies or vehicles and could be beached.

[93] Ltr, Brownjohn, Deputy G–4 SHAEF, to CAO, 26 May 44, sub: Emergency Supply, SHAEF G–4 400 Supplies, General; FUSA Rpt of Opns, Bk. V, pp. 139–40. The barges were requisitioned from the United States in the spring of 1944 and were towed to the United Kingdom by large tugs.

chinery paralleling the organization which was intended to control the troop build-up. However, the COMZ staff believed that an additional monitoring agency was neither desirable nor necessary. While admitting that prescheduled shipments inevitably entailed a certain degree of rigidity, it nevertheless believed that the various means of making emergency shipments and displacing scheduled shipments outlined in theater SOP's provided the needed flexibility, and that it would be possible to cope with any special demands made by commanders on the far shore. Moreover, these procedures did not exhaust the means that could be utilized to meet serious emergencies. Virtually the entire daily supply lift, the COMZ staff argued, was available at all times for emergency loading, the only limit being the capacity of rail and truck facilities in the United Kingdom to move supplies to the ports.[94]

General Moses had even graver misgivings on the subject of the reserve build-up. There appeared to be no question that maintenance requirements could be met satisfactorily, at least in the first six weeks. The difficulty was that tonnage discharge was to be limited in the early phases, principally because port facilities for the reception of large ships would be lacking, and it was therefore impossible to plan for the build-up of large reserves. There was little prospect that the situation would improve after D plus 41. SHAEF planners had estimated that port capacity would reach 45,000 tons by D plus 90, but there was no assurance from the Communications Zone that it would be able to utilize it. The supply build-up, according to General Moses, was expected to be limited to 30,000 tons per day, the tonnage which the Transportation Corps estimated it would be capable of receiving and clearing from the ports and beaches. Receipts at this scale would permit no improvement in the small reserve position in the Communications Zone, and would provide no operational reserves at all for the field forces.[95] In the view of the army group G–4 this limitation would create an impossible situation for the Communications Zone. While the prospect was admittedly unfavorable, the logistical planners nevertheless proceeded on the assumption that the administrative situation would be assessed in the early stages of the operation and that changes would be made in the troop build-up lists and planned cargo tonnages if necessary.

Assuming that the higher tonnage capacities could be utilized, the planners estimated that reserves would gradually start to build up so that by D plus 90 all the required reserves for the air forces would be established, and 5 units of fire and tonnages equal to about 10 days of supply in the Communications Zone would be available for all troops ashore. But even this build-up would not meet the planned levels, which called for 21 days of supply for all forces in the Communications Zone by D plus 90.

These unencouraging prospects led General Moses to state that from the G–4 point of view the logistical support of the operation after D plus 41 was precarious,

[94] Ltr, Moses to G–4 ETO, 20 May 44, sub: Control of Supply Build-up, with 1st Ind by Lord, 1 Jun 44, and Stf Study by Col G. S. Speidel, G–4 FECOMZ, 27 May 44, sub: Control of Supply Build-up—In Answer to Inquiry of Deputy MGA, 21 A Gp, EUCOM 400 Supplies, Services and Equipment, General, IIIB; Draft 1st Ind, Stratton to C-in-C 21 A Gp for U.S. Adm Stf, 15 Jun 44, EUCOM 400.22 Shipments General, I.

[95] Operational reserves are defined as supplies held by an army to insure continuity of distribution and issue to its subordinate elements.

if not impossible. There were many indeterminate factors involved, of course, and, in spite of the gloomy paper prospects at the moment, no immediate changes in plan were contemplated. Hopefully, the G–4 surmised that maintenance requirement estimates might prove excessive, and reserves might be built up from the surplus maintenance brought to the Continent. Progress might also be slower than anticipated, with resulting cuts in supporting and service troops and the creation thereby of greater reserves for the troops ashore.

On the other hand, there was the possibility that conditions might be even less favorable than expected. If supplies were lost, for example, the build-up of troops might be retarded for lack of maintenance. In any event, he concluded, it was imperative that administrative developments be watched closely from the start and that the logistic potential be frequently reappraised.[96]

(6) The Depot Structure

Still another aspect of the OVERLORD logistic plan which had to be given careful consideration was the Continental depot structure. Like other portions of the supply system, the network of base, intermediate, and advance depots, base maintenance shops, vehicle parks, assembly plants, and bulk POL storage facilities, was to have its rudimentary beginnings on the beaches at OMAHA and UTAH. After the landings of the assault forces the first supplies were simply to be dumped into fields immediately behind the beaches, with only a rough attempt at segregation by classes. As soon as the combat forces had expanded the beachhead sufficiently, the engineer special brigades were to bring a higher degree of order into the handling of supplies by organizing the beach maintenance areas. Service troops from each of the technical services in the First Army attached to the brigades were to supervise the establishment and operation of segregated dumps. As enough of these men became available, the installations were to be taken over and operated by army service units, the engineer brigades remaining responsible for the movement of supplies from the beaches to the army dumps. Then, as beach and port operations were developed and First Army moved forward and organized its own maintenance area, more and more installations in the base area were to be turned over to the Advance Section, which was responsible for the initial organization of the communications zone on the Continent. Eventually the Advance Section in turn would relinquish control of the coastal area as other COMZ sections arrived to take over the administration of the base area. For the first six weeks, however, the Advance Section, as the first echelon of the Communications Zone, made detailed plans for the entire administrative structure.[97]

Theater headquarters issued instructions in February 1944 for the establishment of depots on the Continent, and the Advance Section and Forward Echelon, Communications Zone, followed later with detailed plans specifying the exact locations of all types of installations, the amount of covered and open storage required, and the tonnage capacities of all storage facilities. Storage was planned in all the towns in the vicinity of the landing

[96] Memo, Moses to CofS FUSAG, 16 May 44, sub: OVERLORD Supply Situation, D plus 41–D plus 90, SHAEF 12 A Gp G–4 Memos 1944.

[97] Ltr, FUSA to Stf Secs and Svcs, 23 May 44, sub: Control of Beach Area Dumps, FUSA 370 Employment and Opn of Troops, FUSA–16, Drawer 4.

beaches, those figuring most conspicuously being Cherbourg, Ste. Mère-Eglise, Carentan, Valognes, Trévières, La Haye-du-Puits, and St. Lô. Some of these locations were to serve as depots for two or more of the technical services, but most sites were selected for a single specific use, such as third, fourth, and fifth echelon maintenance shops, vehicle assembly plants, Class I storage, or vehicle parks. Since all sites had to be selected on the basis of map reconnaissance it was to be expected that there would bc many changes once they were examined.

Planning the depot structure involved estimating the amount of space required as well as selecting the most suitable sites. Each service had to calculate its needs for covered and open storage, and, depending on its mission, for covered and open hardstandings, vehicle parks, ammunition storage along roads, and bulk POL tankage. In many cases it was important that storage be located near railway spurs and sidings.

Space requirements ran into astronomical figures. In the first six weeks alone the technical services of the Advance Section estimated they would need approximately 2,200,000 square feet of covered storage, 15,000,000 square feet of open storage, 420,000 square feet of covered hardstandings, and 2,000,000 square feet of open hardstandings. Because Ordnance listed what were probably the most varied of all the technical service requirements, its calculations serve well to illustrate the types of administrative facilities for which plans had to be made. In the first six weeks the ADSEC Ordnance Section planned to provide third, fourth, and fifth echelon maintenance for 52,500 vehicles, 2,400 weapons, and 5 antiaircraft battalions, for which it estimated space requirements at 410,000 square feet of covered and 440,000 square feet of open hardstandings. It calculated that storage of 35,000 tons of ordnance Class II supplies, plus a park for 2,000 vehicles would require 560,000 square feet of covered facilities, 360,000 square feet of open storage, and 125,000 square feet of open hardstandings. Storage space for 130,000 tons of ammunition was sited along 260 miles of road. Vehicle assembly at the rate of 100 vehicles per day was to be initiated in this period and would require 15,000 square feet of covered and a like amount of open hardstandings.[98]

The above figures represent the requirements only for the first six weeks, the period during which all supply installations were the responsibility of the Advance Section and all administrative installations of necessity had to be in the Normandy area. After D plus 41 there was to be a noticeable shift, with the main storage and maintenance facilities thereafter concentrated in the Rennes–Laval–Châteaubriant triangle. This shift was to coincide with the change in direction of operations from north-south to east-west as U.S. forces drove into the Brittany peninsula and at the same time east toward the Seine. Important installations were to remain in operation in the base areas, particularly at Cherbourg and St. Lô, but by D plus 90 about two thirds of all storage was to be located in Brittany and farther east.[99] Plans for the depot structure, like others, however, were subject to alterations dictated by tactical needs. As events turned out they proved the least stable of all plans and were completely upset by the course of battle.

[98] ADSEC NEPTUNE Plan, technical service annexes.

[99] COMZ Plan.

(7) Transportation

Movements enter into virtually every aspect of supply. No other function does more to make a living organism of the logistic structure. The OVERLORD planners spent long hours on the problem of rail and motor transport on the Continent and suffered strong misgivings in the preinvasion months over the adequacy of their preparations. That the lack of transport could become a limiting factor of critical dimensions was amply demonstrated during the pursuit across northern France in the summer of 1944.

Railroads and motor transport, the latter bearing a much greater share of the burden than ever before, were to be the chief carriers on the Continent, as they had been in World War I. In the earliest stages of the operation all movements were to be carried out by truck, and very little rail mileage was expected to be placed in operation before D plus 41. As in the case of the ports, restoring transportation facilities, particularly the railways, was primarily the responsibility of one service—the Corps of Engineers—and operating them was the responsibility of another—the Transportation Corps. The latter had been created as recently as 1942, taking over the operation of motor transport from the Quartermaster Corps and of railways from the Corps of Engineers.

The Corps of Engineers began planning the road repair and highway bridging requirements for OVERLORD almost two years before the invasion. For this purpose it established working figures on the capacities of roads of particular widths, made assumptions on the degree of destruction that could be expected, and estimated the amount of construction materials and number of repair units required. Some of these figures were obtainable from experience in the Mediterranean theater, some were secured from tests in the United Kingdom. The Allies did not have full information on the condition of roads in the lodgment area. France had a traditionally fine road network, however, and main roads were hard surfaced and suitable for year-round traffic. The principal restriction to the easy flow of traffic was expected to come in the bottlenecks created by the narrow streets of the older towns. In the early stages of the operation the limited size of the lodgment would undoubtedly present difficulties, particularly at the base of the Cotentin, where egress from the peninsula was limited to a few causeway-type highways across the low, swampyDouve valley.[100]

Enemy-inflicted damage to highways was not expected to be great. Most of the early repair and reconstruction would undoubtedly be required on bridges, and First Army engineers would have to do these initial jobs. As areas were released by the army, the Advance Section would assume responsibility for the continued repair and maintenance of roads. One engineer general service regiment was believed capable of reconstructing 10 to 12 miles of road per day and properly maintaining about 170 miles. To meet estimated needs in the first six weeks, five general service regiments and two dump truck companies were to be assigned to road maintenance and repair for that period. Additional plans were drawn by another COMZ section for the repair and maintenance of the Brittany roads.[101]

The mission of the Transportation

[100] Road Maintenance and Highway Bridging, Hist Rpt 14, Corps of Engrs ETO, Ch. I, ETO Adm; ADSEC NEPTUNE Plan, Annex 6 (Engr), App. D.

[101] ADSEC Plan, Annex 6 (Engr), App. D.

Corps with respect to the operation of motor transport was to carry out all motor transportation connected with port clearance, static interdepot operations, and line-of-communications hauling. This entailed traffic regulation, both at the ports and along the lines of communications, and the establishment of regulating stations to control movement into the army areas. For several months after the invasion the Transportation Corps was handicapped by the lack of a centrally controlled motor transport service, although the Advance Section organized a provisional motor transport brigade to provide centralized field control over its own transportation shortly before D Day. Most of the theater's truck companies had actually been activated as Quartermaster units, and many continued to carry the designation "QM Truck Company (TC)" for some months.

To accomplish its motor transport mission the Transportation Corps estimated that, in addition to the vehicles furnished the field forces, 240 truck companies would be needed in the Communications Zone, and that two drivers should be provided each vehicle to permit round-the-clock operation. It also requested that a large percentage of the truck units be equipped with the large 10-ton flat-bed semitrailers and truck-tractors. Just before D Day theater headquarters granted the additional drivers, but it had authorized only 160 truck companies for the operation, and only a small percentage of the larger capacity truck-tractor–semitrailer units could be furnished. The smaller 2½-ton 6 x 6 truck had to be substituted. Plans called for moving 130 companies to the Continent by D plus 41. This number of units was expected to meet the daily forward movement requirement of 23,700 tons at that date.[102] But there was serious apprehension in several quarters over the adequacy of motor transportation after the first six weeks. Logistical planners at SHAEF noted that the shortage of truck companies was one of the chief factors likely to limit the development of the lines of communications even if operations proceeded as planned,[103] and it was this shortage which led General Moses to express misgivings over the prospects of adequately supporting operations after D plus 41.

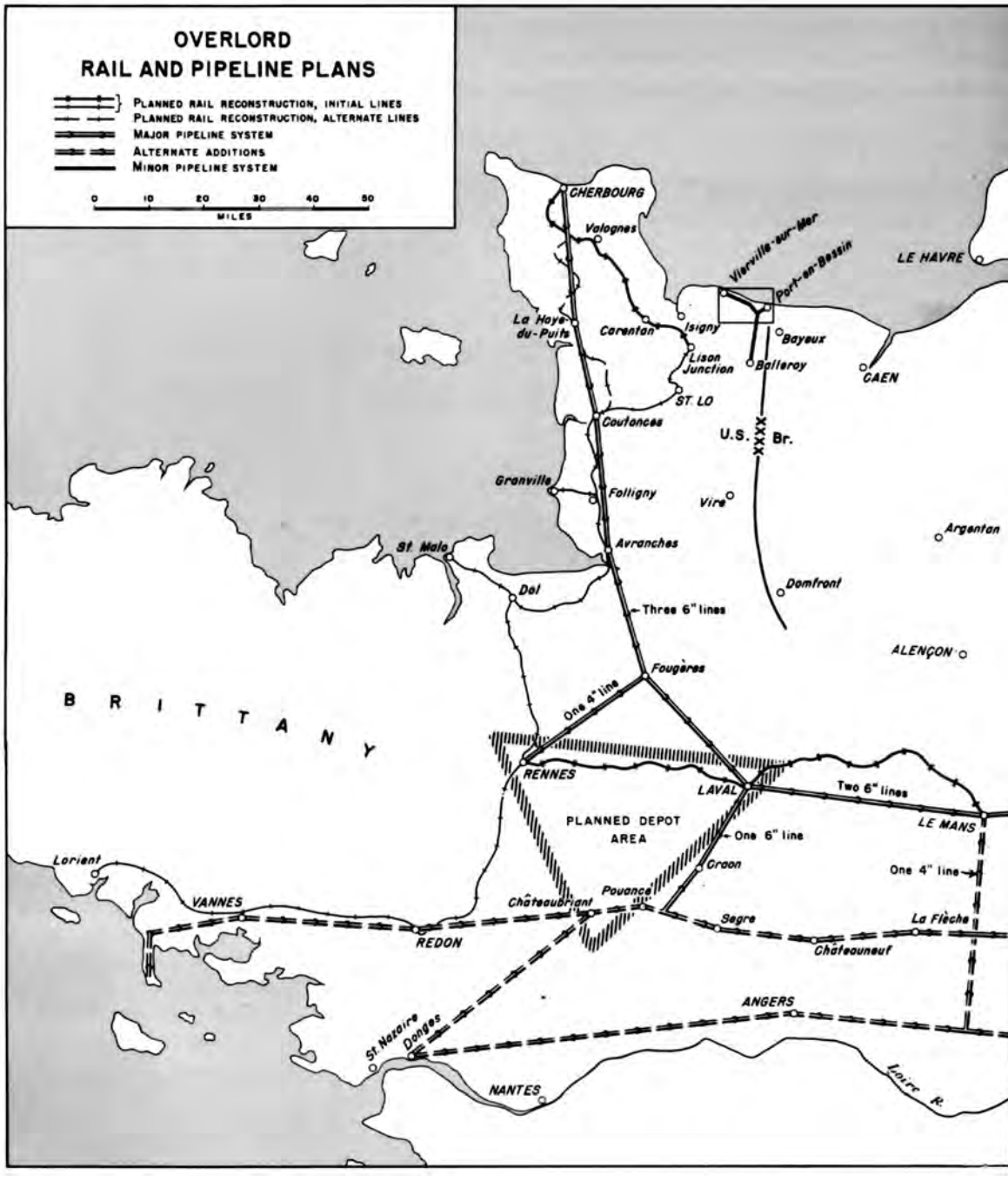
Important as motor transportation was to be in operation OVERLORD, it was not expected to sustain the mounting volume of supply movements after the first few weeks. From the beginning the Allies counted on the railways—a far more economical carrier over long distances—eventually to bear the larger portion of the transportation burden. Restoration of the French rail lines took on added importance in view of the anticipated shortage of truck transport.

Lack of a final operational plan made it impossible for a long time to prepare accurate estimates of matériel requirements. Nevertheless, requisitions for special Class IV equipment had to be placed far enough in advance to insure procurement and delivery in time for the operation. Supply planners found it necessary therefore to estimate needs on the basis of hypothetical operational plans, assuming a rail line of communications of a certain length and assuming certain scales of destruction.

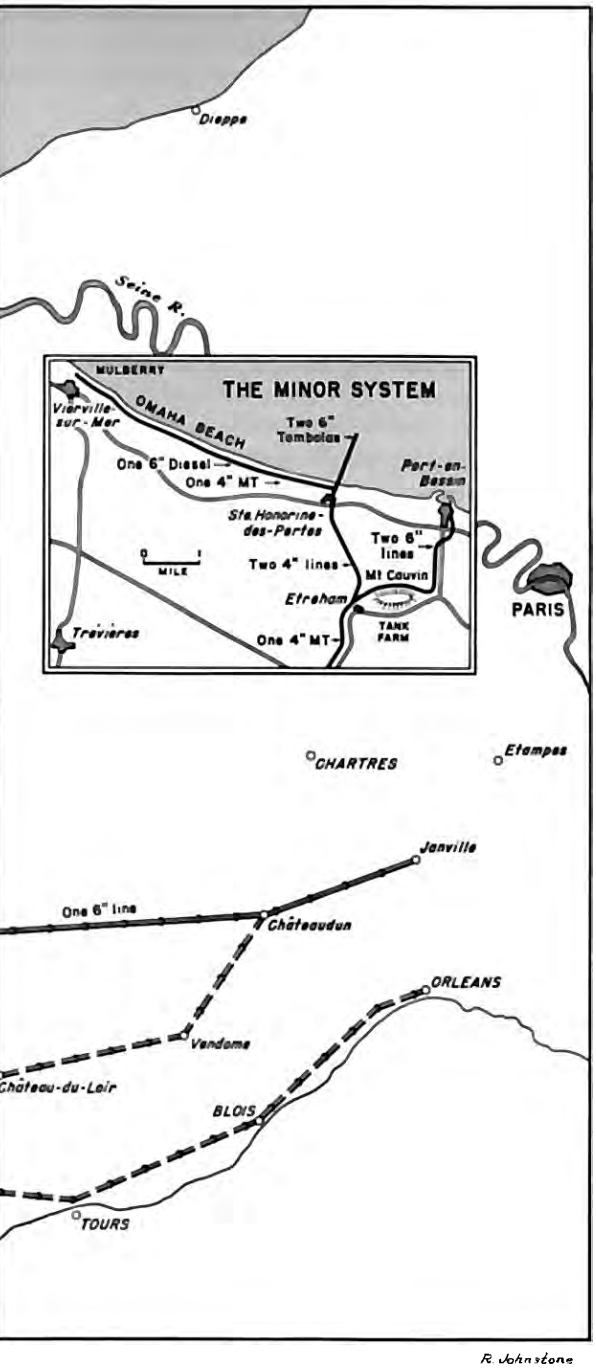
In the meantime studies were made to

[102] ADSEC Plan, Annex 14 (Transportation); Operation, Organization, Supply and Services of the Transportation Corps in the European Theater of Operations, Gen Bd Rpt 122, pp. 42, 99–100.

[103] Ltr, Chief Log Plans Br G–4 SHAEF to G–4 SHAEF, 17 Apr 44, sub: Log Plans Progress Rpt 7, SHAEF SGS 319.1/4 G–4 Rpts.


OVERLORD
RAIL AND PIPELINE PLANS
PLANNED RAIL RECONSTRUCTION, INITIAL LINES
PLANNED RAIL RECONSTRUCTION, ALTERNATE LINES
MAJOR PIPELINE SYSTEM
ALTERNATE ADDITIONS
MINOR PIPELINE SYSTEM
0 10 20 30 40 50
MILES
CHERBOURG
Valognes
Vierville-sur-Mer
Port-en-Bessin
LE HAVRE
La Haye-du-Puits
Carentan
Isigny
Bayeux
Lison Junction
Balleroy
CAEN
ST LO
Coutances
U.S. XXX Br.
Granville
Folligny
Vire
Argentan
St Malo
Avranches
Dol
Domfront
Three 6" lines
ALENÇON
Fougères
One 4" line
B R I T T A N Y
RENNES
LAVAL
Two 6" lines
LE MANS
PLANNED DEPOT AREA
One 6" line
Lorient
Croon
One 4" line
VANNES
Châteaubriant
Pouancé
Segre
La Flèche
REDON
Châteauneuf
ANGERS
St Nazaire
Donges
NANTES
Loire R.

MAP 9



determine the exact condition of the French railway net. The lack of intelligence on European rail lines handicapped planning at first. This was remedied when the British turned over to ETOUSA engineers considerable information on the French railways.[104] Engineer studies covered such matters as the state of track maintenance, grades, carrying capacity, number, type, and size of bridges, the kind of water and coal facilities, and the size of yards. Estimates of damage to the rail system were considerably higher than for highways. For planning purposes it was assumed that 75 percent of the track and all bridges would be destroyed. A portion of this trackage and bridging was expected to be salvageable, but reconstruction of the lines was estimated to require 55 percent new ties and rail and 90 percent new bridging. These estimates were based on the enemy's performance in the Mediterranean theater, where demolitions had been extensive. In Italy the Germans had employed a tie-breaking machine which systematically tore ties from the roadbed and automatically dropped a charge which broke the rails at regular intervals.[105]

ADSEC engineers made all the detailed plans for railway reconstruction as far south as Rennes, although this involved projects which were expected to require almost three months to complete. (*Map 9*) First priority was given to the reconstruction of the yards at Cherbourg. Port clearance facilities were of first importance, and rail operations were logically based on Cherbourg as a starting point, for that port was the only suitable point of entry for locomotives and rolling

[104] Railroad Reconstruction and Bridging, Hist Rpt 12, Corps of Engrs ETO, p. 21, ETO Adm.
[105] *Ibid.*, pp. 23–24.

stock, and the only port capable of handling awkward equipment. Rail line restoration was to be completed only as far as Lison Junction, a few miles southeast of Isigny, by D plus 41. By D plus 90 a total of only 245 miles was scheduled to be in operation, consisting mainly of a trunk line along the route Cherbourg–Lison Junction–Folligny–Dol–Rennes.[106]

The rail plan thus fitted into the general logistic scheme to develop the lines of communications southward to the Rennes depot area, but it was a modest one considering the size of the OVERLORD lodgment area and the eventual course of operations. ADSEC engineers developed plans to reconstruct roadbeds, culverts, and bridges, reclaim salvageable track materials, relay tracks, install yards and sidings, and rehabilitate or construct water and coal supply facilities. With characteristic thoroughness the Corps of Engineers made detailed studies of the work involved in the repair of each bridge, culvert, and spur, and prepared bills of materials listing every need from rock crushers and concrete mixers to ties and spikes. In the 47-mile stretch from Cherbourg to Lison Junction alone the plan listed eighty bridges which might require rebuilding. It was estimated that 47,500 tons of construction material would be needed for the reconstruction of the mileage outlined above. This included steel bridging and culverts, track materials, and miscellaneous items such as cement, lumber, and piling, all phased to arrive at certain ports or beaches in specific amounts, within daily tonnage allocations.[107]

The troop units provided for this mission totaled five engineer general service regiments, three engineer dump truck companies, and one engineer heavy pontoon battalion. Although a training program was worked out for the engineer general service regiments assigned to this work, they had very little experience in railway reconstruction before the invasion. Two of the regiments—the 332d and 347th—had attended the joint U.S.-British railroad bridging school in the United Kingdom. They were the only units that received any measure of specialized training for their continental mission.[108]

In all the planning for reconstruction of the continental railways, the engineers maintained close liaison with the Transportation Corps, which organized the 2d Military Railway Service to operate the lines. The 2d MRS was commanded by Brig. Gen. Clarence L. Burpee, who had come into the service from the Atlantic Coast Line. In the early stages of the operation the Railway Service was to be limited primarily to reconnaissance of captured rail lines, and the Corps of Engineers was to determine what alterations in plans, if any, should be made in restoration of lines. To operate the lines the 2d Military Railway Service organized railway grand divisions, intended to handle roughly the area of a base section. A grand division was normally capable of operating from 250 to 450 miles of railway, depending on the number of units assigned to it. For early operations, to D plus 41, the Transportation Corps provided one railway grand division, with two railway shop battalions and two railway operating battalions.[109] Not until after this period, however, would operation of the lines become extensive.

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[106] ADSEC Plan, Annex 6 (Engr), App. C.

[107] Engr Rpt 12, pp. 25–26.

[108] *Ibid.*, p. 27.

[109] Military Railway Service, Gen Bd Rpt 123, pp. 4, 11.

(8) The Supply of POL

The magnitude and importance of the movement problem are nowhere better illustrated than in the separate plans which were made for the transportation of petroleum products. Arrangements for POL supply enjoyed a pre-eminence in the planning and preparation for OVERLORD matched only by the plans for port reconstruction. POL alone accounted for one quarter of all the tonnage transported to the European Theater of Operations—a convincing statistical token that gasoline had become the lifeblood of modern armies.

The extraordinary demands for POL which the cross-Channel operation was expected to make called for extraordinary preparations. From the very start of invasion planning provision for adequate POL supply focused on the use of some kind of a light pipeline which could be laid down quickly so that gasoline could be transported economically over long distances. British experimentation with this idea began shortly after Dunkerque, and the production of such a pipeline figured in the early ROUNDUP planning. American interest was quickened by the appointment of a special Petroleum Committee in the United Kingdom to study the problem in July 1942, shortly after the European theater was activated. At about the same time the Chief of Engineers in Washington outlined a POL distribution plan which provided for lightweight pipelines which could be laid at the rate of twenty or more miles per day.[110]

Planning for continental POL supply thus got under way at an early date, although definitive plans were long in taking shape. Attempts to requisition materials for a POL distribution system were initially frustrated by the TORCH operation. Experimentation continued, however, not only with an overland pipeline, but with submarine pipelines and ship-to-shore lines. POL planners had much to learn about the handling of equipment and the training and organization of personnel. They attempted to establish sound bases for estimating the POL needs for a continental operation, and found it necessary to requisition enormous amounts of special equipment. Their efforts were partially negated by the lack of a firm troop basis and by the lack of figures on the ratios of vehicles to troops. Nevertheless the later OVERLORD planners profited by the plans and experimentation of the ROUNDUP period. For want of adequate experiential data, the POL planners initially placed considerable reliance on British estimates, particularly for requirements. Estimates as to the earliest date on which POL could be supplied in bulk to the Continent were pessimistic at first. Because all shipping was preoccupied with the movement of supplies and equipment essential to combat operations in the early stages, there was little hope that bulk supply could be initiated before D plus 30.

Planning a POL distribution system also posed an administrative problem since there were several interested parties or services. POL was a quartermaster item of supply. But any system entailing construction of bulk facilities and pipelines involved the engineers. Transportation of POL products, whether by tanker, railway tank cars, or tank trucks, was the job of the Transportation Corps. Ordnance was involved as the designer and supplier of much of the equipment such as

[110] Petroleum, Oil and Lubricants, Hist Rpt 13, Corps of Engrs ETO, pp. 3–6, ETO Adm.

vehicle-loading pumps and hose. The air forces were interested as the consumer of aviation gasoline, for which special provision had to be made. Co-ordinating the interests and responsibilities of these various parties was a difficult task in view of the initial lack of a single agency for that purpose.

POL plans began to assume a clearer outline late in 1943. COSSAC plans at that time called for an intake installation at Port-en-Bessin to receive POL in bulk from tankers in the harbor and via ship-to-shore lines, for storage facilities farther inland, and for a single 4-inch pipeline to St. Lô and Coutances. Contrary to earlier conclusions concerning the availability of tanker shipping for the transport of bulk POL, the COSSAC plans now called for work to begin on bulk installations as early as D plus 5. The initial receiving and storage installations were scheduled to be completed by D plus 10, and the entire line was to be completed by D plus 20. The possibilities of meeting such a schedule were viewed with considerable pessimism until the achievements in the Sicilian operation became known.

The Port-en-Bessin installations and inland pipeline were only part of the POL plan developed by the COSSAC planners in 1943. A similar bulk receiving system was contemplated at Cherbourg, and two pipelines were to reach south from Cherbourg along the axis La Haye-du-Puits–Avranches–Laval. They were to be supplemented by additional lines from the Brittany ports inland to Laval. Construction of this system was scheduled to begin immediately after the capture of Cherbourg and was to be completed by D plus 90.

Preparing to implement these plans was another matter. Until the end of the year there was no definite basis for figuring the requirements of motor or aviation fuel, which was a prerequisite for sound planning by the Quartermaster Corps and the Corps of Engineers. There was continued lack of co-ordination between the services, and there were not enough men trained for this type of operation. Before adequate planning data were agreed on, confusion, disagreement, overlap of authority, and loss of time attended plans for the establishment of POL sections in the various services and echelons of command.

The lack of an agency at the general staff level which could settle jurisdictional differences and co-ordinate the responsibilities and interests of the several services involved in POL supply was finally remedied in February 1944, when a POL Branch was established within the G–4 Section, ETOUSA, under Col. Freeman W. Burford. In the next two months a concerted effort was made to arrive at definitive data on requirements so that lower echelons could write detailed plans. In this planning technical advice was furnished mainly by officers who had served with the big oil companies such as Standard, Shell, and Humble.[111] By the end of March the estimated pipeline and storage tank requirements were established for OVERLORD. They provided for a considerably higher estimate of POL consumption rate, a larger proportion of reserves to be held in bulk storage, and a more extensive coverage of the operational area with bulk distribution lines than originally anticipated. The revised estimates were immediately reflected in higher matériel requirements and made the whole problem of supply of construction equipment

[111] Interv with Col. Elmer E. Barnes, former Chief Petroleum Officer ETO, 20 Feb 50; Ltr, Burford to author, 3 Apr 50, OCMH.

a critical one. Much additional equipment, particularly 6-inch pipe, had to be requisitioned. The fact that much of it had to be obtained from British sources meant some sacrifice of standardization.

In the meantime the delivery of construction materials already on order through PROCO requisition was disappointingly slow, and alarming shortages developed as D Day drew nearer. One of the missions of General Moore, chief engineer of the theater, on his trip to the United States in March 1944 was to impress upon the Procurement Section of the Office of the Chief of Engineers the urgency of filling requisitions promptly. In the last months before the invasion there were times when it was very questionable whether enough materials would be available by D Day to carry on the contemplated construction in the first weeks on the Continent. Even the training program for engineer petroleum distribution units suffered from such deficiencies.

Shortly before D Day high priorities were given to the shipment of the most urgently needed materials. A survey of the stock status of POL equipment in May revealed that with certain exceptions all items listed as critical by the Advance Section could be supplied for the period up to D plus 14, and it was believed that new stocks arriving in depots would be sufficient to meet requirements from D plus 15 to D plus 41. By 1 June preparations for the POL plan were adequate to meet all the needs of the operation.

Problems had also arisen in connection with the proper handling of the materials on hand. Removal of packing lists from boxes often made it difficult to determine the contents of individual crates. POL equipment was scattered over a large area rather than concentrated in one depot; and troops were placed in the depots who were unfamiliar with the nomenclature of items and could not identify articles of equipment. Worse still was the poor care given some of the equipment. Items such as elbows, tees, and valves often lay in the open or were stored in uncovered barrels which collected rain water. Some of these abuses and deficiencies had been noted on inspections in 1943, and corrective measures were taken.

The final U.S. plans for a POL distribution system on the Continent were based on a plan issued by the POL Branch, G–4, ETOUSA, on 14 April 1944. Participating in this planning were representatives from the Quartermaster Corps, the Transportation Corps, the Air Forces, and the Corps of Engineers. The Advance Section, in turn, used this outline as the basis of its more detailed plan, which set forth the organization and operation of the major portion of the pipeline system in the first six weeks of the operation. Of the various ADSEC technical service annexes, by far the most detailed plan was written by the Corps of Engineers, even though POL was a quartermaster supply item and the Quartermaster Corps had the responsibility of receiving, storing, and issuing all packaged POL products at Class III supply points and performing all decanting of POL from bulk to packages. The Transportation Corps had a large measure of responsibility in transporting POL, first in tankers and finally at the opposite end of the supply line in cans and in tank trucks. But it was the Corps of Engineers which had the most extensive mission. The engineers not only had to construct all bulk POL facilities, but they had to operate them—a task that entailed the reception, transportation, and storage of the great bulk of

all POL products needed by U.S. forces.[112]

The final POL distribution plans were based on estimated maintenance needs plus certain reserves. Maintenance requirements were based on an assumed rate of consumption for various vehicles per operational day. First Army assumed a 25-mile operational day for the first two weeks and a 50-mile operational day thereafter. Consumption per 50-mile day was taken as 8 gallons per wheeled vehicle, 24 gallons per half-track, and 52 per full track. Beyond this certain allowances were made to provide for powered equipment. Using these basic working figures, and the number of vehicles scheduled to be phased into the Continent, planners estimated that the following daily tonnages of POL products would be required at D plus 14, D plus 41, and D plus 90: [113]

Date	*Total*	*MT 80*	*Avgas*	*Diesel*	*Kerosene*	*Lubricants*
D+14	5,084	4,470	398	873	11	250
D+41	7,350	4,663	1,076	1,226	64	321
D+90	7,145	4,477	1,059	1,182	67	360

These requirements assumed a strength of approximately 67,000 vehicles on the Continent on D plus 14, 183,000 on D plus 41, and 263,590 on D plus 90. To meet their goal, the Allies had to introduce a total of 271,158 tons of POL products in the first 42 days. This included the aviation gasoline (Avgas) requirement, but the bulk of the tonnage (183,233 tons) was allocated to motor vehicle (MT80) gasoline. These amounts would provide a required reserve level of 7 days on D plus 14, 14 days on D plus 41, and 21 days on D plus 90.

For the first twenty-one days of the OVERLORD operation all POL needs were to be shipped packaged—that is, in cans. Bulk deliveries were scheduled to begin on D plus 15, although a small percentage of MT80 shipments was to continue in packages in order to build up and maintain the can population on the Continent.

The entire POL plan for Operation OVERLORD centered on the two big pipeline systems, designated as the Major and Minor Systems. (*See Map 9.*) The Minor System, scheduled to be constructed first, included facilities for receiving, storing, and dispensing bulk POL products in the Port-en-Bessin–Ste. Honorine-des-Pertes–Balleroy area. It was to consist of tanker berthing facilities and unloading lines, onshore booster stations, inland tank farms (for storage), pipelines, pumping stations, and dispensing facilities. Tanker deliveries were to be discharged through two receiving points. British and American forces jointly were to use Port-en-Bessin, a British-controlled port with berthing facilities, as a discharge point for tankers carrying both motor vehicle and aviation gasoline. Discharge was to be through two 6-inch lines, delivering both to the British and, through booster pumps, to the U.S. tank farm at Mt. Cauvin (near Etreham), about two miles distant from the port. Ste. Honorine-des-Pertes, two miles to the west and convenient to suitable offshore anchorage, was to be the other receiving point, used for the receipt

[112] See COMZ and ADSEC Plans, with Engr, QM and TC annexes and App. P (POL) to the COMZ Plan. The above is based primarily on Historical Report 13 of the Corps of Engineers, ETO.

[113] COMZ Plan, App. P. These figures are mixed net and gross—gross in the case of packaged, net in the case of bulk tonnages.

of motor vehicle and diesel fuel for U.S. Army and Navy use. Discharge at that point was to be effected via two 6-inch ship-to-shore submarine lines (called TOMBOLAS), and delivery was to be made to the Ste. Honorine storage system, and by pipeline to the Navy fueling station at the site of the MULBERRY. The Ste. Honorine storage capacity was to total 20,000 barrels, the Mt. Cauvin tank farm 24,000 barrels. This much of the Minor System was to be completed and in operation by D plus 10. Within the next six days pipelines were to tie in the Ste. Honorine storage system with the lines at Mt. Cauvin, and from this point a 4-inch line was to be constructed to Balleroy, about thirteen miles to the south. Terminal storage tanks with a capacity of 6,000 barrels were to be erected at Balleroy, which, like Mt. Cauvin and Ste. Honorine, was to have dispensing facilities both for canning and for loading tank trucks. The entire project involved the construction of twenty-seven miles of pipeline with the necessary booster stations and fittings, and tank storage for 54,000 barrels. Since there were no known commercial facilities in the area the entire system was to be newly constructed.[114]

While the Minor System was designed to meet the Allies' needs for bulk POL in the initial stages of operation OVERLORD, the biggest share of bulk POL deliveries was eventually expected to be made through the larger and more permanent system based on Cherbourg, known as the Major System. This, like the Minor, was to consist of discharge points, storage facilities, and pipelines, but it was conceived and planned on a much larger scale and, when completed, was to have many times the capacity of the earlier development east of OMAHA Beach. The outstanding features of the Major System were the large discharge capacities at Cherbourg, the long pipelines, and the enormous storage capacities to be developed along the pipeline route.

Deliveries at Cherbourg were to be made principally via tanker discharge alongside the Digue de Querqueville. Five 6-inch lines were planned to handle these deliveries. In addition, one 6-inch line was to receive fuel directly from cross-Channel submarine lines. The latter project was an even more novel feature of the invasion operation than the MULBERRIES. The Allies had seriously considered the idea of submarine pipelines throughout the planning period, and after extensive experimentation the British developed cables that could be laid underwater and would carry POL under high pressures. The Corps of Engineers also conducted experiments in the United States, but this project was abandoned in December 1943 because it could not be completed in time to justify the enormous expenditure of effort that was required.[115] The cross-Channel underwater pipeline plan which was adopted was therefore exclusively a British project. Known as PLUTO (for pipeline under the ocean), it provided for the laying of ten 3-inch cables from the Isle of Wight to Cherbourg, the first line to arrive on D plus 12.[116] At a distance of sixty miles each line had a theoretic delivery capacity of over 300 tons of gasoline per day. Because PLUTO was substantially an untried project until after it started

[114] ADSEC Plan, Annex 6 (Engrs); Engr Rpt 13, Ch. II.

[115] Ltr, Devers to Stark, Cmdr U.S. Naval Forces in Europe, 16 Dec 43, sub: Cross-Channel Submarine Pipeline, and Cbl WL-2729, Lee to AGWAR, 16 Dec 43, ETO AG 678 Pipelines; Engr Rpt 11, pp. 31–33.

[116] ADSEC Plan, Annex 6 (Engr).

actual operation, all POL planners considered deliveries via the submarine supply line as a bonus, over and above the total requirements which, for planning purposes, were to be delivered by the more orthodox tanker method.[117]

To carry bulk fuel inland plans were made for the construction of three 6-inch pipelines from the Digue de Querqueville in Cherbourg south to Laval and then eastward to the vicinity of Etampes, south of Paris. In addition, tactical conditions permitting, it was hoped that other lines could be built from the Brittany ports, either from Vannes (in the vicinity of Quiberon Bay) to Châteaubriant, running northeastward to join the Major System at Laval, or preferably a supplementary line starting at Donges at the mouth of the Loire, and running eastward through Angers, Tours, and Orléans.[118] The Advance Section, as the command responsible for detailed plans through D plus 41, made definite plans to extend the lines only to the Brittany area, where the big depots were to be established. Two of these lines were to carry motor vehicle fuel and the third was to carry aviation gasoline. The three lines were to be laid side by side as far as Fougères, a distance of 101 miles. From Fougères a 4-inch branch line (for MT80) was to be extended to Rennes (28 miles) for local distribution. From Fougères southeast two 6-inch lines were to continue to Laval (also 28 miles from Fougères). In addition, by D plus 41 a branch line was to have been started from Laval southwest to Châteaubriant, partially for the purpose of connecting with lines from the Loire River ports.

The three 6-inch lines from Cherbourg were to constitute the major pipeline system running to the south and east, and were to carry the major portion of bulk POL projects to U.S. forces. The 6-inch lines had a rated capacity of 1,825 tons per day, and the 4-inch lines a capacity of 825 tons. For planning purposes, however, factors of 1,515 and 650 tons respectively were used.

Another vital feature of the Major System was the storage plan. In writing the POL plan for operation OVERLORD the planners did not lack intelligence on the existing facilities in the Cherbourg and Brittany peninsulas. They knew, for example, that Cherbourg had extensive tankage capacity, since it had been a naval base; but, as in the case of the ports, they assumed that such facilities would be destroyed.[119] They therefore planned a tremendous storage program, particularly at Cherbourg, where thirty-eight tanks were scheduled, most of them of 10,000-barrel capacity, with a total capacity of 331,000 barrels. They were to be built on the high ground southwest of Querqueville, concealed and dispersed, but so interconnected as to permit complete flexibility of operation. In order to provide the inland reserve storage, both for local dispensing when pipelines were shut down and for operational storage, tanks were to be built all along the route of the pipelines, at La Haye-du-Puits, Coutances, Avranches, Fougères, Rennes, and Laval, all within the first forty-two days. By D plus 46, when the Craon and Châteaubriant additions were to be completed, a total of eighty-three tanks would have been constructed, with a capacity of 536,000 barrels.[120] As part of these plans, dispensing facilities were to be provided at

[117] *Ibid.*, p. 40.
[118] COMZ Plan, App. P.
[119] *Ibid.*
[120] ADSEC Plan, Annex 6 (Engr).

every storage area, consisting of both truck-filling and canning facilities.

The construction of the Major System followed a schedule, as did all construction projects in the OVERLORD operation. By D plus 21 storage and pipeline construction was to have progressed sufficiently to permit dispensing and storage to begin at La Haye-du-Puits. By D plus 26 a single pipeline was to extend as far as Coutances, and by D plus 31 to Avranches, with storage and dispensing facilities. Meanwhile, work was also to proceed on the second and third pipelines and on storage facilities, so that by D plus 41 the system was to have been completed and in operation as far as Rennes and Laval. A total of 513 miles of pipeline was to be laid in the Major System up to this point. Adding the facilities of the Minor System in the Port-en-Bessin and Balleroy area (27 miles of pipe and 50,000 barrels of storage) a total of 540 miles of pipeline and 586,000 barrels of storage capacity was to be completed and in operation by D plus 46.[121]

Modest as was the Minor System as compared with the one based on Cherbourg, it assumed enhanced importance as D Day drew near. Mention has been made of the change in tactical plans made only a week before D Day when assault units were already marshaling for the cross-Channel movement. This change not only affected the plans for the phasing in of combat and service units but also caused a revision in the estimated capture date of Cherbourg, setting it back one week to D plus 15. It therefore had a special significance for the supply of POL. The POL plan relied heavily on the capture of Cherbourg and the early construction of receiving and dispensing facilities there so that the scheduled transfer from packaged maintenance to bulk maintenance could be made by D plus 21. Any delay in the capture of Cherbourg set the POL plan back proportionately. A week's delay would cause a shortage of 31,400 tons of estimated maintenance and reserve requirements.[122]

To make up this deficit either additional quantities of packaged POL would have to be introduced to offset the delay in bulk deliveries, or additional bulk-receiving facilities would have to be provided. After discussing several possibilities G–4 officials decided on 29 May that the best solution was to increase the bulk capacity of the Minor System. Meeting maintenance requirements with packaged POL would have required adjustments of the whole supply phasing program. They decided rather to increase both the receiving and storage capacity in the Port-en-Bessin–Ste. Honorine–Balleroy area, and made a special allocation of shipping to bring an additional 700 tons of POL construction materials over the beaches for this purpose at an early date.[123]

The vital importance of the OVERLORD POL plans is reflected in the meticulous detail in which they were written. They resembled the port plans in the multitude of considerations that the planners had to take into account. Certain basic assumptions had to be made, including the average mileage of an operational day, the

[121] *Ibid.*

[122] Ltr, Col Cort, Cof S ADSEC, to Deputy CG COMZ, 27 May 44, sub: Effect of New Phasing of Opn NEPTUNE on COMZ Plan, SHAEF 12 A Gp 370 Plng—ADSEC.

[123] Rpt of conf of adm officers, 12 A Gp, 26 May 44, 12 A Gp G-4 Ltrs, Memos, Assorted 1944; Rpt on conf to discuss alterations in POL plan, 29 May 44, SHAEF 12 A Gp 337 Confs and Mtgs, VI; Ltr, Vaughan to U.S. Adm Stf at 21 A Gp, 1 Jun 44, sub: Delay in the Capture of WATSON, USFET 381 Opns Documents.

rate of consumption for each type of vehicle, and an estimated rate of advance. To arrive at estimates of total requirements the planners had to know both the troop and vehicle population on the Continent at different stages. Beyond this fundamental information the ability to construct an adequate POL distribution system on the Continent depended on both the supplies and equipment and the specially trained units which were to be available for such a project. A mass of technical data had to be gathered and applied. The computation of pipeline construction alone involved consideration of all the problems of surveying, clearing the right of way, stringing pipe, connecting joints, installing pump stations, testing and filling the pipeline, building a communications system, and erecting and connecting storage.

Assuming that the construction work was completed, the planners still faced a formidable array of computations and calculations. What, they had to estimate, was the capacity of QM units to decant and to distribute? What was the capacity of TC trucking companies to transport? To answer the latter question they had to determine what types of transportation and container—can, drum, tank truck, skid tanks on cargo trucks, or 2,000-gallon trailer trucks—were best suited to various areas in various stages of the operation. How much should they allow for delays from traffic blocks and breakdowns, for interruptions in loading and unloading, for difficulties in locating dumps? What should be the ratios of motor vehicle, aviation, and diesel fuel, of kerosene, and of lubricants; what percentages of reserves should be maintained in package and bulk at various times; what would the turnround time be; what losses of containers should be expected in maintaining an adequate can population? Such matters as draft, port rehabilitation, turn-round time, and loading time entered into the planners' consideration of what type of tankers should be used. To co-ordinate all the facts and the informed guesses and to synchronize the plans of the various services were tasks of almost infinite complexity. They were tasks, however, on which the success of the invasion depended.

The very bulk and detail of the OVERLORD logistic plans indicate that the planners were determined that every need should be anticipated, and that no requirement, down to the proverbial nail, should be wanting. The logistic plan was based on a deliberately optimistic forecast of tactical progress to insure a timely build-up of troops and supplies, and to insure that the combat forces should never suffer from want of adequate logistic support. On the other hand, operational plans, including the rate of the troop build-up, were so drawn as to utilize the full potential of the supply organization. The entire plan, therefore, represented an attempt to balance requirements with capabilities.

Whether the logistic structure would prove sufficiently flexible to accommodate itself to changing conditions, and whether the capacities of the various facilities along the supply pipeline could be balanced so that strictures did not develop, remained to be seen. The repercussions which late intelligence concerning enemy strength in the Cotentin could have on both tactical and logistic plans had already demonstrated the need for resilience in the supply organization. Logistic planners had long been haunted by the spector of "limiting factors" which might choke the lines of communications at one point

or another. The smooth flow of supply required that all parts of the system operate approximately according to rated capacity. The limiting factor at one time might be a shortage of shipping, at another the capacities of the French beaches and ports. In trying to anticipate the limiting factors the planners had been handicapped initially by the fact that all branches of the staffs started planning at the same time, and decisions were taken before reliable statistical data were available or the limiting factors determined. In mid-April the limiting factors which logistic planners appeared most concerned about were the transportation facilities on the Continent, in which the chief deficiencies were expected to be the shortage of truck companies, the limited capacity of the road net in the early stages, and the slow rate of rail reconstruction. These deficiencies, it was thought, might well limit the scale of operations after D plus 90.[124]

The SHAEF G–4 found little reason for complacency regarding the prospects for even the first three months. In an eleventh-hour assessment of the logistic preparations for OVERLORD he concluded that the operation would be logistically feasible only if certain conditions were met: the front line at D plus 90 must not be any farther advanced than the planned line of the Seine–Loire; the build-up must be limited to troops absolutely essential to the operation; the Allies must be able to maintain a considerable portion of reserves in the vicinity of the ports, and full operational reserves must not necessarily be kept in the most advanced depots; a rail net must be developed as planned with adequate rolling stock. There was a distinct possibility, the G–4 surmised, that some factors, such as port capacity or the extent of rail damage, might be less favorable than assumed. The failure of only one important function—port clearance, for example—might create a bottleneck which could alter the entire course of the operation. In essence, the G–4 study seemed to say that the operation could be supported provided everything proceeded as planned, and that there was no margin of safety in the logistical arrangements for OVERLORD.[125]

[124] Ltr, Chief Log Plans Br G–4 SHAEF to G–4, 17 Apr 44, sub: Log Plans Progress Rpt 7, SHAEF SGS 319.1/4 G–4 Rpts.

[125] Adm Stf Study 11, Log Plans Br, G–4 SHAEF, 3 Jun 44, sub: Logistical Situation U.S. Forces D plus 41–D plus 90, SHAEF 12 A Gp 370 SHAEF Plans, Adm Stf Studies.

CHAPTER VIII

Training and Rehearsing for Operation OVERLORD

(1) Earlier Amphibious Experience

One of the outstanding features that distinguished U.S. operations in World War II from those of 1917–18 was the extent to which the technique of the amphibious assault was developed and employed. The high degree of perfection achieved in both the tactical and logistical aspects of amphibious operations in World War II was the more remarkable in that it represented progress made chiefly after the war began. At the start of the conflict there was little in the way of training centers, proven techniques, or special equipment designed for the amphibious type of operation, particularly for its logistic aspects.

This lack was serious indeed, for an amphibious assault is as much a supply operation as a tactical one. Perhaps at no point in modern warfare do tactics and logistics rub elbows so intimately as in the initial stages of a landing operation. Assault formations of necessity travel light, carrying only the most essential maintenance items such as rations and ammunition. Sustaining and reinforcing them require the immediate—in fact, the almost simultaneous—organization of the assaulted beaches for supply. For a brief moment tactical and supply operations may almost merge. Once the beaches have been cleared and secured they cease to be a battlefield and become a logistic base whose main function is to insure a steady flow of supplies and reinforcements.

The U.S. Marine Corps had prepared a "Tentative Manual for Landing Operations" in 1934, much of which later found its way into the Army field manual titled "Landings on a Hostile Shore" (FM 31–5). In conjunction with the Navy the Marines had conducted a series of fleet landing exercises in the thirties to test their amphibious doctrine, and U.S. Army units participated in those of 1937 and 1938, and again in 1941 and 1942. Throughout the exercises the main emphasis was on the tactical aspects of amphibious assaults, and the doctrine of beach organization and techniques of supply handling got only secondary consideration.[1] Shore party organization was particularly faulty, and there was no clear division of authority between ground and naval units. While the exercises undoubtedly profited the Army units taking part, they left much to be desired so far as the logistic aspects of amphibious warfare were concerned, and the entrance of the

[1] J. A. Isely and P. A. Crowl, *The U.S. Marines and Amphibious War* (Princeton, 1951), pp. 64–66.

United States into the war in December 1941 found amphibious supply techniques in a relatively early stage of their evolution.

Japanese successes in the Pacific gave added impetus to the development of amphibious techniques and equipment in the United States. In the winter of 1941–42 the Japanese launched a series of amphibious operations which carried them into the Philippines, New Guinea, the Aleutians, the Malay Peninsula, and the Netherlands Indies. These landings were either on a small scale or unopposed, however, with ports being captured intact, and they gave little indication of the complex problems connected with large-scale assaults on well-defended shores. Nevertheless they underscored the necessity for devoting greater effort to the development of amphibious warfare and to the production of special equipment. The U.S. Navy took steps to increase the production of landing craft, while the Army devoted additional effort to the development of equipment such as the amphibian truck. The British gave particular attention to commando training and to operations employing landing craft.[2] The first Allied amphibious operations were undertaken in August 1942, when U.S. Marines landed on Guadalcanal and a predominantly British-Canadian force raided the German Atlantic Wall at Dieppe. Both landings provided experience in landing techniques but were on a scale barely suggesting the scope of a full-scale invasion operation.

Early in 1942, meanwhile, the Army had embarked on its own amphibious training program, although it again had units take part in Marine-sponsored exercises in January and during the summer. In March the War Department directed the Army Ground Forces to select a site for an amphibious training center, and the Corps of Engineers was instructed to train enough boat crews and maintenance units to allow divisional and joint training under the Army Ground Forces to begin that summer. Three months later Col. Daniel Noce (promoted to brigadier general in July) organized the Engineer Amphibian Command at Camp Edwards, Mass. The Army Ground Forces meanwhile established the Amphibious Training Command (later renamed Amphibious Training Center), also concentrating its activities initially at Camp Edwards.

The Engineer Amphibian Command was activated principally to train boat crews which the Army Ground Forces expected to use in instructing divisions in amphibious landings. But this concept of engineer responsibilities was immediately broadened, and steps were taken to combine all the units needed to provide transportation, organize the beaches, evacuate wounded and prisoners of war, and handle the build-up of supplies for a division in a shore-to-shore operation. In this way a boat regiment, a shore regiment, and various service units were combined to create the 1st Engineer Amphibian Brigade, which was activated on 15 June. The shore regiment, its key unit, was to be trained to assume responsibility for all supply and engineering functions in the beach area, and the engineer boat regiment was to operate small landing craft and carry out other shore-to-shore operations. An amphibian signal company was added to handle communications, a medical battal-

[2] Except as otherwise indicated this chapter is based on the monograph [Clifford L. Jones] NEPTUNE: Training for and Mounting the Operation, and the Artificial Ports, Pt. VI of The Administrative and Logistical History of the ETO, OCMH.

ion to evacuate the wounded, a quartermaster battalion to operate supply dumps, and an ordnance platoon, a boat maintenance company, and a depot platoon from a base shop battalion to repair vehicles and craft.

Formation of the 1st Brigade by no means crystallized amphibious supply doctrine. The composition of the brigade was still tentative, and its functions were not yet clearly defined, partly because the respective spheres of responsibility of the Army and Navy in a landing operation had not yet been clearly defined. While the brigade was designed to provide both logistical and combat support, the tactical role received the main emphasis at first. Since it had barely a month to ready itself for joint training with the Army Ground Forces, the brigade could not form its many units into an integrated team and had little training in the actual movement of supplies. The 1st Brigade actually received little training in the United States beyond boat operation, beach development, and hasty road construction. In July it was made available to the Amphibious Training Command of the Army Ground Forces for joint exercises, but its training was again cut short, for it was almost immediately alerted for movement to the United Kingdom, and special efforts had to be made to fill its equipment shortages.[3]

In the United Kingdom up to this time developments in amphibious warfare were confined largely to its tactical aspects and were carried on by the Commandos under Admiral Mountbatten, who took command of Combined Operations Headquarters late in 1941. American interest in commando training was evident from the start, and in the spring of 1942 arrangements were made to create an American section at Combined Operations Headquarters and to train American Rangers with the British Commandos.

The development of supply methods and far-shore organization proceeded more haltingly. The 531st Engineer Shore Regiment, one of the key units of the 1st Brigade, received some basic instruction at the British Amphibious Training Center at Inveraray in Scotland, but most of the units of the brigade were scattered upon arrival in England, and for some time its role in a cross-Channel operation was indeterminate. In the United Kingdom all U.S. amphibious training was turned over to the Navy, as was the responsibility of providing boat crews for shore-to-shore movements. Consequently the boat regiment, one of the brigade's basic units when first organized, was disbanded. The brigade's responsibilities henceforth were limited strictly to ship-to-shore and shore operations, and its combat engineers, who had become boatmen, now became stevedores.[4] In fact, there was opposition from the Navy to the retention of any organization higher than a battalion, and the 1st Brigade itself narrowly escaped extinction.[5] Before the North African operation in 1942, therefore, no standard amphibious doctrine had been developed, and few amphibious techniques had been tested. Landing rehearsals conducted in Scotland just before the convoys sailed afforded no training in the vital problem of unloading vehicles and supplies.

[3] H. H. Rosenthal, Troops and Supplies, Vol. I of the Corps of Engineers history in preparation for this series, MS, Ch. VIII, pp. 21–30. Three additional brigades were subsequently activated and trained at Camp Edwards under General Noce's direction.

[4] This practice differed from that followed in the Pacific, where the brigades retained responsibility for the shore-to-shore movement in short-range operations.

[5] Rosenthal, Troops and Supplies, p. 31.

Operations in the Mediterranean inaugurated a more extensive schooling in the logistic aspects of amphibious warfare, with TORCH providing the first lessons. When that operation was finally launched, the lack of training and experience was much in evidence. Critiques of it pointed to many errors and underlined the need for great improvements in training, planning, and equipment. Many of the criticisms applied particularly to the faulty supply operations, the major weaknesses being poor co-ordination between the various forces, undeveloped amphibious techniques, divided authority, insufficient training, poor staging, and bad combat loading. The need for better landing craft and the need for training in the actual handling of supplies across beaches were emphasized, for the time it took to land supplies exceeded all estimates.

The North African operation can hardly be regarded as a prototype of the later OVERLORD operation. It involved a much longer sea voyage, and the amphibious phase of supply operations was actually very short, for the ports were quickly brought into operation and the beaches abandoned. But TORCH did point the way with the practical experience it gave in the handling of landing craft, unloading, the establishment of beach dumps, improvement of exit roads, and so on.[6]

Efforts were immediately made to rectify the deficiencies of the TORCH operation, particularly in landing craft, combat loading, and amphibious techniques and training. Developments in the United Kingdom, which included the setting up of a planning school, will be covered later. In North Africa itself the first major change came when the Army dropped its control over landing craft. A more important development was the organization of a large amphibious training school where experiments could be carried out and key units could be given training in ship-to-shore operations. During the winter such a training center was constructed by the 2d Battalion, 531st Engineer Shore Regiment, at Port-aux-Poules, Algeria, and was activated as the Fifth U.S. Army Invasion Training Center. On the logistical side the center afforded training in loading and unloading vehicles and personnel from various types of landing craft. By the end of May 1943 it had trained many units for the Sicilian invasion, including those of the 1st Brigade.

Planning for the Sicilian invasion (Operation HUSKY) was far more complete than for TORCH and was built on a much sounder foundation. Units were better trained and there was better equipment. In one way the operation was to resemble the later OVERLORD operation much more closely because it was to be made across a short stretch of sea, and was not launched from such widely separated points as was TORCH, for which one task force had to cross the Atlantic. HUSKY was also to be a landmark in the development of amphibious logistic support, both in far-shore organization and in equipment. For the first time a naval beach battalion was utilized to achieve closer co-ordination between the Navy afloat and the Army ashore. In addition, the make-up and responsibilities of the amphibian brigade emerged more clearly.

Through most of the winter the 1st Engineer Amphibian Brigade had existed in name only, its units scattered and performing a variety of duties. Their assignments included unloading cargo, operat-

[6] NEPTUNE: Training for and Mounting the Operation, I, 11–26.

ing smoke pots, running quartermaster depots, and constructing warehouses. The organization was now redesignated the 1st Engineer Special Brigade and was quadrupled in size for the purpose of operating four beaches and a large beach maintenance area. Three engineer combat regiments in addition to the 531st Engineer Shore Regiment were attached and used as the basis of engineer regimental beach groups, each of which was attached to a combat division. The regimental beach groups in turn were broken down into battalion beach groups, each placed in support of an infantry or armored regimental combat team for the landings. With all its attached and assigned units, the 1st Brigade numbered about 20,000 men for the Sicilian operation.[7]

The operation was not without its errors, and new flaws appeared which called for correction. Moreover, elation over the success of the landing was tempered by the realization that the lack of resistance was to a large extent responsible. Observers cautioned that the standard of training would have been severely tested had there been strong opposition on the beaches. HUSKY had also had the advantage of tideless water, a condition which would not favor an operation in the English Channel, where tides of twenty to thirty feet had to be reckoned with. Nevertheless, from the standpoint of supply the Sicilian operation was a gold mine of experience. Once more it underscored the importance of a highly developed beach organization. As one observer remarked, the faster an army intended to advance and the more violent the blows it desired to strike, the larger must be its administrative tail. Only by the quick establishment of a logistic base could the combat forces develop their full striking power, and in an amphibious operation, it was concluded, the organization of such a base required the establishment of the beach group with its essential components.[8]

The Sicilian operation also provided a good test of landing craft. LCT's were used more extensively than ever before and, in general, performed well, although defects in some types were discovered. An innovation that proved very useful was the U.S. Navy's ponton causeways—easily assembled piers used to unload all types of smaller craft. They were used so successfully that they became standard equipment for all future operations of a similar nature.

Perhaps the two most noteworthy revelations of the operation were, first, the feasibility of operating beaches over an extended period of time and, second, the success of a new piece of equipment—the dukw. Until the Sicilian operation it was doubted whether open beaches could be used for an extensive period without deteriorating. The HUSKY experience proved this fear groundless by showing that they would not cut up and deteriorate under intensive use. Even relatively poor beaches proved capable of being efficiently used with certain engineer improvisations. This was a welcome revelation in view of the extensive use of beaches which would have to be made in the cross-Channel operation.

The success of the dukw was phenomenal. Essentially the dukw was a 2½-ton 6 x 6 truck chassis with a boat hull, propeller, and rudder enabling it to operate with about a 5,000-pound load in moderate sea and surf. The first shipment of these amphibians had arrived in North Africa in April. Experienced operators accom-

[7] *Ibid.*, I, 27–32.
[8] *Ibid.*, I, 38–41.



COLUMN OF DUKWS, *during training exercise off Cornwall.*

panied them and set up a school that trained a thousand men to operate them. The amphibians were used for many purposes, including some not intended. They carried stores far inland to forward dumps, evacuated casualties and prisoners, and in at least one emergency were used to transfer a Ranger battalion to meet a sudden enemy counterattack. Their versatility was immediately recognized, and heavy demands were made on them, with the result that they were frequently overloaded and misused. Lack of maintenance equipment and spare parts also contributed to their rapid decline in efficiency. But they demonstrated their usefulness in a hundred ways and proved themselves one of the most valuable "weapons" in the Allied arsenal. From HUSKY on no landing operation was to be attempted without them.[9]

Two later amphibious operations in the Mediterranean gave additional experience to American units in logistical operations. These were Operations AVALANCHE (the southern Italy landings of September 1943) and SHINGLE (the Anzio assault of January 1944). The southern Italy invasion contributed relatively little to amphibious doctrine or techniques. There were few major supply difficulties in the operation of the beaches, and because the ports were opened early the importance of the beaches declined rapidly after they had served their initial usefulness. Additional uses were found for the dukw, but otherwise there were no true innovations. The Anzio operation contributed little more to amphibious doctrine except to underscore the practicability of long-term operation of beaches. The prospects for the success of operation SHINGLE were gloomy for several reasons, among them the reported inadequacy of the beaches. But from the standpoint of supply the operation actually far surpassed the hopes of the planners, thanks largely to an unanticipated development—the quick restoration of the small port of Anzio, which the Navy had thought worthless. The 540th Engineer Combat Regiment developed the port's discharge capacity to the wholly unexpected figure of nearly 8,000 tons per day at the end of March.[10] The operation therefore produced the very significant realization that the performance of small ports might be improved tremendously, a possibility which had been minimized heretofore.[11]

Although conditions in the Mediterranean may have differed in many ways from those in the English Channel, and although none of the Mediterranean operations served as an exact model for the later cross-Channel undertaking, North Africa, Sicily, and Italy provided a school of practical experience in which to test amphibious equipment, planning, organization, and training. Out of these proving grounds came the basis for much of the planning conducted in the United Kingdom for OVERLORD, and a number of the units that were later to participate in the Normandy invasion gained invaluable experience.

(2) The Training Schools and First Exercises

During the period of the Mediterranean operations developments in the field of amphibious operations were of course taking place in other areas as well. In the Pacific smaller but important landings were being carried out, and in the zone of

[9] *Ibid.*, I, 39–44.

[10] It averaged about 4,000 tons per day as against a predicted 600.

[11] NEPTUNE: Training for and Mounting the Operation, I, 44–50. It will be recalled that the OVERLORD planners revised estimated port capacities as a result of this experience.

interior training developments were also to have their influence on amphibious doctrine and practice. Direct exchange of information and personnel between the European and Pacific areas was rather negligible, although there was correspondence between the two, as for example between the 1st Engineer Special Brigade in Europe and the 2d Brigade in the Pacific. Severl key officers who had taken part in the Aleutian Islands landings, among them Col. Benjamin B. Talley, later to command the OMAHA Beach organization for a time, were brought to London to assist in cross-Channel planning.

More evident was the effect of courses, given in the United States, where several agencies were engaged in amphibious training. All units intended for assault missions and sent to the United Kingdom after January 1943 were given advanced training in the assault of fortified positions, much of it at the Engineer School at Fort Belvoir, Va., under doctrine developed by the Corps of Engineers.

Meanwhile, training in various aspects of amphibious supply operations was carried on at several installations. The Engineer Amphibian Command at Camp Edwards continued to train shore service parties and boat crews, and developed techniques for shore-to-shore movements. At Fort Pierce, Fla., and later at Camp Pickett, Va., specialized instruction was given to engineer units under the direction of the Amphibious Force, Atlantic Fleet. These experiments and exercises usually involved an engineer combat battalion with attached service troops in support of a regimental combat team. At first there was no specialized equipment and little conception of the use to which the service troops were to be put. The 1116th and 1119th Engineer Combat Groups (later designated the 6th and 5th Engineer Special Brigades respectively) received training on this pattern, which was quite unlike anything later attempted in the Normandy invasion. Both groups regarded the principles they were taught as unsound and set about developing a new solution, similar to the battalion beach group idea developed for the Sicilian landing. In addition, experiments and training were conducted at Fort Pierce by several engineer combat battalions in the destruction of underwater obstacles, which was expected to be one of the most hazardous of all invasion tasks. Schools were also set up in the United States for the training of dukw operators and mechanics.[12]

The sum of most of this experimentation, training, and actual practice was eventually gathered together and applied in the United Kingdom. Little specialized training, amphibious or otherwise, was given American troops in the United Kingdom until late in 1943, however, since the policy had been laid down that training in the overseas theater should be held to a minimum. For various reasons it was felt that all specialized training should be given in the United States, and the ETOUSA G–3 specifically announced in July 1943 that the theater would proceed on the assumption that troops arriving in the United Kingdom had been properly trained before their departure from the United States. But the pronouncement of such a policy was no assurance that it would be followed, or that any reliance could be placed on its assumption regarding the adequacy of the training of units shipped from the United States. The need for specialized training facilities in the theater became evident as early as 1942.

[12] NEPTUNE: Training for and Mounting the Operation, I, 53–57.

Units could not be shipped back to training centers in the United States for retraining there. As invasion plans progressed, therefore, and as new equipment became available, new techniques were learned, and the specific requirements of the invasion tasks were defined, it became increasingly obvious that the theater would have to conduct its own specialized training.[13]

The first step in the establishment of such specialist training in the United Kingdom was taken in 1942 when the American School Center was organized. The theater commander at first authorized the Commanding General, SOS, to set up two separate schools, one for the training of officer candidates, the other for specialized training which had been neglected in the United States or forgotten through disuse. After the inspection of several possible sites, the Officer Candidate School and the Supply Specialists School were activated at Shrivenham, in Berkshire, where modern barracks, conference rooms, drill and recreation areas, and space for expansion were available. Col. Walter G. Layman was named commandant. The two schools were to accommodate 250 students at one time. They began their activities late in 1942 and later were combined and redesignated the American School Center.

The Officer Candidate School was designed primarily to train men whose professional qualifications fitted them for direct commissions, but who lacked the necessary military background and training. Other men, not qualified for direct appointment, had to be sent to officer candidate schools in the United States. The Officer Candidate School at Shrivenham operated for only about one year. In April 1943 Headquarters, ETOUSA, announced that officer requirements had been met, and the school was discontinued in September.

The Supply Specialists School, which had a longer life, planned courses in such miscellaneous subjects as fire fighting, motor transport, radio operation, mess management, medical field service, counterintelligence, and unit administration. In the spring of 1943 the school was removed from SOS direction and placed under the direct control of the theater commander. Late in the year General Devers ordered the school to give first priority to civil affairs instruction, and the school was expanded to accommodate much larger classes. In May 1944, just before the invasion, instruction was being given in eighteen courses, ranging from a few hours to thirty days in length. In the meantime Colonel Layman, the director of the school, had assumed additional duties as chief of the Field Force Replacement System. In the last weeks before the invasion the school was gradually transformed into a ground force replacement training center and devoted itself almost exclusively to the training of limited-assignment personnel. While the Supply Specialists School did not offer any specialized training in amphibious operations, it had some influence on various supply and service functions common to the coming beach operations and on other normal supply operations. Both the Supply Specialists School and the Officer Candidate School were later established on the Continent.[14]

Of more significance to the logistic preparations for OVERLORD was the training given to Allied officers in administrative planning. British and American officers were poorly acquainted with the

[13] *Ibid.*, I, 57–59.
[14] *Ibid.*, I, 59–66.

planning procedures in each other's forces. This deficiency was particularly noticeable at the staff level, where a high degree of co-ordination and understanding was necessary in the planning of joint operations. The lack of mutually understandable procedures was sharply evidenced in the confusion attending the planning of the North African invasion. To solve the problem the Commanding General, SOS, in October 1942 requested the theater commander's approval of a plan to establish a joint British-American "Q" school, the objective being to form a reservoir of trained American and British administrative officers who were thoroughly familiar with each other's staff procedures and who would thus be better equipped to work together in the detailed planning for the eventual cross-Channel operation. The name Q school derived from the British Quartermaster General or Q staff, which was the equivalent of the G–4 on U.S. staffs, and indicated that the field of study would be logistic planning.

Approval was at first requested only for an experimental trial course to determine its practicability. With such approval granted, General Lee completed arrangements for the school with his opposite number, General Riddell-Webster, the British Quartermaster General. Col. George A. Lincoln, a former West Point instructor and Rhodes scholar, and Brigadier R. A. Riddell of the British Quartermaster General's staff were designated co-directors. They carried out the detailed work on the curriculum and actually launched the courses. The idea of the Joint Q Planning School was to have a special significance for logistical planning, for, while both operational and administrative problems were to be considered, the course was to be devoted primarily to the study of administrative problems arising out of the planning and organization of combined amphibious operations. This entailed also the study of the organization, staff duties and procedures, and maintenance systems of the two Armies.

The experimental courses were held from 5 to 12 December 1942 in the British General Staff College at Camberley. Both British and American staff officers served as instructors, and officers from both armies attended the courses. So confident was General Lee that the justification for the school would be borne out by the experimental course that he meanwhile drew up plans for establishing the school on a more permanent basis. By the time the final plan was outlined (January 1943) the Camberley experimental courses had been given and General Lee could state that they had been sufficiently successful to justify the continuation of the school.

The Joint Q Planning School opened on a more permanent basis on 25 January 1943 at Norfolk House, St. James's Square, London, with a ten-day course for thirty officers, half of them British and half American.[15] Key officers in the SOS staff sections and services and representatives of the Eighth Air Force were directed to attend the first course. The school was placed under the joint supervision of the British Quartermaster General and the Commanding General, SOS. Subjects initially studied included staff procedures, preliminary planning for an amphibious operation, landing tables, mounting, beach maintenance, maintenance problems of the assault and later stages, civil administration, and a host of other problems. These subjects were grouped into three general categories and the course

[15] It was later moved to No. 63 St. James's Street.

was presented in three parts: (1) a comparison of the organization of the British and American Armies, with emphasis on functioning of supply services and administration; (2) background of planning, ships and craft, beach organization, naval and air aspects of overseas movement, mounting, far-shore brigades, division of Army and Navy functions, and civil administration; and (3) planning methods for an amphibious operation, including scales of equipment and maintenance, loss estimates, special features of operations in northwest Europe, and specimen directives.

From the very beginning the school operated on the assumption that it was preparing for the invasion of France, and in the year during which it functioned it was a most important training organization for officers who participated in the OVERLORD planning. Changes were made from time to time as new techniques were developed or new topics became more apropos, and as specialists became available as instructors. The program evolved into a series of twelve-day courses, and classes grew in size to about seventy officers, half British and half American, and most of them of field grade. Both SOS and Headquarters, ETOUSA, sent officers to the school, the SOS allotment being distributed to the staff, services, and base sections, and the ETOUSA allotment being made up from theater headquarters, the air forces, and the field forces. In the year between January 1943 and January 1944, when the last course was offered, 460 American officers attended the school. Most of the officers who took the courses either held key positions or played active roles in the various planning agencies and in the staffs of units which were scheduled to assault the Normandy beaches and establish supply installations on the far shore.[16]

The training afforded by the American School Center and the Joint Q Planning School was initiated in what may be roughly termed the early training phase. In this period, from the activation of the theater in June 1942 to the fall of 1943, there were relatively few American combat or amphibiously trained supply units in the United Kingdom, for the big build-up had not yet begun. Consequently, until the fall of 1943 invasion training was largely a matter of experimentation involving British units and the 29th Infantry Division, the only large American ground force combat unit stationed in the United Kingdom for many months after the departure of units for North Africa. In many respects the 29th Division was a sort of trial horse for training methods. It carried out a rigorous training program, which included trying new assault methods, amphibious landings, testing new equipment such as amphibious tanks, and new techniques such as the waterproofing and swimming of vehicles. This experimentation had its primary effect on later training of combat units, and had only an incidental or indirect bearing on supply operations. Special courses, such as those conducted by the Engineer School at Wallingford, in Oxfordshire, had a more direct influence on logistics. Supply problems received more attention in the various exercises which were held throughout this early period. These exercises were a vital stage in the development of both tactical and logistical doctrine as later applied. Most of them were experimental in nature and were designed more to develop and test techniques than to train troops.

[16] NEPTUNE: Training for and Mounting the Operation, I, 66–77.

Most important of the early exercises from the point of view of amphibious operations and also in the development of supply practices were two known as JANTZEN II and HARLEQUIN. The first of these was held by the British Western Command in the Carmarthen area of southern Wales in July 1943. The purpose of JANTZEN II was to practice the maintenance of a corps and supporting troops over beaches for a period of two weeks. It involved the movement of troops from concentration areas through assembly and transit areas, embarkation, the loading and unloading of coasters, the organization of beaches and a beach maintenance area, the establishment of a bulk fuel supply installation, and so on. Only administrative and supply troops took part, and there was as yet no special amphibious equipment, but the exercise produced valuable information on staging problems and on the whole matter of supply maintenance in an amphibious operation.

Even more important was Exercise HARLEQUIN, held early in September under the direction of the Commander-in-Chief, 21 Army Group, and the commanders of the First Canadian and Second British Armies. HARLEQUIN was actually part of a larger deception scheme planned for the summer of 1943, and therefore had several purposes. Most useful from the point of view of training for the later cross-Channel operation was the testing of mounting procedures—that is, the machinery to move troops from concentration or assembly areas through marshaling camps to embarkation points. Complete landing tables were worked out, and the bulk of the forces involved moved to assembly areas, formed into craft loads, and then moved to embarkation points. Only a small number of vehicles were actually loaded, and the bulk of the troops returned to their stations without embarking. Exercise HARLEQUIN was held along the south and southeast coast of England, where mounting installations, including concentration areas and reception and marshaling subareas, were established. American officers participated only as observers, and learned a great deal about the mounting procedure and about housekeeping problems in the concentration and marshaling areas. Perhaps more significant was the basic change in planning concept which the exercise produced regarding movement and loading. HARLEQUIN revealed that, contrary to previous opinion, the loading of assault forces, even though preplanned, was much more difficult a problem than the loading of build-up forces. The exercise thus had a direct bearing on the estimated needs of mounting and loading facilities.

JANTZEN II and HARLEQUIN were British exercises and were only two of several held in 1943. American units participated in many other exercises designed to test specific doctrines or solve particular problems. These practice operations dealt with such varied problems as communications, the use of smoke, the training of naval forces in combined operations, embarkation, and turn-round of shipping. All had their influence on invasion planning and later training of American units, although the results were hardly definitive.[17]

(3) The Assault Training Center and Engineer Special Brigades

Training activities between the fall of 1943 and the date of the invasion fall roughly into four categories: the highly

[17] *Ibid.*, I, 84–94.

specialized training given to assault units and beach engineers; the minor exercises used to test portions of the OVERLORD plan; the training program worked out by the various assault units themselves; and the major exercises or dress rehearsals held just before D Day. Neither the many minor exercises nor the independent training programs of the various units are within the province of this volume. Space limitations prohibit a detailed description of the many specialized exercises; as for unit training programs, which were undertaken by nearly all American units in the United Kingdom, they had no special bearing on the unusual problems connected with the assault, for in most cases they followed training instructions as laid down in the manuals and were a continuation of training given in the United States. Of more particular significance were the highly specialized training given the assault units and beach brigades, and the big dress rehearsals immediately preceding the invasion.

In view of the type of resistance expected at the Atlantic Wall, which bristled with steel and concrete, it was evident that assaulting forces would need special training and organization. This realization eventually led to the establishment of the most important U.S. invasion training center in the European theater—the Assault Training Center. Its establishment was the direct result of steps taken as early as 1942, when an American section was set up in the British Combined Operations Headquarters. Arrangements to attach such a staff to the Chief of Combined Operations had been made after General Marshall's visit to England in April 1942. Col. Lucian K. Truscott, Jr., who as a lieutenant general later commanded the Fifth U.S. Army in Italy, was selected to head the section, its principal mission being to study and report on the conduct of combined operations and to provide battle training for as many American troops as practicable. The section was established in May, and in the succeeding months U.S. Rangers trained with British units in commando tactics.[18]

The training of U.S. assault units eventually took a different form, however. Americans participated in British combined operations training on the assumption that the training of assault units for the cross-Channel operation would in general follow the principle of Commando and Ranger training. Before long it was realized that this would not be the case. Rangers were selected, trained, and equipped for special missions, usually striking swiftly and then returning to their base. Assault troops in the invasion were to be normal infantrymen, organized on a division basis, and were to remain ashore for sustained offensive action after the capture of a beachhead. In the winter of 1942–43 thinking on this matter had advanced to the idea of an independent assault training center. The ETOUSA G–3 Section, under General Barker, had in fact made plans for the establishment of such a training center and took steps to obtain an officer to head the project. Late in January 1943 Lt. Col. Paul W. Thompson of the Office of the Chief of Engineers, War Department, was transferred to the European theater and a few weeks later was assigned to the G–3 Section to take charge of the new project. Described by General Lee as "our best informed engineer officer on German organization, technique and tactics," Colonel Thomp-

[18] Except as noted, this section is based on Chapter VI and pages 145–63 of NEPTUNE: Training for and Mounting the Operation, Vol. I.

son was a logical choice for the assignment. He had been trained as an engineer, had served with a German engineer battalion and studied hydraulic engineering at the Technische Hochschule in Berlin-Charlottenburg, and had served with the Intelligence Branch of the Office of the Chief of Engineers. His assignment foreshadowed the large role which engineers were to play in the invasion.

Meanwhile members of the ETOUSA G–3 Section began a search for a training area large enough to accommodate regimental combat teams and possessing shore and beachhead terrain generally similar to that of northern France. After inspecting several locations they finally chose an adaptable site on the western coast of Devon between the towns of Woolacombe and Appledore. The area embraced 25 square miles of land, 8,000 yards of beach on the Bristol Channel, and 4,000 yards on the Taw estuary. (*See Map 6.*) Inspecting officers noted several disadvantages, but in general the area had the characteristics of the northwest French coast, including the vitally important tidal range which was absent in the Mediterranean landings. It was thought at first that the area would not have to be evacuated, even though about 10,000 acres of farmland were taken from cultivation. The limitations in space meant that all firing would have to be tightly controlled. It later became necessary to move some of the civilian population for reasons of security and safety. The Assault Training Center was activated on 2 April 1943, with Colonel Thompson named as commandant. Target date for the opening of the center and the start of training was set for 1 September.

The Assault Training Center was placed directly under Headquarters, ETOUSA, and its activities were co-ordinated with the G–3 Section, which was responsible for training. The center's over-all mission was to develop the special tactics and techniques necessary for an assault of a heavily defended shore and to train units to be employed in such an operation. This involved not only the development of assault doctrine and workable methods for the assault of enemy-held shores, but the training of demonstration troops, the staging of demonstrations of approved techniques, and the instruction and supervision of all assault units expected to participate in the operation. For this purpose the center was to assemble and organize a special assault battalion combat team to act as a test unit. It was assumed that all units training at the center would have had either basic amphibious training in the United States or training similar to that of the 29th Division in the United Kingdom, or actual battle experience in the Mediterranean.

In some respects the center began from scratch as far as amphibious techniques were concerned. At the time of its activation in April only the limited lessons of the TORCH landings were at hand, and TORCH showed little resemblance to the type of landings envisaged in the cross-Channel operation. To begin with, the Americans relied heavily on British experience in formulating the training program, and the center was authorized to establish liaison with both British and American agencies in the field and with British Combined Operations Headquarters. That assault techniques were in the formative stage is indicated by the many discussions and proposals initially put forth on the subject of the organization and arming of assault units, some officers recommending that special assault divi-

sions and assault regiments be formed, others recommending that the normal battalion structure be retained but that special assault platoons be constituted. General Noce, who had organized the Engineer Amphibian Command in the United States, had an active part in these early decisions as the new ETOUSA G–3.

The organization of the center and the writing of specific plans for its operation received additional impetus from the RATTLE Conference of late June, where the need for assault training was again noted. By the end of July considerable progress had been made in formulating a training program. Assault unit organization was tentatively agreed to, plans were made for the construction of full-scale German-type beach obstacles and fortifications, obstacle courses, and combat ranges, and arrangements were made for the Navy to provide landing craft and to participate in the preparation of training schedules and field exercises. By mid-August the center had moved from its temporary headquarters in Grosvenor Square, London, to Woolacombe, and work was pushed on the new quarters and on the various assault and firing ranges and courses. Five administrative divisions were set up, including a headquarters and staff, a station complement, a school troop section, an assault training section, and an amphibious section. The amphibious section was to organize training for the purely amphibious phase of operations, from embarkation to landing, while the assault training section was responsible for operations after the touchdown on the beaches. School troops were to provide task forces and combat teams for demonstration and for the development of tactics, for controlling and umpiring exercises, simulating enemy forces, and so on. Early in August the 156th Infantry arrived at the center to assume these duties, testing various techniques developed by planning officers, and later demonstrating them and instructing other units.[19]

Training at the center was organized mainly with the combat units in mind, and was concerned primarily with such matters as the development of the most effective assault team, the best combination of weapons, the use of tanks, and the best techniques to overcome coastal fortifications, although the logistic aspects of amphibious operations also received attention. Beginning in September 1943 the 29th, 28th, and 4th Divisions, and a portion of the 1st Division, despite its battle experience in the Mediterranean, all completed the training course at the center. The 2d and 5th Ranger Battalions and parts of the 101st Airborne Division also took the courses, as did specialized artillery, antiaircraft, chemical warfare service, quartermaster, and engineer units which had missions in the assault. All units were rated on their performance. Training was hard, and a number of accidents occurred, as could be expected in exercises which included the use of live fire. But the need for realistic training undoubtedly justified the risks.

More important for the logistic aspects of the invasion operation was the training given the engineer brigades which were scheduled to organize the Normandy beaches for supply. The infantry participation in the amphibious phase of the operation would be limited to a few hours;

[19] The 156th Infantry, a Louisiana National Guard unit forming part of the 31st Division, had been detached from its parent organization after training at Camp Blanding, Fla., and was shipped to the United Kingdom in October 1942. History of the 156th Inf, 25 Nov 40–31 Dec 42, INRG–156–0.1 (1127) AG Opnl Rpts.

the engineer brigades were to perform service functions for an indefinite period. The 1st, 5th, and 6th Engineer Special Brigades all were given specialized instruction at the Assault Training Center, and were among the most highly trained of the invasion units.

Each of the three brigades consisted basically of three engineer combat battalions, a medical battalion, a joint assault signal company, a company of military police, a dukw battalion, an ordnance battalion, and various quartermaster units, numbering 4,000-odd men. But eventually all three were built up to a far greater strength. The 1st Brigade was transferred to England in December 1943 with only 3,346 men. In the OVERLORD operation it was assigned the mission of supporting the VII Corps and organizing UTAH Beach, and in the spring of 1944 its strength was greatly augmented by the attachment of a large number of units. These included quartermaster service companies, TC port companies, military police escort guard companies, and several small special units, some of which were to land well after D Day and required no special amphibious training. By the time of the invasion the brigade again had a strength of over 15,000.

A considerably larger and more complicated organization was evolved for OMAHA Beach. OMAHA was to have the important MULBERRY installation and was to develop a substantially larger discharge capacity than UTAH. Two brigades—the 5th and 6th—were therefore formed to handle the larger volume of supplies in support of the V Corps. Both the 5th and 6th Brigades were newly organized from engineer units which arrived in the United Kingdom in the winter of 1943–44. Shortly after the 1119th Engineer Combat Group arrived in November 1943, it was designated the 5th Engineer Special Brigade and began the process of building up to invasion strength in the same manner as the 1st Brigade. The 1116th Engineer Combat Group arrived in January 1944, was immediately redesignated the 6th Engineer Special Brigade, and its strength was similarly augmented by attachment of the necessary units. Both groups had had amphibious training in the United States.

In view of the large supply organization envisaged for OMAHA Beach, engineer planners of the First U.S. Army recommended the organization of an over-all headquarters to provide a unified command at OMAHA. Plans for it were drafted in February 1944, and First Army headquarters immediately authorized the grouping of the two brigades under one command. The final form which the OMAHA supply organization would take was not immediately clear, but in March the new headquarters was formed, using personnel from both brigades, First Army, and V Corps, and was named the Provisional Engineer Special Brigade Group.

Group headquarters eventually became an organization far beyond the size originally contemplated. The idea of a small, compact headquarters, concerned primarily with planning, was gradually abandoned as the demands of the job made apparent the need for a much-expanded organization. In the course of the planning it was realized that the two brigades by themselves would not be able to handle the OMAHA supply operation, which included not only the organization of supply over a wide beach, but the operation of an artificial port with a discharge goal of 5,000 tons per day, and of two minor ports (Grandcamp and Isigny). To

meet these latter needs the 11th Port, which had been operating the Bristol Channel ports, was attached to the group in April. The 11th Port, numbering more than 7,600 men, included four port battalions, five amphibious truck companies, three quartermaster service companies, three quartermaster truck companies, an ordnance medium automotive maintenance company, and a utility attachment. By D Day the entire Provisional Engineer Special Brigade Group, with all its attachments, had a strength of nearly 30,000 men.[20]

While the Assault Training Center was set up primarily to develop assault techniques and train infantry combat units, it provided an important training ground for all three of the engineer special brigades. The 6th Brigade carried out the most strenuous program, ending with two beach exercises for groups of 1,600 men. These included landing, setting up dumps, clearing beaches, and constructing exits. This training was conducted largely under the direction of officers from the brigades themselves, employing their own school troops. In November 1943 the 234th Engineer Combat Battalion had been assigned to the center for the training of other engineer units. This battalion maintained beaches, gave indoctrination lectures and demonstrations, and assisted in exercises employing engineer brigades in the organization of beaches, preparation of exits and dumps, maintenance of road nets, preparation of traffic plans, salvage of drowned vehicles, and movement of supplies. For the training of the beach organization, therefore, the center was to a large extent actually organized as a far-shore beach, with the 234th Engineer Combat Battalion carrying on the functions of a far-shore brigade and assisting in the training of engineer units for their mission on the Normandy beaches.

Besides serving as a training ground the Assault Training Center also tested and made alterations in amphibious doctrine and techniques. In connection with supply operations, for example, new uses were found for the dukw, and improvements were made in the use of these amphibians in ship-to-shore operations. Early in November 1943 a demonstration of coaster unloading went very badly, revealing weaknesses particularly in the stage when the dukw was held alongside the coaster to receive cargo. In the following weeks new types of gear were devised to remedy this defect, and when the exercise was repeated a month later great improvements had been made in the transfer operation.

The Assault Training Center thus had an important role in the development of amphibious techniques and in the training of units, not only in methods of assault, but in the vital beach supply operations, on which the OVERLORD operation was to be so dependent. Thousands of troops were run through one or more of the courses at the center, and by the end of April the major portion of the center's training was completed. As the invasion date neared, key personnel at the center were gradually recalled for assignments in units with missions in the assault. Colonel Thompson was given a new assignment early in March, and in the next two months there followed several changes in command. On 1 May the buildings and training areas were, with a few exceptions, turned over to a Field Force Replacement Depot, and on 15 May the center was officially deactivated.

[20] Operation Report NEPTUNE, OMAHA Beach, prep by Hist Sec ETOUSA, Sep 44, App. A (Troop List), OCMH.

(4) Major Exercises

While the Assault Training Center offered specialized training to assault formations and beach organizations, the Allies were holding a series of exercises that constituted a second major category of training. Beginning in January 1944 and continuing until marshaling for the invasion itself began, an almost unbroken succession of such exercises took place, two or more often being conducted simultaneously. There was, first of all, a series of very specialized exercises involving relatively small numbers of troops of one type. These were mainly of the technique-testing variety, the details of which cannot be described here. More important from the point of view of training in the co-ordination of combined arms and services were the large scale exercises and final rehearsals. The major exercises—known as DUCK I, II, and III, FOX, and BEAVER—brought together all elements of a force in a combined assault and supply action, including all phases and aspects of the mounting and launching of an amphibious operation. Finally, two big dress rehearsals—named FABIUS I and TIGER—attempted to duplicate as nearly as possible the conditions expected in the cross-Channel invasion.[21]

Of the major exercises DUCK I was probably the most important. It was the first attempt to bring together the various arms and services in a co-ordinated amphibious operation approximating the conditions of the later assault. Being the first, it revealed many defects, and their elimination greatly affected the training and planning for the exercises which followed. Exercise DUCK I was first conceived as a mounting exercise for the Services of Supply, and was discussed as early as the summer of 1943. Later its scope was extended to cover all phases and aspects of an amphibious operation, and the actual planning of the exercise was begun early in November. The final decision to hold the exercise was made later in the month by representatives of V Corps, SOS headquarters, the Navy, Southern Base Section, XIX District (a subcommand of Southern Base Section), the British Southern Command, and the British Southwestern District. Because DUCK I was to interfere as little as possible with either the preparations or the facilities of OVERLORD, the Slapton Sands area, a few miles southwest of Dartmouth, was selected as the site of the exercise. Although this thinly populated area, relatively removed from the BOLERO and OVERLORD installations, had some disadvantages, it bore a general resemblance to the Normandy coast, even possessing a lagoon separating the beach from the mainland, approximating the features of the UTAH area. (*See Map 6.*)

Participants in the exercise were to include a regimental landing team built around the 175th Infantry (29th Division), units of the 1st Engineer Special Brigade, and such attachments as a Ninth Air Force beach party and a headquarters group from V Corps. The Services of Supply was to provide the mounting installations and the supplies and equipment replacements in co-ordination with V Corps, and was responsible for the marshaling and embarkation of units. As in the later OVERLORD operation, this responsibility was delegated to Southern Base Section, and the latter in turn delegated the task to XIX District, the area in which the exercise was to be held, al-

[21] This section is based on Chapter VII of NEPTUNE: Training for and Mounting the Operation, Vol. I.

though Southern Base Section staff officers aided in the planning and execution of the service functions. Troops were to move from their camps near Plymouth, Taunton, Barnstaple and Land's End to embarkation points at Falmouth and Dartmouth. The 11th Amphibious Force was to move them from the embarkation points to the assault beach at Slapton Sands with the help of British naval units and protect the convoy from enemy attacks, and the Ninth Air Force was to provide air protection. To give additional training in the mounting process, troops of the 28th Division were also to be processed to the embarkation points, and then returned immediately to their stations without actually boarding craft.

The detailed planning of the exercise began late in November when the DUCK I staff held its first meeting at XIX District headquarters near Taunton. The administrative and tactical headquarters involved, XIX District and V Corps, respectively, worked closely in formulating the plan, and the first steps in the implementation of the plan were taken immediately. The exercise was to be of immense value to the Services of Supply because for the first time the whole mounting procedure was to be tried out in a co-ordinated operation. The SOS was to have the primary responsibility in the eventual mounting of Operation OVERLORD, and its activities in this phase included planning, constructing housekeeping installations, assembling troops and supplies, marrying the auxiliary units to their respective combat teams, processing troops through the marshaling areas, moving them to the embarkation points, loading the landing craft, loading and dispatching coasters, and transporting and feeding troops on their return to their home stations. More than 10,000 men made up the assault force in the exercise, and approximately an equal number were involved in performing the SOS functions.

D Day was originally set for 3 January 1944. On D minus 10 the loading of coasters was begun at Bristol. The movement of troops and vehicles to assembly areas began on D minus 8. LCT's began loading on D minus 6, LST's on D minus 4, and LCI(L)'s on D minus 3, which was 1 January. At this time H Hour was definitely set as 1000 hours, and D Day was changed to 4 January. Including the assault troops that cleared the marshaling areas and embarked and the 28th Division troops that moved through the various mounting stages, a total of 26,400 men were marshaled.

The assault phase proceeded largely as scheduled, although the landings did not go entirely according to plan. Considerable trouble was caused by the runnel that separated the beach from the mainland, for bridging equipment failed to arrive on time. But in general the landings were smooth, with assault troops, following a pre-H-Hour bombardment, storming simulated enemy defenses and pushing rapidly inland. Most important from the supply standpoint were the experiences of the 1st Engineer Special Brigade. Brigade troops began landing at D plus 25 minutes, demined one beach, cleared a second, set up three supply beaches, opened beach exits, and began unloading supplies. Coasters began arriving within a few hours and were unloaded by dukws and landing craft, and dumps were then established inland. Engineers tested methods of track laying to improve beach roads and tried new packing and waterproofing methods. Quartermaster units experimented with pallet loading, and the Signal

Corps tested skid loading and new packaging methods.[22]

The exercise lasted two days, after which the mounting process was reversed and troops were returned to their home stations by XIX District. In the meantime observers completed their note taking, and a series of critiques followed. As could be expected in a first trial, errors and deficiencies aplenty were found. Criticisms were directed at varied weaknesses, from poor Army-Navy co-ordination and inadequacy of planning to poor traffic control and discipline, slow movement, overloading of both troops and vehicles, and violations of security.[23] The inexperience of many of the 1st Engineer Special Brigade units was clearly demonstrated. The brigade commander, Col. Eugene M. Caffey, took special note of this, emphasizing the need of the brigade to build up its internal structure and to co-ordinate more closely the work of its heterogeneous units. More specifically, the unloading of LCT's had taken double the time planned, loading priorities had been difficult to follow, and stowage plans had failed to arrive for unloading crews.

For a first attempt the exercise had actually come off quite smoothly. The marshaling procedure, which will be described in more detail in the next chapter, worked so well in DUCK I that it formed the basis for the mounting of all later exercises and for the invasion operation itself. An improvisation had been adopted which proved most effective. British authorities had objected to the holding of large-scale exercises on the southern coast because of possible damage to hardstandings, the areas scheduled for later use as vehicle parks in the mounting of OVERLORD. Many of these could be used only a short time, for the turf was easily torn up and the areas might quickly turn into quagmires. If used prematurely, they would hamper the later mounting of the invasion. To avoid this danger Col. Theodore Wyman, Jr., commandant of XIX District, evolved a plan in which marshaling areas were built along secondary hard-surfaced roads. Camps were established in wooded areas along the edges of the roads, and the roads themselves were blocked off to civilian traffic and used as hardstandings. Because of their elongated shape on maps these areas came to be called "sausages." Hardstandings intended for the OVERLORD mounting were thus saved, and the success of the plan made other exercises possible and also provided a means of supplementing the marshaling installations in the OVERLORD operation.

One result of the DUCK I critiques was the establishment of a permanent planning group for exercises, and after the last critique late in January this group immediately set about planning additional tests. Two sequels to DUCK I—known as DUCK II and DUCK III—were scheduled for February. They were intended to give experience to units in both the 29th Division and the 1st Engineer Special Brigade which did not participate in the first exercise. D Day for DUCK II was finally set for 14 February. Movement tables were published on the 7th, and movement of the

[22] Skid and pallet loading were methods of loading blocks of supplies to facilitate easy handling. Both involved the use of low wooden platforms to which supplies could be lashed and which could be either fork-lifted or transferred by crane. The skid load, which had runners like a sled, could be towed by a tractor. This technique was best adapted to packaged supplies, like rations, ammunition, and gasoline in 5-gallon cans.

[23] Despite the lessons which DUCK provided in the overburdening of both men and vehicles, these errors were repeated, often with tragic consequences, in the invasion itself. See below, Ch. X, Sec. 2.

task force personnel into the assembly area began two days later. Some units moved directly from their home stations to the embarkation points. Loading was completed on 12 February, and the assault was carried out on the 14th and 15th. DUCK III followed the same general pattern, with the D-Day assault coming on 29 February.

In most respects these two exercises went off more smoothly than DUCK I, although the principal problems encountered were much the same as in the first exercise. There still were difficulties over traffic control, over co-ordination between the services, and over the Navy's handling of craft. Although the three DUCK exercises gave training to most of the units of the 29th Division and the 1st Engineer Special Brigade, these two organizations did not team up in OVERLORD. The 1st Brigade eventually supported the 4th Division at UTAH Beach, and the 29th Division was supported by the 6th Brigade at OMAHA.

A fourth exercise held in March more closely paralleled the final OVERLORD assault plan. This was Exercise FOX, the last big training exercise before the final rehearsals. The initiator again was V Corps, which ordered the planning to begin early in February. Since the exercise was intended to be modeled on the OVERLORD operation, detailed planning was held up so that it could parallel the work on OVERLORD, and did not get under way until the First Army Operation Plan NEPTUNE was published late in the month. The exercise suffered somewhat from the resultant tardiness and once more pointed up the vital importance of adequate planning.

Exercise FOX was held at Slapton Sands, but the mounting of the exercise was this time accomplished by XVIII District and involved entirely different personnel and camps. Tactical units taking part were the 16th Regimental Combat Team (1st Division) and the 116th Regimental Combat Team (29th Division), operating in turn under the commands of the 1st Division and V Corps. The two teams were to be supported by engineer combat battalions from the 5th and 6th Engineer Special Brigades. Each of the battalions was reinforced with dukw and truck companies, medical and signal detachments, and quartermaster and port troops to comprise a battalion beach party. The make-up of the assault force therefore bore a strong resemblance to that of the V Corps in Operation OVERLORD, although on a smaller scale.

By the time Exercise FOX was planned the mounting procedure was quite firmly established. Units moved to marshaling areas according to a schedule and began embarkation at the ports of Plymouth, Weymouth, Dartmouth, and Portland on 7 March. Nearly 17,000 men and 1,900 vehicles were processed through the system and embarked on naval craft. Some of the craft, scheduled for early landings, assembled and departed for Slapton Sands the night before D Day, escorted by British destroyers. Air cover was provided by both the RAF and Ninth Air Force.

The landings took place on 9 March, preceded by naval gunfire employing live ammunition. In general, the assault was satisfactory. Its failures and weaknesses were attributable primarily to the inexperience of the units participating, although the operation also suffered from hasty planning and preparation and from the repetition of errors of the previous exercises. Co-ordination between the Army and Navy and between other headquarters was still faulty, and there were other difficulties of a more tactical nature. So far as

the supply and service aspects of the exercise were concerned, neither the mounting nor beach operations went off as well as hoped. The XVIII District had had insufficient time to ready the marshaling camps for transient troops, and lack of experience on the part of camp personnel was also apparent. But camp operation improved as troops gained practice. The major criticism centered about the supply operations, most of it concerning ship-to-shore movements. There had been too few loading points for the number of craft involved; there was poor co-ordination between the beachmaster and coasters, resulting in the delayed arrival of supplies on the beach; unloading equipment on the coasters was in poor condition, and coaster captains had no orders. Communications were generally bad between beach headquarters and the dumps. In addition, it was found that too many dukws had been allotted each coaster for unloading; troops were landed in the wrong order; and there consequently was improper marrying up of troops with their equipment. There were bright spots, however, and this exercise, like others, contributed its lessons and proved the value of several new techniques. One of these was the use of dukws preloaded with balanced loads of ammunition for emergency use. This proved so satisfactory that it was incorporated into invasion plans. Satisfactory progress was also made in the use of new methods and materials in the waterproofing of vehicles.

The DUCK and FOX exercises were all conducted by the V Corps and, with the exception of the 1st Engineer Special Brigade, involved units scheduled to land at OMAHA Beach. In order to give experience to the 4th Division assault units along with the 1st Engineer Special Brigade units which were to support them at UTAH Beach, another series of exercises was therefore planned for the last two weeks of March. Four of these exercises—named OTTER I and II, and MINK I and II—were battalion landing team tests held in the Slapton Sands area. Two exercises—MUSKRAT I and II—involved regimental combat teams and engineer detachments in battalion exercises in the Firth of Clyde in Scotland. Finally, a seventh exercise, known as BEAVER, was a combined test for two regimental combat teams (the 8th and 22d of the 4th Division) with a large beach party from the 1st Engineer Special Brigade, plus two companies of engineers from the 1106th Group, the 502d Parachute Infantry, and elements of the Ninth Air Force. BEAVER was directed by VII Corps and was mounted by XIX District of Southern Base Section. The force marshaled and embarked in the Brixham–Plymouth area and was then moved to Slapton Sands by the 11th Amphibious Force. The exercise was held on 27–30 March and in general followed the DUCK pattern. Assault units secured a beachhead, pushed inland, and were then resupplied and reorganized for continued operations.

In the meantime several small specialized exercises were held by artillery, antiaircraft, tank destroyer, airborne, and air force units, and by medical and signal units. Among them were also several marshaling and loading exercises having a direct bearing on the build-up and logistical support of U.S. forces. Of the marshaling exercises the most important were three called CHEVROLET, JEEP, and JALOPY. The first was carried out mainly by troops from the 5th Engineer Special Brigade and was planned and directed by XIX District headquarters. It was de-

signed to train troops and supply staffs in the outloading of supplies from the United Kingdom, to train chemical warfare units in screening a harbor and beach area by the use of smoke, and to test the feasibility of extended operations in a completely smoke-screened harbor and beach. The exercise was carried out in the Port Talbot and Port Eynon areas at the end of February. Exercise JEEP, conducted by XV Corps and Northern Ireland Base Section in March, was designed to give training in the mounting of build-up forces. Elements of the 2d Division moved from their stations in Northern Ireland to Belfast and went through the entire mounting process with the exception of actual embarkation. Personnel went only as far as quays, simulated loading, and then returned. From this training experiment came several recommendations on marshaling procedures which were later adopted in OVERLORD. A third mounting exercise, called JALOPY, was essentially a repetition of JEEP, using units of the 5th and 8th Divisions, also in Northern Ireland.

Meanwhile a series of loading exercises was held, involving the 1st, 5th, and 6th Engineer Special Brigades and various SOS units under the XVIII and XIX Districts of Southern Base Section. Their purpose was simply to arrive at the most efficient loading procedures for the cross-Channel invasion. The first of the series—NUDGER—was held in December 1943 by SOS and Canadian units at Southampton. Its main object was to determine the time required to load and unload LST's in both daylight and darkness and to determine the speed of turn-round. The results were not final, and later exercises developed speedier methods. The same problems were further tested in Exercise SNIPE in February 1944. In Exercise GULL, held in March, the loading and landing of personnel and vehicles from LST's were also tested.

A more specialized loading exercise, called CELLOPHANE, was conducted by XXIX District of Western Base Section late in April in the Oxwich Bay area. This was an SOS exercise designed to demonstrate skid-loading techniques to the First Army. It included the loading of skid loads and loose cargo onto coasters at ports, offloading into dukws and LCT's, transferring loads from dukws to trucks at beach transfer points, discharging direct from dukws to dumps, offloading LCT's to trucks, and discharging trucks at dumps. Exercise CELLOPHANE was a comprehensive demonstration of specialized types of loading and unloading, showing the extent to which certain types of mechanical equipment, such as fork lifts, would be required. It pointed the way to the organization of transfer points as they were eventually set up at the OMAHA and UTAH beaches. In addition to these marshaling and loading exercises a number of small tests were run off by the engineer special brigades. Among them were two series, known as CARGO and TONNAGE, involving beach battalions in the handling of supplies over beaches.

(5) Final Rehearsals

Of the major combined exercises described above—that is, the DUCK series, FOX, and BEAVER—the three DUCK exercises had been planned and carried out before the OVERLORD plan was made final and the composition of its task forces was established. The DUCK forces were therefore mixed, containing some units later scheduled for UTAH Beach, and some for OMAHA. After publication of the First

Army NEPTUNE Plan at the end of February the exercises followed the pattern of the actual invasion operation, exercise Fox involving the units of the V Corps intended for the assault on OMAHA Beach, and the BEAVER force comprising VII Corps units scheduled for the UTAH landings. These two exercises led logically to the two big rehearsals for the invasion—FABIUS and TIGER.[24]

FABIUS constituted a whole series of exercises in which all the assault forces scheduled to land in the Isigny–Caen area—American, British, and Canadian—were to participate. A separate rehearsal known as TIGER was to be held for the VII Corps operation at UTAH Beach. Both were "dry runs" of the actual invasion, which was to follow very shortly. They were in a sense the climax of all the long months of training and they were the most realistic and comprehensive simulations of OVERLORD which were held.

Preliminary planning for TIGER was initiated early in February 1944, but not until April were VII Corps and the SOS given definite instructions to prepare for the exercise, which was to be held late that month. Exercise TIGER was to involve all three regimental combat teams of the 4th Division and its supporting 1st Engineer Special Brigade, and was to be mounted by XIX District on the same pattern as the earlier DUCK and BEAVER exercises. Slapton Sands was again to be the scene of the landings. The assault force was to be mounted in the Plymouth–Dartmouth area, embarked in the Dartmouth–Brixham–Torquay area and at Plymouth. The 2d Group of the 11th Amphibious Force was to provide the lift for the sea voyage. A total of 25,000 men and 2,750 vehicles was to be embarked.

The plans for the assault on UTAH Beach differed from those for OMAHA in that they included extensive airborne operations by the 82d and 101st Airborne Divisions. In was desirable, of course, for the TIGER exercise to include the participation of airborne units in order that the exercise could duplicate as closely as possible the actual D-Day operation. The unavailability of aircraft, however, and the technical difficulties involved in making drops in the Slapton Sands area cut to a very limited scale the participation of airborne units. They took part in the exercises, but the landings were simulated by the arrival of airborne troops in trucks. This participation involved principally the 101st Division, with which the 4th Division was to establish immediate contact behind the beaches at UTAH.

Exercise TIGER was held between 22 and 30 April, with D Day on the 28th. Six of the nine days were taken up by marshaling and embarkation. As in previous exercises there were traffic jams and confusion when co-ordination failed and schedules were not kept. The fault stemmed partly from the late arrival of naval craft at embarkation points. In some cases loading tables had to be rewritten. But in general the mounting process showed improvement, particularly in the operation of camps, and the force was successfully embarked.

Only a few hours before H Hour a portion of the seaborne force experienced a tragic encounter with German warships, which seriously marred the build-up and supply phases of the exercise. An hour or two after midnight on the night of 27–28 April, German E-boats discovered eight

[24] This section is based on Chapter VII of NEPTUNE: Training for and Mounting the Operation, Vol. I.

LST's in convoy off Portland. The enemy torpedoed and sank two and caused a loss of life greater than that later suffered by units in the initial assault on UTAH Beach. At the time of the attack the LST's were proceeding westward toward the assault area, carrying troops of the 1st Engineer Special Brigade, the 4th Division, and VII Corps headquarters, which were scheduled to participate in the build-up phase of the exercise. Little was known about the enemy except that the attack was believed to have been made by E-boats. The enemy craft launched several torpedoes, some of which failed to explode, and the Germans strafed the decks of the LST's and fired on men who jumped into the water. Several of the LST's escaped, although at least one later picked up survivors.

The attack inflicted its heaviest damage on supply units. Army records list 749 fatalities and more than 300 injured. Most of the casualties were from one LST, No. 531. The unit suffering the heaviest losses was the 1st Engineer Special Brigade, which listed 413 dead and 16 wounded. Other units sustaining heavy losses were the 3206th QM Service Company, which lost 201 killed or wounded of its total strength of 251, and the 557th QM Railhead Company, which suffered 69 casualties. The E-boat attack was a complete surprise, and men on the LST's reacted in different ways. Some thought at first that it was all part of the exercise, and some even kept a sense of humor and leaped over the sides of the craft shouting "Dry run!" The attempts to cope with the emergency met with considerable confusion and disclosed a number of deficiencies in connection with safety devices and regulations.

Except for the costly run-in with the enemy the exercise proceeded substantially as planned, although build-up and supply plans were upset, and the beach party was almost reduced to its assault phase elements. Following a naval bombardment of simulated enemy defenses, 4th Division assault troops went ashore, reduced pillboxes and cut wire, and made their way inland to make contact with elements of the airborne division. Units of the 1st Engineer Special Brigade meanwhile went ashore, swept mines, opened beach exits, laid tracked roads, and established the first dumps. Supply operations were watched closely by First Army, which had ordered 2,200 tons of stores unloaded in the first two days. As scheduled, two LCT's unloaded on the first tide, two coasters on the second, and on D plus 1 the mission was accomplished with the unloading of six barges. Experiments with skid loading were again carried out and proved successful enough for some classes of supplies to be incorporated in the OVERLORD supply plan.

While the VII Corps was engaged in its rehearsal, the U.S. V Corps, the three British assault forces, and certain build-up forces carried out the FABIUS exercises. These exercises, numbered I through VI, were planned independently by the various commands concerned, but were carried out more or less simultaneously and were co-ordinated at the level of 21 Army Group. They were all held in the period 23 April–7 May. Like TIGER, they were patterned after the OVERLORD operation and the forces had the same general makeup as in the actual invasion. Only two of the exercises involved American units. FABIUS I was the rehearsal for Assault Force O and included primarily elements of the 1st and 29th Divisions and the Provisional Engineer Special Brigade Group, under the command of V Corps. FABIUS

VI was a marshaling exercise for certain of the build-up units in the Southern Base Section area. The primary purpose of these exercises was to give the entire invasion machinery an opportunity to function as a whole in a trial run. Every attempt was therefore made to duplicate the conditions expected in the Normandy invasion.

The over-all plan for FABIUS I was drafted by First Army headquarters, but the more detailed planning began with V Corps and continued through the various lower echelons. Approximately 25,000 troops from Force O were involved, including three regimental combat teams (from the 1st and 29th Divisions), two Ranger battalions, two tank battalions, and three engineer combat battalions with various attachments from the Provisional Engineer Special Brigade Group. Patterned after the tactical plan for OVERLORD, the exercise provided for preliminary air and naval bombardments (the former simulated), landings at H Hour by amphibian tanks and infantry at Slapton Sands, followed by engineers who were to blow underwater obstacles, open beach exits, and remove mines. Other infantry troops and Rangers were also to land, with assignments similar to those in OVERLORD, and additional engineer and service troops were to organize the beach, unload cargo, and set up supply installations.

The operation proceeded generally as planned. Marshaling was smooth, the operation of the camps encountered no outstanding difficulties, and embarkation also went successfully. With most of the craft loaded, D Day for all the FABIUS exercises was postponed 24 hours (to 3 May) by 21 Army Group because of unfavorable weather, as was later necessary in the actual launching of OVERLORD. Thereafter the assault was launched as planned. Its tactical progress is of no concern here. Four beaches were opened and given the same designations as the Normandy beaches, and battalion beach groups quickly opened beach exits and roads. Some engineer units, including the 5th and 6th Engineer Special Brigades headquarters and the Provisional Group headquarters, did not make the sea voyage but moved via motor to Slapton Sands and set up installations there. Token supplies were landed just as in exercise TIGER.

FABIUS I probably came as close to following a plan as any of the exercises held thus far. Once more, however, it disclosed flaws, some of them old defects, some new. Perhaps the most applicable of the earlier criticisms was the one concerning poor traffic regulation, which resulted mainly from the tardy arrival and inadequate numbers of properly briefed military police. There also were difficulties over maintaining proper supply unloading records, and over the proper number of dukws required per coaster and their loading capacity. Certain units, particularly signal troops, made the usual errors in their scheduled landing. Some attempts were made to rectify these deficiencies but the time was now short and many of the criticisms of FABIUS I were later applied to the Normandy operation.

Meanwhile FABIUS VI was held to test the organization that would call forward and marshal the early build-up forces in Southern Base Section. About 50 percent of the first three days' build-up scheduled to move through Portland and Southampton were actually marshaled. These included mainly elements of the 2d Armored and 9th Infantry Divisions and the 187th Field Artillery Battalion. About 35,000 men and 5,000 vehicles were called forward to the embarkation points and

then returned to their home stations without embarking. In general the machinery worked quite smoothly, but while the marshaling of assault units had been refined through the many exercises, the marshaling of the build-up forces still left some room for improvement. There was the ever-present trouble over traffic control, the co-ordination of which was difficult at best. It was found, for example, that the speed limit of twelve miles per hour imposed on motor convoys was too slow. Loss of command control in the mashaling camps resulted from the splitting of battalions and companies, and there was some overcrowding in the camps. Measures were taken to correct these deficiencies before OVERLORD was launched.

As the units from FABIUS VI completed their marshaling exercise and moved to their home stations, FABIUS I units returned from the assault area and reentered these camps. There they remained until called forward to embark for OVERLORD. The movement into the marshaling areas for FABIUS I in a sense therefore constituted the first step in the execution of the cross-Channel operation.

FABIUS and TIGER had little of the experimental in their make-up. They were the final rehearsals. With D Day a month away, there was little time for drastic revision of either the plan or the training of units, or for correction of errors and defects. TIGER and FABIUS climaxed a long period of study, experimentation, tests, and exercises, bringing together the lessons of past experience and the fruits of planning ingenuity. Had the men who participated in these exercises known that these were the last dry runs before the invasion they might have breathed a sigh of relief. Every training action taught new lessons. But to the participating units the exercises had already become routine and monotonous. The 1st Engineer Special Brigade, for example, had taken part in fifteen in the preceding four months. There was a tendency on the part of some personnel, therefore, to regard TIGER or FABIUS as just another in an endless series of training exercises.

OVERLORD IS SET IN MOTION, MAY–JULY 1944

CHAPTER IX

Mounting the Operation

(1) The Mounting Problem and Plan

It is unlikely that the average observer in the United States who learned of the Allied invasion of Normandy from his newspaper or radio on 6 June 1944 had much appreciation of the multifarious and almost frenzied activities which occupied the American and British forces in the United Kingdom in the months just preceding the assault. In that period the detailed plans were written, the flow of troops into the United Kingdom reached its height, the big training exercises and rehearsals were held, eleventh-hour efforts were made to fill the supply and equipment shortages, and the coastal areas of the United Kingdom were prepared for the staging of the operation. Finally, in the weeks just before D Day the vast administrative machinery was set in motion by which units were organized for their far-shore missions and moved from their home stations to the embarkation points. The initiation of this hushed and extremely complex process, known as the mounting, marked the first stage in the execution of the great invasion design.

The staging of OVERLORD proved by far the most complex feature of the operation, and called for meticulous planning and an unprecedented degree of co-ordination and control. On its U.S. side the operation involved the loading of 130,000 men in the assault, initial follow-up, and preloaded build-up echelons alone. After these forces were deposited on the far shore the build-up machinery was to move another 1,200,000 men across the Channel within the first ninety days. For an indefinite period thereafter it was to continue to handle whatever additional formations passed through the United Kingdom on their way from the United States to the Continent.

Allied planners had long been aware of the magnitude and complexity of staging a seaborne invasion, and the theory and techniques of mounting had developed through a long period of trial and error. Exercise HARLEQUIN, held in September 1943, had set the pattern for the eventual development of the mounting procedure, establishing the concept of mounting as a series of steps by which units would be brought to a more and more advanced stage of preparation and formation for the assault and finally embarked for the sea voyage. For most units the process involved three successive steps—assembly or concentration, marshaling, and embarkation. The mounting process normally began with the movement of troops from their home stations to the concentration area. The purpose of this step was to reassemble units which for one reason or another had been split up in the United Kingdom, and to replace equipment and supplies which had been lost, damaged, or consumed in their training or in carrying

out earlier tasks. In practice a unit's concentration area might actually be its home station if this was located within reasonable distance (fifty to seventy-five miles) of the embarkation area. Troop units arrived intact and self-sufficient in the concentration area and took the first steps in preparing for the sea voyage. They carried out the preliminary waterproofing of their vehicles, acquired additional supplies, and packed their equipment. At this stage assault units also shed their "residues." Because of the limitations in shipping space it was necessary to move most units in the assault and early build-up at reduced strength, or at "assault scale." All administrative personnel and overstrength, troops whose services would not be needed during the initial stage of the invasion, were therefore detached from their units in the concentration stage. These detachments, unlike the main bodies of the units, were for the most part administratively self-sufficient; they were concentrated in separate residue camps under the direction of the base section commander and were to be called forward later for embarkation and movement to the far shore, where they would join their units.

After the concentration or assembly, troops moved to the marshaling areas. At this stage units were briefed on their mission in the coming operation, were issued their prescribed supply of rations, lifebelts, maps, and other necessities, carried out final waterproofing, and were organized into the formation which they were to have for the assault—that is, broken down and formed into craft loads. Beginning with this phase of the mounting, troops were to be relieved of all administrative responsibility by static service personnel. This step was necessitated in part by the shedding of residues in the concentration areas, and in part by the fact that equipment would have been packed. SOS troops provided by the base sections were to carry out all housekeeping functions such as messing and quartering for troops passing through the marshaling areas.

The final step of the mounting would be taken when units were called forward to the embarkation points, usually only a few miles distant.[1]

Preparation for the mounting got under way in earnest in the fall of 1943 after Exercise HARLEQUIN. Responsibility for mounting the U.S. forces in Operation OVERLORD was assigned to the SOS. General Lee in turn delegated this task to the base section commanders, authorizing them to deal directly with the commanding general of the 1st Army Group and with one another on all matters concerning the administrative facilities and installations required. They were charged with a formidable list of responsibilities: locating and constructing concentration and marshaling areas, feeding and housing troops, waterproofing vehicles, issuing emergency supplies, planning the movement of troops, locating and constructing the necessary roads, embarking personnel, equipment, and supplies, preparing ports and approaches, providing hardstandings for thousands of vehicles, supplying recreational facilities for troops during their stay in the marshaling areas, setting up aid stations and hospital facilities for the care of the sick and wounded, and operating depots and dumps for the storage and last-

[1] [Clifford L. Jones] NEPTUNE: Training for and Mounting the Operation, and the Artificial Ports, Pt. IV of the Administrative and Logistical History of the ETO, MS, I, 281–84, OCMH; Mounting the Operation OVERLORD, Gen Bd Rpt 129, pp. 6–7; History of the Transportation Corps, ETO, prep by Int and Hist Br, Plng Div, Office Cof T ETO, 1944, MS, II, Near Shore Troop Movements, ETO Adm 582; Southern Base Section History, pp. 6–8, ETO Adm 601.

minute issue of supplies. After the start of the operation the base section commanders were to be responsible also for the receipt, treatment, and evacuation to fixed hospitals or concentration areas of casualties, refugees, and prisoners of war, as well as for the continued mounting of troops. All these missions were to be performed under operational procedures already established by and with the British districts, with which the Americans maintained close liaison.[2]

U.S. forces were allotted all marshaling and embarkation facilities in southern England west of Poole, inclusive, and shared facilities with the British eastward as far as Southampton. Almost the entire staging area thus fell within the Southern Base Section, which was to handle by far the largest share of the mounting, including the staging of all the seaborne assault forces. Western Base Section was to handle the preloaded build-up forces and paratroop elements of the airborne divisions, and was to share in the mounting of the later build-up. In actual practice the responsibility for the mounting was further delegated by the base sections to their districts, which became the principal administrative agencies for handling the movements.

Of the two base sections, Southern had by far the more complex task. It had to provide the bulk of the accommodations for the flood of troops arriving in the United Kingdom from the United States in the spring of 1944, and at the same time it had to prepare for the mounting of all the seaborne assault forces. Eight U.S. divisions were quartered in the Southern Base Section area by January 1944. Within the next five months the number rose to fourteen, and the total U.S. military population of the Southern Base Section doubled, rising from approximately 360,000 to 720,000. This sudden growth in strength made it necessary not only to build new camps but to convert old buildings which had been rejected earlier as unsuitable for military purposes.

Mounting all the seaborne assault forces was a tremendous task for Southern Base Section. The assault elements first had to be mounted for the rehearsals, TIGER and FABIUS I, which took place at the end of April and in the first days of May. Those troops were then to return in mid-May to the marshaling areas where they would remain awaiting final embarkation two or three weeks later.[3] When they finally moved out to the ports their places would be taken by the initial build-up forces in accordance with priorities established by the First Army. Once that process had begun it was expected that the marshaling camps would always contain about two days' flow of troops and that troops would spend only from eighteen to thirty-six hours in them.

Southern Base Section had been divided into four districts, numbered XVI, XVII, XVIII, and XIX. The entire coastal zone from Southampton westward was divided between the latter two, however, and those two districts were responsible for the mounting of all assault elements except the airborne troops. XVIII District (Col. Paschal N. Strong), to the east, was to handle Force O, the OMAHA Beach task force, and XIX District (Col. Theodore Wyman, Jr.) to the west, was to handle Force U, the UTAH Beach force.

The entire coast in the Southern Base

[2] NEPTUNE: Training for and Mounting the Operation, I, 122–24, 287–88; Mounting the Operation OVERLORD, Gen Bd Rpt 129, p. 8.

[3] Hq ETO, The Concentration Plan, 15 Apr 44, EUCOM 381.116 Mounting the Operation, Service Plan.

Section zone, extending from Portsmouth westward, was divided into nine marshaling and embarkation areas, four of them falling within the XVIII District and five in the XIX. (*Map 10*)* Of the four in the former, one area in and around Portsmouth and Gosport was operated entirely by the British, two around Southampton were to be used by both the British and Americans and were jointly operated, and a split area around Weymouth, the Isle of Portland, and Poole was operated solely by the Americans. All five areas in XIX District were U.S. operated. The nine areas (lettered from A to D in XVIII District and from K to O in XIX District) had a total of ninety-five marshaling camps with a capacity of 187,000 troops and 28,000 vehicles. The number and size of the camps in each area were determined by the outloading capacity of the adjoining embarkation areas, of which there was a total of nineteen.[4] For the organization of Area M, a typical marshaling and embarkation area lying between Plymouth and Fowey, see Map 10.

The other two Southern Base Section districts—XVI and XVII—were to mount glider elements of the 82d and 101st Airborne Divisions.

Because of the differences in facilities in the eastern and western portions of the Southern Base Section area the two districts mainly responsible for the mounting—the XVIII and XIX—met the problems of accommodation in different ways. The XVIII District to the east contained many large camps, most of which had been constructed by the British and were easily converted. They had capacities ranging from 1,500 to 9,000 men, possessed large messes and recreation halls, and could be expanded fairly readily. Several large buildings used by civilian agencies were also taken over. The XIX District contained fewer large and compact camps, and was harder put to find accommodations for the flood of units which arrived in the spring of 1944. It therefore had to make much more extensive use of the sausage camps described earlier. These small tented camp areas, straddling from five to ten miles of roadway and containing a dozen or more small 230-man camps, had their drawbacks, for they required more personnel for efficient operation, and the wide dispersal of units made control difficult. But they also had their advantages, for camouflage was easy, and they were quickly constructed, and since speed and ease of construction were important they eased the accommodations problem considerably.[5]

The differences in accommodations in the two districts resulted in differences in mounting techniques as well. American observers at the HARLEQUIN exercise had expressed the belief that the mounting procedure, which used one installation for concentrating and another for marshaling, was unnecessarily complicated. The two processes, they felt, could be accomplished in one area. In XVIII District, where facilities were more adaptable, such a consolidation was begun quite early and adopted as more or less standard practice. The XIX District, because of its limited facilities, planned to concentrate troops in one area and marshal them in another near the port wherever necessary.[6]

*Inside back cover.

[4] Area A, with eighteen camps and two embarkation areas (and a capacity of 30,000 men and 4,500 vehicles) was reserved entirely for British use, as were portions of Areas B and C.

[5] NEPTUNE: Training for and mounting the Operation, I, 284–86; Southern Base Section History, p. 18, ETO Adm 601.

[6] NEPTUNE: Training for and Mounting the Operation, I, 291.

Providing the needed accommodations entailed much more than acquiring buildings or erecting tents. Early in the year there was a severe shortage of beds, and it was necessary for Southern Base Section to buy lumber, wire, nails, and tools on the open market and to build 50,000 double-tiered bunks. Later in the spring an acute shortage of operating personnel developed, which promised to become worse once the mounting machinery was set in motion. SOS officials foresaw this deficiency as early as February and at that time indicated that it would be necessary to use field forces to perform service functions during the mounting of the operation. General Lee estimated that at least 15,000 field force troops would be needed, in addition to some 46,000 SOS troops that were to be taken off other work for this purpose.[7]

The necessity of calling on combat troops to perform housekeeping duties was fully confirmed with the mounting of the two rehearsals, TIGER and FABIUS, in April. In fact, the original estimates proved too small. At that time the Southern Base Section was given use of the entire 5th Armored Division in the concentration and marshaling areas of the XIX District. In addition, the 29th Infantry Regiment and the 6th Tank Destroyer Group were assigned similar duties in the XVIII District. Even these measures did not meet all requirements, for there was an unfilled demand for specialists in certain categories. There was a persistent shortage of cooks, for example, despite the fact that attendance quotas at the Cooks and Bakers School were increased early in the year in Southern Base. SOS units were ordered to double the normally allotted number of cooks to meet the housekeeping needs of the marshaling areas. As a result of the stepped-up program, 4,500 cooks, in addition to many mess managers, were trained in the first three months of 1944.

The mounting of the assault forces entailed a great amount of construction besides that involved in the provision of the marshaling camps. Additional loading facilities were vital to the embarkation plan, for the ports were unequal to the task of simultaneously loading hundreds of ships, particularly landing craft. This requirement was met largely by the construction of concrete aprons known as "hards" along the water's edge, some within the ports and others along river banks, where landing craft could nose in and drop their ramps to take on personnel and supplies, and particularly vehicles. Other installations such as engineer depots, advance shops, supply distributing points, railheads, and ordnance recovery points had to be built. Southern Base Section alone increased the number of engineers employed on such projects to 47,500 in May. To service the invasion units, to equip them properly, and to facilitate their movement to the ports, hundreds of still other installations were needed, including dispensaries, sterilization and bath facilities, field bakeries, POL and water distributing points, post offices, ration dumps, traffic regulating points, military police installations, and all types of supply distributing points.[8]

Mounting in Western Base Section, which held six U.S. divisions at the end of May, proved considerably simpler than in the southern coastal area, primarily because seaborne assault units were not in-

[7] Memo, Stratton for DCofS ETO, 26 Feb 44, and Ltr, Lee to Gen Leven C. Allen, CofS FUSAG, 27 Feb 44, ETO 381/320 Troops, OVERLORD.

[8] NEPTUNE; Training for and Mounting the Operation, I, 292–95; Southern Base Section History, p. 18, ETO Adm 601.



WATERPROOFED TANK RECOVERY VEHICLE *moving from a "hard" onto a landing craft.*

volved. Western Base's initial responsibility was to mount the preloaded build-up through the Mersey ports and Bristol and to marshal the paratroops of the two airborne divisions at airfields in eastern England. The base section then had to handle a portion of the later build-up via the shuttling of ships between the United Kingdom and the far shore. Because its units did not have to be broken up and formed into assault teams and craft loads, they were for the most part embarked from quays in the normal manner, which required little of the meticulous planning necessary for the assault forces. The less complicated marshaling process permitted a more centralized administration. Western Base Section constructed only twenty-four marshaling and four residue camps to accommodate its seaborne build-up forces and generally located them farther from the embarkation points than in the Southern Base Section. Reduced scales of accommodations were adopted, and existing camps were expanded by the use of tents where necessary. They were operated by two engineer general service regiments—the 360th and 373d—augmented by camouflage, fire-fighting, depot, and various other detachments, rather than through the district headquarters. There was no resort to the sausage camps, al-

though such areas were surveyed and held in reserve. Part of Western Base's build-up forces were to be staged in Northern Ireland, and a small emergency staging area was constructed for this purpose on the outskirts of Belfast.

The mounting of airborne units was a separate and somewhat special problem. Both paratroops and glider troops were marshaled at their departure airfields, where marshaling camps known as "eggs" were constructed, each camp having a capacity of about 200 men.[9]

(2) The Mounting Begins

The SOS mounting plan was issued on 20 March 1944, and the plans of the base sections and subordinate echelons followed soon after. Under the plan Task Force O was to marshal in the Portland–Poole area, Task Force U in the Torquay–Dartmouth sector, and Force B (follow-up) in the west country around Falmouth and Plymouth. Preloaded build-up units were to be embarked through the Bristol Channel ports, and the earliest build-up divisions via the shuttle service through Southampton.

Months of toil had gone into the army and army group Buildup Priority Lists, which specified the order in which hundreds of units and detachments were to embark for the cross-Channel voyage in the first ninety days. Allied planners nevertheless had foreseen the need for an effective movement control organization which would see to it that marshaling and embarkation were carried out in the order and speed which made the best possible use of shipping without clogging the camps, roads, and embarkation points, and, more important, would permit the modification of priorities in shipments in accordance with tactical requirements insofar as the available shipping would allow. In other words, machinery was needed which would regulate the movement of troops through the mounting process and also permit alterations in the course of the build-up. In addition, a centralized control of ships and craft shuttling between the United Kingdom and the Continent was needed to insure flexibility and economy in the use of shipping.

For this purpose the Buildup Control Organization (short title, BUCO), consisting of British and American ground, naval, and air representatives, was established at Fort Southwick, near Portsmouth, under the joint direction of the Allied Army, Naval, and Air Commanders-in-Chief. Maj. Gen Charles S. Napier, Director of Movements in the War Office and later Chief of Movements and Transportation, G–4, SHAEF, had conceived the basic idea for BUCO and had worked out many of the details personally. Through representatives of the Allied Naval Commander, the British Ministry of War Transport, and the U.S. War Shipping Administration BUCO was to control the movements of ships and craft; through the representatives of the War Office, the Air Ministry, and Headquarters, ETOUSA, it was to control the movement of personnel and vehicles to the embarkation points.

BUCO was not an agency of the Supreme Commander. It was to operate directly under the tactical commands most immediately concerned with the build-up of troops. Under the chairmanship of Brigadier G. C. Blacker (Br.), who represented the Commander-in-Chief, 21 Army Group, BUCO had both U.S. and

[9] NEPTUNE, I, 296–99; Western Base Section History, Ch. IX, G–4, ETO Adm 603.

British zone staffs. The U.S. Zone Staff consisted of a chairman (Col. Eli Stevens), representatives of the major U.S. commands involved in the build-up, and an advisory representative of the War Shipping Administration. In practice, the U.S. Zone Staff functioned directly under the senior American tactical commander on the far shore (the Commanding General, First Army, until 1 August and the Commanding General, 12th Army Group, thereafter). Supervision by the representatives of the joint commanders in chief was limited mainly to decisions affecting the allocation of shipping between U.S. and British forces.

Two subordinate organizations were established to act as executive agencies in carrying out BUCO's decisions. These were Movement Control (MOVCO) and Turn-Round Control (TURCO). On its U.S. side MOVCO was in effect an agency of the ETOUSA chief of transportation and had the mission of supervising the movement of troop units from their home stations to the embarkation points. It planned to accomplish this roughly as follows: On the basis of the over-all troop Buildup Priority Lists, prepared and amended from time to time by First Army and 1st Army Group, BUCO prepared appropriate lists for each embarkation area indicating the order in which units were to embark for the next three weeks, and in addition periodically released a forecast of loadings. On the basis of this information MOVCO in turn was enabled to prepare a periodic "force loading forecast," projected ten days in advance, and finally a daily "force movement table." It issued force loading forecasts for each embarkation area, indicating the allocation of craft and shipping to units, the approximate time of arrival of units in marshaling areas, and their loading times, thus giving the base sections and embarkation areas an indication of movements that could be expected. The final movement schedule took the form of a daily movement table issued by U.S. MOVCO to Headquarters, Southern Base Section, the marshaling areas, and the embarkation areas covering a twenty-four-hour period of flow. In effect, the daily table was an extract from the loading forecast brought up to date with the latest amendments in priorities, and was the basis for a detailed allocation by the embarkation area headquarters of personnel and vehicles to individual craft and ships. It also served as instructions to the transportation agencies in the base sections, enabling them to issue road and rail movement tables for the movement of units forward into the marshaling areas.

TURCO was organized to assist naval commanders in controlling the movement of ships and craft so as to achieve the optimum rate of turn-round of vessels between the far shore and loading points. On instructions from BUCO it was responsible for bringing the prescribed number of ships and craft into designated embarkation points.[10]

In co-ordinating the actual marshaling and embarkation with these two agencies the two base sections again developed different methods. Western Base Section set up a simpler and more centralized system of control. All movement orders were the responsibility of the Transportation Corps, which controlled the location and movement of all units through a headquarters established at Newport and a subsection

[10] Control of the Buildup of Troops in a Cross-Channel Amphibious Operation as Illustrated in Operation OVERLORD, Gen Bd Rpt 22, pp. 5–11; Mounting the Operation OVERLORD, Gen Bd Rpt 129, pp. 22–24.

headquarters at Swansea in the Bristol Channel area. The district headquarters had no intermediary role in this system. Southern Base Section set up a more elaborate supervisory agency known as Embarkation Control, or EMBARCO, which was intended to serve as a nerve center for the entire Southern Base Section mounting complex. EMBARCO planned to maintain a record of the location and capacity of all concentration and marshaling area camps, and to keep informed at all times as to the location of every unit in the mounting process. For this purpose enormous boards were set up in a large Nissen hut at Southern Base Section headquarters near Salisbury, where the strength and location of all units were charted. Through this agency Southern Base Section hoped to exercise detailed control over every movement from concentration area to embarkation point, issuing the necessary movement instructions to the districts. The system proved difficult to operate, as will be shown in the next chapter.[11]

The machinery in Southern Base Section was set in motion late in April with the mounting of forces participating in the final rehearsals. Force U, consisting principally of the 4th Division and the 1st Engineer Special Brigade and totaling 30,452 men and 3,569 vehicles, was marshaled by the XIX District. In mounting Exercise TIGER, however, a procedure was followed which was contrary to established practice. Units were broken down into craft loads at their home stations before their briefing, a step that caused considerable confusion in the marshaling camps. SHAEF intervened and ordered troops to be briefed by unit rather than by craft load in the future, thus making mandatory the standard mounting procedure originally planned. There were other defects in these initial stages of the mounting. Traffic did not move smoothly in the embarkation stage, and there was poor liaison between Army and Navy officials.

In XVIII District the marshaling of Force O, which consisted mainly of elements of the 1st and 29th Divisions and the 5th and 6th Engineer Special Brigades and totaled 29,714 men and 3,241 vehicles, also encountered difficulty, owing principally to the complicated movement schedule. Some units were misdirected; a few could not be located immediately; and the dissemination of information and instructions was faulty, in some cases as a result of an overemphasis on security.

Portions of the build-up forces, including the 9th Infantry and 2d Armored Divisions, rehearsed their marshaling and movement to the point of embarkation, and then returned to their concentration areas. Upon the completion of these rehearsals and the return of assault units to their marshaling areas the movement of Force B, the follow-up force of 26,492 men and 4,431 vehicles, also got under way.

In the weeks just before D Day a tremendous increase in movements took place in England, particularly in the coastal areas. The transportation network became alive with trucks, combat vehicles, and train after train of foot troops, and cities like Gloucester, Cheltenham, Cirencester, and Oxford became critical traffic bottlenecks. In many areas, particularly where the sausage camps had been established, embargoes on all traffic were imposed, creating hardships on the local inhabitants and in some cases causing resentment. On all other highways move-

[11] NEPTUNE, I, 301–02; Cross Channel from Southern Base Section, prep by Southern Base Sec, ETO Adm 601.

ments were rigidly controlled, with military police guiding all convoys in their movement through the mounting process. The Transportation Corps assigned 478 officers and 2,583 men from group regulating stations and traffic regulating groups to Southern Base Section alone for the control of troop movements.[12] Upon arrival at the regulating points convoys were checked for their make-up by base section personnel, and then were escorted to the designated camps. Assignment of a camp area depended on the type of vehicles in the unit, the roads it was to travel, and the time schedule. At the edge of the camp the units were met by a representative of the camp commander, who indicated parking areas. Vehicles were then parked, camouflaged, and "topped off" with gasoline, and guards were posted. The troops then marched into the camp, which was usually less than a mile distant. There the unit was once more checked against the movement forecast, and troops taken to the quarters areas and assigned blocks of tents. After being briefed, units were broken down into craft loads. Thereafter they awaited the final embarkation signal.[13]

In the vital marshaling phase of the mounting the assault forces were placed in final readiness, in both supply and organization, for the cross-Channel movement and actual assault of the enemy beach. It was in the marshaling area that the soldier was issued the items which probably first impressed him with the real nature of coming operations. For there, during the waiting period, he received such items as anti-seasickness pills, water-purification tablets, emergency rations, heating units, vomit bags, dusting powder, and a lifebelt, and there he donned the impregnated clothing and applied to his shoes the paste intended to protect him against chemical warfare. Perhaps the most convincing sign that this was not to be just another dry run was the payment of 200 francs in the new French currency issued by the Allied military government.

Once these details were out of the way the soldier might ease the long wait with a game of baseball or poker, he might go to a movie, he might read the *Stars and Stripes*, *Yank*, or the special issue of *Army Talks* called "Achtung," specifically written for the men scheduled to enter combat on the Continent. Extraordinary efforts were also made to indulge the men's taste and appetite in these last few days in the United Kingdom. Fresh meat and white bread were regular items on the menu in this period, and special precautions were taken to guard the diet against foods conducive to seasickness in the case of seaborne assault forces, and against gas-forming foods which might induce stomach cramps in the case of paratroops. In an unaccustomed display of kindness, the Army even allowed some troops to sleep through breakfast and then served them an extra large noon meal.[14] Mobile bakeries provided fresh bread; laundry and shoe repair units provided other essential services. Ordnance patrols circulated through the areas, checking waterproofing, making minor repairs, and occasionally replacing vehicles or other equipment.

Maintaining adequate security was another vital aspect of the mounting, entail-

[12] History of the TC, ETO, Vol. III, Ch. VI, p. 3, ETO Adm 582.

[13] Southern Base Section History, pp. 41–43, 47, ETO Adm 601.

[14] Basic Needs of the ETO Soldier, Pt. XI of the Administrative and Logistical History of the ETO, Vol. I, Ch. I, p. 43, OCMH; Quartermaster Supply in the ETO, prep by QM School, Camp Lee, Va., II (Subsistence), 44, OCMH.

ing protection against air attack as well as against the leakage of information. Once the briefing began at the end of May a complete security seal was imposed on all marshaling camps, wire was strung around the perimeter of each camp, all contact with the outside was controlled through gates, and more than 2,000 counterintelligence corps personnel ceaselessly covered their beats to prevent strays from entering or leaving the camps without authorization.

Because it was impossible to conceal completely from enemy eyes the tremendous concentration taking place in southern England, both on land and along the shores, the Allies expected the Germans to send bombers over the marshaling and embarkation areas. To provide air protection against such attacks an antiaircraft brigade was attached to Southern Base Section, the heavy antiaircraft artillery being manned by the British, and the light guns by Americans.[15] Camouflage was another logical protective measure. Instructions on camouflage measures in the marshaling areas were issued in March, and camouflage discipline began even with the selection of mounting installations. New construction was carried out with the minimum of disturbance to the ground pattern; and there were periodic inspections by both visual and photographic aerial reconnaissance. Both districts of Southern Base Section were given engineer camouflage units (from the 604th Engineer Camouflage Battalion). Officers from these units gave standard camouflage instruction to the task forces as they passed through the camps, erected model camps for demonstration purposes, and enforced camouflage discipline. The 604th Camouflage Battalion painted 18,000 tents in the sausage camps with reclaimed camouflage paint, and also repainted much sand-colored equipment originally designed for Operation TORCH. The goal of the battalion was to render marshaling areas unrecognizable at 10,000 feet.[16] In Western Base Section preparations were made for the smokescreening of some of the big general depots, like G–40 at Barry in southern Wales.[17]

Two onerous problems—making up supply deficiencies, and waterproofing vehicles—added greatly to the administrative burden of the mounting. In theory, every American unit in the United Kingdom should have been properly equipped either before departure from the United States or from preshipped stocks shortly after arrival in the theater. In actual practice many units lacked portions of their basic equipment for varying periods of time after they arrived in the United Kingdom. Such shortages should have been made up at their home stations by normal requisitioning. But again practice often fell short of theory. Either because the equipment simply was not available, or because late arrivals in Britain had too little time, emergency issue of many items was necessary in the last weeks before the invasion. This continued after the mounting had already begun, and therefore at a time when the SOS administrative machinery was already heavily taxed.

Deficiencies within the assault units were attended to first, for they had been noted in the course of the exercises. By the time those units returned to the marshaling areas after the final rehearsals most of their shortages had been eliminated. The

[15] The tactical command in the mounting areas was British.

[16] NEPTUNE, I, 320–24.

[17] Western Base Section History, Ch. IX, G–3, ETO Adm 603

build-up divisions, however, started the marshaling process with serious shortages. The Ordnance Service was particularly hard pressed to meet late demands, for it already had many responsibilities in the mounting. Troops were scheduled to arrive in marshaling areas with ordnance equipment checked and with complete combat loads of ammunition. Base section mounting installations were to provide only the day-to-day maintenance and replacements normally required while units were in the camps, and certain services connected with the mounting. The Ordnance Service accordingly set up field depots and field service points to issue limited quantities of new equipment and ammunition and to repair or replace vehicles. It also provided teams to test waterproofing and wreckers to clear highways in case of accidents.

But many units began the marshaling process with little or no ordnance equipment, and for a time the supply of these units was badly snarled. Meeting eleventh-hour deficiencies of equipment therefore proved an unexpectedly heavy burden. Nondivisional units made the heaviest demands, and the condition of their vehicles and other equipment was inexcusable in many cases. One unit with a T/E calling for 136 carbines arrived in the marshaling area without a single weapon and without ammunition, creating a problem which the Ordnance Service was neither prepared nor expected to cope with during the mounting process. Many showdown requisitions had been submitted but had not been filled. In some cases they were canceled without notice to the requisitioning unit. Providing the initial issue of T/E equipment was made difficult in many cases by the fact that First Army had been permitted to draw replacements in advance of the operation, thus exhausting surplus stocks. Some of the needed equipment was known to exist in First Army dumps, but it could not be obtained for lack of the necessary authority on the part of the base sections. Sufficient priority was eventually given the base section requisitions, and the situation began to clear up rapidly at the end of May. In the end almost all needed equipment and supplies were obtained.

Similar situations developed in connection with medical and signal supply. There were critical shortages of some signal equipment until the very date of the invasion, and in the case of medical supplies the Western Base medical officer and depot personnel intervened in the last weeks to get vitally needed items released and issued to the using units.

Many an emergency was attributed to the failure to follow existing instructions. Procedures for handling supplies and equipment in an amphibious operation had long since been laid down in a guide known as "Preparations for Overseas Movement, Short Sea Voyage" (POM SSV). Had more of the field force units followed this bible, many crises and anxious weeks could have been avoided.[18] In some instances transient units left camps in a deplorable condition. Some camps were below standard, creating sanitation hazards. Fortunately, medical troops were able to expand their facilities and prevent serious threats of epidemic.[19]

Waterproofing of vehicles was an inescapable requirement. That stage in the landings when vehicles left the ramps of landing craft and entered the water was expected to be a crucial point in the

[18] Western Base Section History, Ch. IX, G-4, Ordnance and Surgeon Sections; NEPTUNE, I, 327-31.

[19] Western Base Section History, Ch. IX, G-3.

assault. Unless adequate precautions were taken, not only might many vehicles be drowned in the sea but vehicles stalled at the end of a craft's ramp could effectively prevent the unloading of other vehicles at that spot. This threat was a great deal more critical in the OVERLORD landings than in the Mediterranean operations because of the greater tide ranges in the Channel. A rising tide could block salvage efforts for many hours.

With these problems in mind great efforts were made both in the United States and the United Kingdom to develop satisfactory waterproofing techniques. Essentially, the problem was one of developing a compound which would effectively seal the vital parts of vehicles and yet be easily stripped off after the vehicles were landed. British experiments begun early in 1942 led to the developments of a compound which was used by both the British and Americans in the North African landings. Experimentation continued after TORCH, and in the spring of 1943 an experimental station was opened at an American ordnance depot in the Southern Base Section where shop facilities and beaches for wading exercises were available. In January 1944 the station was given full responsibility for developing an adequate waterproofing technique. This included the development of proper methods of handling all ordnance equipment in amphibious operations, developing a satisfactory waterproofing material, and the co-ordination and supervision of all training and experimentation in waterproofing. In the meantime trials with jeeps and trucks were held off a beach near Plymouth, and a training film was prepared by the Army Pictorial Service. Progress was satisfactory enough by the summer and fall of 1943 to start classes for the training of instructors and inspectors in December. Under specifications laid down by the ETOUSA G–3, the Amphibious Division of the Ordnance Service trained more than 3,500 men as waterproofing instructors and inspectors by July 1944.

The basic material adopted was a British product known to the Americans as asbestos waterproofing compound, which consisted of grease, lime, and asbestos fibers. Metal tubing was used to extend air vents in gas tanks and crank cases, and flexible tubing for carburetor air intake extensions and exhausts. Metal stacks and adapters and ventilating ducts were built for armored vehicles to enable air to be drawn in and exhaust to be blown out, a release mechanism permitting the stack to be jettisoned by the driver after the tank reached shore.

The actual waterproofing was to be accomplished in three steps. The biggest portion of the job was done in the home camps. Vital parts of the motor and wiring were left exposed at this stage, since they could not withstand sealing for any extended driving. Additional work was accomplished in the marshaling areas, and the final sealing was done after vehicles had been loaded. In a reversal of the process, a minimum of de-waterproofing was to be accomplished immediately after the vehicles left the water on the far shore, and the larger job of stripping the compound was handled later. Standardized procedures were developed and publicized for all vehicles and for other special equipment such as Signal Corps radios.

Until March 1944 field force units sent representatives to the experimental station in Southern Base Section to be trained in waterproofing methods. It was decided at this time, however, that waterproofing in-

spection should be performed by specially trained personnel provided by the Ordnance Service. In addition to carrying out the responsibilities already listed, Ordnance now had to furnish inspectors, it had to send welding teams to mount stacks and shrouds on tanks, it had to prepare and circulate instructions on salvaging waterproofed equipment on the far shore, and it had to do the actual waterproofing of all replacement ordnance vehicles. An ordnance base automotive maintenance battalion and a base armament maintenance battalion provided personnel to act as waterproofing inspectors in Southern Base Section. In Western Base Section First Army provided over a hundred men for inspection teams, and qualified ordnance waterproofing detachments from the SOS were also stationed at each camp. Actual waterproofing was carried out by field forces units, many drivers having attended the Ordnance training schools in the two base sections. Materials were issued for 137,041 wheeled and semitracked vehicles, 4,217 full-tracked vehicles, and 3,500 artillery pieces. Waterproofing of vehicles of the build-up forces continued for a month after the invasion, after which it became feasible to land vehicles dry shod.[20]

Both base sections suffered acute shortages of manpower in operating the mounting machinery. The demands for service personnel actually compounded a preexisting shortage, and some units found themselves with overlapping missions—attached to a base section in the United Kingdom to assist with the staging, and assigned to the Advance Section and scheduled for early movement to Normandy. Diverting combat units to service duty undoubtedly eased the situation but was not an unqualified success. Combat troops were untrained in many of the assignments they were called on to perform, and latecomers even among the SOS units were seriously handicapped by inexperience and lack of adequate orientation in the plan and all its intricacies. Men were called on to work long shifts to meet the demands of the mounting schedule. Southern Base Section alone employed 43,000 men in the process, 20,000 in XVIII District and 23,000 in XIX District, excluding troops used in mounting the airborne forces.[21] To make matters worse, many units, choosing to ignore instructions, needlessly added to the burden of the mounting machinery by arriving in the marshaling areas with overstrengths and residues in addition to their assault echelons. Others arrived with equipment in excess of that which could be accommodated on unit vehicles or on landing craft and ships, on which space had been carefully allocated. The excess baggage had to be shipped to the proper port for loading on cargo vessels, and its delivery to the far shore consequently was delayed. Such practices were in clear violation of mounting instructions and caused unnecessary confusion in the marshaling areas.[22]

The briefing of officers in Forces O and U finally began on 22 and 23 May respectively. In the case of the 1st Engineer Special Brigade, headquarters staff officers visited all field units and briefed unit officers who, in turn, briefed the men under their command. Some headquarters formed briefing teams, which moved from unit to unit and outlined the plans. In many cases they used excellent visual aids,

[20] NEPTUNE, I, 307–15.

[21] Southern Base Section History, p. 27, ETO Adm 601.

[22] Mounting the Operation OVERLORD, Gen Bd Rpt 129, p. 10.

such as sponge rubber models of the beach areas as well as large-scale maps and aerial photographs. Security precautions were doubled, and marshaling areas were patrolled night and day. In this critically important period a few well-executed enemy air raids might easily have disrupted plans. But only a few minor raids took place, the most serious of which occurred on the night of 30 May, when German planes dropped several bombs in the bivouac area of an ordnance battalion near Falmouth in Cornwall. Twelve men were killed and nineteen wounded; but replacements were obtained immediately and the unit was at its former strength when it embarked.

Just the problem of maintaining communications with the many units was a tremendous one. Because marshaling camps were scattered throughout southern England, it was often difficult to locate units to inform them of changes in plan, plans which were highly classified and had to be delivered by courier and then disseminated to subordinate echelons. One major change in the tactical plan was made only a few days before embarkation. This was the change resulting from the discovery of additional German strength in the Cotentin, which prompted the VII Corps to shift the drop zones and area of operation of the 82d Airborne Division so as to assure the winning of the beachhead. The change had no effect on the mounting of units scheduled for the D-Day assault, but certain follow-up and build-up units were now given new priorities and phased forward.

In the meantime the "mounting" of supplies had also begun. The loading of vehicle ships, coasters, LCT's and barges got under way in the second week of May, most cargo being prestowed to meet the desires of the First Army. All supplies scheduled for delivery on the far shore in approximately the first fifteen days were loaded before the operation was actually launched. Several ports specialized in loading certain commodities. Llanelly, Sharpness, and Port Talbot, for example, were used exclusively for POL; Penarth and Fowey were primarily ammunition ports; heavy engineer and other out-of-gauge equipment was handled at Cardiff; and a fleet of 112 vehicle-loaded Liberties operated mainly out of Southampton.[23] In this way equipment that had crossed the submarine-infested Atlantic in 1943, and cargo that more recently was piled on the wharves of the New York and Boston ports—oil from wells in Texas, jeeps from Detroit, M1's from Massachusetts, radios from Pennsylvania, artillery shells from Illinois, K-ration cheese from Wisconsin, blood plasma from a town in Tennessee—found their way into the holds of vessels which soon would converge on the Normandy shore.

Late in May the build-up of certain combat units was moved forward, and a last-minute accommodation had to be made to meet the new supply requirements. Since shipping was closely allocated and loading was already well under way, special measures had to be taken to find space for additional supplies. Part of the requirement was met by the acquistion of extra barges which could be beached on D plus 1. More space was acquired by the expedient of loading the vehicles of certain truck companies which had been left empty for just such an emergency. Nearly 4,000 tons of supplies were carried in this manner.[24]

As the marshaling of men, vehicles, and

[23] I. Swerdlow, "Forgotten Ports," *Army Transportation Journal,* I (October, 1945), 23–25.

[24] FUSA Rpt of Opns, Bk. I, p. 33.



LOADED LANDING CRAFT AND SHIPS *for the cross-Channel voyage.*

supplies of the assault forces began, the warships and landing craft which were to carry and escort these forces were also being assembled by the Navy. The assembly of craft for the assault forces began after the Allied Naval Commander, Admiral Ramsay, issued his operation order at the end of April. The American naval forces were organized as the Western Naval Task Force, commanded by Rear Adm. Alan G. Kirk, and comprised the two assault forces and one follow-up force. Assault Force O (Rear Adm. John L. Hall, Jr.), totaling nearly 1,200 ships and craft, provided the lift and necessary naval gunfire support for the OMAHA force, and Assault Force U (Rear Adm. Don P. Moon), totaling nearly 800 vessels, provided the lift and support for the UTAH force. Elements of both forces participated in the TIGER and FABIUS I rehearsals and then returned to port for final repairs and refitting. Force B (Commodore Campbell D. Edgar), with about 500 ships and craft, constituted the follow-up force for OMAHA Beach.

For the cross-Channel movement Task Force O was organized into five convoys. Most of its craft were assembled at Portland and Weymouth, and the remainder at Poole. Assembly was completed by 30 May, and loading began the following day. Task Force U was organized into twelve convoys. Its loading ports were more widely scattered, extending all the way from Falmouth, in Cornwall, to

Poole, and the assembly of the force was therefore more difficult. Force U was given somewhat greater fire power, since it was to operate on the right flank of the invasion force and counter enemy naval attacks from Cherbourg and the Channel Islands. Its craft were assembled and ready to load on 30 May.

Embarkation of both assault forces and the follow-up force was completed on 3 June, and the marshaling of the remainder of the OVERLORD forces was in full swing. With the loading of the assault forces completed and the task force convoys assembled along the southern coast of England, the cross-Channel movement now awaited only the signal from the Supreme Commander.

CHAPTER X

Launching the Invasion: Organizing the Beaches

(1) Tactical Developments in June [1]

On the morning of 6 June 1944 five task forces, three British and two American, under continuous air cover and following air and naval bombardment, assaulted the coast of Normandy and won continental beachheads. On four of the beaches opposition ranged from light to moderate. On the fifth, OMAHA, unexpectedly strong enemy forces delayed the V U.S. Corps in its advance inland and inflicted heavy casualties. In the UTAH sector the VII U.S. Corps, assisted by two airborne divisions dropped six hours before the seaborne attack, secured a firm beachhead by the end of D plus 1. At the eastern end of the assault area British and Canadian forces initially enjoyed rapid success and pushed inland toward Caen and Bayeux. Although the two American landings remained unlinked for several days, it was apparent by the end of D plus 1 that the Allies had succeeded in the initial assault.

The Supreme Commander had made a significant change in the scheduled landings at the eleventh hour. The date for the attack had been set as 5 June, when moon and tidal conditions most satisfactorily met the requirements of all components of the invasion force. Loading of the assault elements was completed on 3 June, and certain vessels of the Force U Fire Support Group sailed from Belfast the same day, other convoys getting under way that evening. The night of 3–4 June was clear, but the wind was rising and the Channel was choppy.

General Eisenhower was given an unfavorable forecast for D Day that evening, and early on the morning of 4 June he made the difficult decision to postpone the assault twenty-four hours. Convoys that had already departed were immediately notified by prearranged radio signal, and destroyers were also dispatched to overtake them. Some of the ships and craft were forced to return to ports; others simply reversed their course and backtracked for the next twenty-four hours.

The decision to postpone D Day was based on a forecast of more moderate seas and more favorable flying conditions between the afternoon of the 5th and the afternoon of the 6th. But the forecast for the subsequent period was not encouraging, for it promised an indefinite period of unfavorable weather. The Supreme Commander was therefore faced with the necessity of making a further decision on whether to initiate the operation on 6

[1] For the full story of tactical operations see Harrison, *Cross-Channel Attack.*

June or order a further delay. To order a delay would have meant a postponement of two weeks, since the required conditions of tide and moon would not occur again until that time. The invasion had already been postponed a month in order to permit enlargement of the assault forces and widening of the assault front. Another delay of two weeks would shorten the summer campaign season still more. Furthermore, some of the assault forces were already on the Channel, others were briefed and embarked, and additional follow-up units had already moved into the marshaling areas. The entire mounting machinery was already in full operation. Early on the morning of 5 June General Eisenhower directed that the assault be launched the following day.

On the morning of 5 June the seventeen convoys of Forces O and U, comprising nearly 2,000 ships and craft, started across the English Channel. The voyage itself was uneventful, although the weather continued unfavorable. The convoy routes led through minefields, but well-marked lanes had been swept through them. Convoys began arriving in the transport area, approximately twelve miles off the beaches, about midnight. The moderate sea, greater at OMAHA than at UTAH, created some difficulty in transferring assault teams from the transports to the small landing craft, and there was much seasickness. By dawn of 6 June hundreds of craft in the invasion armada lay off the French coast, assembled in the transport area. At approximately midnight, 5–6 June, RAF bombers had ranged along the entire invasion coast striking at heavy coastal batteries and other specific targets. Shortly thereafter, beginning at H minus 6 hours, paratroops of the 82d and the 101st Airborne Divisions began dropping astride the Merderet River and to the rear of the inundated areas to seize the causeway exits and thus facilitate the later landings of the 4th Infantry Division in the UTAH sector. Immediately preceding the seaborne landings came the preparatory naval and aerial bombardments. At H minus 40 minutes warships of the bombardment groups began firing on enemy shore batteries on both OMAHA and UTAH Beaches, and as the assault craft started for the beaches the naval bombardment was augmented by the fire from fire-support craft, variously equipped with rockets and small guns. In the meantime aerial bombardments hit both beaches. At UTAH Beach medium bombers of the Ninth Air Force struck at specific beach targets without destroying beach fortifications. The bombing by the Eighth Air Force planes at OMAHA meanwhile was foiled by bad weather. Forced to use blind-bombing equipment and to take special precautions against hitting friendly troops in the assault craft, bombers at OMAHA released their loads too far inland to be of any direct assistance to the assaulting infantry.

U.S. forces in the OMAHA sector badly needed an effective air effort. Initial assault units of the V Corps, comprising elements of the 1st and 29th Infantry Divisions and Rangers, touched down on OMAHA Beach at approximately 0635, and met unexpectedly heavy opposition. As a result of the rough sea many craft foundered, amphibian tanks were swamped, and landing craft missed their assigned beaches. Heavy enemy fire prevented the proper clearance of beach obstacles. The landings lost all resemblance to the plan, and the beaches soon became congested with disabled and burning vehicles and with troops immobilized by enemy fire. Landing operations were finally halted

until enemy fire could be neutralized. With the help of close-range naval fire the situation was gradually brought under control and landings were resumed. Units gradually reorganized themselves and pushed up the slopes to destroy enemy positions behind the beaches. But for many hours the situation at OMAHA was uncertain, and at the end of D Day units of the V Corps clung precariously to a hard-won strip of land less than 3,000 yards deep.

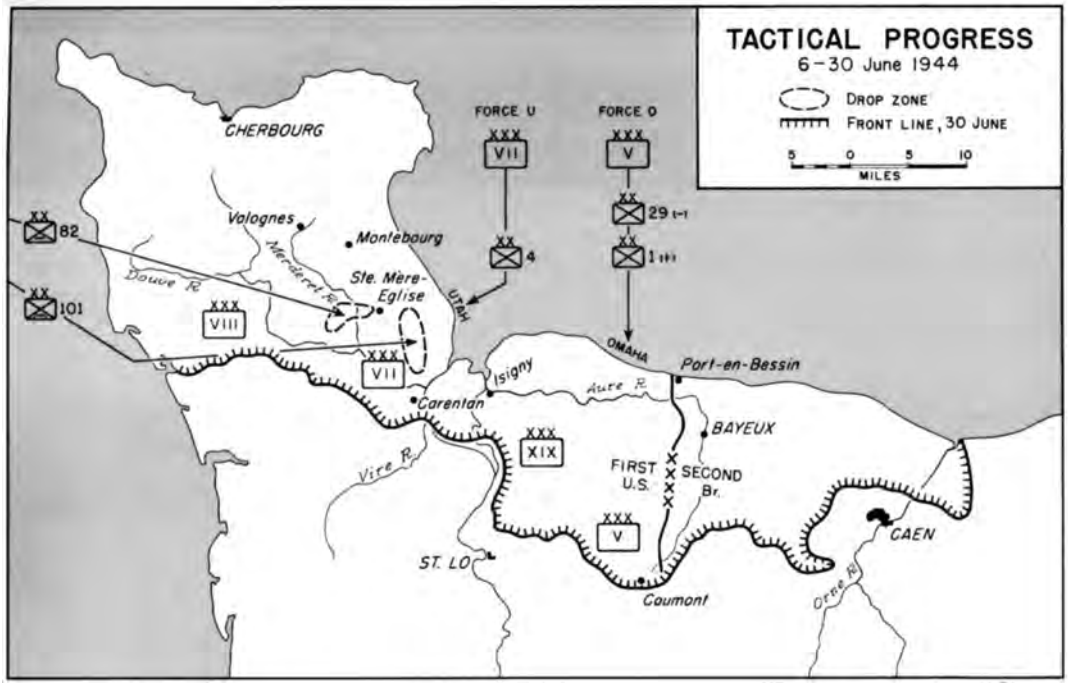
At UTAH Beach, meanwhile, seaborne elements of the VII Corps carried out their landings with contrasting ease. Troops of the 4th Division touched down on UTAH at approximately 0630, rapidly overcame relatively weak enemy opposition, crossed the causeways spanning the inundated areas, and pushed inland as much as 10,000 yards on D Day. The initial success of the 4th Division was partly attributable to the naval and air bombardment, which was more effective than at OMAHA, but also to the assistance rendered by the airborne units that had dropped during the night. Both airborne divisions suffered heavy losses in men and matériel and were able to bring only a portion of their full strength to bear in the fighting on D Day. By striking suddenly in the enemy's rear, however, the airborne infantry created confusion in the enemy's ranks and secured the western exits of the inundated area, thus rendering much easier the initial task of the seaborne elements.

But there was little cause for optimism on either beach as D Day drew to a close. The V Corps held only a tenuous beachhead at OMAHA. At UTAH, in spite of the successful landings of the seaborne elements, heavy fighting with high losses had been going on inland. Both airborne divisions had had scattered drops, the 82d Division had not linked up with the seaborne forces and had no communications with other units, and some of its elements were completely isolated west of the Merderet River.

Both V and VII Corps pressed forward on D plus 1, the VII Corps clearing out scattered enemy holdings and rounding out its lodgment, the V Corps enlarging and securing its precarious toe hold. In the next few days the V Corps pushed inland to capture the high ground between the beaches and the Aure River, and by 10 June it had pushed west to the Vire and south just beyond the Forêt de Cerisy. In the UTAH sector the VII Corps extended its beachhead north, west, and south. In the north the 4th Division fought through heavily fortified headland batteries toward Montebourg; in the west the 82d Airborne Division established a bridgehead over the Merderet after hard fighting; and in the south the 101st Airborne Division crossed the lower Douve and established contact with the V Corps. Carentan, vital communications link with the eastern beachhead, was not captured till 12 June.

After the capture of Carentan VII Corps turned its attention to its major objective, Cherbourg. Its first move was to strike westward to cut the peninsula and prevent the enemy from reinforcing his forces in the north. The stroke was accomplished by the veteran 9th Division during the night of 17–18 June. The corps then quickly organized its attack toward Cherbourg and on 19 June pushed rapidly to the north its three divisions (the 4th, 79th, and 9th) converging on the port. Temporarily checked at the prepared defenses which ringed Cherbourg on the south, the three divisions, with the aid of an intensive air preparation on 22 June, finally broke through and captured the port on the 27th.

No full-scale attacks had been attempted on the remainder of the Ameri-



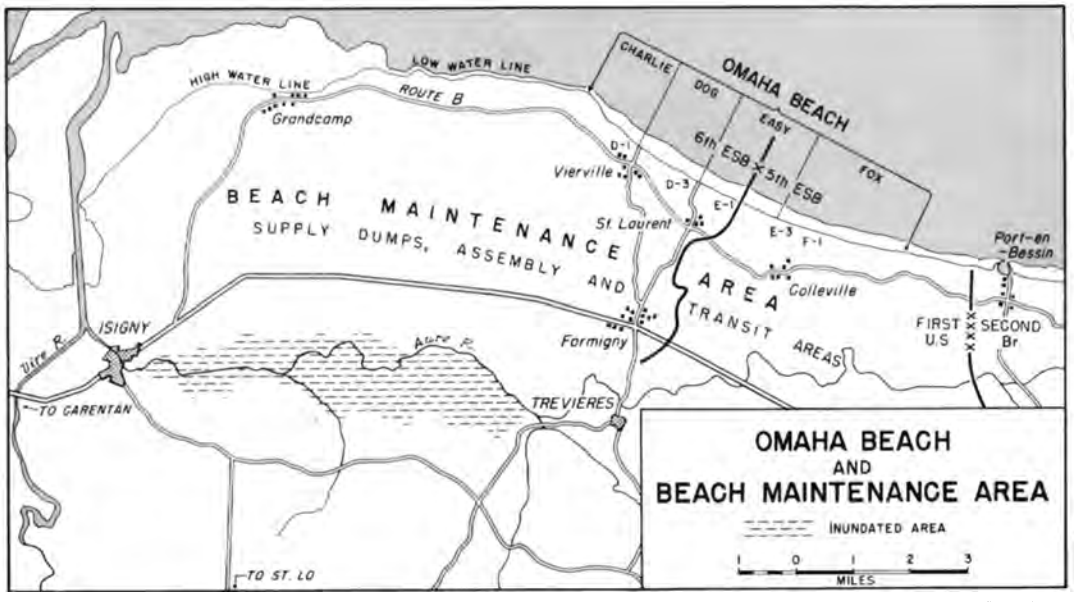
MAP 11

can front after 20 June, and only minor advances were made in efforts to deepen the lodgment southward. Two additional corps meanwhile joined First Army forces. The VIII Corps, becoming operational on 15 June, assumed control of the divisions released from VII Corps (90th Infantry, 82d and 101st Airborne) at the base of the Cotentin peninsula on 19 June and undertook to clear the area southward toward La Haye-du-Puits. Meanwhile the XIX Corps took over a sector between V and VIII Corps on 14 June, with the 29th and 30th Infantry Divisions under its command. It immediately took steps to consolidate the beachhead junction in the Carentan–Isigny area, and then drove southward astride the Vire River. On about 21 June, their supply limited by the priority given the Cherbourg operation and by an interruption of unloadings at the beaches, all three corps assumed an active defense, and only minor gains were made toward the city of St. Lô.

At the end of June, although advances were somewhat behind schedule, the First U.S. Army was firmly established on the Continent. (*Map 11*) It had cleared the Cotentin, captured a major port, and extended its holding inland from OMAHA Beach to a depth of about seventeen miles. Nowhere on the American front had the enemy been able to gather sufficient strength to threaten the continental beachhead seriously.

(2) OMAHA Beach on D Day

The story of supply operations in the first weeks of the continental operation is almost exclusively that of the organization of the beaches and beach maintenance



MAP 12

areas, and of the part played by the engineer special brigades.[2]

In the V Corps sector the beach known as OMAHA was a 7,900-yard flat stretch of sand running from Pointe et Raz de la Percée to Colleville-sur-Mer, backed by hills and flanked by steep rocky cliffs rising from the water's edge. (*Map 12*) It had a great tidal range and a large tidal flat. Between the low- and high-water marks the flat consisted of hard, well-compacted sand, with shale outcroppings on the flanks. Its average width was 300 yards, and it was broken in places by a series of runnels, two and a half to four feet deep, located 50–100 yards from the high-water mark. This wide tidal flat was a key feature of OMAHA and figured importantly in both the invasion plans of the Allies and the defensive plans of the Germans. The enemy had assumed that the width of the beach was too great to permit a landing at low tide and had built his defenses to guard against a high-tide assault. These defenses consisted of rows of obstacles covering the tidal flat, including bands of steel hedgehogs, heavy log stakes driven into the sand at an angle pointing seaward, and huge iron gate barriers known as Element C or Belgian gates, often with Teller mines lashed to them. They were no barrier to men landing at low tide, but they created a great hazard for craft approaching shore after the tide began to rise. For this reason the Allies planned a low-tide assault, counting on heavy air and naval bombardment to neutralize shore defenses sufficiently so that men could cross the beaches and demolition teams could de-

[2] Description of the beaches and supply operations is based on [Clifford L. Jones] NEPTUNE: Training for and Mounting the Operation, and the Artificial Ports, Pt. VI of The Administrative and Logistical History of the ETO, Vol. II, Chs. IX–XII, OCMH.

stroy the obstacles before the tide again came in.

Above the tidal flat the OMAHA terrain varied greatly. Along most of its length the beach sloped upward sharply for about twenty-five yards. On the eastern half this rise ended in an extended shingle pile of small rounded stones. On the western end a wood and masonry sea wall rose from six to twelve feet high. Concertina wire was strung along both the shingle pile and the wall. A road ran along most of the beach, hard-surfaced at the western end, but hardly more than a trail through the dunes farther east. Two of the roads leading inland off the beach were blocked by antitank ditches, and fields were sown with mines or falsely marked with warning signs.

Just beyond this strip above the tidal flat the ground rose more precipitously, particularly at the western end, with most of the beach backed by hills of from 80 to 130 feet. Bisecting these hills and cliffs were several draws which served as natural exits from the beaches. Starting at the western end of OMAHA they were designated with letter-numbers as follows: D–1, which had one of the best roads from the beach, leading to the town of Vierville-sur-Mer, about 600 yards behind the beach; D–3, which also had a good road, leading to St. Laurent-sur-Mer, about one mile inland; E–1, which had a narrow cart track leading up a steep hill on the west and also southwest to St. Laurent; E–3, which had a dirt road winding through thick scrub growth and trees to the small town of Colleville; and the easternmost exit F–1, which had only a cart track and was the poorest of all.

As the logical routes of advance from the beaches inland, these exits had great importance to both the defenders and the assaulting forces. They were well defended, therefore, with gun emplacements set into the sides of the hills, together with pillboxes, dugouts, and interlocking trenches designed to cover the exits as well as the beaches themselves. Artillery and mortar positions were placed well behind the high ground.

Inland from these hills and bluffs a rolling plateau extended two to four miles, descending to the low, swampy Aure River valley. The road network of this area was based on two highways. One (Route B), less than a mile from and roughly parallel to the beach, ran through the three principal villages immediately back of the beaches (Vierville, St. Laurent, and Colleville). The other was the Isigny–Bayeux road, roughly parallel and a few miles farther south. The area from the beaches to the Aure River comprised the planned beach maintenance area, and its organization for supply was the responsibility of the Provisional Engineer Special Brigade Group.

Infantry assault teams were scheduled to land in the first wave to overcome resistance on the beaches. Joint Army-Navy demolition teams were to follow closely behind and, under the infantry's protection, blow gaps in the maze of obstacles on the tidal flat. But plans went wrong from the beginning. Most of the initial landings took place too far to the east, and some demolition teams landed before the infantry. The first waves suffered heavy casualties from enemy automatic small arms fire and artillery, and the infantry were thus unable to afford the necessary protection to the demolition teams. Assault engineers consequently were forced to work on a tidal flat drenched with fire. Only five of the sixteen teams came in on their assigned beaches, and they had only six of the six-

teen tank dozers scheduled to land, five of which were shortly knocked out. They were able to clear only five narrow lanes instead of the sixteen 50-foot gaps planned, and of the five only one proved very useful. Through these inadequately cleared gaps the succeeding waves tried to pour onto the beach.

The landings of assault elements were unnecessarily marred by the repetition of an error which had been detected as early as the first DUCK exercise in January. Troops as well as vehicles were overloaded in the assault, often with tragic consequences. While there is no precise record of the load men carried, it is clear that the equipage of the individual rifleman weighed at least sixty-eight pounds. The additional personal items not specified in orders which many men are known to have carried brought the load of even the most lightly equipped rifleman to seventy or more pounds. BAR-men and heavy weapons crewmen carried even greater burdens.[3]

Planners had taken early cognizance of the weight problem. In the critique of DUCK I, the director of umpires had recommended that the load of the infantrymen in the initial assault be kept under forty-four pounds. In subsequent exercises, however, these good intentions were gradually submerged as more and more "essential" items were added to the soldier's pack, with the result that the load he carried in the OVERLORD assault eventually included several items not allowed for in recommendations of earlier conferences and critiques, such as grenades, TNT, a lifebelt, and a raincoat, which added about fifteen pounds to the load carried in the exercises.

Overloading had particularly serious consequences at OMAHA, where both surf and enemy opposition were greatest, and survivors of the landings there were virtually unanimous in their judgment that they had been overburdened with unessential impedimenta.[4] Battle shock and fear in themselves are known to induce physical weakening, and every extra pound which the soldier carried only reduced his tactical capabilities still further and in many cases prevented men from ever reaching the beach.[5]

In the midst of mounting confusion and congestion came the first elements of the engineer special brigades, which were to organize the beaches for supply. First to land was a small reconnaissance party from the 37th Engineer Combat Battalion, which came ashore at exit E–3 within a half hour of the first assault wave. Within another thirty minutes eight other groups from the engineer brigades reached the beach, but it was immediately clear that their planned work was impossible. The tidal flat was becoming littered with dead and wounded, and the infantrymen who

[3] The figure of sixty-eight pounds is derived from orders and historical accounts and includes the intrenching tool, which was not specified in orders but which other evidence indicates was carried. Royce L. Thompson, D Day Personal Loads, a compilation and study of data on the equipment and supplies carried by individuals in the assault waves on D Day, MS, OCMH.

[4] Ltr, AG 29th Div to AG WD, 1 Aug 44, sub: Battle Lessons, 29th Inf Div Battle Lessons 320–0.4 (5451); Thompson, D Day Personal Loads, Apps. IA5 and 7.

[5] After the war Col. S. L. A. Marshall, chief historian of the ETO and respected military journalist, first drew attention to the dire effects which overloading has on the individual's effectiveness in combat in an article in the *Infantry Journal* (October, 1949) entitled "The Mobility of One Man," later published as a book, *The Soldier's Load and the Mobility of a Nation* (Washington, 1950). Colonel Marshall showed that the load which a man can carry on a road march is no measure of what he can bear in battle, and proposed that the infantryman's load in combat be kept under forty pounds. The experience at the Normandy

had succeeded in reaching the sea wall or the shingle pile on the eastern end of the beach formed only a thin line of fire, which was inadequate to silence the enemy in his hill emplacements. Initially, therefore, engineers from the special brigades devoted themselves to aiding the wounded and building up the line of fire.

Landings continued in the second hour, but most of the men and vehicles were confined to the beach. A few small groups of infantrymen worked their way up the hills, but their penetrations were initially insufficient to reduce the enemy fire. The result was additional congestion and confusion. Engineer brigade troops landing in the second hour, mostly on the wrong beaches, joined the others in aiding the wounded and building up fire power. In a few cases they helped to blow gaps in the wire obstacles. Some units lost a large part of their equipment. Signal Corps troops, unable to use their transmitters, turned them over to the infantry who had lost their radios in the water.

Most of the landings in the first two hours were made near exits D–3 and E–1, in approximately the center of OMAHA Beach, creating increasing congestion and a profitable target for the enemy. The beach soon became littered with wrecked vehicles and landing craft, and to add to these difficulties the tide began to rise, forcing the gap assault teams to come ashore. This made the landing of all craft more and more hazardous and inspired the commander of one unit in the 6th Engineer Special Brigade to radio offshore command ships to stop sending in vehicles.

In the next two hours the number of landings was greatly reduced. The fire from the hills continued to be heavy, and many of the engineer troops continued to aid the infantry. One sergeant in the 37th Engineer Combat Battalion led a mine detector crew into an open field in the face of enemy fire and cleared a path up a defile between exits E–1 and E–3, opening the first personnel trail. Infantry units were then organized and urged to advance inland on this trail, and between 0830 and 1030 infantry parties managed to clear enough of the area around E–1 to enable elements of the 37th and 149th Engineer Combat Battalions to begin opening that exit. A company from the 37th cut one road from the tidal flat east of the exit, and another company from the 149th cleared a road to the west with dozers. Men from both battalions helped fill the antitank ditch blocking the exit and cleared mines from the road and a field to the west. Near D–3 elements of the 147th Engineer Combat Battalion cut through wire entanglements, blew gaps in the sea wall, and cleared the beach with dozers.

At 1030 the prospects for the beginning of orderly landings and the organization of the beaches still appeared very dim. The

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beaches indicated that any substantially larger burden only hastened bodily exhaustion and seriously impaired, if it did not completely destroy, the individual's mobility. In 1950 a special Army Field Forces board at the Infantry School at Fort Benning further examined the entire problem. The board concluded that the policy by which the soldier had been overloaded with supplies and equipment to meet every conceivable contingency had been wrong, for it had made the soldier a vehicle for the transportation of cargo beyond his immediate needs. It accepted forty pounds as the optimum load for the rifleman operating under the most trying conditions, but saw little possibility of reducing the load to that figure. The Infantry School at that time submitted minimum lists of equipment, the weight of which ranged from 44.88 pounds (for the rifleman) to 65.26 pounds (for the BAR-man) in the rifle squad, not including the clothing worn (7.88 pounds) and water carried in the canteen (2 pounds), which brought the minimum load for men in the rifle squad to a range of between 54.76 and 75.14 pounds. Rpt of Army Field Forces Bd 3, Project 2053A, 5 Aug 50, sub: Loads Carried by the Soldier and Means for Carrying Same, OCMH.

tide reached its peak at that time, landings had almost come to a halt, and except at E–1 enemy fire appeared as heavy as in the beginning. Infantry troops, however, were beginning to filter over the hills to get at enemy positions to the rear of the beaches, and two fortuitous events helped change the future. Two landing craft (an LCT and an LCI(L)), unable to find a safe landing place, suddenly drove full speed through the obstacles in front of E–3, firing all their weapons at the enemy emplacements. Both craft beached and landed their men. One of them was damaged and could not withdraw, but several enemy positions had been silenced, and the beach obstacles were found to be less formidable than expected. Observing the success of this daring experiment, other craft began to follow suit.

The second event to give heart to the attackers occurred at about the same time. A destroyer neared shore, swung broadside, and, beginning at D–3, fired on the German emplacements at that exit and then continued down the beach hitting all defenses spotted. Lack of communications with the beach had prevented calling for naval fire, and naval officers until that time had refrained from firing on beach targets because of the vague situation on the beaches and the fear of hitting friendly troops.

These two events unquestionably influenced the more rapid progress which followed. Men readily moved forward under the destroyer's support to take the high ground, and in the next two hours, from 1030 to 1230, more and more troops exploited the penetration inland, particularly on the eastern half of the beach. Additional combat units also landed to reinforce those already ashore, and some degree of order gradually emerged from the earlier chaos.

Elements of the engineer special brigades played a large role in resolving the confusion and congestion, although hardly according to plan. Beach clearance had been assigned first priority. But in some sectors such work was impossible and even pointless. First things came first. In some cases this meant clearing the ramps of LCT's so that undamaged vehicles could come ashore. In others it entailed removing damaged tanks and half-tracks which were clogging the beach exits. Shortly after noon all exit strongpoints were neutralized and a bulldozer began clearing the beach road. An attempt to cut a new road directly south from E–1 to the highway (Route B) proved premature, for Germans still held the ground north of the road. But vehicles began moving off the beach and over the hill, thus escaping the artillery fire that was falling on the beach, and at 1400 tanks began to use exit D–1. Exit F–1 had been cleared, but was of no use to vehicles because of the poor road. In the middle of the afternoon exit E–1, at the center of OMAHA, was still the focal point of beach operations.

Late in the afternoon, as the tide dropped, the gap assault teams returned to the tidal flat to carry out the mission that they had found impossible at H Hour, With salvaged explosives and detonating equipment and dozers borrowed from other units they resumed the work of clearing the beach of obstacles and debris. The task proved difficult even at this time. Artillery fire still covered all exits and continued to fall on the beach, and the almost continuous arrival of new waves of infantrymen hampered the demolitions. By late afternoon, however, five large and six small gaps were cleared and marked.

In the meantime the situation in the center of the beach continued to improve. Fighting in the vicinity of St. Laurent-sur-

Mer delayed the opening of through traffic in that area, but late in the afternoon 1st Division engineers pushed a branch road through from E–1 to the highway so that vehicles could be driven up from the beach and shunted off into fields adjoining the highway. The exit road was thus cleared and some of the congestion on the beach was relieved. Meanwhile brigade engineers cleared minefields and opened up transit and bivouac areas where units could pause and reorganize. On the beach they continued to aid the wounded and clear wreckage. Enemy small arms fire gradually slackened and died out as the infantry and engineers mopped up more and more of the hill area.

Organization of the eastern end of the beach also got under way late in the afternoon. Advance units of the 5th Engineer Special Brigade landed between exits D–1 and D–3, 4,000 yards from their assigned beach, and made their way eastward. The first men from the 336th Engineer Combat Battalion arrived at Exit F–1 at 1700 and found that good progress had been made in the removal of obstacles. Because the condition of the exit road had been miscalculated some changes in plan were necessary, but demining teams and tractors immediately started work on another route and built a through road to the highway. Antitank ditches were filled, fields were cleared of mines, and a number of LCT's and other craft were ordered to land on the beach opposite F–1 in anticipation of the opening of the new exit. The exit was actually opened at 2000 hours when two tanks passed through, although succeeding tanks struck mines and were disabled. A path around the tanks was cleared, and by 2230 other tanks were passing through to aid in clearing the enemy from the Colleville area. Two small fields on the high ground were then demined and used as dump areas, the first deliveries being made in dukws preloaded with gas. Additional fields near the exit were cleared for use as bivouacs.

Toward evening the situation also improved at exit E–3. Enemy small arms fire was finally silenced about 1630. Men of the 348th Engineer Combat Battalion began sweeping the lateral beach road for mines, completing the task by 1700. For some time, continued artillery fire on the beach prevented work on the exit road, but by 2000 hours it slackened sufficiently to permit beach engineers to work on this road also. They made the most of the unusually late hours of daylight, but sniper fire stopped work after darkness fell. Tanks began using the exit shortly after 0100.

By the end of D Day, then, the prospects for systematic organization and operation of the beaches at OMAHA were much more encouraging. Brigade engineers had opened enough beach exit roads to accommodate all incoming vehicles and had made a good start on clearing obstacles from the tidal flat. Three exits—D–1, E–1, and F–1—were in operation, the first dumps were open, and units of the Provisional Engineer Special Brigade Group were ready to reorganize and begin their planned missions. Logistic operations on the first day had been limited chiefly to such tasks as removing obstructions and cutting trails to permit the movement of men, vehicles, and a few supplies away from the congested beaches. Tonnage targets had to be forgotten, and only a negligible quantity of stores could be landed and placed in the hastily improvised dumps. Personnel build-up, on the other hand, fared quite well in view of the heavy fighting on OMAHA Beach. Of the two loaded forces intended for OMAHA—Force O, with 29,714 men, and Force B, the follow-up force of 26,492

men, only part of which was expected to land on D Day—more than 34,000 are estimated to have crossed the beach on the first day.

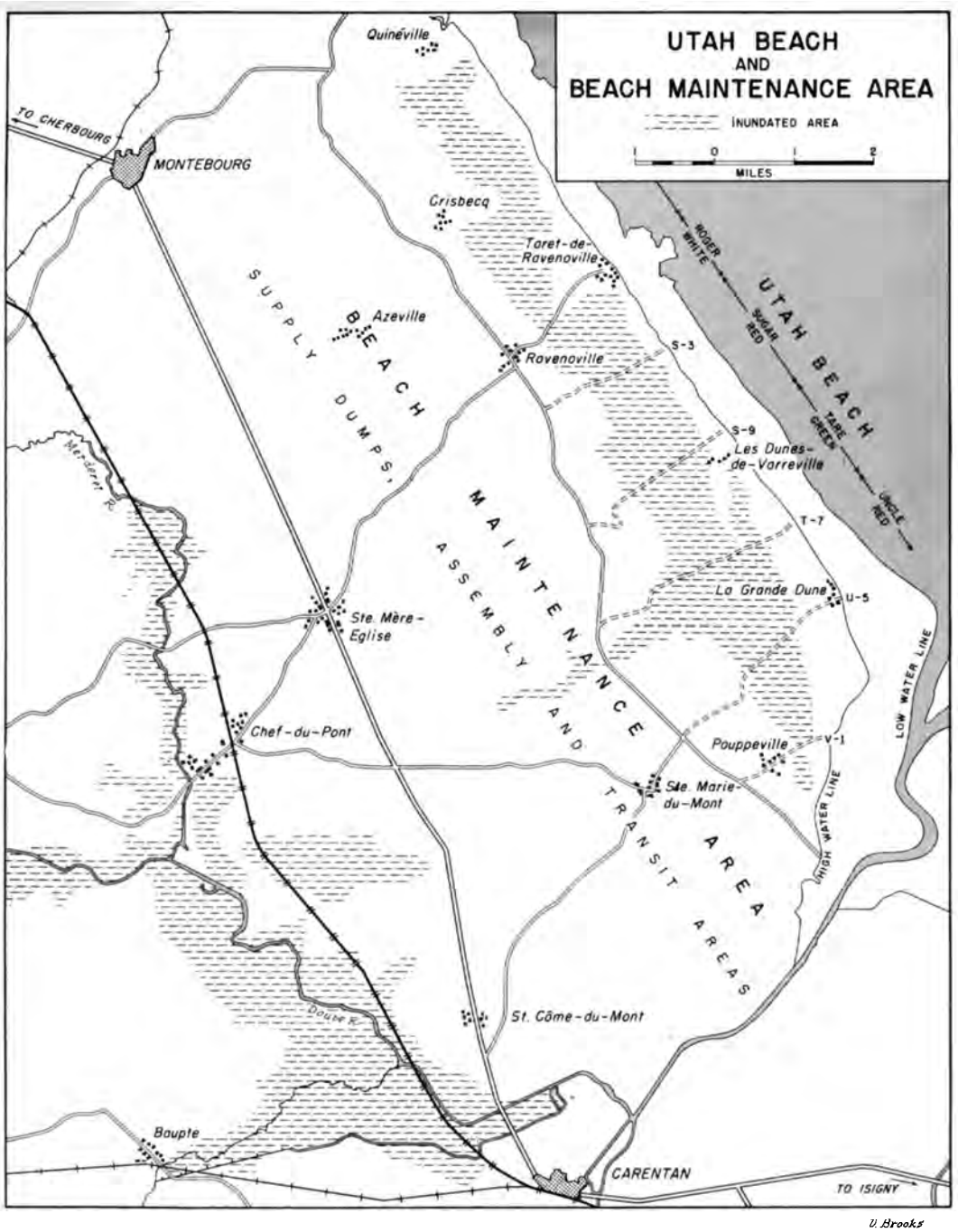
All engineer special brigade operations on D Day were under the direction of the commanding officer of the 5th Brigade, Col. Doswell Gullatt. In midafternoon the command party of the Provisional Engineer Special Brigade Group arrived at Exit E–1 and set up its first headquarters in a beach pillbox. At midnight the commanding general of the group, Brig. Gen. William M. Hoge, took command of all units ashore. Those of the 6th Brigade, which had been under the control of the 5th, then reverted to their parent headquarters. The commander of the 6th Brigade, Col. Paul W. Thompson, became a casualty on D Day and was succeeded by Col. Timothy L. Mulligan.

(3) UTAH Beach on D Day

While operations at OMAHA were going badly, those at UTAH proceeded more nearly according to plan and provided one of the bright spots of the day. In many respects the physical characteristics of UTAH and OMAHA were similar, but in some ways they differed as sharply as did D-Day operations on the two beaches. UTAH Beach was a 9,000-yard stretch of flat sandy beach extending from the mouth of the Douve River north and northwest to Quinéville. (*Map 13*) The assembly, or transport, area for Force U was the same as for the OMAHA forces, ten to twelve miles offshore, and partially sheltered from westerly storms by the Cotentin peninsula. UTAH Beach itself, lying on the eastern shore of the peninsula, enjoyed even better protection than either OMAHA or the British beaches against storms from the northwest. Otherwise weather and tidal conditions were about the same. Deep anchorage for task force vessels was provided about two and a half miles offshore. UTAH, like OMAHA, had a wide tidal flat. In some places it was even wider than the one at OMAHA, and in the southern sector, near the mouth of the Douve, it was so wide and the gradient so slight that it was useless for landing craft.

The UTAH tidal flat had the usual type of beach obstacles, which were thicker toward the northern end of the beach. Beyond the high-water mark was a stretch of loose sand about twenty-five yards deep, backed by a concrete sea wall about five feet high which extended the entire length of the planned assault beaches. Gaps existed for exit roads at two places, but all other outlets were blocked off. Immediately to the rear of the wall were sand dunes, in some places barely extending above the wall, in others reaching a height of perhaps twenty-five feet. In this respect UTAH contrasted sharply with OMAHA, for there was no sudden rise immediately behind the beaches. Physically the dunes constituted no hazard to assaulting troops. But built into them were the enemy defenses—field fortifications consisting of fire and communications trenches, machine gun emplacements, and some field guns. Concrete pillboxes were built into the sea wall itself and thus were tied in with the other fortifications. The strongest of these were on the northern half of the beach, at Les Dunes de Varreville and beyond.

The grassy sand dunes extended inland from 200 to 600 yards, sloping downward and becoming flat pasture land and cultivated fields. The fields were small in size and distinctly outlined by their tall border hedges, drainage ditches, and tree lines. Behind the actual assault beaches, in the



U. Brooks

MAP 13

southern sector of UTAH, the flat pasture land extended inland about 1,000 yards. Farther north it gradually decreased in width and almost disappeared, becoming only a narrow spit of solid ground between Ravenoville and Quinéville. Beyond this solid ground lay an inundated area. This feature of UTAH Beach, plus the absence of hills behind the beaches, formed the most striking contrast with OMAHA, and created an entirely different problem.

The flooded area extended from Quinéville south to the Douve River and averaged 1,500 to 2,000 yards in width. In the area of the assault opposite La Grande Dune the water started 1,000 yards behind the beach and extended 1,800 yards inland, its depth varying from two to four feet. This water barrier was an artificial one, created intentionally by the enemy to prevent, or at least hinder, an advance inland. The flooding was controlled by obstruction across several small streams south of Quinéville, and in the southern sector additional inundations could be created by the control of certain locks, for the land was slightly below sea level at high tide. Beyond these inundations the terrain was similar to that behind OMAHA Beach. It consisted of gently rolling country and offered no unusual difficulties to the attackers except for the hedgerows that sharply limited observation. The enemy built heavily fortified casemated batteries on the headlands overlooking the inundated area.

The flooded area posed a special problem in the UTAH area. Even if the assaulting troops overcame opposition on the beaches they would still have to cross the flooded area. There were only a few roads or causeways across these inundations, down which the attacking forces would be channeled, and it was likely that the western shore of this area, and particularly the road exits, would be defended. The anticipation of difficulties in crossing this barrier was one of the chief reasons for the decision to use airborne troops. These troops were to drop behind the inundations, disrupt communications, capture strategically important objectives, and secure the western exits to facilitate the crossings of the seaborne forces. The roads and causeways that led from the beach inland and across the inundations were therefore an important feature of the area. Infantry troops might with difficulty be able to wade through the shallower parts of the inundations; but the area was honeycombed with deep drainage canals and tributary ditches, which presented a hazard to any movement inland, and the causeways were vitally necessary to the movement of vehicles and artillery.

The roads leading across this artificial lake in the area of the assault varied as to type and state of repair. The following ones were the more important, from north to south: S–9, which was flooded along its entire length; T–7, which was also flooded for most of its length, but hard surfaced and usable even though under water; U–5, leading directly inland from the center of the assault area, narrow but hard surfaced and in good condition, and the first to be used by troops on D Day; and V–1, at the southern extremity, which was almost completely dry, but in poor condition and without a beach exit. All of the causeways were narrow, and their shoulders had been softened by the water. The importance of gaining immediate control of them was obvious.

Plans for the landings at UTAH Beach were very similar to those for the landings at OMAHA. Infantry assault teams were to constitute the first wave, followed closely

by the gap assault teams which were to clear avenues through the obstacles on the tidal flat. The initial landings by two battalions of the 8th Infantry (4th Division) took place approximately on time, but about 2,000 yards to the left (south) of the planned beaches. The error actually proved fortunate. Beach fortifications at the planned landing spots were stronger, and the tidal flat was mined and had many more obstacles than farther south. The actual assault beach had only one less favorable feature. The distance between the low- and high-water marks was greater, creating a wider tidal flat, forcing craft to remain farther offshore, thus causing some beaching difficulties.

The first landings were made astride route U–5, rather than T–7 as planned. Some of the amphibian tanks were late in arriving, but almost all of them landed and aided in reducing the opposition along the beach. The gap assault teams which had been scheduled to land in separate waves—the Army-Navy teams to clear the underwater obstacles, and the Army teams to clear those above water—actually landed almost at the same time. This departure from plan also proved fortunate, for all obstacles were found to be dry, and the demolition teams therefore found it possible to clear complete lanes by placing their charges on all bands and blowing them simultaneously. And since the obstacles were not as thick as had been expected, they cleared the entire assault beach on the first tide instead of blowing only fifty-yard gaps as originally planned. A wide avenue of approach was therefore open at an early hour, allowing uninterrupted landings on a relatively broad front. Other engineers meanwhile proceeded to blow gaps in the sea wall and to destroy barbed wire obstacles in front of the wall and on the dunes. Four gaps were soon blown in the wall to provide exits for vehicles, and two Belgian gates were blown from the exit at the terminus of route U–5.

Elements of the 1st Engineer Special Brigade, including its commander, Brig. Gen. James E. Wharton, began to cross the beach at about H plus 60 minutes. Initially the brigade was to organize two beaches, known as Uncle Red and Tare Green, each with a width of 1,000 yards. To the north of Tare Green a third beach, Sugar Red, was to be opened on the second tide. When the assault forces landed too far south these beach designations were simply shifted to correspond to the actual landings. Uncle Red and Tare Green therefore lay approximately south and north respectively of the U–5 exit.

The first elements of the brigade to land came from the 531st Engineer Shore Regiment and the 286th Joint Assault Signal Company. When they landed (H plus 60 minutes) there was no longer any small arms fire on the beach except from a few snipers, although there was intermittent shelling from inland batteries. There was none of the congestion that prevailed at OMAHA. Units arriving in the succeeding waves had no difficulty getting off the beach, and there was very little wreckage. The initial tasks of the engineers included the building of exit roads through the sea wall and dunes, and the clearing of mines from roads, dump sites, and transit areas. Few areas in the immediate vicinity of the assault beaches were actually mined, but the enemy had marked many fields as mined and they had to be combed thoroughly. While the fields were being checked, brigade engineers widened the gap at U–5 and blew additional gaps in the sea wall. They improved the existing

beach road with wood and wire matting known as chespaling. U–5 was found to be usable, and troops and tanks began crossing the flooded area via the causeway. Meanwhile General Wharton redesignated the beaches, and markers were prepared to aid incoming craft in locating the beaches, exits, and various installations as they were completed. Officers also reconnoitered the area north of Tare Green, and the beach was partially cleared in preparation for its operation (as Sugar Red) by the 531st Engineer Shore Regiment. The 1st Brigade command post was established about 700 yards behind the dune at the small hamlet of La Grande Dune. With the arrival of other brigade units, such as elements of the 1106th Engineer Combat Group, work also began on the causeway roads across the flooded area, and on the sluice gates which controlled the water in the inundations. The most important of the locks were the northern gates near Quinéville, the central gates north of Sugar Red beach, and the locks southeast of Pouppeville. Neither the northern nor central locks could be reached on D Day, but elements of the 1106th worked their way down the beach to the Pouppeville area, removed booby traps, and demined and opened the locks there to begin draining the southernmost area.

The organization and operation of UTAH Beach proceeded, but not without difficulties. Enemy shelling continued with varying intensity and hampered beach work to some extent. Perhaps more important were the navigational difficulties, changes in naval landing orders, and beaching troubles, which contributed to a general slowing down of the landings. The planned phasing of troops fell behind schedule quite early, vehicles arrived late throughout the day, and the sequence of landings was not strictly followed. The remoteness of the transport area and defects in ship-to-shore communications and coordination contributed to these difficulties. One of the chief tasks of beach engineers was to rescue drowned vehicles. Because of the shallow gradient, landing craft tended to discharge their loads in deep water, and many vehicles stalled as they left the ramps.

Nevertheless the build-up continued steadily and in a much more orderly manner than at OMAHA. Causeway U–5 had been placed in service during the morning after some difficulty with an enemy antitank gun on the west bank of the inundated area, and engineers had quickly installed a treadway bridge to replace a culvert which had been blown. U–5 was the best of the causeways and soon bore the main burden of vehicle traffic inland. By noon it was clogged with vehicles, and two-way traffic became almost impossible because of the trucks and guns which had slipped halfway off the soft shoulders and mired in the mud and water that came within a foot of the road's surface.

Development of the beaches themselves continued as additional elements of the 1st Brigade landed. Work on the third beach, Sugar Red, was stepped up with the arrival of the 3d Battalion of the 531st Engineer Shore Regiment, although the job was hindered somewhat by the continuing shellfire and by the late arrival of road construction equipment. As the tide again ebbed later in the day gap assault teams returned to the tidal flat they had cleared on the first low tide. They resumed the demolition and removal of obstacles on the flanks and thus cleared a still greater expanse of beach. Eight major gaps were blown in the sea wall, and Sommerfeld

track[6] was laid to the existing lateral roads. About nightfall route T–7 was opened, although the road was still under water.

Unloading operations also proceeded more satisfactorily than on OMAHA, although hardly according to plan. Because every craft scheduled to land and discharge on D Day was combat loaded, all unloading was confined to the offloading of trucks and the unloading of engineer road-building equipment from preloaded LCT's. Only six of the twelve LCT's came in on D Day, and one of the six was lost after it beached when it received a direct hit from an enemy shell. Two others were hit but managed to transfer their loads to other craft. The remaining six beached and unloaded on D plus 1. Dumb barges[7] were also beached on D Day, but were kept in reserve and not unloaded. Only limited use was made of dukws on the first day. Four of the amphibians came ashore with their cargoes at 1330 and during the rest of the day were used to evacuate casualties. Since the dukws were not yet greatly needed, most of them were held offshore until D plus 1 to prevent losses.

The establishment of dumps and transit areas also began on the first day, but could not proceed as planned because some of the chosen areas remained in enemy possession. Beach dumps were established on Tare Green for ammunition and medical supplies, and brigade officers reconnoitered inland dump sites. Class I, III, and engineer Class IV sites were in the hands of the 4th Division, but still under the fire of enemy snipers. None of the other planned locations had been captured. The same situation prevailed for the transit areas. One was overrun but was under enemy fire; another remained in enemy hands throughout the day. Incoming units therefore reorganized and bivouacked in an initial assembly area immediately behind the dunes, thus causing some congestion and hindrance to engineer operations toward the end of the day. Military police units began to land within the second hour of the landings, their principal task being to keep traffic moving inland so that troops and vehicles would be dispersed and other units could cross the beaches.

As at OMAHA, brigade units worked late on D Day (until 2300). Enemy planes raided the beach after darkness, but they inflicted no damage, and the end of D Day saw a fairly high degree of organization and security despite landing difficulties and enemy fire. The tidal flat was clear of obstacles, exit roads had been established, the beach area had been demined, two causeway roads were in use, and a few dumps were established and in operation. There are no estimates as to tonnages of supplies landed, but approximately 23,000 of the 32,000 men in Force U crossed the beach on D Day.

(4) Development of the OMAHA Area

At both OMAHA and UTAH various difficulties hampered beach development, and discharge performance was erratic for some time. UTAH was subject to enemy artillery fire for a full week. The Germans shelled OMAHA only until about noon of D plus 1, but sniping from scattered enemy troops plagued the beach maintenance area for several days. The engineers were under the initial disadvantage of having to clear a great amount of wreckage. Ship-

[6] A matting made of wire netting reinforced with steel, used in the same manner as chespaling.

[7] Unpowered LBV's which had a capacity of 100–200 tons and could be beached.

to-shore operations did not go smoothly at either beach at first.

These troubles were gradually overcome, and tonnage discharge improved steadily. Beginning with an estimated capacity of 2,400 tons on D Day, the daily discharge rate at OMAHA Beach was scheduled to reach 10,000 tons by D plus 12 rising to 15,000 tons in about two months. UTAH was estimated to have a starting capacity of 2,250 tons, leveling off at 5,700 tons by the end of the first week and ultimately attaining a maximum of 10,000 by the end of the second month. There are no records of actual unloadings on D Day and D plus 1. Available figures indicate that UTAH exceeded its planned intake of 3,300 tons on D plus 2. But the chaotic situation at OMAHA in the first day or two and the shipping and unloading difficulties at both beaches permitted a total discharge of only 26.6 percent, or 6,614, of the planned cumulative 24,850 tons at the two beaches in the first three days.[8]

Marked improvement was made in the next few days at OMAHA, where the target of 7,000 tons was actually exceeded on D plus 5. At that time 28,100 tons or 46.6 percent of the planned cumulative 60,250 tons had been discharged on the two beaches. Vehicle build-up continued to lag at both beaches, with only 20,655 or 65.7 percent of the planned total of 31,424 tons unloaded at this date. Personnel build-up fared considerably better. By D plus 5, 88 percent, or 184,119, of the planned cumulative build-up of 207,771 had been achieved, with eight and a half of the planned nine divisions ashore.

The progress of the OMAHA area was made possible partly by the rapidly moving tactical situation. On the morning of D plus 1 enemy troops were still fighting on the edge of Vierville and St. Laurent. But the advance south of Colleville was more rapid. On D plus 2 the Americans entered both Formigny and Mosles and made a rapid advance westward almost to Grandcamp. On D plus 3 they entered Isigny, and with the taking of Trévières on D plus 4 all of the area north of the Aure River, the proposed beach maintenance area, came under V Corps control.

One of the chief concerns of the beach brigades was the protection of the beach area against enemy activity. Elaborate precautions were taken, particularly against air attacks. In addition to taking normal measures, such as providing antiaircraft artillery and camouflaging installations, the Americans made plans for the use of deceptive lighting to represent such things as convoys and beach exit roads, and also for the use of smoke. But the deception plan was abandoned as unfeasible, first, because capture of the area in which it was to be used was delayed and, second, because the bright moonlit nights made its success doubtful. Nor were smoke generators used, inasmuch as air attacks never became serious. The few enemy planes that appeared over the beach every night inflicted only slight damage on installations and troops. Enemy activity was directed mainly against ships anchored offshore and consisted primarily of dropping mines, which caused some sinkings. The most serious damage in the beach maintenance area occurred on the night of 13–14

[8] First Army build-up figures, as given in FUSA Rpt of Opns (Bk. V, p. 147) do not agree with those of the brigades. The statistics given here are derived from a comparison of actual build-up, as given in NEPTUNE: Training for and Mounting the Operation, II, Apps. A, B, and C, based on brigade records, with planned personnel and vehicle build-up as given in the FUSA Troop List (FUSA Rpt of Opns, 20 Oct 43–1 Aug 44, Bk. II, pp. 142ff.) and planned tonnage discharge as given in NEPTUNE, II, App. A.

June, when fifteen tons of ammunition were destroyed in a dump near Formigny. Beyond this sporadic and relatively ineffectual air activity the enemy did little to disrupt the organization of the beach. The development of the beach maintenance area and port area therefore proceeded relatively free of interruption.

Plans had outlined three phases in the development of the beach areas after the assault. In the first phase, known as the initial dump phase, the beaches were to be marked and cleared of wreckage, and temporary supply dumps were to be established on the beach itself. The second phase, called the beach maintenance area dump phase, was to begin when the dumps were moved farther inland. The third, or port phase, would begin with the opening of the MULBERRY. These designations were established simply for convenience in planning, and no schedule was written for the beginning and ending of the phases. The transition from one to another was expected to be gradual, with certain installations closing as new ones were opened.

The initial dump phase may be said to have begun on the morning of D plus 1, the first beach dumps having been opened late the first night. One of the first tasks on D plus 1 was marking the beaches so that incoming craft could locate the proper unloading points. The few markers that had been erected on D Day were shot down by enemy artillery. Beaches were designated in accordance with the British "World Wide System" of marking. Under this system the entire 7,900-yard stretch of beach was divided into sectors, named after the phonetic alphabet, beginning with Able at the western extremity. What is usually referred to as OMAHA Beach consisted of beaches Dog, Easy and Fox. Each of these was further subdivided into three subbeaches known as Green, White and Red. The beaches were marked with large panels, and with colored lights at night.

Another task which had high priority was beach clearance. On the morning of D plus 1 the tidal flat was still littered with wrecked ships, drowned vehicles, obstacles, and equipment. Scores of craft lay beached at the high-water mark, some undamaged, but many torn by shellfire. The clearance of the flat was obviously necessary to allow the beaching of additional craft and the movement of men and supplies. Special brigade units applied themselves to this task at first light at D plus 1. In addition, survivors of the demolition teams returned to remove the remaining obstacles, and dozers towed away swamped vehicles. Some craft were patched up enough to be floated again. Several days were required to complete this cleaning up. In the meantime work also proceeded inshore of the high-water mark. Gaps through the shingle pile and sea wall were widened, chespaling was laid on the soft sand to provide a firmer footing for vehicles, beach exit roads were improved, and mines were swept from fields needed as bivouac areas or parking and dump sites.

Preoccupation with preliminary work such as clearance delayed the planned development of the beaches. One result was that LCT's and preloaded barges intended as an insurance against bad weather were the only means of supply on both beaches in the first days, and larger vessels could not be berthed inshore until late on D plus 1. By D plus 2 an enormous pool of unloaded ships lay offshore, and the debarkation of personnel and unloading of supplies consequently fell far behind schedule.

Other conditions contributed to this lag. Certain methods of discharge of the various types of ships and craft had been specified and a system of calling in and berthing of craft had been worked out. Both plans had to be radically altered before unloading met requirements. Troops and vehicles continued to go ashore on D plus 1 via two methods. Under the first, landing craft, except LST's, beached and when necessary "dried out." The craft would beach on a falling tide, discharge after the water had receded, and then wait to be refloated on the next tide. Vehicles and men could thus go off the ramps onto a dry beach instead of wading through several feet of water. Only the smaller craft used this procedure. MT coasters, MT ships, APA transports, and LST's were unloaded onto ferry craft and dukws. But it became evident on D plus 1, when unloadings fell behind, that the process had to be speeded up. One solution was to beach LST's and dry them out, as was being done with smaller craft. This method was urged by ground force commanders in both the V and VII Corps, for there was growing concern over the lag in the build-up. Naval authorities had not favored this procedure for LST's because ground inequalities on the beaches might cause hogging damage. Larger craft had been successfully beached in the Mediterranean, where tides were small, but it was feared that they might break their backs if dried out on the Normandy beaches. When landings fell behind schedule, however, and when the Americans realized that scores of smaller craft had been lost in the assault, they decided to take the risk. Experimentation with several vessels revealed no damage to the ships,[9] and, beginning on D plus 2, LST's were dried out regularly. More than 200 were unloaded in this manner at OMAHA in the first two weeks, all without damage. The discovery that the beaching and drying out technique could be applied to LST's was an important factor in the accelerated build-up of troops and vehicles.

A second important modification was necessitated by the partial failure of the plan for calling in and berthing ships and craft. Supply plans for OVERLORD had laid down a procedure by which stowage and sailing information could be transmitted to the First Army, enabling the latter to establish unloading priorities in accordance with immediate and foreseeable needs. Times of departure, identities of ships, and manifests showing their content and stowage plans all were supposed to be communicated to the First Army in advance by a combination of radio and airplane or fast surface craft. First Army was to consolidate this information and send it to the beach brigades, assigning priorities for unloading. Upon the actual arrival of ships at the far shore, the Naval Officer in Command (NOIC) at the beach was to inform the brigades, which would indicate the time and place of berthing according to priorities established by the army.

This plan broke down in actual operations, mainly as the result of poor communications. The inability of planes to get through, and the tardy arrival of courier launches, plus other failures in communications, meant that ships would arrive and no agency ashore or afloat would know their identity or their contents. Stowage plans were not received, and ships arrived without being seen by the NOIC. In addi-

[9] Operation, Organization, Supply and Service of the Transportation Corps in the ETO, Gen Bd Rpt 122, pp. 28-29; Ltr, Col Charles F. Howard to CG AGF, 27 Jul 44, sub: Observer's Rpt, WDGDS 319.1, A47-2, Rpts, I.

tion, there was a shortage of ferry craft to transfer cargo from ship to shore. The lack of orderly control of allocation and berthing of ships resulted in considerable confusion afloat and ashore. Lacking instructions, ships' masters frequently made their own decisions on where to anchor their ships, some going to the wrong beaches, many of them anchoring too far offshore, thus necessitating long round trips for ferry craft and dukws.

First Army initially insisted on adhering to the system of selective unloading and unloading on a priority basis, even though manifests were unavailable and the names of the ships offshore were unknown. For a time Navy and Transportation Corps officers had the impossible task of going about in small boats to determine what ships were present and what cargo they carried. Armed with this information First Army would then indicate the vessels it wanted unloaded. Since unloading priorities and allocations were often made late or not at all, the brigades likewise resorted to expedients and adopted the practice of scouting for ships awaiting discharge, and then working whatever vessels were ready and eager to unload.

The subsequent provision of radio communication between the offshore naval control craft and beach headquarters made it possible to identify craft on arrival at the control point and to make arrangements with the beach brigades for berthing. But these improvements in communications were not made in time to prevent the formation of a large backlog of loaded ships and craft. A more immediate although temporary remedy was found in abandoning the priority system. After repeated requests by naval authorities, First Army finally agreed on D plus 4 (10 June) to order LST's and LCT's unloaded in the order of their arrival, and on the following day it ordered all ships and craft unloaded without delay and without regard to priorities. Another expedient which aided in speeding up unloading operations was the relaxation of blackout restrictions. Because opposition was slight, vessels were authorized on 12 June to use hooded lights to permit unloading to proceed at full capacity throughout the night. By that date a shortage in some types of ammunition had developed, particularly in 155-mm. shells, and ammunition was therefore given unloading priority for a time. The new plan quickly solved the problem, and the backlog of ships was cleared by D plus 9 (15 June).[10]

In ship-to-shore operations, cargo was moved by a variety of ferry craft, including lighters, barges, dukws, and landing craft of the smaller types, principally the LCT, which was considered one of the most useful of the naval craft. By plan, the deputy assault group commanders were to direct the use of ferry craft until the NOIC was ready to take control. After the assault, however, the landing craft were scattered, it was difficult to concentrate them at the designated rendezvous points, and the deputy assault group commanders were not equipped to operate the large numbers of craft. Consequently the transition of control to the NOIC was "not notable for its orderliness," and the employment of ferry craft was not efficient in the early stages. In many instances craft were unavailable when needed, and sometimes they were as much as forty-eight hours late in responding to requests. While

[10] Operation Report NEPTUNE, OMAHA Beach, prep by Hist Sec ETOUSA, Sep 44, pp. 175–78, 188, OCMH; Operations History of the Advance Section, COMZ ETOUSA, prep by Hist Sec ADSEC, 1945, mimeo (hereafter cited as ADSEC Operations History), pp. 31, 38, OCMH.

their first-priority mission was to unload vessels carrying vehicles, in which a backlog developed, it became necessary to shift the ferry craft to certain coasters loaded with critical supplies.

One of the most useful of the various types of craft was the Rhino ferry, a barge made up of ponton units and propelled by outboard motors. Rhino ferries were towed across the Channel, their crews riding on the open and unprotected decks, and then used to unload LST's and MT ships. They enjoyed several advantages over other craft, for they had a large load capacity (two could normally empty an LST), their cellular construction made them almost unsinkable, and they could discharge vehicles on beaches of almost any gradient. Even when they were poorly beached and broke their backs the undamaged sections could readily be joined with others to build a new ferry. In the early stages, before LST's were beached, these craft brought in a large percentage of the vehicles, and their crews displayed a high quality of seamanship in handling the unwieldly craft.[11]

Much of the initial cargo unloading was accomplished by dukws. These 2½-ton amphibians were called on to bear a heavy burden in the early ship-to-shore operations and, as in the earlier Mediterranean operations, proved their versatility and endurance. The first dukws were scheduled to land within the first hour on D Day. One unit attempted to land at that time, but its officer was killed and none of the amphibians reached the beach. Others went ashore early in the afternoon, but most of the dukws scheduled to land on D Day were held offshore until D plus 1. Once they were available great demands were placed on them because of the shortage of both ferry craft and trucks. The lack of trucks forced the dukws to carry a major portion of the supplies the entire distance from the ships to the initial dumps. They had originally been intended to carry their cargo only to beach transfer points, where it was to be lifted onto trucks and transported to dumps. The practice of having dukws carry their cargo beyond the beaches was uneconomical, for their ship-to-shore function was a highly specialized one. They had a relatively slow speed in the water, and the added mileage only increased their turnround time and thus reduced their overall capacity. Nevertheless they continued to make the complete round trips to the dumps until enough trucks became available and transfer points were established.

To make matters worse, many of the dukws were discharged as far as twelve and fifteen miles from shore in the first two days. Many exhausted their fuel in the long run, in maneuvering, in searching for the proper beach, or in awaiting an opportunity to land. When they ran out of fuel they sometimes sank, for the bilge pumps stopped when the motor went dead. In addition, most of the amphibians preloaded for the assault were overloaded. Their normal load was three tons, but most of them carried at least five tons, and some as many as six and seven, a burden that caused many to swamp. While maintenance of the dukws was generally good, there was a serious lack of spare parts, which had to be salvaged from sunken vehicles and from 2½-ton cargo trucks, many of the parts being interchangeable. Despite excessive periods of operation and special maintenance problems the dukw again demonstrated its usefulness and dependability. Its unique ability to trans-

[11] Operation Report NEPTUNE, pp. 199–201.



DISCHARGING AT THE BEACHES. *Landing craft, above, and Rhino ferry, below.*



port cargo both from ship to shore and overland to dump contributed immeasurably in meeting the problem posed by the shortage of trucks, cranes, and transfer rigs during the first days. In the words of one observer, "It converted this beach operation from what might have been a random piling of supplies on the beach to an orderly movement from ship to dump." [12]

Landing hazards had reduced the number of trucks available, and many were either lost or held offshore longer than planned. The losses resulted more from drowning than enemy fire. Landing craft often beached in front of deep runnels and sometimes lowered their ramps in four to six feet of water. Waterproofing failed to protect vehicles in such depths, and many were either swamped or mired in sand after leaving the craft. The 5th Brigade alone lost forty-four trucks in the first two days, mainly in this way. At no time were there enough vehicles to meet the great demand for them on the beach. The critical period in operations came at low tide when trucks were needed for hauling the cargo brought ashore by ferry craft as well as the cargo brought to transfer points by dukws. Maintenance work on trucks was therefore restricted to high-tide periods, and available vehicles were pooled under brigade direction and allotted to the engineer battalions in accordance with needs.

Quartermaster and Ordnance units, attached to the brigades to set up the first dumps, began landing at D plus 90 minutes, but they found it impossible to carry out their assigned tasks because of enemy fire. Elements of the 95th Quartermaster Battalion, for example, suffered sixteen casualties coming ashore, others were forced to dig in on the beach, and still others were held offshore. Despite the situation on the beach some supplies were brought ashore and piled on the beach, and the 37th Engineer Combat Battalion cleared a few small fields for emergency dump and transit areas, at which preloaded dukws discharged the first ammunition. These emergency dumps in the 5th Brigade area operated through D plus 2, and then were consolidated with larger dumps. In the 6th Brigade area on the western half of OMAHA Beach emergency Class V dumps were established as late as D plus 1 and 2, and one continued to issue ammunition till D plus 5. Meanwhile the first planned dumps were opened in the 5th Brigade area on D plus 1 and in the 6th Brigade area on D plus 4. They were located behind the cliffs, inland from the beach. Sniper fire hampered operation of the 5th Brigade's initial dumps until D plus 3, and in the western sector the dumps were still so near the front lines when they opened on D plus 4 that shells were taken from their boxes at the dump and carried by hand to the artillery batteries. Very little segregation of supplies was possible, and it was difficult to locate required items. In these first days priority of cargo unloading was generally given to ammunition, and on D plus 4 a special air shipment of 200,000 rounds of small arms ammunition was made to overcome a developing shortage in this category. The reserves of Class I and III (rations and gas) carried by the units in the assault tided them over the critical first stages when supply was difficult. [13]

On D plus 6 (12 June) the initial beach dump phase ended and the beach maintenance area dump phase began. On that

[12] *Ibid.*, pp. 199–203, 207–08; ADSEC Operations History, pp. 34–37; Ltr, Hq COMZ to CG ADSEC, 21 Jun 44, sub: Inspection of UTAH Beach—Misuse of Dukws, with Ind, Col Cort, CofS, ADSEC, 26 Jun 44, EUCOM 451.94 Amphibian Vehicles 1944.

[13] Operations Report NEPTUNE, pp. 225–31; FUSA Rpt of Opns, 20 Oct 43–1 Aug 44, Bk. II, p. 55.

day the inland dumps began to function, although a few had actually begun to issue supplies the day before. The dumps were located very much as originally planned, except those for Class V (ammunition), which were consolidated near Formigny. It became evident early in the operation that ammunition would offer the biggest supply problem, since stocks were not built up as rapidly as had been hoped. The Americans decided to open only one Class V dump, the one near Formigny, and First Army almost immediately took charge of it. On D plus 7 First Army decided to take control of all inland dumps from the beach brigades in order to tighten control over the issue of critical items. The responsibility of the special brigades was thereby limited to unloading supplies from ships and craft and passing them across the beach to the army supply points. In the next few days engineer, signal, and medical dumps were opened, and existing installations were expanded. Most of the dumps were located in the small Normandy fields, with supplies usually stacked along the hedgerows which provided partial concealment. In many cases it was necessary to fill ditches and punch gaps in the hedgerows to permit truck movements. The fields were well turfed and provided a firm footing for storage, but there was considerable trouble with mud during rainy spells.

While the beach maintenance area dumps were being established, the first transfer points were opened on the beach in order to speed deliveries to the dumps and to save dukws the long trip inland. The transfer points were simple, consisting mainly of crane facilities to swing nets of cargo from dukws to trucks. They were set up so that dukws and trucks approached the cranes in parallel lanes on either side, with the cargo being transferred either directly or to a platform where it could be sorted and reloaded. Later, when more trucks were available, a highly organized transfer system was worked out with carefully co-ordinated control, closely regulated traffic, and an efficient communications system connecting traffic control towers, truck pools, and transfer points, to facilitate the most economical use of all vehicles.

In contrast to the confusion and chaos of D Day, activities at OMAHA Beach by the end of the second week resembled the operations of a major port. Except for three or four wrecked craft, beaches were clear, and minefields behind the sea wall were slowly being cleared. Additional roads were pushed through the shingle pile, and exits were blasted through the sea wall. The discharge and inland movement of cargo and the evacuation of casualties and prisoners of war were highly organized. One of the most encouraging developments for the engineer special brigades was the build-up of trucks, for every additional truck increased the amount of cargo which could be unloaded and moved forward. By the end of the second week the limiting factor in supply build-up was no longer the number of trucks, dukws, and ferry craft, but the arrival of ships. At that time the daily tonnage discharge at OMAHA averaged nearly 9,000 tons, about 95 percent of its target, and approximately 11,000 men and 2,000 vehicles were crossing the beach every day and moving forward to add their weight to the offensive.

(5) Development of the UTAH Area

UTAH Beach likewise developed into an important logistic base within the first two weeks, although on a smaller scale than OMAHA. In the first few days UTAH was actually able to receive greater tonnages

than its neighbor (a total of 7,541 tons in the first four days as against OMAHA's 3,971) and in the second week of operations it began to achieve a daily discharge of between 5,000 and 5,500 tons, which roughly approximated the planning figures.

In developing that rate UTAH experienced difficulties not unlike those encountered at OMAHA, despite the initial advantages enjoyed as the result of the more orderly landings. Although the beachhead at UTAH was relatively deep, its flanks were not immediately extended sufficiently to secure beach operations from enemy artillery fire. Expansion of the lodgment was slow in the first week, and in the north the limited progress had special importance because of the strongly fortified headland batteries in that sector. Observed artillery fire fell on the beach until D plus 5, and sporadic unobserved fire continued until 12 June and had a noticeable effect on unloading operations. On that day the 4th Division finally overran the last enemy battery able to fire on the beach.

The UTAH installations were also subjected to enemy air attacks, but, as at OMAHA, the Germans made their raids entirely at night and concentrated on shipping and on mining the harbor. Several casualties resulted, but no damage was done to beach installations. Activity was hampered more by the slow progress in broadening and deepening the beachhead. The 1st Engineer Special Brigade's units were confined to a much smaller area than planned. During the first week five battalions of engineers were restricted to an area which was scheduled to have been operated by two.

The UTAH beaches were to have been marked like the OMAHA beaches, but differences in the physical features of the two areas made this impossible. At OMAHA the signs were placed well up on the hills and were clearly visible to incoming craft. Since there was no high ground at UTAH, markers were initially erected along the sea wall where they could not be seen from very far offshore. The addition of barrage balloons as markers remedied the situation on D plus 1. The balloons, appropriately colored and numbered, were flown at the beach boundaries, and on the cables holding the balloons naval signal flags were flown to guide incoming craft. The system proved very successful, although there was suspicion in some minds that the balloons provided a convenient target marker for enemy artillery in the first week.

While the removal of debris and obstacles from the beach of necessity held first priority at OMAHA, supply clearance was the main problem at UTAH because of the inundations. The 1st Engineer Special Brigade had to give immediate attention to drainage of the flooded area and improvement or construction of exit roads. The engineers began drainage at once and at the southern end of the beach did the job rapidly. The central gates north of Sugar Red were opened on D plus 2, but they required constant maintenance and had to be closed during periods of high tide. The northern gates could not be opened until after D plus 8 because the enemy occupied the Quinéville ridge. Even in the southern area, where drainage was effected, the fields remained saturated and could not be used as transit areas or dumps. The chief effect of the drainage on military operations was to make some of the previously flooded roads usable. Route T–7, although completely under water, was used beginning the night of D Day, but the heavy traffic quickly made it impassable. On D plus 3 it was closed, and troops of the 531st

Engineer Shore Regiment worked continuously for thirty-six hours to improve it. By that time the water was drained off and the road was graveled, and it proved one of the most useful of all routes leading from the beach.

To relieve pressure on the lateral road which paralleled the beach about 700 yards inland, and also to speed traffic along the beach itself, engineers quickly laid Sommerfeld matting along the base of the dunes and parallel to the sea wall about 125 feet inland. They blew additional gaps in the wall, improved the exits by dozing and grading, and laid matting in these exits and also along stretches of the beach itself. At the southern extremity of the beach, route V–1 was improved and carried some traffic beginning the night of D Day. To provide access to it the engineers extended a lateral beach road southward from U–5. By D plus 1 UTAH Beach had several exits through the sea wall, two lateral beach roads, and three outlets across the flooded area.

Throughout the first weeks the three beaches opened on D Day—Uncle Red, Tare Green, and Sugar Red—continued to serve as the principal landing points. Initially the most important was the southernmost of these beaches—Uncle Red. It was free from shellfire and had the best exit and road, U–5. One battalion of the 531st Engineer Shore Regiment was originally supposed to move north on D plus 1 and open a fourth beach south of Quinéville. Since the area was not cleared for several days, such a move was impossible.

Instead, plans were made to open an additional beach north of Sugar Red, known as Roger White. That beach was reconnoitered on D plus 2, while still under enemy artillery fire, and on D plus 4 elements of the 38th Engineer General Service Regiment landed and began developing the area. The principal route (S–3) serving Roger White had been flooded, like S–9 to the south, but the opening of the gates drained it sufficiently to make it usable. The engineers meanwhile proceeded with their usual tasks of preparing the beach for unloading operations. Beach obstacles, which included tetrahedra and mined stakes in this area, they either blew or pulled off the tidal flat, and they blasted gaps in the sea wall. By 12 June the beach was announced ready for operation. No dukws were on hand at that time, however, and no coasters were ready for unloading. Furthermore; the beach was still subject to enemy fire. Its opening was postponed, therefore, and it was not put into operation till later.

While unloading operations got off to a better start at UTAH than at OMAHA, build-up targets were not met in the VII Corps sector for several days. The unloading of the first tide convoy was not completed until D plus 1. Of the twelve preloaded LCT's scheduled to land on D Day, six came in on the second tide, and the remainder did not beach until the morning of D plus 1. Some of the LBV's landed at OMAHA by mistake. By D plus 2 all sixteen supply coasters were located and were unloading, but discharge proceeded slowly because the dukws had to make such long trips from the transport area to the dumps. The initial refusal to beach LST's compelled all unloading to be accomplished by dukws, by ferry craft such as LCT's and LBV's, and by the dumb barges intended as a bad weather reserve. Unloading soon fell behind schedule, and the lag created apprehension on the part of the ground commanders. In this respect UTAH's experience was similar to OMAHA's. A back-

log of shipping developed and was not relieved until the decision was made to beach LST's. Once this decision was made, as many as fifteen LST's were brought ashore at a time.

Other factors contributed to the slow start. Neither trucks nor dukws were plentiful. Three dukw companies came ashore on D plus 1, and an additional four companies came in within the next five days.[14] But the shortage of trucks made it necessary for dukws to carry cargo the entire distance to the inland dumps. Some vessels carrying hatch crews from the United Kingdom failed to arrive on schedule. And before the first week had passed, a partial breakdown of the loading arrangements at Southampton set back the movement of troops and supplies still further.[15]

Additional difficulties arose from the initially imperfect functioning of the brigades and the temporary disorganization of ship-to-shore operations. While some units of the special brigades had trained together, the beach organizations were really put together for the first time on the beaches and did not immediately achieve their highest efficiency. A loose control of certain units of the brigades, such as the dukw companies, at first resulted in wasted effort and inefficient ship-to-shore operations. Furthermore, the early lag in unloading created a natural anxiety in the minds of the corps commanders, who intervened in the beach organization in an effort to hasten the discharge of supplies.[16]

Part of the trouble lay in poor co-ordination between the Army and Navy at the beaches. Control of shipping at both OMAHA and UTAH left much to be desired, and close co-operation with the Navy was delayed by the late arrival of the Naval Officer in Command, who was responsible for the control of ferry craft and for the location and berthing of all vessels. At UTAH the NOIC was finally ordered ashore at the request of the VII Corps commander.[17] A further stumbling block to the smooth functioning of the beach port was the disagreement between the Navy and the brigade over the former's policy of holding ships offshore to prevent damage from shelling. Once these various difficulties were ironed out and lines of control were clearly established, discharge at UTAH proceeded more smoothly. On the whole, co-operation between the 1st Engineer Special Brigade and the Navy was close, since the 2d Naval Beach Battalion had operated with 1st Brigade in the Mediterranean. Brigade headquarters eventually established a close control over all units involved in cargo unloading; it notified the NOIC of its requirements, and the NOIC allocated ferry craft through the Navy's Ferry Craft Control.

Similar difficulties were experienced at OMAHA, where dissatisfaction quickly developed over the way in which the NOIC discharged his responsibilities, particularly with regard to the location of ships. The brigades, anxious to control shipping once it arrived at the far shore, soon got into the habit of ordering vessels moved without reference to the NOIC. The initial difficulties and confusion were undoubtedly the product of poor preparation, and were

[14] One load of dukws, unaware of the enemy situation, tried to land near Quinéville. As the ramp of the LST went down, enemy artillery found the craft, and three dukws were lost.

[15] See Section 9 of this chapter.

[16] Comments on the early functioning of the special brigades are contained in an *aide-mémoire* by General Moses, 30 June 1944, in 12 A Gp G-4 Misc Ltrs, Memos by chiefs of divs in G-4. Moses was critical of higher commanders' interference with the brigades, the operations of which he thought they did not fully understand.

[17] Ltr, Col Howard to CG AGF, 27 Jul 44, sub: Observer's Rpt, WDGDS 319.1, A47-2, I.

aggravated by complicated channels of control and poorly defined lines of responsibility. They revealed many of the difficulties inherent in joint operations. Improvement was marked after NOIC headquarters was reorganized on 10 June, and within two weeks the difficulties were largely resolved and an effective port organization was in operation.[18]

Development of the UTAH area was to be carried out in two roughly defined phases: first the initial dumps were to be established; then the beach maintenance area was to be organized. Initial dumps were actually established somewhat earlier than at OMAHA, and the transition to the beach maintenance area phase also took place sooner. Demining activities delayed the opening of the dumps somewhat, but this was a minor hindrance inasmuch as supplies did not begin arriving in any great quantity until late on D plus 1, when initial dumps for ammunition, gasoline, and salvage were opened back of Uncle Red and Tare Green.

Within the first week it became possible to move dumps farther inland and to organize the beach maintenance area. Sites had been selected in advance by map reconnaissance. Most of them were found to be satisfactory as they were uncovered, and for the most part the beach maintenance area therefore developed as planned. When the Class V dump was reconnoitered on D plus 1 and found to be under artillery fire an alternate area was selected. Meanwhile dumps for Classes I and II, signal, engineer, medical, chemical warfare, and air force supplies were also established in the beach maintenance area, all within the first few days.

Beginning with the second week the First Army established a more centralized control over supply operations in both the OMAHA and UTAH areas. On 13 June it took direct control of all dumps, although brigade units continued to operate them. On the same date it took over direct control of the 1st Engineer Special Brigade from the VII Corps. Five days later the brigade was attached to the Advance Section, which in turn remained attached to the army. Control of motor transportation was concentrated in the 537th Quartermaster Battalion.

The week of 13–19 June was one of steady development and consolidation of the beach maintenance area. In that period the beachhead was expanded to the Quinéville ridge in the north and beyond Carentan in the south. In the west, corps units drove all the way across the peninsula, thus giving Advance Section considerably more elbow room in which to develop a supply base. Unloading operations also proceeded more smoothly in the second week, and the movement of supplies inland from the beaches was facilitated by an increasing number of trucks. Congestion in the dumps actually became a major problem for a time. On the night of 15 June the tie-up in the Class V dumps was so great that drivers had to unload their own trucks. A similar congestion occurred with gasoline, and in the next few days additional dumps were established to relieve this situation.

By D plus 12 (18 June) the movement of both troops and supplies over UTAH Beach was proceeding approximately according to plan. Daily tonnage discharge was averaging 5,500 tons (about 97 percent of the target), and 7,000–8,000 men and 800 vehicles were crossing the beach every day.

[18] Operation Report NEPTUNE, pp. 135–39; Ltr, Col Gullatt to OCMH, 17 Jul 51.

(6) The Beach Ports

The two methods of unloading that have been described—discharge directly onto the beach from landing craft, and unloading from larger vessels moored offshore into ferry craft and dukws—were intended primarily for the early stages of the invasion in the absence of adequate port facilities. Construction of the beach ports made possible a third method of discharge—to pierhead, or quayside. The progress made in completing these ports contributed in large measure to the improved discharge performance in the second week.

At UTAH the planned harbor installation was relatively small, consisting simply of two ponton causeways and a GOOSEBERRY made up of ten blockships, which were to provide shelter for landing craft. The emplacement of these ships was begun on D plus 2, when British tugs towed three of them into position. Siting of the GOOSEBERRY had to be accomplished under enemy artillery fire, and the troops at UTAH thought it a good joke when the Berlin radio announced that two Allied ships had been sunk off that beach. Two of the breakwater ships had been hit by the enemy and obligingly sunk in approximately their correct positions, although slightly too far apart. The enemy fire did hamper operations, however, and a third blockship was also spaced incorrectly when the tug that was towing it cut loose too quickly in its eagerness to escape. The remaining ships were sited properly and the UTAH breakwater was completed on D plus 7 (13 June).

Meanwhile work had begun on the ponton causeways. The first was laid off Uncle Red and was opened on D plus 7. Three days later a second causeway, extending beyond the line of blockships, was completed, and debarking troops began using it. A third causeway, not in the original plans, was built later.[19]

Construction of the larger port at OMAHA also began on schedule. The first units of MULBERRY A to get under way were the blockships which were to form the breakwater. These included both merchantmen and warships, sailing under the flags of many of the United Nations. Either obsolete or war damaged, some more than forty years old, all were destined to render one last useful service. Because of their age and slowness they had to leave British ports as much as six days before D Day, and were therefore the first units of the invasion fleet to sail. Surveys for the proposed harbor and the actual siting of the blockships were begun on D plus 1 with the arrival of the commander and staff of Force MULBERRY. Three ships were sunk in position the same day and immediately came under enemy artillery fire, which caused some casualties among the merchant marine crews. On D plus 2 three more blockships were sunk, three PHOENIXES were emplaced to begin the caisson breakwater, and the first BOMBARDONS were moored. By D plus 4 the GOOSEBERRY was completed, 10 PHOENIXES were emplaced, 12 BOMBARDONS were moored, 19 additional moorings were laid, and all breakwater surveys completed. Within another week (by 17 June) all 24 BOMBARDONS were moored, 32 of the 51 PHOENIXES had been sited, and moorings for 2 Liberty ships were completed. Meanwhile, work on the 3,000-foot piers had also progressed rapidly. By 16 June the center LST pier was completed and in operation, both western and eastern piers were well under

[19] NEPTUNE: Training for and Mounting the Operation, II, 129–30, OCMH.



PARTIALLY COMPLETED MULBERRY *off OMAHA Beach. Portion of breakwater, above; piers and pierheads, below.*



way, and two of the big Lobnitz pierheads were installed.[20] On the first day the center pier was used LST's spent an average time of 64 minutes in discharging, disgorging their vehicles at the rate of one every 1.16 minutes.

The 2,450-foot ponton causeways were also built on schedule. Naval construction workers started on one causeway on D plus 2, building it twice the width originally contemplated, and completed it on D plus 4. The causeway enabled almost all troops coming ashore thereafter to land dry shod and it was also used for unloading various types of craft. A second causeway was started on D plus 5. Although it was completed in three days, it was not immediately put into full operation. MULBERRY A was not scheduled to be completed until D plus 18 (24 June), but unloading profited increasingly from the partially constructed port. The lengthening line of blockships and PHOENIXES afforded considerable protection for small craft and coasters and small craft were unloaded more rapidly than they could have been had the roadstead been left open.[21]

At the end of the second week, then, there was every reason to feel encouraged by the discharge situation. Even though the minor ports of Grandcamp and Isigny had not been opened as scheduled, the performance at both beaches offered hope that the planning targets would soon be reached. Tonnage discharge had lagged at first and ground forces had not made as rapid progress as had been hoped for, but there were favorable factors as well. Total casualties thus far had been unexpectedly low, the expenditure of materiel was less than preinvasion estimates, and the build-up of men and supplies was now picking up speed. By 18 June (D plus 12) the combined daily discharges at the two beaches were averaging approximately 14,500 tons, which was only slightly below expectations. The combined target was actually exceeded on D plus 9 (15 June) when nearly 15,000 tons of supplies and equipment were unloaded at the two beaches, as against a target of 13,700. Such occasional performance in excess of estimated capacities had not sufficed to overcome the initial lag, of course. On 18 June the total cumulative discharge still stood at about 72.8 percent of planned unloadings (116,065 as against 159,350 tons). First Army estimated that it had accumulated a stockage of 9 days of rations, 5 days of POL, and about 3 units of fire of ammunition.[22] Vehicle discharge continued to cause concern, for only 40,541, or 66 percent, of the planned 61,367 vehicles had been delivered to the far shore. The troop build-up continued at approximately 88 percent of scheduled debarkations.[23] By D plus 12 a total of 314,504 of the planned 358,139 men had crossed the American beaches, and eleven of the planned build-up of twelve divisions were ashore.[24] At both beaches evacuation of casualties and prisoners of war proceeded without difficulty. As of that date, 18 June, a total of 14,500

[20] Weekly Logistical Summary, 6–18 Jun, SHAEF G–4 War Diary, Jun, Exec Br, App. 3, SHAEF G–4.

[21] Operation Report NEPTUNE, pp. 141–51, 157–58, 186.

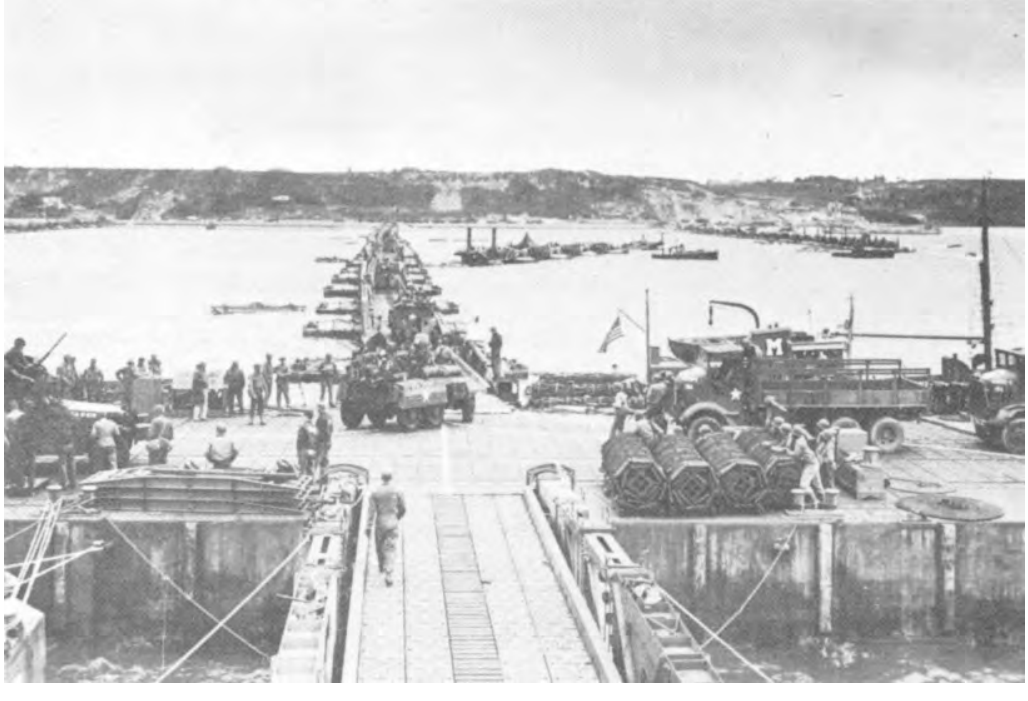
[22] FUSA Rpt of Opns, 20 Oct 43–1 Aug 44, Bk. V, p. 142.

[23] Landings at OMAHA consistently achieved a higher percentage of the build-up target, with 93 percent of its planned debarkations completed on D plus 12.

[24] As compared with the British build-up of eight and two-thirds divisions out of a planned nine and a third. British and U.S. Buildup Progress Rpts for 18 Jun, SHAEF G–4 319.1 Buildup Rpts, I. Personnel landing figures given above do not take into account the two airborne divisions included in the total of eleven U.S. divisions ashore.



COMPLETED PIER OF THE MULBERRY *in operation. Loaded vehicles coming ashore, above, and leaving Lobnitz pierhead, below.*



casualties had been evacuated via the beaches, an additional 1,300 by air, and an estimated 10,000 prisoners of war had also been shipped to the United Kingdom.[25]

(7) The Great Storm of 19–22 June

Hopes had soared on 16 June when the first vehicles and personnel debarked onto the MULBERRY pierheads. Three days later nature struck a devastating blow to the installations which the Allies had so carefully planned and laboriously constructed, and threatened to disrupt the entire invasion design. Beginning on 19 June and continuing for three days, high winds pounded the French invasion coast, wrecking scores of craft and smashing the artificial harbor. When the gale finally subsided on the 22d much of the work of the first two weeks had been demolished, and MULBERRY A was never to be reconstructed.

A northeast wind had freshened early on the morning of the 19th, immediately hampering unloading operations, and the rising sea shortly halted all dukw and ferry craft operations at both OMAHA and UTAH. Within a few hours antiaircraft crews were forced to abandon their guns on the PHOENIXES in the outer breakwater at OMAHA because of the heavy seas that swept away handrails and shelters at the base of the gun platforms. Inside the western breakwater, pier bridging soon began to break away from mooring cables. Before long all normal port operations ceased, and almost all available men were diverted to whatever rescue and salvage work was possible. Late in the day conditions worsened. The winds increased in velocity and began to drive scores of craft onto the beach. Some were thrown undamaged beyond the normal high-water mark and could not be refloated for many days; others were thrown against the UTAH sea wall or onto the OMAHA shingle pile and damaged beyond repair.

Danger threatened the MULBERRY not only from the heavy sea, which tore the breakwater units from their moorings, but from the many craft which tossed about helplessly and crashed into the piers. Toward evening an American salvage barge and five British LCT's struck the center pier, damaging beetles and mooring cables. The strong winds continued on 20 June, thwarting attempts to keep craft under control, and many vessels drifted against the bridging and pierheads. By the evening of the second day the eastern mooring cables were cut, and one pier drifted westward, damaging adjacent bridging.

At the same time both the Lobnitz pierheads and some of the PHOENIXES showed signs of breaking up, and personnel had to be removed from the former. The floating BOMBARDONS broke from their moorings, and all twenty-four went adrift, some of them washing into the piers, some piling up on the beach, and others threatening to crash into ships offshore. During the night WHALE bridging of the piers was further damaged by drifting shore ramps and pontons, and a telescopic section connecting two of the pierheads was carried away. By the morning of 21 June only eight of the thirty-two PHOENIXES that had been sited remained effective. The day brought more damage, and on the night of the 21st the two pierheads were carried away and driven into shallow water. By that time all

[25] Medical evacuation figures from FUSA Rpt of Opns, Bk. VII, Medical Annex, Apps. 20, 21, pp. 169–70. Prisoner of war evacuations are estimated from total captures. FUSA Rpt of Opns, Bk. V, G–1 Annex, Chart 7.

pier bridging was badly twisted, and landing craft of all sizes and descriptions were piled on the beach, entangled with the bridging of the piers.

The storm finally abated somewhat on 22 June, although normal operations were still impossible. But on the 23d dukws were again able to operate, and unloading was resumed. At UTAH Beach the NOIC estimated that 60 percent of the ferry craft there would be inoperative for thirty-six to forty-eight hours even after normal unloading began again.

Of most immediate concern throughout the storm was the almost complete stoppage of unloading, which promised to nullify the gains of the preceding week and again widen the gap between planned and actual discharge. On 19 June, when the storm began, approximately half of the discharge targets were met. The brigades managed to unload more than 8,300 tons of supplies and 3,000 vehicles, and about 17,750 troops debarked. But the full effect of the storm was felt the following day. Only 1,000 tons of supplies, 738 vehicles, and 3,300 troops were brought ashore on the 20th. On the 21st 1,000 tons were discharged, and on the 22d only 500.

The inability to unload supplies threatened to produce a grave situation. Some types of ammunition were already in short supply and were urgently needed ashore, particularly by the VII Corps, which had just started its drive up the Cotentin and in the next few days was to launch its final assault against Cherbourg. The situation at the beaches prompted First Army to direct that expenditures be cut to one-third unit of fire per day. Shortages in critical calibers were met chiefly by specially arranged air shipment, 500 tons being flown in daily over a period of three days. Meanwhile, First Army also ordered eight ammunition coasters to be beached, and directed the brigades on both beaches to give first priority to ammunition discharge and second priority to gasoline. To fortify the ammunition position further, five prestowed Liberty ships lying in U.K. waters were also called forward.[26] Normal discharge was impossible, but several small coasters were beached and unloaded at low tide. These were worked only with great difficulty, and, where necessary, holes were cut into the sides of the craft in order to reach cargo.[27]

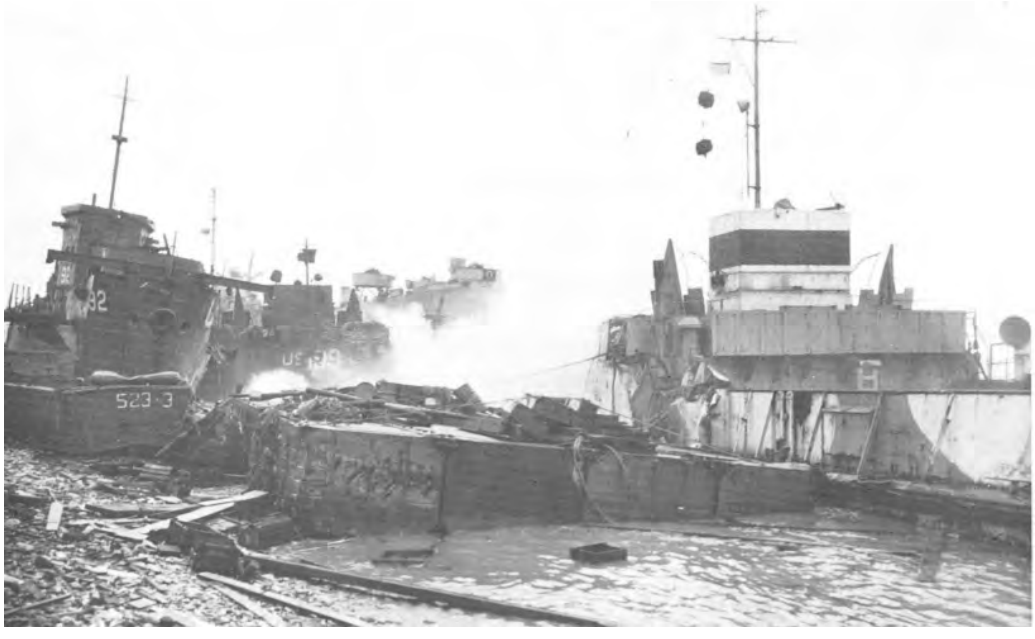
The cumulative effect of the four-day storm can be seen most readily in the following figures: of a planned stores discharge of 64,100 tons, only 12,253 were unloaded; of a projected 13,337 vehicles, only 4,205 were brought ashore; of a scheduled 77,081 troops, only 23,460 were debarked. Percentages of cumulative planned build-up targets achieved consequently fell considerably behind. Whereas on 18 June 72.8 percent of the projected build-up of supply tonnages had taken place, on 22 June this had fallen to 57.4 percent; vehicle build-up had fallen from 66 percent to 57 percent; and the personnel build-up had dropped from 88 to 77.7 percent.[28]

OMAHA Beach presented a chaotic picture as the weather moderated on 22 June. Nearly a hundred LCVP's and LCM's were lost, in addition to a large number of LCT's and larger craft. Of twenty Rhino ferries only one remained operational. All types of craft were strewn along the entire beach, partially blocking every exit. E–3

[26] FUSA Rpt of Opns, Bk. V, p. 142.

[27] ADSEC Operations History, p. 32.

[28] NEPTUNE: Training for and Mounting the Operation, II, Apps. A, B, and C; FUSA Troop List, FUSA Rpt of Opns, Bk. II, pp. 171–74; FUSAG Buildup Priority Tables. List B, BUCO Tables FUSAG, EUCOM Hist Files, AG Hist Records.



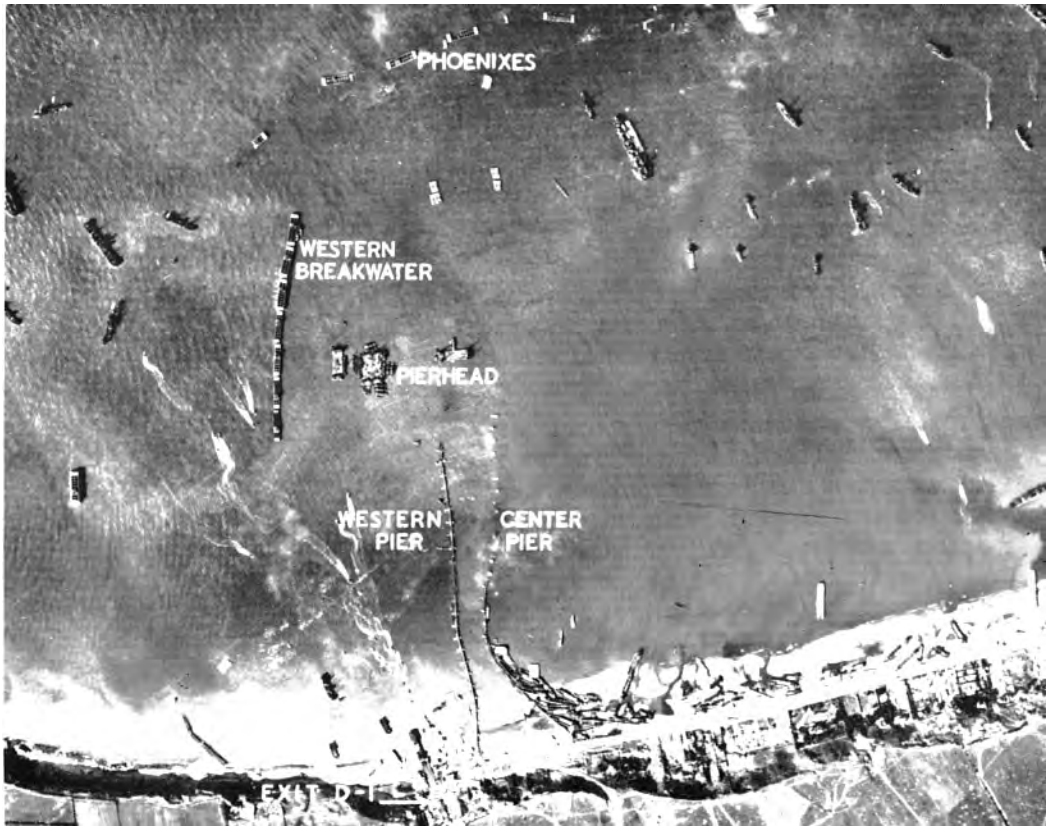
BEACHED AND WRECKED LANDING CRAFT *smashed during the storm of 19–22 June.*





STORM-TWISTED PIERS. *Lobnitz pierheads are visible in the background.*





MULBERRY A *as seen from the air after the storm.*

was complete disorder. A tentative check revealed that eighty craft, including 35 LCM's, 11 LCT's, 9 Rhino ferries, 3 LCI's and various smaller craft, were piled opposite the exit. Near by an LCM straddled the deck of an LCT, a coast guard cutter had cut into a nest of LCM's and wound up sideways on the sand, and four LCT's were piled together deck to deck. The MULBERRY was a total loss with the exception of the blockships, and even these had been pulled out of line, and half had broken their backs. Many of the PHOENIXES had likewise broken, and one had piled on the cliffs at the western end of the beach. One of the piers was completely ruined. Its center span of bridging was bent and twisted in a great arc curving to the west, and its beetles were either broken loose and beached, or smashed and filled with water. The other pier was not as badly damaged, but was also bent in a great arc. It was difficult at first to estimate the damage because ships and craft had crashed into the causeways, obscuring their condition.

The brigades at both beaches had continued their efforts throughout the storm to salvage craft and equipment, and particularly to clear openings so that craft

could beach. They also opened emergency exits from the beach and cleared some of the salvaged material in trucks. Thus it was possible for LCT's to continue beaching and keep a trickle of supplies coming in. On the 22d all the craft on the beach had been completely unloaded, and there was the very hopeful prospect when the weather cleared that day that many of the craft could be taken off the beach in good condition. The brigades had also made plans and preparations to facilitate the discharge and movement of cargo upon the return of favorable weather. They checked and repaired equipment, moved supplies left on the beach to the inland dumps, and built some new installations, the most important of which were the improved transfer points. Consequently, although the beaches, particularly at OMAHA, were a mass of wreckage when the storm subsided on 22 June, inshore installations and facilities were much improved. Roads were in better condition, dumps cleared, and trucks and dukws in good repair. Beach clearance again became a tremendous problem at OMAHA, but efforts were also immediately made to resume the unloading of cargo. On 22 June five coasters with ammunition were beached and dried out so they could unload directly into trucks, and other coasters were taken in as close as possible to reduce dukw and ferry craft travel.

UTAH had not suffered as badly as OMAHA, and by the afternoon of 23 June coasters were again being beached rapidly and unloaded directly into trucks and dukws. Many craft were strewn along the beach, but since UTAH had virtually no limits and could expand to either side the congestion was not serious. As at OMAHA, the 1st Brigade had improved inshore cargo-handling facilities during the storm. Most important were the erection of new transfer points and the improvement of the whole traffic organization, which subsequently made it possible to handle a record volume of supplies without developing a bottleneck. In addition, engineers opened the northern locks and completed the drainage of the inundated area behind UTAH, they repaired beached craft, and they cleared away wreckage.

During the storm, and for a few days thereafter, certain loaded ships had been held at U.K. ports owing to the difficulties of unloading at the far shore and to the fact that there were numbers of loaded MT ships still off the beaches. On 23 June sailings were resumed on a limited basis, and on the 26th normal sailings were restored, though planned loadings were not reached in most categories owing to the nonreturn of MT ships and craft from the far shore. LCT's, and even LST's, were held at the beaches to unload the accumulation of MT ships.[29] A reallocation of craft between U.S. and British forces partly alleviated the shipping shortage,[30] but the effects of the storm continued to be felt in the U.K. ports in the succeeding days when loading was delayed for lack of adequate lift.

Despite these disruptions in the shipping program, and in spite of the destruction of the piers and the wreckage which cluttered the beaches, discharge operations showed a remarkably quick recovery when unloading was fully resumed on 23 June. On that day OMAHA unloaded 10,000 tons and UTAH unloaded 6,400 tons, both beaches surpassing all their pre-

[29] Col Brooke, SHAEF representative on BUCO, Report of Bad Weather 19–23 June 1944, 27 Jun 44, App. 7 of Exec Br, SHAEF G-4 War Diary, Jun, SHAEF G-4.

[30] 12th A Gp Rpt of Opns, VI (G-4), 21.



BEACH TRANSFER POINTS. *Pool of trucks waiting to be loaded, above. Crane transferring cargo from a dukw, below.*



vious performance. In the last week of June OMAHA averaged 13,500 tons per day, 115 percent of planned capacity, and UTAH averaged 7,000 tons, or 124 percent of capacity. This record was achieved over open beaches and without the benefit of the MULBERRY facilities, although the sunken ship breakwaters still afforded some protection to craft at both beaches.[31]

The failure of MULBERRY A to withstand the storm of 19–22 June gave definite warning that the artificial ports could not be relied on in winter weather. By normal standards the storm actually had not been a very severe one. Winds had reached velocities of 25–32 knots (29–36 miles an hour), and had therefore never exceeded half-gale force.[32] General Eisenhower thought it one of the fortunate results of the storm that a timely warning had been given, and hoped for the quick capture of Cherbourg.[33]

Immediately after the storm the commander of the Western Naval Task Force, Admiral Kirk, surveyed the damage at OMAHA and concluded that no attempt should be made to reconstruct MULBERRY A.[34] BOMBARDONS had been a complete failure, and rebuilding them would have served no useful purpose. The PHOENIXES had sustained heavy damage and revealed an inability to withstand heavy sea action and scouring. Piers appeared to be impractical under weather conditions which destroyed the PHOENIXES. The GOOSEBERRIES had also tended to weaken in the face of northerly gales, although it was concluded that they offered the one means of affording shelter to small craft. These observations led Admiral Kirk to recommend that the MULBERRY be abandoned and that the GOOSEBERRY be reinforced. On 24 June the commander of Task Force MULBERRY and other high Navy officials met with the commander of the Western Naval Task Force and accepted this recommendation. Two days later General Gale, the chief administrative officer of SHAEF, and other top administrative officers gave their concurrence, and the recommendation was approved by the Supreme Commander. More specifically, it was agreed that the GOOSEBERRY at OMAHA should be reinforced with twelve additional blockships; that a 25-ton pier for unloading coasters should be constructed within the breakwater; that no attempt would be made to replace the BOMBARDON breakwater; that pier bridging should be salvaged for use in the British MULBERRY; and that the capacity of Cherbourg should be increased.[35]

The decision to abandon MULBERRY A and to strengthen the GOOSEBERRY instead was buttressed by the demonstration of what could be accomplished over open beaches. Despite the loss of the MULBERRY and despite the fact that the 25-ton pier was never built, OMAHA handled tonnages

[31] The OMAHA Command changed hands in the last week of June, Colonel Talley replacing General Hoge.

[32] Memo, Capt Robert C. Lee, USN, Mov and Tn Br, G-3 SHAEF, for Crawford *et al.*, 26 Jun 44, sub: Building Up Load and Discharge, SHAEF G-4 825.1 Piers, Wharves, Docks and Berths 1944, II.

[33] Ltr, Eisenhower to Somervell, 25 Jun 44, Hq ASF—European theater last half 1944; Cbls, Eisenhower to Marshall, 20 Jun 44, S-54240, and 21 Jun 44, S-54306, P & O Cbl Files.

[34] It is worth noting that on the very day the storm had broken—19 June—the ANCXF made proposals to SHAEF advocating that the MULBERRIES be strengthened against autumn gales by extending the breakwater and double-banking the ends with additional PHOENIXES. Ltr, ANCXF to SHAEF, 19 Jun 44, sub: Completion of MULBERRIES, SHAEF AG 820-1 Artificial Harbors April-July 44.

[35] Min, Mtg held at SHAEF, 26 Jun 44, Gale presiding; Ltr, Gale to Smith, 26 Jun 44, sub: Reconstruction of MULBERRIES; TWX S-54648, Eisenhower to ANCXF and 21 A Gp, 27 Jun 44. All in SHAEF SGS 800.1 MULBERRY O/CS, II.



DRIED-OUT LST *discharging its cargo at OMAHA Beach. Portion of a BOMBARDON washed ashore during storm may be seen at left.*

far beyond the most optimistic forecasts, overshadowing Cherbourg as an intake port for several months to come.

The destruction of MULBERRY A by a single storm and the subsequent success of the build-up over open beaches at first sight would appear to discredit the whole idea of the artificial port. Several U.S. officials had in fact been dubious of the project from the start and had withheld their criticisms only because of the high-level support which the project was known to have.[36] A few had predicted that the synthetic ports would not withstand bad storms. MULBERRY A might well have held together if craft in the harbor had not drifted and smashed it, or if the BOMBARDONS had held. It is of course impossible to say what might have been accomplished with the artificial port had it withstood the storm of 19–22 June. Some indication of its probable worth may be derived from the performance of the British port. MULBERRY B did not take the full brunt of the storm, for the Calvados reef, lying offshore, gave it some protection by breaking the main force of the waves. It suffered considerable damage, nevertheless, and many craft were driven ashore. In addition, many components of the harbor,

[36] Intervs with Talley, 6 Mar 51, and with Lord, 9 Aug 51, OCMH.

such as PHOENIXES and sections of pier, were lost or damaged when caught by the storm while they were still being towed. But most of the partially completed harbor remained intact, and with the salvaged units and equipment from OMAHA it was far easier to complete the British port at Arromanches than to reconstruct the American harbor at OMAHA. Despite the decision regarding the American MULBERRY, great importance was still attached to the completion of the British port.

To finish it and to put it in first-class condition by the end of September so that it might withstand the autumn gales, additional WHALE and PHOENIX units had to be constructed. These General Eisenhower requested from the British immediately after the storm. In his requests he had the full support of the Prime Minister, who had a great personal interest in the MULBERRY and was convinced of its vital role. Mr. Churchill was determined that all necessary steps be taken to make the port fully secure and effective. He assured the Supreme Commander that everything would be done to meet the requirements.[37]

Not only did MULBERRY B prove useful; it exceeded its targets. The British port was expected to handle 6,000 tons of cargo per day after reaching its capacity on D plus 14. For more than three months it actually averaged 6,765 tons, handling 48 percent of all the tonnage landed for British forces. British observers have speculated that, but for the MULBERRY, operations might have been halted at the Seine or the Somme, and that without it the 21 Army Group probably would have had to ask for an allocation of a portion of the capacity of Cherbourg.[38] In the light of the British experience, it would appear that the American artificial port might have had equal success had it withstood the storm which struck before the harbor was even complete, or had it been reconstructed. It is important to remember, however, that MULBERRY B was substantially reinforced with units salvaged from the American harbor and that the PHOENIXES were pumped full of sand to give them greater stability, measures that undoubtedly explain the extended service which the British port was able to render. Furthermore, the planners obviously underrated the capacities of open beaches. The tremendous tonnage capacities subsequently developed at both UTAH and OMAHA were without doubt one of the most significant and gratifying features of the entire OVERLORD operation.

(8) The Build-up to 30 June

While the value of the beaches was not yet fully appreciated at the end of June, both OMAHA and UTAH had already begun to handle cargo considerably in excess of planned estimates, a welcome augury in view of the unsatisfactory port situation. Together the two beaches handled a total of 161,507 tons in the eight days following the storm. By 30 June a total of 289,827 tons of supplies had been moved to the Continent. While this amount represented 80.5 percent of the cumulative tonnage (360,000) that planners had estimated should be landed over the beaches by that date, it represented

[37] Ltr, Eisenhower to Churchill, 29 Jun 44; Note by Minister of Production, 12 Jul 44, sub: Provision of Additional MULBERRY Equipment, DC (S) (44) 27 Defence Com; Min, Stf Conf, Defence Com of War Cabinet, 6th Mtg, 13 Jul 44, DC (S) (44). All in SHAEF SGS 800.1 MULBERRY O/CS, Vol. II. Ltr, Churchill to Eisenhower, 1 Jul 44, SHAEF SGS 800.1 MULBERRY Case A.

[38] Rear-Adm H. Hickling and Brig I. L. H. MacKillop, Story of the Mulberries, MS, OCMH.

TABLE 7—SUPPLY BUILD-UP OVER THE BEACHES: 6–30 JUNE 1944

[Long Tons Daily]

Date		Total		OMAHA Beach		UTAH Beach	
D Days	June	Planned	Actual	Planned	Actual	Planned	Actual
D Day	6	4,650	[a]	2,400	[a]	2,250	[a]
D+1	7	9,900	[a]	5,100	[a]	4,800	[a]
D+2	8	10,300	5,807	7,000	1,429	3,300	4,378
D+3	9	11,000	5,705	6,600	2,542	4,400	3,163
D+4	10	11,700	6,340	7,000	3,942	4,700	2,398
D+5	11	12,700	9,452	7,000	7,187	5,700	2,265
D+6	12	12,700	9,896	7,000	5,752	5,700	4,144
D+7	13	13,700	9,300	8,000	5,461	5,700	3,839
D+8	14	13,700	12,335	8,000	7,377	5,700	4,958
D+9	15	13,700	14,744	8,000	9,008	5,700	5,736
D+10	16	14,700	14,466	9,000	8,535	5,700	5,931
D+11	17	14,700	13,660	9,000	8,876	5,700	4,784
D+12	18	15,900	14,360	10,200	8,690	5,700	5,670
D+13	19	15,900	8,339	10,200	5,764	5,700	2,575
D+14	20	16,000	999	10,300	676	5,700	323
D+15	21	16,100	1,558	10,400	1,077	5,700	481
D+16	22	16,100	1,359	10,400	494	5,700	865
D+17	23	16,300	16,395	10,600	9,996	5,700	6,399
D+18	24	16,300	17,521	10,600	11,562	5,700	5,959
D+19	25	16,400	20,136	10,700	12,994	5,700	7,142
D+20	26	17,500	21,347	11,800	14,449	5,700	6,898
D+21	27	17,500	19,699	11,800	12,808	5,700	6,891
D+22	28	17,500	22,512	11,800	13,842	5,700	8,670
D+23	29	17,500	23,040	11,800	14,869	5,700	8,171
D+24	30	17,500	20,857	11,800	14,361	5,700	6,496

[a] No record.

Source: NEPTUNE: Training for and Mounting the Operation, II, App. A, Pt. VI, of The Administrative and Logistical History of the ETO, OCMH.

only 71 percent of the total tonnage that was to have been moved to the Continent (408,550 tons). (*Table 7*)

Both Cherbourg and the minor Normandy ports were supposed to have been opened before the end of June. According to plan, Cherbourg was to have been captured about 20 June and expected to receive cargo within a few days of its capture, beginning with a capacity of about 1,600 tons per day. As events turned out, however, Cherbourg made no contribution to the logistical support of the American forces for at least another month. Two minor ports—Grandcamp and Isigny—had been captured within the first four days, and after Carentan was seized on D plus 6 the Allies decided to utilize that

TABLE 7—SUPPLY BUILD-UP OVER THE BEACHES: 6–30 JUNE 1944—Continued

[Long Tons Cumulative]

Date		Total			OMAHA Beach		UTAH Beach	
D Days	June	Planned	Actual	Percent of planned build-up achieved	Planned	Actual	Planned	Actual
D Day	6	4,650	[a]	[a]	2,400	[a]	2,250	[a]
D+1	7	14,550	[a]	[a]	7,500	[a]	7,050	[a]
D+2	8	24,850	5,807	23.4	14,500	1,429	10,350	4,378
D+3	9	35,850	11,512	32.1	21,100	3,971	14,750	7,541
D+4	10	47,550	17,852	37.5	28,100	7,913	19,450	9,939
D+5	11	60,250	27,304	45.3	35,100	15,100	25,150	12,204
D+6	12	72,950	37,200	51.0	42,100	20,852	30,850	16,348
D+7	13	86,650	46,500	53.7	50,100	26,313	36,550	20,187
D+8	14	100,350	58,835	58.6	58,100	33,690	42,250	25,145
D+9	15	114,050	73,579	64.5	66,100	42,698	47,950	30,881
D+10	16	128,750	88,045	68.4	75,100	51,233	53,650	36,812
D+11	17	143,450	101,705	70.9	84,100	60,109	59,350	41,596
D+12	18	159,350	116,065	72.8	94,300	68,799	65,050	47,266
D+13	19	175,250	124,404	71.0	104,500	74,563	70,750	49,841
D+14	20	191,250	125,403	65.6	114,800	75,239	76,450	50,164
D+15	21	207,350	126,961	61.2	125,200	76,316	82,150	50,645
D+16	22	223,450	128,320	57.4	135,600	76,810	87,850	51,510
D+17	23	239,750	144,715	60.4	146,200	86,806	93,550	57,909
D+18	24	256,050	162,236	63.4	156,800	98,368	99,250	63,868
D+19	25	272,450	182,372	66.9	167,500	111,362	104,950	71,010
D+20	26	289,950	203,719	70.3	179,300	125,811	110,650	77,908
D+21	27	307,450	223,418	72.7	191,100	138,619	116,350	84,799
D+22	28	324,950	245,930	75.7	202,900	152,461	122,050	93,469
D+23	29	342,450	268,970	78.5	214,700	167,330	127,750	101,640
D+24	30	359,950	[b] 289,827	80.5	226,500	[b] 181,691	133,450	108,136

[a] No record.

[b] Includes 4,558 long tons discharged at Isigny and Grandcamp, for which distribution figures by day of arrival are not readily available.

port also. Port structure was found intact in all three. But there were mines to be cleared, sunken craft and other obstructions and debris to be removed, and dredging and lock repair to be accomplished. Port construction and repair units started work after a reconnaissance, and the speedy rehabilitation of these ports promised an early, if limited, augmentation of beach discharges.

Together the two ports of Grandcamp and Isigny were expected to have an opening capacity of but a few hundred tons, and to develop an ultimate capacity of 1,000–1,500 tons per day. Isigny was to have been opened on D plus 10 (16 June)

TABLE 8—VEHICLE BUILD-UP OVER THE BEACHES: 6-30 JUNE 1944

[Daily]

Date		Total		OMAHA Beach		UTAH Beach	
D Days	June	Planned	Actual	Planned	Actual	Planned	Actual
D Day	6	[a] 6,810	2,870	3,241	2,870	3,569	0
D & D +1	6 & 7	[b] 4,431	——	4,431	——	0	——
D+1	7	[c] 2,821	2,676	1,656	1,207	1,165	1,469
D+2	8	[d] 4,854	4,713	2,616	3,555	2,238	1,158
D+3	9	4,108	4,035	2,879	2,148	1,229	1,887
D+4	10	3,920	2,667	2,117	1,579	1,803	1,088
D+5	11	4,480	3,694	3,001	2,183	1,479	1,511
D+6	12	4,086	2,645	2,480	1,610	1,606	1,035
D+7	13	4,334	3,134	2,685	2,268	1,649	866
D+8	14	4,278	2,388	1,381	1,506	2,897	882
D+9	15	4,071	2,819	2,457	1,584	1,614	1,235
D+10	16	4,413	2,908	2,533	2,228	1,880	680
D+11	17	5,001	3,581	4,359	2,515	642	1,066
D+12	18	3,760	2,411	2,225	2,087	1,535	324
D+13	19	4,103	3,045	2,781	1,902	776	1,143
D+14	20	4,792	738	2,004	533	2,077	205
D+15	21	4,220	243	[e]	243	[e]	0
D+16	22	4,222	179	[e]	146	[e]	33
D+17	23	4,118	4,053	[e]	3,430	[e]	623
D+18	24	4,031	3,866	[e]	3,321	[e]	545
D+19	25	4,193	2,519	[e]	1,971	[e]	548
D+20	26	4,124	3,428	[e]	2,984	[e]	444
D+21	27	4,136	4,160	[e]	2,713	[e]	1,447
D+22	28	3,523	2,080	[e]	1,425	[e]	655
D+23	29	3,543	3,230	[e]	552	[e]	2,678
D+24	30	3,549	2,828	[e]	1,466	[e]	1,362

[a] Forces O and U.
[b] Force B or follow-up.
[c] Preloaded build-up.
[d] Includes 3,242 vehicles in preloaded build-up.
[e] Data not readily available.

and Grandcamp on D plus 14 (20 June). Grandcamp was ready for operations on 17 June, ahead of schedule; but too few troops were available to operate it, and not till 23 June did the first craft, a Dutch coaster, enter the basin. During the remaining week in June the port discharged an average of about 280 tons per day. Isigny was finally opened on 24 June and averaged 475 tons per day in the first week. At the end of the month it was estimated that with additional troops and equipment the combined capacity of the two ports could be raised to 3,500 tons.

TABLE 8—VEHICLE BUILD-UP OVER THE BEACHES: 6–30 JUNE 1944—Continued

[Cumulative]

Date		Total			OMAHA Beach		UTAH Beach	
D Days	June	Planned	Actual	Percent of planned build-up achieved	Planned	Actual	Planned	Actual
D Day	6	6,810	2,870	42.1	3,241	2,870	3,569	0
D & D+1	6 & 7	11,241	——	——	7,672	——	0	——
D+1	7	14,062	5,546	39.4	9,328	4,077	4,734	1,469
D+2	8	18,916	10,259	54.2	11,944	7,632	6,972	2,627
D+3	9	23,024	14,294	62.1	14,823	9,780	8,201	4,514
D+4	10	26,944	16,961	62.9	16,940	11,359	10,004	5,602
D+5	11	31,424	20,655	65.7	19,941	13,542	11,483	7,113
D+6	12	35,510	23,300	65.6	22,421	15,152	13,089	8,148
D+7	13	39,844	26,434	66.3	25,106	17,420	14,738	9,014
D+8	14	44,122	28,822	65.3	26,487	18,926	17,635	9,896
D+9	15	48,193	31,641	65.7	28,944	20,510	19,249	11,131
D+10	16	52,606	34,549	65.7	31,477	22,738	21,129	11,811
D+11	17	57,607	38,130	66.2	35,836	25,253	21,771	12,877
D+12	18	61,367	40,541	66.1	38,061	27,340	23,306	13,201
D+13	19	65,470	43,586	66.6	40,842	29,242	24,082	14,344
D+14	20	70,262	44,324	63.1	42,846	29,775	26,159	14,549
D+15	21	74,482	44,567	59.8	(e)	30,018	(e)	14,549
D+16	22	78,704	44,746	56.9	(e)	30,164	(e)	14,582
D+17	23	82,822	48,799	58.9	(e)	33,594	(e)	15,205
D+18	24	86,853	52,665	60.6	(e)	36,915	(e)	15,750
D+19	25	91,046	55,184	60.6	(e)	38,886	(e)	16,298
D+20	26	95,170	58,612	61.6	(e)	41,870	(e)	16,742
D+21	27	99,306	62,772	63.2	(e)	44,583	(e)	18,189
D+22	28	102,829	64,852	63.1	(e)	46,008	(e)	18,844
D+23	29	106,372	68,082	64.0	(e)	46,560	(e)	21,522
D+24	30	109,921	70,910	64.5	(e)	48,026	(e)	22,884

[e] Data not readily available.

Source: Planned build-up data from First Army Revised Consolidated Troop List (List A), FUSA Rpt of Opns (20 Oct 43–1 Aug 44), II, Annex 2a, and FUSAG Buildup Priority Tables, List B, in BUCO Tables FUSAG, EUCOM Hist Files, AG Hist Records. Actual data from NEPTUNE: Training for and Mounting the Operation, II, App. B.

But their initial tonnages were negligible. Together with the delay in the restoration of Cherbourg, these deficits explain the over-all lag of approximately 30 percent in the cumulative build-up, despite the encouraging performance of the beaches.

In vehicle unloadings and personnel debarkations the records of the beaches were not as spectacular in the week following the storm. About 26,165 vehicles were landed at the two beaches against a planned 31,217, and a cumulative total of

TABLE 9—TROOP BUILD-UP OVER THE BEACHES: 6–30 JUNE 1944

[Daily]

Date		Total		OMAHA Beach		UTAH Beach	
D Days	June	Planned	Actual	Planned	Actual	Planned	Actual
D Day	6	[a] 61,626	57,500	29,714	34,250	31,912	23,250
D & D+1	6 & 7	[b] 26,492	——	26,492	——	0	——
D+1	7	[c] 21,238	31,569	13,428	20,834	7,810	10,735
D+2	8	[d] 31,220	33,349	17,668	21,761	13,552	11,588
D+3	9	23,986	20,291	13,781	15,881	10,205	4,410
D+4	10	23,232	22,571	8,899	12,397	14,333	10,174
D+5	11	19,477	18,839	11,932	12,428	7,545	6,411
D+6	12	22,869	17,270	13,483	8,777	9,386	8,493
D+7	13	27,275	17,901	18,708	13,779	8,567	4,122
D+8	14	19,713	19,460	8,309	11,481	11,404	7,979
D+9	15	17,151	22,841	9,280	10,798	7,871	12,043
D+10	16	20,527	16,696	9,165	11,538	11,362	5,158
D+11	17	27,919	17,905	22,036	10,791	5,883	7,114
D+12	18	15,414	18,312	9,200	12,729	6,214	5,583
D+13	19	[e] 18,359	17,765	10,992	8,318	3,786	9,447
D+14	20	[f] 24,493	3,299	9,403	3,299	9,806	0
D+15	21	17,051	1,498	([g])	1,498	([g])	0
D+16	22	17,178	898	([g])	333	([g])	565
D+17	23	19,592	30,916	([g])	24,425	([g])	6,491
D+18	24	12,425	17,345	([g])	15,525	([g])	1,820
D+19	25	23,023	9,351	([g])	7,624	([g])	1,727
D+20	26	21,657	13,590	([g])	10,747	([g])	2,843
D+21	27	14,634	14,341	([g])	6,816	([g])	7,525
D+22	28	19,264	9,430	([g])	4,540	([g])	4,890
D+23	29	19,138	12,168	([g])	1,395	([g])	10,773
D+24	30	14,018	7,355	([g])	3,657	([g])	3,698

[a] Forces O and U.
[b] Force B or follow-up.
[c] Preloaded build-up.
[d] Includes 21,734 troops in preloaded build-up.
[e] Includes 3,581 planned arrivals at Cherbourg.
[f] Includes 5,284 planned arrivals at Cherbourg.
[g] Data not readily available.

only 70,910 as compared with the scheduled 109,921. The vehicle build-up therefore continued to fall short of expectations, with only 64.5 percent of the target achieved, and was estimated to be about thirteen days in arrears. (*Table 8*)

The troop build-up likewise had not recovered from the setback occasioned by the storm, although the lag had not been as serious. In the week following the storm a total of 114,496 troops debarked at the two beaches, compared with the originally

TABLE 9—TROOP BUILD-UP OVER THE BEACHES: 6–30 JUNE 1944—Continued

[Cumulative]

Date		Total			OMAHA Beach		UTAH Beach	
D Days	June	Planned	Actual	Percent of planned build-up achieved	Planned	Actual	Planned	Actual
D Day	6	61,626	57,500	93.3	29,714	34,250	31,912	23,250
D & D+1	6 & 7	88,118	——	——	56,206	——	31,912	——
D+1	7	109,356	89,069	81.4	69,634	55,084	39,722	33,985
D+2	8	140,576	122,418	87.1	87,302	76,845	53,274	45,573
D+3	9	164,562	142,709	86.7	101,083	92,726	63,479	49,983
D+4	10	187,794	165,280	88.0	109,982	105,123	77,812	60,157
D+5	11	207,271	184,119	88.8	121,914	117,551	85,357	66,568
D+6	12	230,140	201,389	87.5	135,397	126,328	94,743	75,061
D+7	13	257,415	219,290	85.2	154,105	140,107	103,310	79,183
D+8	14	277,128	238,750	86.2	162,414	151,588	114,714	87,162
D+9	15	294,279	261,591	88.9	171,694	162,386	122,585	99,205
D+10	16	314,806	278,287	88.4	180,859	173,924	133,947	104,363
D+11	17	342,725	296,192	86.4	202,895	184,715	139,830	111,477
D+12	18	358,139	314,504	87.8	212,095	197,444	146,044	117,060
D+13	19	376,498	332,269	88.3	223,087	205,762	149,830	126,507
D+14	20	400,991	335,568	83.7	232,490	209,061	159,636	126,507
D+15	21	418,042	337,066	80.6	(ε)	210,559	(ε)	126,507
D+16	22	435,220	337,964	77.7	(ε)	210,892	(ε)	127,072
D+17	23	454,812	368,880	81.1	(ε)	235,317	(ε)	133,563
D+18	24	467,237	386,225	82.7	(ε)	250,842	(ε)	135,383
D+19	25	490,260	395,576	80.7	(ε)	258,466	(ε)	137,110
D+20	26	511,917	409,166	79.9	(ε)	269,213	(ε)	139,953
D+21	27	526,551	423,507	80.4	(ε)	276,029	(ε)	147,478
D+22	28	545,815	432,937	79.3	(ε)	280,569	(ε)	152,368
D+23	29	564,953	445,105	78.8	(ε)	281,964	(ε)	163,141
D+24	30	578,971	452,460	78.1	(ε)	285,621	(ε)	166,839

ε Data not readily available.

Source: Planned build-up data from First Army Revised Consolidated Troop List (List A), FUSA Rpt of Opns (20 Oct 43–1 Aug 44), II, Annex 2a, and FUSAG Buildup Priority Tables, List B, BUCO Tables FUSAG, EUCOM Hist Files, AG Hist Records. Actual build-up data from NEPTUNE: Training for and Mounting the Operation, II, App. B.

scheduled 143,751. On 30 June the cumulative U.S. troop build-up in Normandy totaled 452,460, which represented 78 percent of the planned 578,971.[39] (*Table 9*)

[39] Comparative statistics are compiled from NEPTUNE: Training for and Mounting the Operation, II, Apps. A, B, and C, and from FUSAG Buildup Priority Tables, List B, EUCOM Hist Files, AG Hist Records, BUCO Tables. These figures differ slightly from those in FECOMZ Rpt 21, for 30 Jun 44, Information re Logistical Buildup on the Continent, 3 Jul 44, EUCOM 381 Rpts General—Logistical Build-up on the Continent. See also 12th A Gp Rpt of Opns, VI (G-4), 21.

Evacuations through 30 June totaled approximately 27,000,[40] bringing actual strength down to about 425,000. The lag in personnel build-up consisted entirely of a lag in service and supporting troops. The combat strength of the First Army was actually greater than originally planned—eleven divisions as scheduled, plus the two airborne divisions which were to have been withdrawn to the United Kingdom but which were retained on the Continent through June.[41]

(9) Cross-Channel Movement

The difficulties attending the reception and discharge of ships at the Normandy beaches constituted only part of the continental build-up problem. Several other closely related difficulties plagued the build-up from the start.

The whole movements machinery was put to a severe test in the first days of the invasion, for the shipment of men, and particularly supplies, was almost immediately thrown off schedule for lack of shipping at the embarkation points. The immediate cause of this shortage was the failure of ships to return from the far shore for the planned shuttle service. Shipping simply did not complete the round trip to the beaches in the time originally estimated. This failure was directly attributable to discharge difficulties on the far shore and to a wasteful use of craft. Not only did the entire procedure for calling in and berthing ships at the beaches have to undergo a shakedown before it was efficiently organized, but cargo discharge points did not always come into operation as planned. Vessels were not always unloaded as they arrived and they were often subjected to a "selective" discharge to obtain certain urgently needed supplies. A number of ammunition ships, for example, were only partially unloaded in the search for comparatively small quantities of particular types of shells, and then remained idle off the Normandy coast.[42]

The failure to receive ships' manifests at the beaches also contributed to the tie-up of shipping. Many vessels arrived at the far shore with their contents unknown to shore personnel. One example of the results is seen in the search for 81-mm. mortar shells, which were urgently needed in the Normandy hedgerow fighting. Because the troops on shore did not know where this type of ammunition was located in ships lying offshore, they called forward a large part of the ammunition in U.K. waters. Even then they had to conduct a ship-by-ship search to find the desired items.[43] Late in June, after hearing many complaints on the subject of manifests, General Eisenhower became impatient with the poor performance and promised that heads would roll if no improvement was shown.[44]

The admittedly wasteful practice of selective unloading was in part the result of unusual demands for certain types of supplies, the need for which could not be accurately foreseen. Without adequate records of the status of supplies in conti-

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[40] FUSA Rpt of Opns, Bk. VII, Apps. 20, 21.

[41] The British build-up at this time stood at thirteen divisions as against a planned fifteen. It was planned to be slower than the American build-up initially, and actually achieved its targets more nearly on schedule in the first week, after which it fell behind slightly. The U.S. build-up, on the other hand, lagged for about ten days, then accelerated, and achieved its planned strength of eleven divisions by 30 June.

[42] Mounting the Operation OVERLORD, Gen Bd Rpt 129, p. 19.

[43] G-4 History, COMZ ETO, prep by Hist Sec G-4 COMZ, 1945, mimeo, Sec. I, p. 22, ETO Adm 553.

[44] Ltr, Eisenhower to Bradley, 27 Jun 44, Diary Office CinC.

nental dumps and depots or lying offshore, and without adequate experience factors on consumption and expenditure, it was not immediately possible to make adjustments in the scheduled shipments. In the early weeks, therefore, it was natural to rely on emergency requisitions such as Red Ball, GREENLIGHT, and air shipment, and to unload the most urgently needed supplies where and when they could be found.[45]

In addition, the whole discharge program at the far shore was affected by such factors as bad weather and the shortage of ferry craft, tugs, and barges. The total effect of these difficulties and practices was to slow up the turn-round time of shipping and consequently create a shortage of vessels for the scheduled movement across the Channel.[46]

The nonreturn of shipping had an immediate impact on the outloading ports in the United Kingdom. Its worst effect was felt in Southampton, where backlogs of both men and supplies immediately began to form. In fact, the backing up of personnel had begun earlier for another reason. The movement of troops, like the shipment of supplies, was prescheduled, and the entire mounting process was already in full swing when D Day was postponed twenty-four hours. As men continued to pour into the ports even though embarkations had halted, the ports quickly became clogged. The situation was further aggravated when outloading fell behind for lack of shipping. It soon had its repercussions farther back along the lines of movement. Apparently disregarding force movement tables and the slowdown in embarkations, Southern Base Section continued to move units into the marshaling areas. Before long, camps were so overcrowded that the original craft-load basis of marshaling lost all meaning, and all flexibility of control temporarily disappeared. Each day's craft assignment continued to differ both in quantity and in type from the planned movement.

The confusion reached its height about 12 June, when units became so badly scrambled that troops could not be identified and sorted into craft loads at all. For a brief period the clogging of the marshaling areas prevented the flow of troops to the ports in numbers sufficient to load the available ships, and the U.S. Zone chairman, Colonel Stevens, on his own authority diverted vessels to the British in order to avoid wasting precious shipping which otherwise would have remained idle.[47] The log jam was finally broken by simply funneling troops into the ports and onto ships and craft as fast as possible and without regard to craft-loading plans. It was doubly fortunate that no shipping losses occurred in this period, for no record was kept of many of the embarkations.[48]

The burden on the outloading sectors became so heavy at this time that stowage and loading plans made on the basis of expected movements simply had to be abandoned. The number and type of craft becoming available in no way conformed to the embarkation and loading plans. Lack of advance information about actual craft availability added to the difficulties, and loading was either hastily worked out on paper within a few hours' notice that ves-

[45] Gen Bd Rpt 129, p. 21.

[46] Military Shipments Priority Mtg, SHAEF, 1 Jul 44, SHAEF AG 337–18.

[47] Interv with Col Stevens, 15 Feb 50, OCMH; G–4 Plans Diary, 7, 10, 13 Jun, including Memo for Col Potter, OCofT, 13 Jun 44, sub: Rpt of Inspection of Areas C [Southampton] and D [Portland], SHAEF G–4 Plans Diary.

[48] Interv with Lt Col Ivan L. Brenneman, U.S. member, SHAEF liaison stf, BUCO, 8 Feb 50, OCMH.

sels had arrived, or was improvised on the ground. At the height of the confusion a few devoted and experienced men worked round the clock, keeping up a grueling schedule of improvisations to unscramble the mixed units and maintain the best possible volume of shipments across the Channel. More than one officer collapsed from exhaustion during this trying period.[49]

Beginning on 13 June a concerted "clean-up" effort was made, and by the time of the storm the chaotic conditions of the first week were largely eliminated. But the experience had been a harrowing one. Some units were "lost" for several weeks. On one occasion Maj. Gen. Leonard T. Gerow, the V Corps Commander, personally visited the United Kingdom to locate a unit which the Southern Base Section insisted had been shipped to the Continent, and found that it had not even moved out of its assembly area.[50]

Logistical operations require as high a degree of co-ordination as tactical operations, and the difficulties that beset the movement of men and supplies from the U.K. camps and depots to the front lines in Normandy were the result of a failure to gear capacities with one another along the entire line of communications. The principal single cause of the trouble in personnel movements had been the lack of balance between movements in and out of the marshaling areas and the failure to match these movements with the capabilities of the ports to outload. The OVERLORD planners had foreseen the need for exercising detailed control over the mounting process, and it was precisely for this purpose that they had established BUCO.

In practice, however, the movement-control machinery did not initially operate as intended. In the desire to work out a uniform system with the British, in view of the possible disruption of the mounting process by enemy air attacks and the possible necessity of handling British troops through U.S.-controlled areas or vice versa, the control of movements had been somewhat decentralized. While the decentralization apparently caused little difficulty in the British zone, it was definitely a hindrance to efficient operations in the U.S. zone, at least at the beginning. BUCO occupied a rather anomalous position with respect to command, for it was not a formal agency of either the First Army, 1st Army Group, or Supreme Headquarters. Because of divided responsibility for preparing the build-up priority lists and preparing and executing the mounting plan, BUCO found it necessary to deal with numerous authorities and experienced difficulties in taking timely action to correct mistakes in the mounting of the operation.

MOVCO was charged with executive supervision of the whole process. But powers were dispersed and the demarcation of authority was ill defined. The authority to order units forward to the ports and hards was vested in U.S. MOVCO; the control of movements into the marshaling areas, on the other hand, was assumed by the base section.[51]

The SOS had never been sympathetic to the joint movement plans and instructions issued by SHAEF,[52] and, to complicate matters, established an agency of its

[49] Intervs with Stevens, 15 Feb 50, and Lt Col Leo J. Meyer, then CO 14th Port (Southampton), 8 Nov 49, OCMH.

[50] *Ibid.*

[51] Interv with Meyer.

[52] Ltr, Ross to H. Larson, 5 Dec 49, Note A, OCMH.

own for the control of the mounting—that is, Embarkation Control, or EMBARCO. In an already intricate setup, "Embargo," as it was derisively referred to by other agencies, was generally regarded as an encumbrance to the whole machinery, and the Southern Base Section and the SOS were warned that it would not work under the pressure of the inevitable last-minute changes occasioned by tactical needs. The base section persisted, nevertheless, with full confidence that it could control the location and movement of the hundreds of units involved.[53] Events proved otherwise.

EMBARCO performed a useful function to the extent that it confined itself to its original purpose—that is, keeping an up-to-date record of the location of all units in the mounting process, thus enabling the Southern Base Section commander to keep abreast of all movements in his command. But it came in for severe criticism for attempting to exercise actual control over those movements, for in doing so it encroached directly on the authority of BUCO and its executive agency, MOVCO.

The entire movements machinery was under constant compulsion to accommodate itself to changes in the build-up schedule or to the unpredictable shipping situation. Build-up priority tables were closely followed only in the first few days, after which BUCO issued frequent changes in priorities. Despite the fact that such changes were anticipated they caused great confusion. There was no reversing the marshaling process. Once a unit moved forward, its place was immediately taken by another, and every change in the priority for embarkation necessitated holding other units in the marshaling areas like a train on a siding, while higher priority units were processed past them. Even so, much of the congestion could have been prevented. Southern Base Section had been advised to hold 25 percent of the marshaling camp capacities free for such contingencies, and had failed to do so.[54] The result was that the lines of communications became choked, and elasticity of control was nullified. To aggravate matters, units were occasionally called forward on short notice and without regard for their "readiness date," and were found to lack most of their equipment.[55]

Turn-round performance continued to fall far short of expectations, with the result that neither cargo nor troops could always be dispatched as rapidly as they became available in U.K. ports.[56] Since the nonreturn of ships was in part due to the practice of selective unloading at the far shore, the SOS urged the First Army to complete the discharge of ships and release them so that better use could be made of the limited lift.[57] Of particular concern were the lag in the movement of vehicles and the lack of a deepwater port for the reception of larger vessels. The latter handicap made it especially important that the maximum number of shallow-draft, coaster-type vessels be retained in the Channel shuttle service to permit the fullest utilization of the beaches and small ports. The storm had already

[53] Interv with Stevens.

[54] Interv with Brenneman.

[55] Historical Critique of the United Kingdom Overlord Movements, prep by Lt Col M. J. Frechie, OCofT, 1 Nov 45, p. 37, OCMH.

[56] Memo, Col Meyer for Dir of Opns, 14th Port, 8 Jul 44, and TWX, 14th Port to OCofT COMZ, 8 Jul 44, ETO OCOT 563.512 14th Port; Ltr, Napier to Smith, 24 Jul 44, sub: Release of Berths Occupied by MONTCLARE at Southampton, SHAEF G-4 825.1 Piers, Wharves, Docks and Berths 1944, II.

[57] TWX E-33816, Lord to FUSA G-4, 19 Jun 44, EUCOM 560 Landing Craft.

aggravated the shipping position by its destruction of LCT's.[58]

Before the end of June theater headquarters took steps to end its embarrassment in shipping. Immediately after the storm, with the U.S. vehicle build-up about 35,000 in arrears, General Eisenhower appealed to Washington and succeeded in getting additional allocations of both MT ships and LST's.[59] In addition, the theater secured a postponement of the planned reduction in the coaster fleet which was to have occurred after D plus 42.[60]

[58] Cbls S-54240 and S-54306, Eisenhower to Marshall, 20, 21 Jun 44, P&O Cbl Files.

[59] Cbl OZ-3538, AMSO to JCS, 6 Jul 44, SHAEF Cbl Log, Smith Papers; Cbls, Eisenhower to JCS, 27 Jun 44, S-54625, and 14 Jul 44, FWD-12397, and Cbl WAR-61920, JCS to SHAEF, 7 Jul 44, P&O Cbl Files; Memo, COS Com to CofS SHAEF, 5 Jul 44, COS Brief and Action Rpt, 27 Jul 44, sub: OVERLORD—MT Shipping Requirements; Cbl W-75165, CCS to SHAEF, 3 Aug 44. All in SHAEF SGS 540 Shipping Problems.

[60] Ltr, Ross to Continental Movements and Shipping Com, 30 Jun 44, sub: Retention of Coaster Fleet beyond D plus 42, EUCOM 560 AT, Transport, Vessels, Boats; Supply Movement (U.S.) Instructions, Hq COMZ, Supplement 2 (Coaster Revision), 22 Jul 44, EUCOM 381/12 OVERLORD, I.

CHAPTER XI

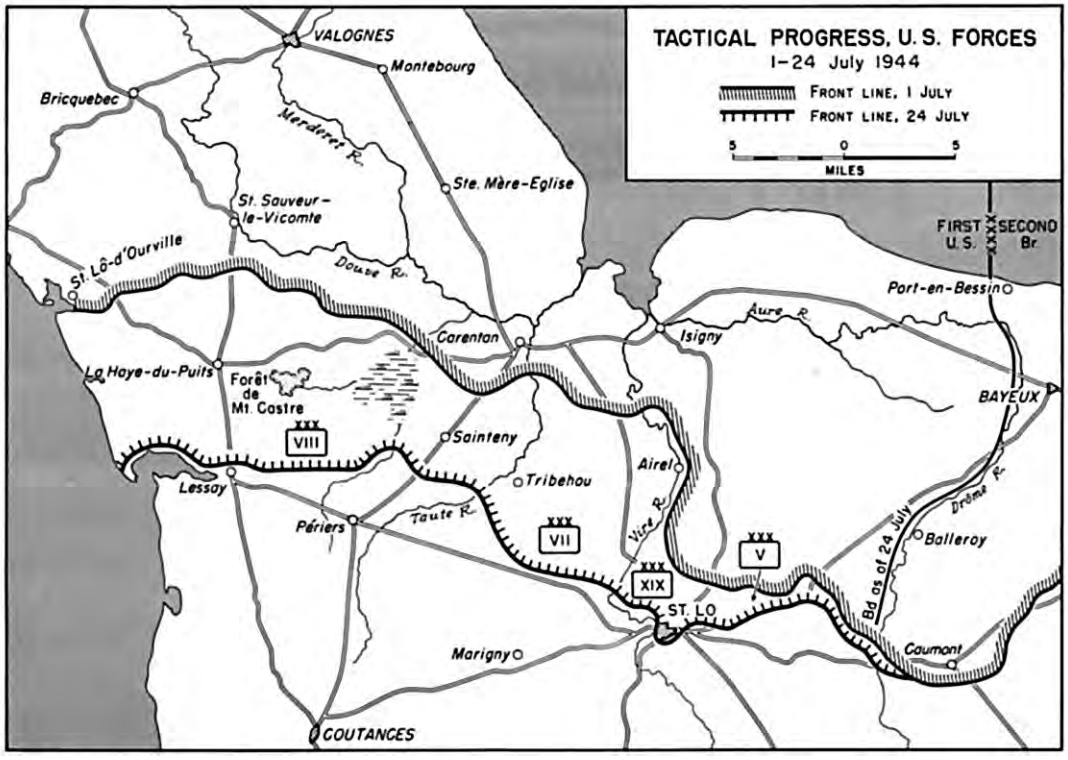
The Logistic Outlook in June and July

(1) Tactical Developments, 1–24 July

After the capture of Cherbourg on 27 June the First Army reoriented its resources for a general drive southward. At the end of June the lodgment in the OMAHA sector reached a depth of about seventeen miles, extending south to Caumont and almost to St. Lô. From there the American lines arched sharply northward and westward, and in the vicinity of Carentan, vital communications link between the U.S. forces in the Cotentin and those east of the Taute River, the lodgment had a depth of only five miles. Farther west the enemy still held the base of the Cotentin to St. Lô-d'Ourville. Confined in a relatively small area and confronted with difficult terrain and an inadequate road network, First Army needed elbow room and more advantageous ground in which to employ its growing forces more effectively. Farther south the terrain became increasingly favorable for offensive maneuver, but to reach it the American forces had to penetrate a belt ten to twenty miles deep which continued to favor the defender. For four tortuous weeks the First Army fought through this Normandy hedgerow country to win additional maneuver room and to gain the terrain considered essential as a line of departure for a general offensive. *(Map 14)*

After considerable regrouping which included the transfer of the VII Corps from Cherbourg to a position between VIII and XIX Corps, and after minor preliminary operations in the zones of the two latter corps designed to improve their positions, First Army was ready to launch its attacks on 3 July. Its objective was the general line Coutances–Marigny–St. Lô. First Army at this time comprised the VIII, VII, XIX, and V Corps, in line from west to east, with a total of twelve divisions operationally available. Since the attainment of the objective involved the greatest advances on the right (west), the army planned to have VIII Corps make the initial attacks southward along the coast. The offensive would then widen progressively eastward in a succession of blows by the VII and XIX Corps, each attacking on army order, with the whole front pivoting on V Corps, east of St. Lô.

In accord with these plans the VIII Corps (82d Airborne and 79th, 90th, and 8th Infantry Divisions) opened the First Army offensive on 3 July with a three-division attack toward La Haye-du-Puits and the Forêt de Mont-Castre hills. The three divisions encountered strong resistance from the start. Favored by the terrain, the



U. Brooks

MAP 14

enemy met the attacks with heavy machine gun and mortar fire from well dug in positions on the hills that dominated the approaches to La Haye-du-Puits. In addition to the inevitable hedgerows, rain plagued the attackers almost every day, confining movement to the roads, limiting air support, and restricting observation. Persisting in their attacks, and repeatedly counterattacked, VIII Corps units inched forward, covering about 6,000 yards in the first three days. They finally captured La Haye-du-Puits on 8 July. Beginning on the 10th the attacks began to move faster against diminishing resistance, and by 15 July VIII Corps units had reached the northern slopes of the Ay River valley. There First Army ordered its men to halt their advance, and they consolidated their positions while awaiting the outcome of action farther east. In twelve days of severe fighting the corps had advanced approximately eight miles, and was still twelve miles short of its objective, the high ground at Coutances.

The hard experience of the VIII Corps was typical of the fighting which took place along the entire front. On army order the VII Corps (4th, 9th, and 83d Divisions) joined the attacks on 4 July. Hemmed in on one side by the Prairies Marécageuses and on the other by drainage ditches and tributaries of the Taute River, the VII Corps attack was channel-

ized down a narrow corridor only a few miles wide which offered no room for maneuver and first permitted the employment of only one division (the newly arrived 83d). Moving generally astride the Carentan–Périers highway, the attacks ran into defenses organized in great depth by an enemy expecting the major effort in this sector. As in the VIII Corps area, gains were measured in yards.

By 6 July it was possible to commit an additional division—the 4th—on the VII Corps front, and three days later the corps left boundary was shifted eastward so that the 9th Division could also be employed. Fighting for every field against determined resistance, the 4th and 83d Divisions gradually pushed the enemy back along the axis of the Carentan–Périers highway and by 15 July captured the slightly higher ground at Sainteny. From there the approach to Périers narrowed into a corridor less than two miles wide, with streams on both flanks restricting all maneuver. Further advance in this sector was therefore halted.

Meanwhile in the eastern sector of the corps front the enemy launched a strong counterattack with armor and momentarily forestalled the 9th Division's threatened breakout from its constricted area east of the Taute. After repulsing the German attack, the 9th Division made substantial gains and fought its way across the Tribehou–St. Lô highway, putting still another tributary of the Taute behind itself.

At the same time the 30th Division (of the XIX Corps) had been advancing abreast of the 9th just west of the Vire River. The 30th had inaugurated the XIX Corps attack on 7 July by seizing a bridgehead over the Vire and, followed by elements of the 3d Armored Division, had expanded its crossing west and south. To bring all these operations between the Vire and Taute under one command, First Army now shifted the VII Corps boundary still farther east—to the Vire—thus bringing the 30th Division also under VII Corps control. In the next few days the 9th and 30th Divisions extended their gains a few miles more, almost reaching the St. Lô–Périers highway. While these positions were several miles short of the objective originally assigned at the beginning of July, VII Corps units had at least advanced through the worst of the maze of rivers, marshes, and canals which had hindered movement on every side.

East of the Vire the last of the series of drives along the army front got under way on 11 July. The attack of the XIX Corps (29th and 35th Divisions), in which the 2d Division of the V Corps also took part, was aimed at the capture of the ridges along the St. Lô–Bayeux highway and finally at St. Lô itself. Both the 29th and 2d Divisions made satisfactory gains on 11 July and won positions on the ridge that dominated St. Lô from the east. In the next few days the corps encountered the same determined resistance which had been met in other sectors. It plodded forward suffering heavy losses in routing the enemy from well-prepared positions. After a temporary lull on 14 July the corps resumed its attacks and with unrelenting pressure forced the enemy to give way. Finally on the 18th the two divisions of the XIX Corps closed in on St. Lô from both the north and east, and a special task force from the 29th Division captured the city the same day.

The fall of St. Lô concluded a period of the most difficult fighting the American forces had seen thus far. Favored by endless lines of natural fortifications in the characteristic Normandy hedgerows, and aided by almost daily rains which nullified

Allied tactical air support and reduced observation, an enemy inferior in numbers and deficient in supplies and equipment was able to contest virtually every yard of ground. For the American forces the period proved costly in the expenditure of ammunition and in casualties among their infantry.

(2) The Normandy Supply Base

While the problem of maintaining an adequate flow of men and supplies across the Channel was due chiefly to difficulties at the beaches, which resulted in a shortage of shipping and played havoc with the entire marshaling process in the United Kingdom, the logistical problems in the continental lodgment area were due chiefly to the lag in tactical operations. Progress had not been as rapid as hoped, and on 1 July the front lines were approximately sixteen days behind the phase lines drawn into the OVERLORD plan.

The retarded advance had inevitable repercussions on logistic plans. Because Cherbourg had not been captured and put into operation as scheduled, port plans had to be reconsidered. Because lines of communications were short and the fighting in Normandy had become a struggle for hedgerows, requirements for both supplies and troops differed from those originally anticipated. Because the lodgment area throughout June and July remained small and congested, neither the continental administrative organization nor depot structure could be developed as planned. In short, the lag in tactical progress directly influenced the whole development of the Normandy supply base in the first weeks and determined not only its physical appearance but the nature of its operations and its organizational structure.

By 25 July the Allied lodgment was to have extended southward to the Loire, eastward to a line running roughly through Le Havre and Le Mans, and westward into the Brittany peninsula as far as Lorient–St. Brieuc, covering an area of almost 15,000 square miles. Instead, the lodgment on that date consisted of only the Cotentin peninsula and a shallow beachhead with an average depth of twenty miles south of OMAHA and the British beaches. It covered an area of only 1,570 square miles, smaller than the state of Delaware and only one tenth of the planned size. The flow of men and supplies had continued apace, and the troop strength on 25 July was only slightly smaller than the planned build-up.

The first effect of the restriction in space was felt in the development of the depot system. OVERLORD administrative plans specified that the Advance Section should assume responsibility for the development of the supply base in Normandy after the initial two weeks of First Army control. In accord with these plans the Advance Section, after careful map reconnaissance, had tentatively chosen sites for every installation and unit and had allocated space so as to minimize conflict between the various services and facilitate the orderly development of a maintenance area. With a few exceptions the selected locations worked out successfully in the upper Cotentin, which was evacuated by the tactical units and made available to the Advance Section shortly after the capture of Cherbourg.

The development of the areas inland from the beaches proved more troublesome. The principal difficulty arose because the front lines were too close to the beaches. Contrary to plan, it was impossible to establish an army service area for-

ward of the beach maintenance areas. Truckheads, ammunition supply points, and advance dumps were moved forward as the situation required, south from OMAHA and west and southwest from UTAH, but the beach maintenance areas continued as the main depot areas throughout the first two months of operations. While the intake capacities of the beaches were enlarged, the maintenance areas remained relatively static in their growth because the lodgment could not be expanded. The result was that division, army, and ADSEC units and installations were telescoped into an area only a fraction of the size planned, and supply operations suffered an increasingly chronic congestion.

Development of the depot plan consequently was not as orderly as it was planned to be, and it was necessary to use open fields for storage to a far greater extent than was desirable. Fortunately the ground was for the most part well turfed. But the fact that most of the Normandy terrain was divided into small fields by thick earth embankments topped with hedges made it necessary to punch holes in the hedgerows in order to provide access for trucks. The usual practice at first was to stack supplies along the edges of fields to take advantage of the partial concealment which the hedges and trees afforded. The congestion became so bad in July, and the almost daily rain during that month created such muddy conditions, that more and more supplies were simply stacked in the middle of open fields to simplify the handling problem. Most camouflage efforts were abandoned in view of the light enemy air activity. Covered storage was largely nonexistent. Virtually the only such facilities were provided by the Amoit Aircraft Plant at Cherbourg, which was used as an ordnance Class II and IV depot, and by a large dirigible hangar near Montebourg, which was used as an ordnance maintenance shop. A small amount of inside storage for rations was also available in Cherbourg. Supplies received at OMAHA Beach, Isigny, Grandcamp, and Carentan flowed into a dump area south of Trévières. UTAH's intake was generally sent to the Chef-du-Pont area. But to the casual observer it appeared by the end of July that almost every field in the lodgment was occupied by some type of supply or service installation.[1]

The crowding and congestion affected supply operations in various ways. The storage of ammunition, for example, was a matter of special concern since Class V supplies had to be adequately dispersed. In mid-July an explosion and fire destroyed more than 2,000 of the 50,000 tons of ammunition held in the large depot near Formigny.[2] The delayed capture of Cherbourg, meanwhile, had its effect on the handling of Transportation Corps supplies. Plans had been made for the establishment of TC depots in Cherbourg rather than in the beach areas, with separate installations for railway supplies such as locomotive and car parts, and for marine supplies, including hand tools, rope, cable, and lifting gear. This equipment was scheduled for early shipment to the Continent, and when it arrived too soon to be received at Cherbourg it was taken into engineer and ordnance depots. A considerable quantity of equipment for both the

[1] G-4 History, COMZ, I, 8–9; Mechanics of Supply in Fast-Moving Situations, Gen Bd Rpt 27, pp. 33–34; Operations History of the Advance Section COM Z ETOUSA, prep by Hist Sec ADSEC, 1945, mimeo (hereafter cited as ADSEC Operations History), pp. 29, 38, 65, ETO Adm 583.

[2] ADSEC Operations History pp. 64–65; Ltr, Plank to OCMH, 10 Jul 51.

4th and 11th Ports was landed on the wrong beaches or at Barfleur and Isigny and lay there for a month before being recovered from an engineer dump. Poor documentation and improper packing contributed to the misdirection and even loss of some equipment. With the establishment of a TC depot at Bricquebec about D plus 30 this situation gradually began to improve.[3]

Traffic congestion was a natural concomitant of the confinement to the shallow lodgment area. The road net in Normandy was extensive enough, but was hardly suited to heavy military traffic. Most of the routes were narrow country roads with deep ditches and hedges that hampered two-way traffic, particularly in rainy periods. There were six or seven good hard-surface (macadam) routes leading southward from the Cotentin and from the OMAHA area, and there were good lateral routes in both beach maintenance areas. Even the metaled roads were often narrow, however, their edges soon crumbling under the constant pounding of the 2½-ton 6 x 6's, and required constant mending by engineer road repair crews.

Traffic was particularly heavy in the OMAHA area because of larger tonnages discharged there. Many of the supply dumps lay astride the main lateral highway, which was a few miles inland from the beach and was intersected by all the routes leading inland. As the principal connecting link with the UTAH area at the base of the Cotentin, this highway bore a tremendous volume of traffic. There were at least four intersections in the lodgment area where more than a thousand vehicles passed a given point every hour during the periods of peak activity. At Formigny, the site of the large ammunition depot and the point where the main road from the beaches to St. Lô crossed the principal lateral artery, and at the main junction point between Isigny and Carentan, there was an hourly flow of almost 1,700 vehicles during the most active period of the day in mid-July. On 18 July a traffic count revealed that the bridge between Carentan and Isigny accommodated 14,434 vehicles in the hours between 0600 and 2100.[4]

Normal stoppages to permit cross traffic at important intersections often backed up traffic bumper to bumper for a mile or two and made it necessary to construct traffic circles and establish one-way routes through such bottlenecks as Ste. Mère-Eglise and Isigny. Choked with vehicles, the Normandy roads would have presented a remunerative target for a more active enemy air force. Only because of Allied air supremacy was it possible for this tremendous volume of traffic to continue relatively unmolested and in open violation of normal road discipline.

Trucks handled nearly all transportation in the lodgment in June and July. At the end of July nearly 30,000 tons of supplies were being cleared from the beaches and small ports every day, mostly by the truck companies of the provisional Motor Transport Brigade which the Advance Section had organized just before D Day. Rail transportation played a negligible role in these early months, although not because of any failure to rehabilitate the existing network. The delay in capturing and restoring Cherbourg ruled out the plan to

[3] Operation, Organization, Supply and Services of the Transportation Corps in the ETO, Gen Bd Rpt 122, p. 101.

[4] Memo, Col Norman H. Vissering for DACOS G-4, Mov and Tn Br, 13 Jul 44, sub: Rpt of Visit to Continent, SHAEF G-4 319.1 Rpts (General) I 45; FUSA Rpt of Opns, 20 Oct 43–1 Aug 44, Bk. V, pp. 143–44, Bk. I, p. 81.

have that port receive railway equipment and rolling stock by D plus 25, but reconnaisance of portions of the main line running from Cherbourg to Carentan and southeastward began within a week of the landings, sometimes under fire. The 1055th Engineer Port Construction and Repair Group began to rehabilitate the Carentan yards on 17 June, shortly after the capture of the town. A few days later repair work was undertaken at Lison Junction to the southeast, and later at Cherbourg, where the destruction had been the greatest. By the end of July four rail bridges had been repaired and 126 miles of rails were in operating order, including the double-track line from Cherbourg to Lison Junction, and single-track branch lines from Barfleur and St. Vaast and from St. Sauveur-le-Vicomte. (*See Map 17.*) The first scheduled run between Cherbourg and Carentan was made on 11 July by a train operated by the 729th Railway Operating Battalion, a unit sponsored by the New York, New Haven, and Hartford Railroad.[5]

Although the supply of rail equipment and construction materials was not entirely satisfactory, restoration of existing lines had progressed as far as the tactical situation permitted.[6] Until the end of July, however, conditions in the lodgment made the use of railways uneconomical. Distances were short, and rail transportation would have involved multiple handling and initial hauls by trucks in any event. No freight of any consequence, therefore, was hauled by this means.[7]

Except for the congestion on the highways, transportation posed no serious problem in the first two months. At the end of July the Advance Section had ninety-four truck companies available for use on the Continent. While the number was considerably short of the 130 companies planned for that date, it was more than ample for the hauling requirements on the relatively short lines of communications at that time.[8]

The disappointingly slow tactical advance in July and the resulting claustrophobic confinement of the lodgment also had a direct bearing on the development of the administrative command and organizational structure on the Continent. One of the key factors in the evolution of the logistic structure was the question of when the army rear boundary should be drawn, for it was at that point that the Advance Section would be detached from the army and begin to operate as an advance echelon of the Communications Zone. In the plan it was assumed that the switch would occur between D plus 15 and 20. Another important factor was the matter of the introduction of a second COMZ section, which was to take over the Rennes–Laval–Châteaubriant area from the Advance Section and eventually organize Brittany as a base, for this step was to bring the Forward Echelon into active command of the Communications Zone. Both steps were of direct concern to the tactical command, for they involved the progressive surrender of its control over supply operations and the rear areas.

With the launching of OVERLORD the command structure agreed upon for the first phase had gone into operation, with First Army in command of all U.S. ele-

[5] "Job Well Done: From D Day to VE Day with the Transportation Corps," *Quartermaster Review*, XXV (July–August, 1945), 108.

[6] ADSEC Operations History, pp. 54–55; Operations, Organization, Supply and Services of the Transportation Corps in the ETO, Gen Bd Rpt 122, p. 101.

[7] History of the TC, ETO, Vol. IV, Ch. IV, p. 2, ETO Adm 582.

[8] Gen Bd Rpt 122, p. 43.

ments, including the Advance Section. ADSEC troops and headquarters personnel began arriving on the far shore as early as D plus 1, and on 16 June the Advance Section announced the opening of its headquarters on an operational basis. Its staff maintained close liaison with opposite numbers in the First Army headquarters to prepare for the assumption of supply responsibility in the rear.

The question of drawing an army rear boundary arose almost immediately as the result of a request from General Eisenhower for information as to when it would be practicable to establish the Communications Zone on the Continent. General Lord promptly advised the theater commander that the transition could be made at any time, and that it was dependent only on General Bradley's drawing of a rear boundary. He recommended that this be done at an early date, arguing that the Advance Section could relieve the army commander of a heavy administrative burden, and that the change would also result in better co-ordination of supply and service functions between the United Kingdom and the Continent.

But the First Army was reluctant to relinquish control of supply operations at so early a date and delayed action on the matter. The result was that the transition to ADSEC control of the rear area supply operations was very gradual, the army making piecemeal delegations of functions and transferring control of only a few installations at a time, meanwhile retaining over-all command of the entire lodgment. Instead of designating an army *rear* boundary First Army on 20 June established an ADSEC *forward* boundary, running along the road between Vierville-sur-Mer and Port-en-Bessin. By this ingenious device First Army assigned a narrow strip of land along the beach to Advance Section for its operations, but retained command of all forces on the Continent, with the Advance Section continuing to function as a major subdivision of the field army. While this did not accord with COMZ wishes, the Advance Section itself had no objection to the arrangement. It had established a close and friendly working relationship with First Army during the planning period, and, although a subcommand of the Communications Zone, actually felt a closer affinity with the armies throughout operations than with its parent headquarters.[9]

Had the plan been followed, an army rear boundary would have been drawn between 21 and 26 June (D plus 15–20), and the Forward Echelon would have assumed active command of the Communications Zone about 17 July (D plus 41). On the latter date, however, First Army was still attempting to break out of the difficult hedgerow and *marécage* country west of the St. Lô–Périers highway, 125 miles from the Loire. The crowded conditions which had militated against carrying out the arrangements for even the first phase still obtained.

The designation of a rear boundary was again considered in mid-July, and tentative plans were made to release most of the upper Cotentin and the UTAH Beach area to Advance Section. But action was again postponed, and instead the additional territory was assigned to the Advance Section by an extension of its forward boundary. The drawing of an army rear boundary in fact was not carried out until after the breakout from Normandy at the end of the month.[10]

[9] Interv with Col Alvin G. Viney, successively Deputy Engr, G-4, and Deputy Comdr of ADSEC, 24 Feb 50, and Interv with Plank, 28 Jul 50, OCMH.

[10] Memo, Eisenhower for CofS, SHAEF, 16 Jun 44,

The above developments had also altered the role of the Forward Echelon, Communications Zone, whose position in the command structure had occasioned so much debate. Plans provided for the establishment of Forward Echelon in two groups on the Continent—an advance group at St. Lô for the period when Forward Echelon functioned as part of the 21 Army Group staff, and a second group at Rennes for the later phase when Forward Echelon assumed actual control of the Communications Zone. The two were to merge into a single headquarters when the main COMZ headquarters arrived about D plus 90. The movement of Forward Echelon was to take place in six parties and was to be completed by about D plus 40. The actual movement was delayed somewhat, but the first echelon arrived on the Continent on 18 June and eventually located itself at Château Servigny, near Valognes. Additional increments crossed the Channel early in July and moved to Château Pont Rilly, also near Valognes. On 12 July Col. Frank M. Albrecht arrived and assumed direction of the group, General Vaughan having been relieved as deputy commander for the Forward Echelon and given a new assignment. This did not complete the displacement of the headquarters, however, for the operating party had by then been phased back for arrival early in August. In view of the course which tactical operations had taken, the original plans with regard to headquarters locations could not be followed, and the two châteaux near Valognes therefore became the headquarters of Forward Echelon, which officially opened on 15 July.

By that time the question of Forward Echelon's role on the Continent had become closely tied up with the matter of drawing an army rear boundary, which the First Army had resisted in its desire to retain control of the lines of communications as long as possible. As time went on, however, the control of the increasingly complex supply operations on the Continent became a weighty responsibility, and the Communications Zone exerted increasing pressure to be allotted a definite sphere of responsibility. In an obvious attempt to allay First Army's fears of any disadvantage attending Forward Echelon's control of the lines of communications, COMZ headquarters early in July drew up a memorandum suggesting a delineation of function between the army commander and the Communications Zone. It stipulated that the senior field force commander would continue to control priorities in troop movements, that the Communications Zone would on request make available detailed information on the status of supplies, that the field force commander would retain control of allocations of scarce items of supply, that First Army would remain in control of all supply depots and distributing points in the beach area until separate army depots could be established, and that the Advance Section would continue to be the direct representative of the Communications Zone in all dealings with First Army.

While nothing came of this proposal, SHAEF stepped in in mid-July to institute the transitional phase in the command setup without drawing an army rear boundary. On 14 July Advance Section was finally detached from First Army and turned over to the control of the Com-

with note on action taken by staff, SHAEF SGS 300.6/6 Supreme Comdr's Memo of 16 June; [Robert W. Coakley] Organization and Command in the ETO, Pt. II of The Administrative and Logistical History of the ETO, II, 141-44; ADSEC Operations History, pp. 26-27.

manding General, Communications Zone, with the stipulation, however, that until SHAEF was established on the Continent General Bradley was to have final authority in all matters except conflicts over troop and supply priorities for the air forces. Thus, over-all control was to continue to rest with the senior field force command on the Continent, and, contrary to the view it had consistently held to before, the Communications Zone was at least in a transitional phase to be subordinated to the field force commander (at the moment the Commanding General, First Army, later the Commanding General, 12th Army Group, but in both cases the same person, General Bradley). Actually the SHAEF directive of 14 July did not materially affect the status of Advance Section, for its units were not officially relieved from attachment to First Army until 30 July. First Army therefore retained control of the entire U.S. zone until 1 August, when the Third Army and the 12th Army Group were introduced, although Advance Section was in effect the real Communications Zone on the Continent after mid-July.

Since the immediate administrative control of Advance Section had passed to Headquarters, Communications Zone, it would appear that the Forward Echelon should have become operational and taken control of the Advance Section at this time. But Forward Echelon's continental mission was now radically altered. Forward Echelon had been formed in part to meet the expected interim need for an operational headquarters on the Continent in the belief that the main COMZ headquarters could not be moved across the Channel before D plus 90. In mid-July it was decided that there was no need for interposing such a command. In fact, with a breakout from Normandy a possibility, the desire to be closer to the scene of action and thus be able to guide the development of the expanding rear areas made good sense.

Actually, the decision to advance the transfer of that headquarters to the Continent was strongly influenced by another consideration. Despite the pretensions which the Communications Zone once permitted its offspring, Forward Echelon, to have, it began to grow apprehensive toward the end of July of the independence and authority which the Forward Echelon was beginning to display at Valognes.[11] Accordingly, late in July Colonel Albrecht was ordered to prepare for the immediate reception of Headquarters, Communications Zone. In the next few weeks the headquarters at Valognes was greatly enlarged to accommodate the main body of the COMZ staff, and signal facilities were installed to permit communications with the United Kingdom, the United States, the subcommands on the Continent, and the field forces.

In the end, therefore, to carry the story forward a bit, the organization whose authority and role had occasioned so much controversy and aroused so many suspicions was destined to be merged with Headquarters, Communications Zone, without ever becoming operational as intended, chiefly because the main headquarters moved to the Continent in the first week of August, a full month earlier than planned. So far as its continental activities were concerned, Forward Echelon was a stillborn organization.

At the end of the war a board of officers rendered a harsh judgment on Forward Echelon, asserting that its establishment "created confusion and misunderstanding at all levels and interfered with logistical

[11] Interv with Lord, 9 Aug 51, OCMH.

planning for Continental operations." But Forward Echelon, as shown earlier, made a significant contribution in co-ordinating the logistical planning for OVERLORD, and although its performance on the continental stage was restricted to a walk-on role, that role was the useful one of advisory agency for Headquarters, Communications Zone, and insurer of continuity of action for that headquarters on the Continent.[12]

Attempts were also made in the first two months of operations to clarify the relationship between COMZ-ETO and Supreme Headquarters. General Eisenhower's directive of 6 June had not definitely settled the issue of the role of the U.S. component of the SHAEF staff vis-à-vis the COMZ-ETO staff.[13] The continued assumption by American officers at SHAEF that they were to be the theater commander's staff and carry out theater functions led to several conferences after D Day. On 9 June Maj. Gen. Everett S. Hughes, as the personal representative of General Eisenhower, met with General Lord and reaffirmed the principle announced earlier that the theater functions assumed by the SHAEF staff should be kept to a minimum. General Hughes assured General Lee's representative that the intention of the Supreme Commander's letter of 6 June was to reduce the U.S. activities at SHAEF to the point where the Communications Zone would be paramount within the defined sphere of administration and supply. General Smith had agreed, observing that the American staff officers at SHAEF had all they could do to carry out their duties in connection with Allied matters. General Eisenhower expressed the same views in a personal conference with General Lee, and on 20 June he issued an additional memorandum enjoining the two staffs to observe established channels of responsibility and authority.

General Lee at that time still held the position of deputy theater commander, for this arrangement had not been terminated on 7 June when the SOS officially became the Communications Zone. The designation was finally dropped on 19 July, when General Eisenhower further amplified his earlier directive regarding the relative positions and authority of Headquarters, COMZ-ETO, and SHAEF. Except for this change the delineation of authority did not differ materially from that of earlier pronouncements. Under it the theater commander, as before, noted that he would from time to time delegate to the three major commands of the theater—the 1st Army Group, the Communications Zone, and USSTAF—responsibility and authority for certain matters normally reserved to himself. The determination of broad policies, objectives, and priorities affecting two or more of these commands was to be reserved to the theater commander under all circumstances, and in exercising these functions he announced that he would utilize the U.S. element of SHAEF and the chiefs of the special staff. The latter were to be located as directed by the Commanding General, Communications Zone, however, and they were to report to the latter and be responsible to or through him for the execution of all COMZ and theater duties. The Communications Zone remained the theater channel of communications with the War Department on all technical and routine matters.

Since the July memorandum terminated General Lee's position as deputy theater

[12] Organization and Command, II, 130–34, 138–40, 144–48; 150–52; Organization and Functions of the Communications Zone, Gen Bd Rpt 127, p. 19; Ltr, Albrecht to OCMH, 29 Jun 51, with comments attached.

[13] See above, Ch. V, Sec. 7.

commander it appears that one of its purposes was to take away from the COMZ commander his theater prerogatives and establish the Communications Zone as coequal with the other two major commands. Although General Lee no longer exercised his prerogatives as deputy theater commander, however, the change did not alter existing responsibilities or channels of command nor the manner of doing business, and General Lee continued to regard his headquarters as theater headquarters even after movement to the Continent. The Communications Zone still remained the channel of communications with the War Department on technical and routine matters, the chiefs of services continued their residence at the COMZ headquarters, and General Lee's general staff was still officially the theater general staff except that the U.S. officers at SHAEF were to advise General Eisenhower on problems which he reserved for himself.

General Eisenhower apparently was desirous of preserving as far as possible the established integration of supply and administrative matters in the theater, and he spelled this out in even greater detail in a memorandum issued a few days later. To avoid confusion in the utilization of the special staff at Headquarters, Communications Zone, he cautioned that "all of us in SHAEF must channel our communications through General Lee, or through his general staff, if he prefers it that way. Since we impose upon the Commanding General, L[ine] of C[ommunications], all theater duties except those of decision and policy wherein some major difference arises between two of our principal commands, we must carefully avoid interfering with his methods and subordinates."

On the other hand, the Supreme Commander noted that it was impossible completely to separate American from Allied interests, and in the interests of economy in the use of personnel he announced that he would continue to use the senior U.S. officers in each of the various staff sections at Supreme Headquarters as advisers on U.S. matters that required the theater commander to take personal action. These officers he regarded as convenient agents for advising him when necessary, and for following up on matters of particular importance, but the SHAEF general staff officers were not to be regarded as part of the theater general staff. Finally, General Eisenhower thought it essential that "whenever any subject pertaining to American administration comes under consideration by the SHAEF staff, careful coordination with General Lee and his staff be assured," particularly when communication with the War Department was contemplated.[14]

That the relationship thus outlined was not so clear cut as might have been desired was probably an unavoidable result of the dual position which General Eisenhower held. Basically, the theater commander was using the staff of the Communications Zone to do the normal job of a theater staff. The smooth functioning of this setup unquestionably required a high degree of mutual co-operation and co-ordination between the two headquarters. In passing General Eisenhower's memo on to the U.S. element of the SHAEF staff General Smith underscored this point in noting that every precaution must be taken to insure that the COMZ staff be "kept well in the general picture," and that "short cuts which might confuse or militate against the effec-

[14] Memo, Eisenhower for CofS, SHAEF, 21 Jul 44, as cited in Organization and Command, II, 127–28. A copy of this document may also be found in EUCOM 371 Theater of Opns, I.

tive use of the L of C staff in its administrative functions must be carefully avoided, and full coordination must be assured." [15] The COMZ staff was likewise asked to be careful to consult the SHAEF staff on all matters of Allied interest.

The delineation of responsibilities appears to have been as distinct as could be made at the time. It was admittedly not an ideal arrangement, and there was continuing friction between the COMZ and SHAEF staffs over jurisdiction in supply and administrative matters, and between the Communications Zone and the field commands over the handling of supply in general.[16]

(3) The Status of Supply

Despite the difficulties over cross-Channel movements, the delay in the capture of Cherbourg, and the congestion of the lodgment, the actual delivery of supplies to the combat forces in June and July was generally satisfactory. The shortages that developed did not reach critical proportions in these first seven weeks, and certainly were not serious when compared with the difficulties that developed in later months. Fortunately, the unfavorable developments of this period were at least in part offset by factors that proved much more favorable than anticipated: lines of communications were short; the lack of interference from the Luftwaffe obviated the requirement for elaborate camouflage and dispersion measures in the rear areas; destruction, except at Cherbourg, was considerably less than expected, particularly of the railways; the utilization of captured supplies, especially signal and engineer items, helped considerably to compensate for the lag in receipts; and consumption rates of certain items, particularly POL, were lower than expected, helping offset deficits in planned discharges.

There was no difficulty with Class I supply in the first two months, although the issue of rations was not in the proportions planned and not to everyone's taste. American troops had read many times that they were the best-fed soldiers of all time. But while their rations differed vastly from the hard tack and beef stew issued to the soldier in the Spanish-American War, and from the corned beef, baked beans, bread, and canned vegetables of World War I, American soldiers were hardly convinced of their palatability. Army cooking was something they wrote home about, but not always in a complimentary vein.

By the time of the Normandy invasion the Quartermaster Corps was issuing five major types of combat rations. The C ration, as developed up to that time, consisted of six cans (each of twelve fluid ounces' capacity), three containing meat combinations (either meat and vegetable hash, meat and beans, or meat and vegetable stew), and three containing biscuits, hard candy, cigarettes, and either soluble coffee, lemon powder, or cocoa. The entire ration (three meals) weighed approximately five pounds, could withstand a temperature range of 170°, and could be eaten either hot or cold. Although touted as "a balanced meal in a can," the C ration was not popular until new combinations were added early in 1945 to give it considerably more variety.

The K ration was better packaged and, according to the theater chief quartermaster, more popular in the early months of

[15] Memo, Smith for SHAEF stf, 22 Jul 44, sub: Adm of American Theater, as cited in Organization and Command, II, 128.

[16] Organization and Command, II, 122–29.

fighting, although the validity of this conclusion is debatable. As finally standardized it consisted of a breakfast unit, made up of meat and egg product, soluble coffee, and a fruit bar; a dinner unit, containing cheese product, lemon powder, and candy; and a supper unit with meat product, bouillon powder, and a small D-ration chocolate bar. In addition, each unit had biscuits, sugar tablets, chewing gum, and a few cigarettes. The idea for the K ration was suggested by a concentrated food of the American Indian known as pemmican, made up of dried lean venison mixed with fat and a few berries pressed into a cake. Variants of pemmican had been used by Arctic and Antarctic explorers, and experimentation with a similar product, beginning with tests at the University of Minnesota in 1940, eventually resulted in a standardized ration in 1942. The ration was originally designed for airborne and armored units and for other troops engaged in highly mobile operations. It was well packaged, each meal's perishable component being hermetically sealed in a small can, and the other items in a sealed bag. Each unit was enclosed in an inner carton dipped in wax, plus an outer cardboard box, and the three packages were of convenient size to be pocketed. Both the C and K rations were individual rations and were intended to be used only for short periods of time when tactical conditions prevented better arrangements for feeding.

Meanwhile, experimentation begun before World War I had resulted in the adoption in 1939 of a supplementary field ration, the D ration. This was known at first as the Logan Bar, named for Capt. Paul P. Logan, who had developed it in 1934–36 while head of the Quartermaster Subsistence School. Its main component was chocolate, although it also contained powdered skim milk, sucrose, added cacao fat, oat flour, and vanillin. Strictly an emergency food, the D ration was intended to sustain men for only very short periods of time under conditions in which no means of resupply was possible.

Finally, mainly as a result of British experience in North Afirica, and suggested by the successful British 12-in-1 composite pack, two types of composite rations known as 5-in-1 and 10-in-1 had also been developed, each unit containing sufficient food for five or ten men. These rations contained a considerably greater variety of food and were put up in five different menus. A sample 10-in-1 menu contained premixed cereal, milk, sugar, bacon, biscuits, jam, and soluble coffee for breakfast; ten K-ration dinner units; and meat stew, string beans, biscuits, prunes, and coffee for the supper meal. The 10-in-1's also contained a preserved butter which, in deference to a well-known brand of lubricants, the troops quickly dubbed "Marfak No. 2." Considerable controversy over the adequacy of its caloric content attended the development of the composite ration. It was developed for use over longer periods than either the C or K ration, for troops in advance areas that could not be served by field kitchens, and for troops in highly mobile situations. It was well suited for bridging the gap between the C and K rations and the B ration, the normal bulk ration which was intended to be served over long periods of time in the field. The B ration was essentially the garrison or A ration without its perishable components.[17]

The OVERLORD administrative plans provided that men in the assault stages

[17] Quartermaster Supply in the ETO in World War II, OQMG, 1948, II (Subsistence), 64–68, Apps. XXVII–XXXIII.

would personally carry one D and one K ration. Their organizations were to carry an additional three rations per man, either C or K. Maintenance shipments in the first few days were to consist wholly of C and K rations, but after the fifth day 50 percent of the deliveries were to be in 10-in-1's. After the first month of operations half the subsistence was to be in B rations, about one quarter in 10-in-1, and the remainder in C and K. In actual practice there was considerable departure from the plan after the first few days. Rations were delivered to the Continent principally in prestowed ships loaded in New York weeks before the invasion, each vessel containing from three to eight 500-ton blocks. In this way approximately 60,000,000 rations were delivered in the first four weeks of operations. The shift to 10-in-1 rations, however, was more rapid than contemplated, and in the first four weeks approximately 77 percent of all issues were of this type, at the expense of the less popular C's and K's. Early in July, as planned, came the shift to the B ration, starting with issues to about 57 percent of all troops on the far shore. By that time the operational ration was already being augmented by the issue of freshly baked white bread, which began on 1 July, with one static bakery (at Cherbourg) and seven mobile bakeries in operation. As was the case with the 10-in-1's, the change-over to type B was more rapid than planned. By mid-July more than 70 percent of all troops were receiving the B ration.[18]

Experience with the C, K, and 10-in-1 rations in the first two months of operations produced mixed reactions. The 10-in-1 was undoubtedly the best liked initially. Troops found the C ration monotonous with its indestructible biscuits and its constant repetition of meat and vegetable hash, meat and beans, and meat and vegetable stew. But whether the C or the K was least popular is debatable. The demand for one or the other was influenced at least in part by convenience in handling. The K ration was the handiest for the man on foot; headquarters organizations and units with adequate transportation and heating facilities tended to prefer the C ration. All three had one component which was the subject of universal derision—powdered lemon juice. Showing little concern as to whether they received the proper amount of ascorbic acid in their diet, troops consistently disposed of the powder in ways not intended by quartermaster dietitians, either discarding it or combining it with liberated spirits in new tests of inventiveness.

Early in July the almost universal demand for more coffee in the menus, and for improvement of the biscuits, particularly in the C and 10-in-1 rations, led the chief quartermaster of the ETO to request improvement in the packaged rations, including an augmentation of their nutritional value. Eventually all rations were greatly improved in palatability by the introduction of a considerable variety of foods, but these changes were not to appear until early in 1945.[19]

Difficulties in Class II and IV supply arose either from shipping delays or from unexpected maintenance and consumption factors in the fighting of the first two months. Engineer supply was generally adequate, though only because captured stocks of construction materials were ex-

[18] *Ibid.* pp. 26–27; ADSEC Operations History, p. 61; FUSA Rpt of Opns, 20 Oct 43 to 1 Aug 44, Annex 14 (QM), App. 14 (rations issued), Bk. VI.

[19] Quartermaster Supply in the ETO in World War II, II, 68; Basic Needs of the ETO Soldier, I, 44–45.

tensively used. Delivery of construction materials suffered from the initial lag in tonnage discharges, and receipts also fell behind because of the inability to receive them at Cherbourg, where mine clearance took much more time than expected. Fortunately a large portion of the construction materials required in the rehabilitation of Cherbourg could be procured locally or from captured stocks. Large quantities of cement, lumber, concrete mixers, and small items of equipment and supplies were found in the Cotentin.[20] Huge rafts of timber piling were towed across the Channel for use in the reconstruction of the ports.

One engineer supply shortage that could not be solved locally was in maps. Allowances were found to be quite inadequate, partly because of the slow tactical progress, for the relatively static conditions of July occasioned demands beyond all expectations for large-scale (1:25,000) maps. Most of these demands were met by air shipments from the United Kingdom.[21]

Signal Corps supply followed the same general pattern as Engineer supply. The delivery of Signal Corps construction materials also lagged because of transportation difficulties. But the deficiency was largely made up by the capture of construction supplies and the discovery of enemy equipment in only slightly damaged condition. Shortages developed in certain types of radios because of losses in the landings, but these were made good by express shipments via both air and water. The major supply problem was lack of information as to location of Signal Corps supplies aboard ships arriving off the beaches.[22]

Shortages of ordnance Class II and IV equipment resulted either from losses in the landings or from the nature of operations. Enemy action and mishaps in unloading at the beaches caused immediate shortages in 105-mm. howitzers, medium tanks, jeeps, and multigun motor carriages. Some of the lacks were rectified by priority call on the United Kingdom for replacements. Perhaps the most unexpected shortages occurred in mortars, light machine guns, BAR's,[23] and grenade and antitank rocket launchers.

The Normandy hedgerow fighting took an unprecedented toll of these weapons. The heavy losses in BAR's—835 in First Army in June, or one third of the total number authorized—were attributed mainly to the special effort which enemy infantrymen consistently made to eliminate the BAR man in the American rifle squad.[24] The shortage of grenade launchers was laid to the fact that the M1 rifle could not be fired automatically with the launcher attached. Many launchers were lost when they were removed, and in mid-July First Army reported a shortage of 2,300.[25]

The delay in the arrival of ordnance troops and bulk shipments of supplies was felt keenly, especially since an accelerated build-up of combat units caused available reserves to be expanded at rates far greater than anticipated. The shortage of at least one item, the 2.36-inch rocket launcher, was met by having service organizations

[20] ADSEC Operations History, p. 44.

[21] FUSA Rpt of Operations, Bk. V, p. 220.

[22] *Ibid.*, Bk. VI, pp. 17–18; ADSEC Operations History, p. 59.

[23] Browning automatic rifles.

[24] Ltr, Col John B. Medaris, FUSA Ord Officer, to Chief Ord Officer, ETO, 3 Jul 44, Weekly Ord Ltr 2, AGF Bd Rpt 114, 4-3.114/44 (4202) 14 Jul 44, Opns Rpts.

[25] Ltr, Col Charles H. Coates, WD Observers Bd, 14 Jul 44, sub: AGF Rpt 114—Ammo and Weapons for First Army, AGF Bd Rpt 114, 4-3.114/44 (4202) 14 Jul 44, Opns Rpts.

turn their weapons over to combat units.

Vehicle maintenance was not a serious problem in the first weeks, undoubtedly because most vehicles were new. But shortages of spare parts began to give trouble as early as July, when First Army had its first troubles with cannibalization, particularly of certain types of tires.[26] At the end of July, on the basis of its first two months' experience, First Army recommended upward revisions of replacement factors for forty ordnance items.[27]

The first weeks of fighting also produced reports on the quality of U.S. equipment, particularly combat vehicles. The inferiority of the 75-mm. gun on American tanks was recognized before the invasion, and remedial measures had already been taken. Before D Day the theater had received 150 tanks mounting the 76-mm. gun, which had somewhat better armor-penetrative power, and more shipments were expected during the summer months. In addition, there had been a limited authorization of tanks mounting the 105-mm. howitzer. General Bradley, aware of the limitations of both the 75-mm. and 76-mm. gun, had indicated in April that the 105-mm. howitzer and the still newer 90-mm. gun motor carriage (the M36 tank destroyer), which was not yet available, might well become the logical successors to the 75 and 76 respectively to meet the dual requirement for a gun with superior high-explosive qualities and an armor-piercing weapon capable of engaging hostile armor.

The first few weeks of combat on the Continent made it abundantly clear that the 75-mm. and 76-mm. guns were no match for the enemy's Panthers (Mark V's) and Tigers (Mark VI's), and on 25 June Brig. Gen. Joseph A. Holly, chief of the ETOUSA Armored Fighting Vehicles and Weapons Section, was called to the Continent to meet with senior combat commanders and determine the details of their requirements. Shortly thereafter he went to the United States to obtain expedited shipment of the maximum number of both the 105-mm. and 90-mm. weapons. Meanwhile General Eisenhower himself reported the inferiority of American tank armament to the War Department, and made an urgent request for improved ammunition and weapons. The War Department agreed to expedite the shipment of the new 90-mm. gun tank destroyer and released the first hundred to the New York Port early in July. In the meantime the only immediate action that could be taken within the theater was to dispatch to the far shore fifty-seven of the new medium tanks equipped with 105-mm. howitzers, which had just been received in the United Kingdom.[28]

The status of POL (Class III) supply in June and July was entirely satisfactory. Plans for the delivery of gasoline and other petroleum products proved quite adequate in view of the slow rate of advance, the short lines of communications, and the resulting low consumption. Bulk deliveries of gasoline were scheduled to begin on D

[26] FUSA Rpt of Opns, Bk. VI, pp. 99–100; Bk. I, p. 95.

[27] Ltr, Hq FUSA to CG ADSEC, 30 Jul 44, Forecast of First Army Requirements for D plus 50 to D plus 140, EUCOM 475 Equipment of Troops.

[28] Ltr, FUSAG to CG ETO, 25 Apr 44, sub: Characteristics of Medium Tanks for 1945 Production, 12 A Gp 470.8 Tanks; Stf and Comd Conf, COMZ, 2, 9 Jul 44, EUCOM 337/3 Confs Stf-Weekly, I; TWX, Eisenhower to Smith, 3 Jul 44, SHAEF Cbl Log IN 1944–45, Smith Papers; Ltr, Marshall to Eisenhower, 13 Jul 44, ASF Plans and Opns, 201.04 Requirements and Stock Control, A47–289; SHAEF G-4 War Diary, VI (Jul); Final Hist Rpt, Armored Fighting Vehicles and Weapons Sec, Hq ETO, pp. 21–22, ETO Adm 540. See also 12 A Gp 472 Cannons and Field Pieces, and SHAEF G-3 O&E 370.8 Tanks.

plus 15, but construction of the Minor Pipeline System was delayed by difficulties in delivering construction materials, all of which had to arrive over the beaches or through Port-en-Bessin. POL construction materials were mixed with other cargo on several vessels and, in the early confusion and competition for priorities, did not arrive as scheduled. A limited quantity of materials was gathered together very shortly, however, and, the 359th Engineer General Service Regiment began work on D plus 7, although many needed fittings were still unavailable. Just before D Day, when the discovery of additional enemy forces in the invasion area indicated that the capture of Cherbourg would be delayed, thus enhancing the importance of the Minor System, 21 Army Group had fortunately made a special allocation of LCT lift to bring in additional construction materials. This cargo began arriving on D plus 9 and was routed to Port-en-Bessin, where it was promptly unloaded.[29]

The POL plan benefited by another favorable development. Previous intelligence had indicated that only the east mole at Port-en-Bessin could be used for discharge and that only small tankers of 350 tons capacity could be handled. On arrival the Allies found that both the west and east moles could be used, one for the British and one for the Americans, and that tankers of up to 1,300 tons' capacity could be received. Eventually it was therefore possible to develop intake capacity of some 2,000 tons per day instead of the 700 originally estimated. This was most fortunate in view of the increased burden put on the Minor System during the prolonged period required to clear the port of Cherbourg.

Meanwhile construction of the facilities at Ste. Honorine also proceeded, although plans for a third TOMBOLA were canceled because of terrain difficulties. Operation of the two underwater lines was actually restricted to fair weather because of difficulties in mooring tankers and connecting pipeheads in rough seas. Reconnaissance of the port areas shortly after the landings also resulted in some change in the siting of the tank farms. Many of the sites selected from contour maps before the landings were unsuitable, primarily because of unfavorable gradients. The number and size of tanks placed at the ports were therefore held to a minimum, and the main storage was sited on better ground at Mt. Cauvin, near Etreham.

Construction of the pipeline inland from Ste. Honorine was delayed somewhat by the necessity of clearing thickly sown minefields in the area. Several casualties were sustained in this operation, but losses were undoubtedly kept down thanks to information provided by a former French Army captain on the location of mines both inland and offshore. He had witnessed the sowing from his home near the beach.[30]

Construction of the Minor System progressed steadily and was far enough along for the 786th Engineer Petroleum Distributing Company to begin operations on 25 June, when the first bulk cargo of MT80 was received, about nine days behind the planned schedule, at the Mt. Cauvin tank farm. (*See Map 16.*) More than enough packaged gas was on the far shore to bridge the gap, inasmuch as vehicular mileage had been much less than expected

[29] Hist Rpt 13, Petroleum, Oils, and Lubricants, Corps of Engrs ETO, pp. 54–55, ETO Adm.

[30] Hist Rpt 13, Corps of Engrs ETO, p. 57; Completion Rpt Bulk POL Installations Minor POL System, 1 Oct 44, ADSEC Engr Completion Rpts.

in the limited area of the lodgment.[31]

Because of the delay in the capture of Cherbourg the Minor System assumed even greater importance than expected. It was expanded beyond the original plans after the port was captured because the number of obstacles in the harbor promised to delay still further the use of the Querqueville *digue* for tanker deliveries. Pipelines were extended from the Mt. Cauvin tank farm to St. Lô for both MT80 and Avgas, and a branch line for Avgas was laid to Carentan to take advantage of existing facilities there. Eventually the Minor System had seventy miles of pipeline instead of the planned twenty-seven. Additional tankage was also constructed to give the system a storage capacity of 142,000 barrels instead of the planned 54,000. Because of rough sea conditions at the OMAHA beach fueling station, the Ste. Honorine-des-Pertes installation was not used by the Navy as intended, but was turned over to the Army to be used exclusively as an MT80 receiving and storage terminal.[32]

The Minor System was intended to deliver a total of about 6,000 barrels per day of MT80 and Avgas combined. By the end of July the output was double that figure.[33] At that time the First Army was consuming about 400,000 gallons (9,500 barrels) of motor fuel alone each day.[34] Though originally scheduled to have served its purpose by D plus 41, the Minor System was compelled by tactical conditions to continue in operation at maximum capacity for many weeks to come. For a twelve-day period in September its daily issues averaged 18,000 barrels.[35]

While the over-all supply situation was generally satisfactory in June and July, there was one major exception. Ammunition (Class V) supply was a repeated cause of concern in this period and came nearest being a "critical" shortage in the sense of jeopardizing the success of operations, although, disturbing as it was, the situation was not serious when compared with later difficulties. Most of the trouble over ammunition supply arose not so much from excessive or unexpected expenditures as from difficulties in delivery of adequate tonnages to the Continent.

Ammunition supply became serious at the very start of the operation, particularly at OMAHA Beach. Scheduled landings of supplies had been upset by the loss of key personnel, vehicles, and equipment of the beach brigades. Fortunately the artillery, except for separate armored battalions, had not engaged in particularly heavy firing in the first days, and naval gunfire had given good support to ground units. Expenditures had actually been below estimates.[36] But ammunition was not arriving at planned rates, and it was almost immediately necessary for the First Army commander to take emergency action in order to give high priority to the

[31] Comd and Stf Conf, COMZ, 25 Jun 44, EUCOM 337/3 Confs Stf-Weekly, I.

[32] Rpt on POL Plans and Construction to 8 May 45, n. d., ADSEC Engr Completion Rpts Bulk POL Installations; Interv with Col Alvin G. Viney, Deputy Engr of ADSEC in this period, 24 Feb 50, OCMH.

[33] Hist Rpt 13, Corps of Engrs ETO, pp. 61–62. Port-en-Bessin alone had received 35,000 tons of MT80 and 8,160 tons of Avgas at the end of the month. Ltr, COMZ to ADSEC, 10 Jun 45, sub: Bulk POL Stock Transactions from D Day to 31 Jul 44, and 1st Ind, 15 Jun 44, ADSEC 463.7 Gasoline and Motor Oil.

[34] FUSAG Rpt of Opns, Vol. VI, Annex 14 (QM), App. 15.

[35] ADSEC Rpt on POL plans and construction to 8 May 45.

[36] Memo, Col Martin F. Hass, Chief Supply Br G-4 12 A Gp, for C/MGA, 21 Jun 44, sub: Ammo Expenditures D to D plus 5, Opn OVERLORD, 12 A Gp Ammo.

beaching of ammunition vessels. By 10 June the situation had already improved somewhat.[37]

Nevertheless the ammunition supply picture was subject to frequent ups and downs in the first weeks. The initial shortages had developed in small arms ammunition and hand grenades, of which there was an unusually large expenditure in the hedgerow fighting. These shortages were relieved by air shipments from the United Kingdom.[38] By the middle of the month ammunition stocks in general were far below planned targets, and steps were taken to give Class V supply, particularly field artillery ammunition, the highest priority, replacing scheduled shipments of POL.[39] On 15 June restrictions on expenditure were imposed for the first time when First Army rationed ammunition by limiting the number of rounds per gun which could be fired each day by the two corps. Stocks were low in part because of nondeliveries. But rationing was resorted to mainly because corps and divisions had violated army directives in creating excessive unreported unit dumps at artillery positions. Lower units had stocked excessive amounts forward, reducing reserve stocks in army dumps and therefore under army control.[40]

A more serious threat to the whole ammunition position came in the period of the storm, when unloading virtually ceased. Special measures were taken at that time both to limit expenditures and to expedite deliveries of items in critical supply. First Army immediately limited expenditures to one-third unit of fire per day, and then arranged for air shipments of 500 tons per day for three days, ordered ammunition coasters beached, and called forward from U.K. waters five U.S. Liberties prestowed with ammunition.[41] The shortage of field artillery ammunition was alleviated somewhat by employing tank destroyer and antiaircraft battalions in their secondary role as field artillery to perform long-range harassing and interdiction, for the expenditure of 90-mm. and 3-inch gun ammunition was not restricted.[42]

With the general improvement in the entire build-up after the storm, First Army on 2 July temporarily lifted the restrictions on expenditures. At the same time, however, army presented a table of expenditures which, on the basis of experience, it regarded as ample enough to allow its corps to accomplish their respective missions, and it directed that units conform on a corps-wide basis to expenditures at rates not to exceed one unit of fire in the initial day of an attack, one-half unit of fire on each succeeding day of an attack, and one-third unit of fire for a normal day of firing. Any expenditure in excess of these rates had to be justified to First Army within twenty-four hours. The new system eased the previous rigid restriction on the basis of rounds per gun per day and gave the corps more leeway in planning their operations, but the army warned that any abuse would result in a return to strict rationing.[43]

This limitation was in force for the next two weeks, during which the army made a succession of limited attacks with all four corps through the difficult terrain already

[37] FUSA Rpt of Opns, Bk. VI, pp. 69–70.

[38] FUSAG Rpt of Opns, VI, 69–70.

[39] Memo, Eisenhower for CofS, SHAEF, 16 Jun 44, SHAEF SGS 300.6/6 Supreme Comdr's Memo of 16 Jun.

[40] FUSA Rpt of Opns, Bk. V, p. 184; Ltr, Bradley to CGs divs and corps, 19 Jun 44, sub: Ammo in Excess of Basic Load, FUSA 471 Ammo, ORB.

[41] FUSAG Rpt of Opns, I, 80; ADSEC Operations History, p. 32.

[42] FUSA Rpt of Opns, Bk. I, pp. 123–24.

[43] Ltr, Maj Gen William B. Kean, CofS FUSA, to CGs Corps, 2 Jul 44, sub: Field Arty Ammo Expenditures, FUSA 471 Ammo.

described. In effect, the army directive imposed very little restriction on firing, and "morale" firing by new divisions, plus increased depth and width of concentrations fired to compensate for poor observation, tended to increase expenditures. The result was a period of the most continuous heavy firing in the first two months. Reserves were depleted at the rate of .2 unit of fire per day, and depot stocks became insufficient to sustain the army's allowed expenditure rate. The depot level of 105-mm. howitzer ammunition dropped to three and a half units of fire after having been built up to six units of fire earlier in the month.[44] The stocks of 81-mm. mortar ammunition, which was the most critically short of all, were reduced to .3 unit of fire on 16 July.[45]

Aware that the situation was worsening, First Army on 13 July issued warnings about expenditures in hopes of avoiding a return to rationing. In a letter to the division and corps commanders, Maj. Gen. William B. Kean, the army chief of staff, noted that expenditures had been far in excess of the replacement capabilities of the supply services. He expressed doubt that the results had justified the heavy firing of the past few days.[46]

His warnings were insufficient. Three days later, on 16 July, army imposed a strict rationing system in order to rebuild reserves for the offensive operation then being planned. It now made detailed allocations that differed for each corps on the basis of the estimated scale of combat activity during the period covered by the allowance. Initially the allowance was for specific numbers of rounds per weapon on a day-to-day basis and permitted no accumulation from one day to the next.[47]

Combat commanders objected strongly, arguing that it was false economy to limit the expenditure of ammunition, for combat units consistently sustained fewer casualties and made better progress when artillery support was ample.[48] Undoubtedly these restrictions did not represent the wishes of the army commander either.

The difficulties in replenishing the supply of ammunition were not at this time the result of shortages in the theater, although such shortages were to develop very soon. They were due rather to inadequate arrivals and discharges at the beaches.[49] In mid-July ammunition was being unloaded at the rate of only 3,000 tons per day. First Army asked the Advance Section for a daily discharge of 7,500 tons, the amount which it insisted was necessary to maintain an adequate supply for the combat forces then on the Continent.[50]

After rationing was imposed in mid-July the ammunition situation improved rapidly. From the 16th to the 24th expenditures were actually less than rationing permitted. Firing was light, for the bulk of the artillery was held silent in new positions in preparation for the attack of 25 July.[51] The shipping and discharge situa-

[44] FUSA Rpt of Opns, Bk. V, p. 184.

[45] FUSA AAR, Ammo Officer to Ord Officer for Jun and Jul, Gen Bd files 471/1 A/A Rpt FUSA.

[46] Ltr, Kean to CGs Divs and Corps, 13 Jul 44, sub: Field Arty Ammo Expenditures, FUSA 471 Ammo.

[47] FUSA Rpt, Bk. I, p. 125; Ltr, Bradley to Corps CGs, 17 Jul 44, sub: Ammo Allocations, FUSA 471 Ammo.

[48] Ammunition Supply for Field Artillery, Gen Bd Rpt 58, pp. 16–17; Ltr, Brig Gen Raymond S. McLain 30th Div Artillery to CG 30th Div, 15 Jul 44, sub: Ammo Expenditures, FUSA 471 Ammo.

[49] Memo, Maj Gen Henry B. Sayler for CG COMZ, 18 Jul 44, and Memo, Col Hugh Cort, CofS ADSEC, for CG ADSEC, 16 Jul 44, ADSEC 471 Ammo.

[50] Ltr, Kean to Plank, 18 Jul 44, sub: Ammo Supply, and Memo, Cort for Plank, 16 Jul 44, ADSEC 471 Ammo.

[51] FUSAG Rpt, I, 94–95 and V, 184.

tion also improved in this period, and as a result of the calling up of additional ammunition ships there were approximately twenty-nine vessels with a capacity of about 145,000 tons awaiting discharge off the beaches at the end of the month.[52]

The special express shipping services to the far shore to meet unexpected or unusual demands by the combat forces proved a farsighted provision. Arrangements had been made for shipments by both air and water, the latter being handled either as GREENLIGHT shipments, consisting of 600 tons per day of ammunition or engineer Class IV supplies, or as Red Ball shipments, under which 100 tons of supplies could be rushed to Southampton by truck and dispatched by daily coaster to the far shore. In the first eleven days of operations four GREENLIGHT, fourteen Red Ball, and ten emergency air shipments were made to the Continent, ranging in size from small boxes of penicillin to fifteen 105-mm. howitzers. In the first month more than forty special ammunition shipments were made, approximately one third of them by air. It had been estimated that requests for Red Ball shipments would be filled in from three to five days. At the end of July General Ross reported that up to that time the average elapsed time from receipt of requests to delivery had been eighty-nine hours (three days, seventeen hours).[53] Although shipment by air was still in its early stages of development and did not account for a large portion of the over-all tonnages, it was particularly useful in meeting urgent demands for certain types of ammunition in the period of the storm. Approximately 6,600 tons of supplies were flown into the lodgment area during June and July.[54]

While the various express services operated satisfactorily to meet emergency requirements on the far shore, the supply system as a whole developed an undesirable rigidity and thus tended to bear out the misgivings voiced before D Day by General Moses, the army group G-4.[55] Several factors contributed to its inflexibility, some of them inherent in the supply plan, some of them resulting from difficulties on the far shore. The prescheduling of supply shipments for the entire first three months imposed an initial strait jacket, for it placed a great burden on the U.K. depots and also resulted in the building up of unbalanced stocks on the Continent. The U.K. depots were hard put to prepare shipments of small quantities of many items for each day's requisition and also meet sudden priority demands for shipments via GREENLIGHT, Red Ball, and air. On the Continent, meanwhile, the receipt of prescheduled shipments led to the creation of unbalanced stocks. Record keeping on the far shore was not sufficiently accurate to provide a true picture of supply stocks there. Since actual consumption rates and depot balances were not known, no attempt was made to alter requisitions to reflect real needs. Under these circumstances the far-shore commands found it easier to have their urgent requirements met by the various express services.

Selective unloading on the far shore created additional inflexibility, for it promoted forced idleness of shipping at the beaches, lengthened the turn-round time, and reduced the number of vessels return-

[52] Operation, Organization, Supply and Services of the TC in the ETO, Gen Bd Rpt 122, p. 29; Ltr, Cort to Kean, c. 20 Jul 44, ADSEC 471 Ammo.

[53] Comd and Stf Conf, COMZ, 18 Jun, 9 and 30 Jul 44, EUCOM 337/3 Confs, Stf-Weekly, I, 44.

[54] 12 A Gp Rpt of Opns, VI (G-4), 20, OCMH; Supply and Evacuation by Air, Gen Bd Rpt 26, p. 29.

[55] See above, pp. 310–12.

ing to the U.K. loading points. The net result was to increase the intransit time for all supplies and to place a larger portion of the theater's supplies in the pipeline. Once committed to movement an item was not available for issue until it was stocked in a depot on the far shore. The tonnages thus committed to the pipeline sometimes constituted a substantial percentage of the available theater stocks of certain items.

The ability of the supply system to respond to requirements depended largely on movement capabilities, which were always limited. Committing a large portion of the lift to prescheduled shipments, some of which were unnecessary, eliminated whatever cushion there might have been. In a post-mortem of the OVERLORD supply plan after the war critics agreed that the shipments of supplies on a daily basis could have been discontinued much earlier, and that the prescheduling of shipments for three months imposed an unnecessary rigidity on movement capabilities in view of the large percentage of theater stocks which were tied up as a result. Furthermore, had the turn-round time of shipping been shorter, and had an accurate running inventory of depot stocks been kept so that predetermined shipments could have been adjusted to reflect actual consumption, a greater degree of flexibility in the use of shipping would have been achieved, and the demands of the combat forces could have been met more promptly.[56]

(4) Troop Build-up

Even before D Day the OVERLORD planners had hopefully considered the possibility of carrying out the continental troop build-up at a greater speed than that laid down in the priority lists. After the operation was launched the prospect of accelerating the flow of troops, first from the United Kingdom and then from the United States, was examined repeatedly.

The theater first sounded out the War Department early in June on the possibility of advancing the shipment of divisions. Through the chief of OPD, General Handy, who was then in the theater, it suggested that under favorable circumstances the build-up might be accelerated, and it asked the War Department for an estimate of its ability to speed up the flow of units after D plus 30. OPD replied that no additional divisions could be shipped in July and noted that it also was too late to preship equipment for any in addition to the four already scheduled for August.[57] Three additional divisions could be shipped with their equipment in August, however, and could go directly to the Continent. The War Department also held out the possibility of shipping two divisions in September by advancing one scheduled for movement in October. It emphasized that the big problem in accelerating the flow of divisions was not one of readying them from the standpoint of training, but finding sufficient equipment.[58]

Meanwhile logistics officers at both the

[56] Mounting the Operation OVERLORD, Gen Bd Rpt 129, pp. 17–22.

[57] The 17th Airborne, 9th Armored, and 94th and 95th Infantry Divisions, whose equipment was already on the way.

[58] Cbl S–53541, Handy (at SHAEF) to Hull, 10 Jun 44, and Cbl W–49325, Hull to Handy, 11 Jun 44, SHAEF G–4 Troop Flow 121/1 GDP–1, 69; Memo for record, OPD, 10 Jun 44, OPD 370.5, XIII. The arrival of the 80th Division in England early in July would bring the total number of divisions in the theater to 22 (14 infantry, 6 armored, and 2 airborne). No shipments were scheduled for that month, but the 4 divisions scheduled for early August shipment would bring the theater strength to 26 (16 infantry, 7 armored, and 3 airborne).

SHAEF and ETO headquarters also studied the problem, considering both the theater's ability to receive and equip additional divisions and the prospect of maintaining them on the Continent. For one thing, they noted, the theater would not yet be ready to receive divisions on the Continent directly from the United States in August. To process them through the United Kingdom would create added administrative burdens since a number of divisions were already scheduled to remain in the United Kingdom until D plus 180 because of the inability to support them on the Continent. Furthermore, the reception of additional divisions would entail a drain on existing stocks of supplies, for there was no surplus equipment in the United Kingdom.

As far as receiving the divisions on the Continent was concerned, it was admitted that the rate of build-up might be increased "under favorable conditions"—that is, if supply requirements were materially less than anticipated, or if port capacity and enemy railway demolitions proved more favorable than expected. But the very opposite might well be true, and the maintainable build-up therefore actually less than forecast. Logistical planners felt that the pre-D-Day forecasts were not unduly conservative to begin with, and were in fact based on far lower supply levels than were desirable. They had already considered that the support of the current troop list would be critical in the period from D plus 60 to 90, and had concluded that limitations in both beach and port capacity and in transportation facilities would be a major restriction on the maintenance of a force larger than the one currently planned. Early in June, therefore, supply planners at SHAEF, 1st Army Group, and the Communications Zone were in general agreement, for the moment at least, that an acceleration of the flow of divisions would be unsound. At any rate, it was rather academic to plan a more rapid build-up on the Continent until the trend of operational developments could be seen more clearly.[59]

The importance of the whole matter was accentuated by the initially slow tactical progress, with its attendant danger of a strong enemy build-up on a relatively narrow front. The nature of the early fighting led General Bradley to order the first major alteration in the build-up schedule on 15 June, advancing the movement of the 83d Division by nine days, from 30 June to 21 June. He also ordered that a study be made as to the possibility of similarly advancing the movement of the entire XV Corps (three divisions), across the beaches if necessary.

The army commander was extremely conscious of the necessity to keep the situation in Normandy from "solidifying" in view of the increased resistance building up, and he felt that it might be necessary to bring in additional divisions to enable

[59] Adm Study 11, SHAEF G-4, sub: Logistical Situation U.S. Forces D plus 41 to D plus 90, Pt. I—General, 3 Jun 44, Pt. II—Movements, 1 Jun 44, SHAEF G-4 Adm Stf Study 11. Ltr, Col William Whipple to Lt Col William L. Barriger, Deputy G-4 FUSAG, and Col Albrecht, CofS FECOMZ, 9 Jun 44, sub: Logistical Situation U.S. Forces D plus 41 to D plus 90; Ltr, Hq COMZ to U.S. Adm Stf 21 A Gp, 12 Jun 44, sub: Build-up—D plus 60–D plus 90; Memo, Moses for G-3 FUSAG, 13 Jun 44, sub: Build-up D plus 60–D plus 90; Ltr, FECOMZ to U.S. Adm Stf 21 A Gp, 23 Jun 44, sub: Build-up D plus 60–D plus 90. All in 12 A Gp 370 Build-up Tables. Memo, Whipple, 14 Jun 44, sub: Build-up of Forces, SHAEF G-4 381 Bolero I 44, and draft of 7 Jun 44, SHAEF G-4 Log Plans Br 1062/4/GDP Post-OVERLORD Availability of Forces, 66; Memo, Current Opns Br G-4 for Exec Sec, 20 Jun 44, sub: Progress of Build-up of Major Combat Units, G-4 SHAEF 381 BOLERO I 44.

the army to continue the attack along the entire front. This view was fully shared by the Supreme Commander, who took steps to advance the shipment of fighting units and ammunition at the expense of service personnel and other types of supplies.[60]

The administrative implications of such rephasing were fully appreciated.[61] While developments on the Continent could fully justify the acceleration at the moment, there was an inherent danger that the development of an imbalance of combat and service forces might at some future date jeopardize over-all operations. For this reason the advisability of further accentuating the disparity in forces was seriously questioned.[62]

At General Eisenhower's request, meanwhile, the whole matter of accelerating the long-range build-up from the United States was again investigated, prompted in part by questions submitted by the British Prime Minister. Mr. Churchill had expressed disappointment, both to the Supreme Commander and to President Roosevelt, over the great preponderance of service troops over combat troops in the forces scheduled for shipment from the United States. He pointed out that the 553,000 men arriving from May through August included only seven divisions, which would indicate a division slice of about 79,000 men. In his opinion the "administrative tails" were too long, and he desired that there be more "fighting divisions" at the expense of service units.[63]

The protest was hardly warranted, for the shipments in this particular period bore little relationship to the apportionment of combat and service forces planned for the theater— that is, a division slice of 40,000. Service force shipments in these months were abnormally large only because those of earlier months had been disproportionately small in deference to combat units.

In their analysis of the problem both the G–3 and G–4 of SHAEF at first recommended caution in attempting any further acceleration in the build-up of combat forces or reduction in maintenance scales. Some acceleration had already taken place, with the result that the preponderance of combat elements was already greater than planned. As of 27 June, for example, eleven divisions were ashore, as planned, plus the two airborne divisions which had not been withdrawn as scheduled, although the over-all U.S. build-up on the Continent was behind by more than 100,000 men. Only 63,000 of the troops ashore were service troops of the line of communications, the great bulk of the forces consisting of divisions, corps, air force units, and army overheads. The division slice at the time was only 31,000. Some disparity had been planned for in the initial phases, but the continued landing of combat elements more or less on schedule while the build-up as a whole fell in arrears, and the phasing in of some elements (notably the 83d Division) ahead of schedule had created an even greater disparity. Changes in the movement dates for certain service elements, predicated on the early fall of Cherbourg, had been post-

[60] Memo, Smith for Chief Historian ETO, 22 Feb 45, sub: Document for Inclusion in Hist Records, SAC's Decision on Opn OVERLORD, Smith Papers.

[61] Memo, Lt Col Edwin N. Clark, Current Opns Br, for Exec Sec, 20 Jun 44, sub: Build-up on Continent, SHAEF G–4 381 BOLERO I 44; Memo, Current Opns Br for Exec Sec, 20 Jun 44, sub: Progress of Build-up of Major Combat Units, SHAEF 381 Build-up of U.S. Forces I 44. See also papers in 12 A Gp 370 Build-up Tables.

[62] Memo, Bull for CofS, SHAEF, 21 Jun 44, sub: Increase in Rate of Build-up, SHAEF G–3 War Diary.

[63] Cbl, Churchill to Roosevelt, 28 Jun 44, P&O 381 1943–45.

poned when the capture of that port was delayed.[64]

Several developments to date had admittedly been favorable, resulting in reduced scales of logistical support and therefore indicating the possibility of a more rapid build-up of combat forces. Casualties had been fewer than expected; demolitions had been on a small scale and most rail lines had been captured intact; the small scale of enemy air activity had reduced the need for antiaircraft defenses; and the food situation in Normandy was good.

There were unfavorable factors as well. Bad weather had interfered with shipping and unloading, particularly retarding the discharge of motor transport; the U.S. MULBERRY and many landing craft had been destroyed by the storm; and the capture of Cherbourg had been delayed. Referring to the Prime Minister's observations on reducing logistic requirements, Maj. Gen. Harold R. Bull noted that it had become "a favorite pastime . . . to compare the excessive American tonnage required per divisional slice to that required by the British." He thought it might be appropriate to point out the difference in the respective tactical missions of the American and British army groups. U.S. forces would have by far the longest lines of communications in their advance westward into Brittany, south to the Loire, and then on the outer edges of the huge wheeling maneuver toward the Seine, which would add immeasurably to their logistical problems.

The G–4, General Crawford, noted that while it was true that administrative requirements had been low thus far as a result of the slow advance, it was by no means certain that tactical progress would continue at such a slow pace, and if a break-through occurred and a rapid exploitation became possible, the maximum number of service troops would be required to develop the lines of communications. He noted further that the build-up was already restricted by the available lift for vehicles and by the over-all supply situation, and that the reduced requirements for antiaircraft defense did not allow any material reduction in air force needs, for these were designed largely for offensive operations.

On balance, therefore, not only the G–4, whose responsibility for supply inclined him to conservatism, but also the G–3 felt that neither previous estimates as to the number of divisions which could be supported on the Continent (twenty-one by D plus 90) nor the planned allocation of service troops, already low, should be altered at this time. In fact, as one officer pointed out, once the already augmented combat forces developed momentum did it not follow that the build-up would perforce have to revert to an accelerated service troop movement in order to develop the lines of communications?

The achievement of a proper balance was indeed an elusive matter, and any disproportionate preponderance of combat units over service troops could be a temporary one only. The initial examination of the problem of an accelerated flow of combat elements therefore resulted in the tentative conclusion that no drastic alteration in the planned proportion of combat and service troops was either desirable or feasible on the basis of experience thus far. In the view of both the G–4 and G–3 the build-up plan was sufficiently elastic to meet changing needs. Some alteration had already been made, and tentative plans

[64] The Procurement and Use of Manpower in the ETO, p. 29.

existed whereby divisions could be brought in up to twenty days ahead of the present schedule for the first three months. Conversely, additional service troops could also be made available if the demands for logistic support required, so that the forces could be balanced to meet any situation likely to arise.[65]

Despite these counsels the Supreme Commander immediately took steps which would at least permit the theater to take advantage of any favorable developments. At the end of June General Eisenhower instructed that measures be taken to have four divisions available in the United Kingdom at all times up to D plus 150 instead of the three then provided, so that an adequate number would be on hand in the event logistic limitations later permitted their movement to the Continent.[66] Arrangements were accordingly made with the War Department for the first acceleration in the build-up, four divisions instead of three being scheduled for shipment in the month of September.[67] The movement of an additional division to the United Kingdom was not an immediate worry so far as its support on the Continent was concerned, but it did entail a sacrifice of an equivalent number of replacements, for which there was soon to be a critical need.[68]

The problem of accelerating the build-up was under continuous study in July. At its root lay such basic questions as the adequacy of shipping, the availability of equipment, the status of training of divisions in the United States, the theater's ability to receive them both on the Continent and in the United Kingdom, and, finally, the practicability of maintaining them on the Continent. The theater was of course primarily concerned with the question of its ability to receive and maintain the additional forces. Answering the latter half of this question required a thorough examination of the first month's operations. The SHAEF G–4 was already gathering data on port and beach capacities, on the availability of equipment, on maintenance factors, on the ratio of service and supporting troops to combat divisions, on the reception capacity of staging areas on the Continent, and on the repercussions of an accelerated build-up on railway plans and the reserves and storage program.

On 6 July, although these studies were by no means complete, the logistical plans chief, Col. William Whipple, set down his first tentative conclusions. Preliminary investigation indicated that logistical considerations would permit the maintenance of a larger number of divisions after D plus 60 than had been thought possible. The first available statistics on maintenance in the initial thirty days of operations were encouraging. Consumption and expenditure figures on POL and ammunition were reported to have been so far below expectations as to raise doubts about the validity of previously accepted planning

[65] Ltr, Bull to Chief Plans Sec G–3 SHAEF, 27 Jun 44, sub: Analysis of Build-up from D to D plus 90, SHAEF G–3 17100/4/Ops Complete Plng for OVERLORD Build-up; Stf Study, SHAEF G–4, 29 Jun 44, sub: Analysis of Build-up from D to D plus 90 (6 Sep), SHAEF G–4 Log Plans Br 1062/4/GDP Post-OVERLORD Availability of Forces; Memo, Bull for Eisenhower, 30 Jun 44, sub: U.S. Build-up on Continent, SHAEF G–3 370.01 Troop Build-up, II.

[66] Ltr, Bull to CofS, SHAEF, 30 Jun 44, sub: U.S. Build-up on Continent, SHAEF G–3 17100/44/Ops Complete Plng for OVERLORD Build-up.

[67] Cbl S–55316, Smith to Handy, 11 Jul 44, SHAEF Cbl Log OUT 1944–45, Smith Papers; Memo, Lt Col Alfred D. Starbird for Lt Col Chuck, 12 Jul 44, sub: Availability of Divisions, OPD 370.5, XIII.

[68] Ltr, Lt Col Frank A. Osmanski to Whipple, 1 Jul 44, sub: U.S. Build-up, SHAEF G–4 Log Plans Br 1062/44 GDP Post-OVERLORD Availability of Forces.

figures. Estimates on requirements for construction materials and coal might also be revised. While the data were far from complete, and while operations to date were not believed to be truly representative, logistic planners at SHAEF nevertheless expressed a guarded optimism over the possibility of maintaining additional forces on the Continent despite the knowledge that there were inadequate service and supporting troops to accompany the additional divisions.[69]

A more detailed and definitive staff study, completed two weeks later, generally confirmed these conclusions, although it embodied important revisions of earlier views on supply requirements. A closer study of the experiential data on the first month's operations had revealed that maintenance planning figures had been verified more closely than originally believed. The only reductions in divisional maintenance tonnages which now seemed justified or desirable were in engineer construction supplies. The consumption of POL had been extremely low, but in view of the slow rate of advance and short lines of communications, no revision in consumption was predictable for long-range forecasts. Ammunition expenditures, it was now revealed, had actually been slightly higher than forecast, but were expected to drop as operations became more mobile. While the first month's supply experience was not quite as favorable as first believed, however, it did not alter the earlier conclusions that a speed-up in the build-up was feasible.

The question of accelerating the flow of divisions really did not enter into any discussion of the period before D plus 90. There was no possibility of receiving divisions on the Continent directly from the United States, especially in view of the delay in the capture of the Brittany peninsula where they were to have been received and staged. And there was no chance of increasing the total number of divisions on the Continent by the end of August, since all divisions operationally available were already scheduled for early movement to the Continent.[70] A long-range acceleration could not begin until September, when additional divisions might be brought from the United Kingdom, assuming that they could be maintained. Accelerating the flow from the United States could not begin until November.

For planning purposes logistical officers in July had developed three (later four) alternative build-up schedules labeled W, X, and Y, which were later re-christened, P, R, and O, since they represented the "pessimistic," "realistic," and "optimistic" views as to the build-up possibilities. Under all three plans the total theater build-up would remain as originally scheduled until November—that is, 24 divisions by D plus 90, 29 by D plus 120, and 34 by D plus 150. They differed only in the rate at which divisions might be transferred to the Continent from the United Kingdom. The pessimistic Plan W, predicated on a delay in the capture of Brest, provided that as many as four divisions (other than airborne) would be kept in the United Kingdom until February

[69] Memo, Whipple for Crawford, 6 Jul 44, sub: U.S. Build-up on Continent, SHAEF G-4 Log Plans Br 1062/4/GDP Post-OVERLORD Availability of Forces.

[70] Because of arrears in build-up, Movements and Transportation Branch, G-4, SHAEF, had believed that even the movement of divisions from the United Kingdom was out of the question. Ltr, Napier to Col Hamilton A. Twitchell, 6 Jul 44, sub: Projected Move of Additional Divisions, With Note on Shipping Implications, SHAEF G-4 Mov and Tn War Diary 3014/22 Mov.

1945. Plan X represented the original and current schedule, which provided for a build-up of 21 divisions on the Continent by D plus 90, 25 by D plus 120, and 30 by D plus 150. Plan Y called for an acceleration in the transfer of divisions to the Continent in September, with a build-up of 27 instead of 25 by D plus 120 (4 October), 34 instead of 30 by D plus 150 (3 November), and would have resulted in the complete evacuation of divisions from the United Kingdom by November, including the four which were then expected to be held in the United Kingdom on the assumption that they could not be maintained in France. In view of actual developments it is worth noting that all administrative planning had proceeded on the assumption that forces on the Continent would remain generally on the offensive, with periods of intense activity followed by pauses for regrouping, and that approximately 25 percent of the divisions would always be held in reserve.

Consideration was also given in this study to an increase in the flow of divisions from the United States, known as Plan Z. This was an even more optimistic alternative, which was believed possible either if (1) the reserve in the United Kingdom was reconstituted for subsequent shipment to the Continent, or if (2) additional divisions were brought to the Continent and held as a "quiescent reserve" in addition to the normal reserve of 25 percent. There were disadvantages and advantages in both courses, but the disadvantages of the former appeared to outweigh those of the latter. Holding large numbers of troops in the United Kingdom would not tax maintenance facilities on the Continent but had the disadvantage of necessitating a large administrative organization in the United Kingdom, dispersing Communications Zone troops, and requiring a prolonged maintenance of ports, depots, and other installations. Processing units through the United Kingdom would also require double handling and therefore entailed a decided waste of effort. Bringing additional divisions onto the Continent would not necessarily tax administrative facilities there unduly if the number of divisions in combat was not increased. It was estimated that four divisions held quiescent consumed no more supplies than one in combat. They could be held in staging areas near ports or, preferably, in reserve nearer the front where they could be rotated with combat divisions. Such was the theory at least, and it was therefore considered most desirable to hold additional divisions quiescent on the Continent rather than in the United Kingdom. Under Plan Z the number of U.S. divisions on the Continent would be increased to 35 by D plus 150, and to 41 by D plus 180.

On the matter of service troops, the planners now concluded that the COMZ units currently scheduled for movement to the Continent should prove adequate for the limited increase in the build-up. While the COMZ portion of the divisional slice (10,000 of 40,000 in the current troop list) was considered low in view of the ultimate length of the lines of communications, the COMZ estimates of supply tonnages were somewhat higher than were now believed necessary for even the increased build-up. The service troops originally provided for were therefore believed adequate to handle the supplies for the accelerated build-up, although there would be shortages of certain types of units.[71]

[71] Memo, Whipple for Crawford, 29 Jul 44, sub: Availability of Divs, and Memo, Col Osmanski to Chief Log Plans Br, 31 Jul 44, sub: U.S. Build-up,

From the above estimate it is seen that the SHAEF logistic planners were fairly optimistic in mid-July that additional divisions could be maintained on the Continent after D plus 90, and that a further acceleration could be carried out after 1 October if the additional units were held in "quiescent reserve." The planners at General Lee's headquarters had reached quite different conclusions and were considerably less sanguine on the matter. They pointed out that the War Department allocation of shipping for September was already short of the requirements to maintain the existing troop basis. The equipment for an infantry division required about 60,000 measurement tons of shipping for movement from the United States. Bringing in two additional divisions plus 50,000 supporting troops would necessitate canceling the shipment of supplies and equipment urgently needed to support operations and to equip troops already scheduled for arrival. Furthermore, the use of continental ports for bringing in additional divisions would cut into their capacity to receive supplies. The opening of the Brittany ports had already been delayed. In view of all these unfavorable factors it was the opinion of the COMZ planners that a more rapid build-up could not be supported, and they therefore opposed the proposal to accelerate the flow of divisions.[72] It is clear that the two headquarters were using conflicting data in their calculations, for the logistic officers of SHAEF rejected the Communications Zone's contention that shipping would not be adequate and did not regard its objections as valid.[73] Much depended on still-unknown factors, of course, among them the important prerequisites of capturing the Brittany peninsula, preparing a staging area, and improving port capacities. But in mid-July the SHAEF planners appeared inclined to recommend the acceleration. As of 25 July no decision had yet been made.

Meanwhile, the theater had requested the War Department to allocate for the European theater all divisions in the undeployed reserve in the United States and also asked that the War Department provide the necessary supporting and service units to accompany them. The War Department acceded, earmarking all nine divisions then in the reserve—one light mountain division, one armored division, and seven infantry divisions. It warned, however, that this was a tentative allocation, for one or more of the units might be diverted to other areas, and that the theater would have to provide most of the service and supporting troops.[74]

Until this time the ETO troop basis provided for 47 divisions (30 infantry, 14 armored, and 3 airborne), which were to arrive by early 1945. With the tentative earmarking of nine divisions from the un-

SHAEF G-4 Troop Flow 121/1 GDP-1, Folder 64; Stf Study 12 (Second Draft), Log Plans Br, G-4 SHAEF, 19 Jul 44, sub: U.S. Personnel Build-up, and Note, Summary of Plans for U.S. Build-up, no date and no signature, SHAEF G-3 370.01 Troop Build-up, II.

[72] Memo, Requirements Sec G-4 SHAEF for Opns Br G-4 ETO, 6 Jul 44, sub: U.S. Divisional Build-up, and Memo, G-4 Plans ETO to Requisition Sec G-4 SHAEF, 10 Jul 44, same sub, SHAEF G-4 Troop Flow 121/1 GDP-1; Memo, Col Potter ETO for Whipple, 14 Jul 44, sub: Reception of Troops on Continent D plus 90 to D plus 120, SHAEF G-4 Stf Study VIII, Logistical Implications of Rapid Exploitation on Seine River 142/13/GDP-1.

[73] Memos, Potter for Whipple, 14 Jul 44, and Whipple for Stratton, 17 Jul 44, with draft of Stf Study 12, SHAEF G-4 Stf Study VIII, Logistical Implications of Rapid Exploitation on Seine River 142/13/GDP-1.

[74] Cbl W-69670, Marshall to Eisenhower, 24 Jul 44, SHAEF G-3 370.01 Troop Build-up, II; Note for record, OPD, n. d., OPD 370.5, XIII.

deployed reserve, the theater had a prospective strength of 56 divisions (37 infantry, 15 armored, 3 airborne, and 1 light mountain), to be built up by March or April 1945.[75]

While planners deliberated the question of accelerating the long-range build-up, the cross-Channel movement of divisions already available in the United Kingdom went on apace. The 83d Division was phased forward about nine days as General Bradley ordered and, contrary to the originally planned sequence, preceded the 3d Armored Division, whose arrival was delayed about five days. The XV Corps units gained only a day or two over previously planned schedules. But after the middle of July a significant acceleration took place in the movement of three divisions intended for later arrival. The 6th Armored Division landed on 22 July, 14 days earlier than planned; the 28th Infantry Division was brought in on 23 July, gaining 24 days on its scheduled arrival; and, finally, two other divisions (the 7th Armored and 80th Infantry) were passed over in the priority list to advance the shipment of the 5th Armored Division, which arrived on 25 July, 47 days earlier than originally scheduled and 31 days earlier than the date set for the 7th Armored Division, which it replaced.[76] As a result of this sudden speed-up there were eighteen U.S. divisions on the Continent on 25 July instead of the planned fifteen.[77] The build-up was therefore a full month ahead of schedule.

The over-all troop flow to the Continent in July meanwhile more nearly approached the scheduled build-up than in June. On 1 July, as summarized earlier, the cumulative arrivals on the far shore totaled 452,460 against a planned 578,971, or 78 percent of the target. All troops continued to be brought to the Continent via the beaches, and between 1 and 25 July a total of 415,202 men debarked, 96 percent of the planned 430,949.[78] Since arrivals continued to lag slightly, the initial deficits of June were not overcome. By 25 July the cumulative U.S. arrivals since D Day totaled 867,662 troops, or 86 percent of the build-up of 1,009,920 scheduled in the build-up priority lists.[79] The actual strength on that date was approximately 812,000 owing to evacuations of

[75] The ANVIL force, entering the Continent via southern France, was to add another three divisions to the U.S. troop basis later in the summer.

[76] The planned and actual build-up of divisions from 6 June to 25 July was as follows:

Planned Arrival		*Division*	*Actual Arrival*	
D Day	6 June	1st Infantry	D Day	6 June
D Day	6 June	4th Infantry	D Day	6 June
D Day	6 June	29th Infantry	D Day	6 June
D Day	6 June	101st Airborne [a]	D Day	6 June
D Day	6 June	82d Airborne [a]	D Day	6 June
D+2	8 June	2d Infantry	D+2	8 June
D+2	8 June	90th Infantry	D+2	8 June
D+4	10 June	2d Armored	D+4	10 June
D+7	13 June	9th Infantry	D+6	12 June
D+7	13 June	30th Infantry	D+10	16 June
D+8	14 June	79th Infantry	D+8	14 June
D+11	17 June	3d Armored	D+16	22 June
D+24	30 June	83d Infantry	D+15	21 June
D+29	5 July	8th Infantry	D+27	3 July
D+32	8 July	35th Infantry	D+32	8 July
D+34	10 July	4th Armored	D+36	12 July
D+36	12 July	5th Infantry	D+35	11 July
D+60	5 August	6th Armored	D+46	22 July
D+71	16 August	28th Infantry	D+47	23 July
[D+80	25 August	7th Armored	D+68	13 August]
[D+88	2 September	80th Infantry	D+58	3 August]
D+96	10 September	5th Armored	D+49	25 July

[a] Both airborne divisions had been withdrawn to the United Kingdom for refitting by 25 July.

Source: Planned arrival column from Ltr, Smith to Secy COS Com, 12 Jun 44, sub: Rate of Build-up, Opn OVERLORD, SHAEF G-3 17100/44/Ops Opns OVERLORD, Bundle P A 1889. Actual arrival column from listing in SHAEF G-4 Troop Flow 121/1 GDP-1, Folder 64.

[77] The two airborne divisions had been withdrawn.

[78] The millionth Allied soldier crossed the beach on 4 July. Cbl FWD-12346, Eisenhower to Marshall, 4 Jul 44, P&O Cbl Files.

[79] NEPTUNE: Training for and Mounting the Operation, II, App. B, OCMH; FUSA and FUSAG Build-up Priority Lists.

about 55,000.[80] With the 640,000 British troops, this brought the Allied strength on the Continent to 1,452,000 (thirty-six divisions) on 25 July.[81]

Shipments in July did much to redress the imbalance between combat and service troops at the end of June, when the division slice was only 31,000. In the middle of July the division slice rose temporarily to more than 45,000. With the sudden influx of combat divisions between 22 and 25 July the proportion of service troops fell again, but the slice of 42,000 at that time represented a considerable gain over the previous month.[82]

(5) Replacements

The replacement plan, like other aspects of the OVERLORD logistical plan, received its initial test in the first two months of operations. In general, the machinery organized to meet the needs of the assault forces was entirely adequate, particularly in its semiautomatic provision of replacements in the earliest stages of the invasion. As in the matter of estimated supply requirements, however, the experiential data of the first two months dictated important revisions in replacement planning factors.

As planned, the initial losses were met by the 5,300 men allotted to the assault units as overstrengths. While the overstrength increments were not intended to accompany the divisions in the landings, in actual practice some of them were "smuggled" across with the assault formations.

After the overstrengths were exhausted, replacement needs were met for a short time by the 250-man packages, of which 142 had been formed with a total of 35,500 men.[83] In practice the package system served its purpose very satisfactorily, although the prearranged schedule of shipment was not followed strictly. It was soon found that the solid infantry detachments were in greater demand than expected, and after the scheduled order of movement had been followed for about four days packages were dispatched according to need. Officers in the divisions, corps, and in First Army had high compliments for both the quality and immediate availability of replacements. In the view of one observer, the greater assurance which the package system gave that replacement needs would be met relieved much of the anxiety of combat commanders and conclusively demonstrated its value to the morale and efficiency of units.[84] The system proved so convenient and efficient, in fact, that the practice of

[80] Nearly 20,000 of the evacuations were by air. FUSAG Rpt of Opns, VII, Apps. 20, 21. Figures on actual build-up and evacuation vary slightly from source to source, but the discrepancies are not large. All above figures are from beach brigade and FUSA records rather than from the daily logistical bulletins or weekly logistical summaries of the SHAEF G-4. The latter may be found as follows: Daily Logistic Bulletins in SHAEF G-4 Log Plans Br 1-17/8/1 GDP Progress of Build-up, and Weekly Logistic Summaries in SHAEF G-4 War Diary.

[81] OPD 320.2, XVII.

[82] On 21 July the division slice was reported to be 40,345, with the following breakdown: 15,600 men in an average basic division (including normal tank destroyer and antiaircraft attachments), 14,958 in corps and army overhead (6223 combat and 8,735 service troops), and 9,787 COMZ troops. Memo, Lt Col R. Lutes, of G-4 SHAEF, for Whipple, 5 Aug 44, sub: U.S. Troops on Continent—Interim Rpt 5, SHAEF G-4 Troop Flow 121/1 GDP-1. This computation is believed to be in error since it is based on a strength of seventeen divisions, whereas there were only sixteen divisions on the Continent on that date. Use of the latter strength figure would result in a larger division slice.

[83] The Procurement and Use of Manpower in the ETO, pp. 30-34; History of the Ground Force Reinforcement Command, ETO, Ch. VI, pp. 250-51, ETO Adm 571.

[84] Ltr, Lt Col D. V. Scofield, Hq FUSA, to CG

organizing men into 250-man detachments was continued after the supply of prepared packages was exhausted.[85]

Replacements arriving in the first three weeks were handled exclusively by the three battalions attached to the V, VII, and XIX Corps and were initially controlled by those headquarters. The first battalions arrived within a day or two of the dates scheduled and served their respective corps very successfully. On 16 June First Army assumed direct control of these battalions and established a normal requisitioning procedure, in part because of the delay in establishing a replacement depot, which was about a week behind schedule, and in part because of one corps' extravagance in directing its supporting battalion to release 1,500 replacements to a division which was already overstrength.[86] While the battalions continued to operate in support of the corps, the army shortly thereafter required that all requisitions be processed through the army G–1, who directed the replacement battalions to fill them and in turn prepared a consolidated requisition for the Ground Force Replacement System (GFRS) in the United Kingdom in order to maintain the stocks in the battalions on the Continent.

With the establishment of the first replacement depot (the 14th) on the Continent late in June the GFRS hoped to establish a more centralized control of the processing of replacements on the Continent through its deputy commander, Col. Robert S. Miller, who had arrived in the lodgment area as chief of the advance echelon on 18 June. Both the theater G–1 and the commander of the Replacement System were dissatisfied with some of the unbusinesslike practices of the army in the handling of replacements.[87] But First Army was not yet ready to relinquish control of the system on the Continent. It retained control of the 14th Depot and the battalions serving the corps, and used the Advance Echelon of the GFRS simply to forward its requirements to the United Kingdom and keep the continental replacement installations stocked. First Army therefore retained control of the replacement system on the Continent just as it retained control of all supply in the lodgment until a rear boundary was later drawn.[88]

The build-up of the replacement system proceeded substantially as planned. By 25 June the system comprised one depot and five battalions and, in addition to filling all requirements, had built up a pool of 9,000 replacements, considerably above the planned target. One month later there were three depots and fifteen battalions on the Continent.[89]

While the organization and machinery of the replacement system thus served admirably to meet the initial needs of the invasion forces, one important aspect of replacement planning was rudely upset by the experience of the first two months:

GFRS, 23 Jun 44, sub: Liaison Rpt First U.S. Army, FUSA AG 200.3 Personnel Reinforcements; Memo, Col Harvey W. Wilkinson, G–1 U.S. Adm Stf 21 A Gp for major comds, 4 Jul 44, sub: Inspection of G–1 Activities on Continent, SHAEF G–1 322.2 Reinforcement Units.

[85] Procurement and Use of Manpower, pp. 33, 35.

[86] Ltr, Scofield to CG GFRS, 5 Jul 44, sub: Detailed Liaison Rpt, FUSA AG 200.3 Personnel Reinforcements.

[87] Memo, G–1 ETO for DCofS, 6 Jul 44, ETO GFRS Replacements; Ltr, Col Albrecht, DCofS COMZ, to Lord, 27 Jul 44, EUCOM 322 Replacement Units, IIa.

[88] History of the Ground Force Reinforcement Command, Ch. VI, pp. 256–60.

[89] Procurement and Use of Manpower, p. 19.

the requirements for particular categories of men had been miscalculated.

After repeated revisions of the planning factors the percentage of total replacements allotted to the infantry had been raised to 70.3 only shortly before D Day.[90] Requisitions on the zone of interior were adjusted accordingly, but it was already too late to alter the flow of replacements for the month of May, and plans were immediately made to convert some 2,500 men of other branches to infantry.[91] But only 52 percent of the 76,000 replacements in the theater pool on D Day were infantry-trained replacements.[92]

The first month of operations on the Continent failed to confirm the planning estimates. It was found that the percentage of total losses was considerably higher in infantry—85 percent as compared with the planning factor of 70.3—and lower in other branches.[93] This discovery did not cause immediate concern, for over-all casualties had not been excessive. In fact, they had been lower than expected, and there still were sufficient replacements, although continued losses in the proportions experienced thus far promised to create an improper balance in the various arms. As late as 11 July the theater asked the War Department to delete 15,000 replacements from its September allocation so that the shipment of divisions could be advanced.[94]

Only a few days later the theater realized that it was faced with a potential manpower crisis. The tortuous hedgerow fighting of early July resulted in continuing infantry losses out of all proportion to the factors used by planners in arranging for the flow of replacements. In mid-July the GFRS commander, Colonel Layman, reported that 90 percent of the casualties were infantry and that First Army's requisitions were confined almost exclusively to infantry rifle and heavy weapons personnel. Not only had the requirements for infantry been miscalculated, but the breakdown within infantry had also been wrongly estimated. Experience thus far had shown that 95 percent of the infantry replacements should be rifle and heavy weapons trained,[95] rather than the 76 percent which the War Department had used in its apportionment in May.[96]

To make matters worse, only 39.7 percent of the infantry replacements arriving in the theater were rifle trained, according to the Replacement System commander,[97] in contrast with the 60 percent called for in the War Department breakdown. The result was that the stockage of replacements trained as rifle and heavy weapons troops was being rapidly exhausted, while overages in field artillery, tank destroyer, and antiaircraft replacements were building up.

Colonel Layman expressed serious concern over these developments and considered the measures which might be taken to meet the inevitable deficits. It was obvious that the percentages on which

[90] It was estimated that 88.4 percent of all casualties would occur in the combat arms (infantry, artillery, cavalry, etc.) and 11.6 percent in the services.

[91] Memo, G-1 ETO for G-3, Apr 44, sub: Infantry Replacements, ETO GFRS Replacements; Procurement and Use of Manpower, pp. 47, 65.

[92] History of the GFRS, Pt. II, Annex II.

[93] Memo, Col Wilkinson to major comds, 4 Jul 44, sub: Inspection of G-1 Activities on Continent, SHAEF G-1 322.2 Reinforcement Units.

[94] Cbl E-37383, ETO to AGWAR, 11 Jul 44, P&O Cbl Files.

[95] Ltr, Layman to Deputy Theater Cmdr, 17 Jul 44, ETO GFRC 200.3 Personnel—Assignment, Transfer, etc.

[96] Cbl, AGWAR to ETO, 9 May 44, EUCOM 322 Replacement Units IIa.

[97] Comd and Stf Conf Notes, 23 Jul 44, ETO Adm 459 Stf Conf Notes.

earlier requisitions had been made needed correction. Steps were also being taken to convert to infantry the surpluses in headquarters and service personnel and in arms other than infantry. But these measures did not promise early returns of any consequence. To meet the threatened shortages in the immediate future there appeared to be no other course but to ask for emergency shipments from the United States. Colonel Layman accordingly recommended that 25,000 infantry rifle replacements be shipped to the theater by the fastest available transportation, to arrive before the end of the month.[98]

In the following two weeks the critical replacement situation was a topic of great urgency in the theater's communications with the War Department. Beginning on 26 July the theater requested first that the War Department expedite the shipment of infantry replacements scheduled for movement in July and August by every possible means, including the cancellation of furloughs, and then asked the War Department to restore to the September requisition the 15,000 replacements only recently canceled. The theater also asked that virtually the entire September requisition of 36,750 be made up of infantry replacements—33,825 infantry, 2,175 paratroops, and 1,750 medical.[99]

At this late date it was impossible to speed up the shipment of the July and August requisitions by cancellation of furloughs, since the requisitions for these months had either departed already or were en route to the port, and the theater was so informed.[100] But the War Department did agree to meet the demand for 33,825 infantrymen in September, although not in the breakdown desired. In hopes of correcting the imbalance in its stockages resulting from the heavy infantry losses of June and July the theater had asked not only that the September shipments consist almost wholly of infantry replacements, but that they should be 85 percent rifle trained and 10 percent heavy weapons trained. This apportionment was expected to be temporary, and once the current deficiency was remedied the theater estimated that subsequent shipments of infantry replacements could be made up of 70 percent riflemen, 20 percent heavy weapons personnel, and 10 percent other infantry types.

The War Department could not meet the demand for riflemen in the proportions desired. It was prepared to ship 25,000 riflemen in September, which was approximately 75 instead of 85 percent of the total of 33,825 infantrymen; but to send more, the War Department G–1 explained, would require the stripping of five divisions, which would set them back from three to four months in their training and would affect the War Department's ability to provide replacements in later months.[101]

The shortage in replacements did not actually reach critical proportions in July, although on the 23d of the month there were only 12,985 rifle-trained replacements in the entire system and as few as 750 immediately available on the far

[98] Ltr, Layman to Deputy Theater Comdr, 17 Jul 44.

[99] Memo, G–1 ETO for G–3, 24 Jul 44, EUCOM 322 Replacement Units, IIa. Cbl EX–39873, Eisenhower to WD, 26 Jul 44; Cbl E–39908, Lee to Marshall, 26 Jul 44; Cbl EX–40655, ETO to WD, 31 Jul 44. All in OPD 370.5 ETO, Sec XI. Cbl W–71022, AGWAR to ETO, 26 Jul 44, and Cbl EX–40659, G–1 COMZ to AGWAR, 31 Jul 44, SHAEF G–3 370.092 Reinforcements 44.

[100] Cbl WAR–74630, Marshall to Eisenhower, 1 Aug 44, OPD 370.5 ETO, Sec XI.

[101] Telephone Conf, Lee *et al.* of ETO and Maj Gen Miller G. White, WD G–1 *et al.*, 2 Aug 44, SHAEF G–3 370.092 Reinforcements 44.

shore.[102] Stockages were sufficient to meet all the needs of the combat forces in the first two months, however, and operations in August were soon to relieve the disproportionately heavy drain on infantry-trained personnel. But there was no way of knowing at the end of July what the future might bring, and the experience of the first two months therefore gave cause to consider the entire manpower problem. Early in August the theater G–1, Col. James M. Franey, reported that the casualties in June and July had totaled slightly more than 100,000 (85,000 battle casualties and 16,000 nonbattle). Of these, 85 percent had been infantry losses, and of the infantry casualties 63 percent were riflemen. The latter percentage had been increasing during July, and was expected to go up to 70 percent. Colonel Layman thought the War Department should plan for an even greater percentage of riflemen, and recommended that 90 percent of the infantry replacements be rifle and heavy weapons troops, leaving only 10 percent for other components.

The planning miscalculations for the first two months were understandable in view of the extreme difficulty in predicting the course of operations, although the War Department felt that the theater should have foreseen the shortage in riflemen earlier than the seventh week of operations. It was particularly perturbed over the theater's apparent assumption that the War Department could in a matter of a few days or weeks fulfill the theater's sudden and unusual demands. The War Department now made it clear that replacement problems could not be met on an emergency basis; replacement requirement figures could not be juggled and altered every few days. Firm planning figures were needed, with requisitions made several months in advance, so that the necessary manpower procurement and training could be carried out in the United States. Once that process was begun, it was almost impossible to make sudden changes in shipments. Major alterations to meet an emergency would mean stripping divisions in training in the United States and robbing other theaters. Consequently the War Department was anxious to know immediately if the theater expected to be in desperate straits for replacements in later months so that it could make the necessary decisions.

But accurate predictions and advance planning were only part of the problem. The experience of July provided an opportune time to examine the larger aspects of the manpower problem as it applied to the European theater. The War Department had long since become acutely aware of the critical manpower situation, and General Marshall had advised the theater in January 1944 of a shortage in the planned strength of the Army and of the necessity for conservation.[103] The theater commander complied by directing that a constant study be made with a view to effecting economies and a wider utilization of limited assignment personnel. The War Department repeatedly urged more drastic action on this program, asking for a continuous personnel audit for the purpose of putting physically qualified men into combat units and finding jobs for limited assignment personnel.

In the month before the invasion General Eisenhower took additional steps to screen out men suitable for the field forces, and by June the theater headquarters had laid down policy intended to make the most effective utilization of limited assign-

[102] Comd and Stf Conf Notes, 23 Jul 44, ETO Adm 459 Stf Conf Notes.

[103] Ltr, Marshall to Eisenhower, 6 Jan 44, ETO GFRC Plng File.

ment personnel. But the indefinite state of the final COMZ structure on the Continent, involving the withdrawal of personnel from the old base sections to create new ones, made it difficult for the theater to take drastic measures at this stage. Furthermore, in the midst of a tremendous build-up for continental operations, for which the ETO enjoyed the highest priorities and for which nothing was being spared, there was little inclination to change personnel policies, and it was easier to postpone such distasteful work.[104]

Until July the manpower problem had obviously not become as urgent a matter to the ETO as it had to the zone of interior, and in the course of the theater's urgent appeals for more infantrymen the War Department G–1, Maj. Gen. Miller G. White, endeavored once more to impress upon the theater the necessity of using its personnel more economically. In a transatlantic telephone conference with General Lee and Colonel Franey, General White made pointed reference to the theater's overstrength of 70,000 men, 32,000 of whom were overhead. Its immediate problem was therefore not a shortage of bodies, but a shortage in a category—riflemen. The theater would have to recover this overstrength and the overages in replacements in other branches and get them retrained and into combat units. It would have to convert the general service men in the Communications Zone and get them into combat, and replace them with limited assignment men. General White notified the theater that manpower was simply no longer available to tolerate big overstrengths. Recalling the experience in North Africa, where manpower utilization had been particularly wasteful, he warned the theater that vigorous action had to be taken in order to avoid a repetition of that sad experience. The War Department G–1 took pains to point out repeatedly that the War Department's plans of necessity had to be made far in advance and could not be altered overnight to satisfy sudden demands which had not been anticipated. He called on the theater to do everything possible to employ its personnel economically and to determine more definitely what its future needs would be. General White did not accuse the theater of maladministration or of poor planning or of excessive demands, and he professed not to criticize. But the implication was clear: the theater had not heeded the War Department's warnings, and it was not making the best possible use of its manpower.[105]

(6) The Ports

Any thought of altering the rate of the build-up in the continental lodgment area eventually involved a problem which was basic in all logistical planning for the OVERLORD operation—port discharge capacity. In July, mainly as the result of the course of operations in the first weeks, and because it was inseparably connected with the proposal to accelerate the flow of divisions, the port problem dominated the thoughts of logistical planners.

The OVERLORD plan had anticipated meeting the initial requirements of U.S. forces on the Continent by the development of the beaches and MULBERRY A, and had envisaged the capture and development of Cherbourg and six smaller

[104] Ltr, Maj Gen Ray W. Barker, SHAEF G–1, to Col Franey, ETO G–1, 15 Jun 44, sub: Utilization of Limited Assignment Personnel; Memo, Lee for CofS, 9 Jul 44, sub: Manpower Bd; Memo, Franey for Lee, 13 Jul 44. All in ETO GFRS Replacements.

[105] Telephone Conf, Lee and Franey, ETO, and White *et al.*, WD, 2 Aug 44, SHAEF G–3 370.092 Reinforcements 44.

ports by D plus 30. Taken together, these facilities were planned to have a discharge capacity of about 27,000 long tons per day by that date, which would be sufficient to support twelve divisions on the Continent. Within another month (by D plus 60) Brest, Lorient, and Quiberon Bay were to have been captured and brought into use and, added to the Normandy facilities, were to have brought the total capacity to approximately 37,000 tons per day. Of this, 33,000 tons would be allocated for U.S. use to provide the 30,700 tons required for the maintenance and reserves build-up for sixteen divisions.

	D+60	*D+90*	*D+120*
Total capacity, U. S. sector.	36, 940	45, 700	39, 650
Normandy [a]	[b] 26, 400	[b] 28, 150	[b] 15, 700
Brittany	10, 540	17, 550	23, 950
Allocated for U. S. use	32, 940	39, 150	34, 850
Total requirements [c]	30, 711	37, 627	38, 642

[a] Including MULBERRY A and beaches.

[b] A portion of these tonnages was to be allocated to the British.

[c] Exclusive of bulk POL, which in mid-June was estimated to total 5,232 tons at D plus 60, 8,248 tons at D plus 90, and 8,520 tons at D plus 120. Bulk POL tonnages normally do not enter into estimates of port discharge requirements or capacity.

By D plus 90 total discharge capacities in the U.S. sector were planned to reach 46,000 tons per day, of which 40,000 tons would be allocated for U.S. use to meet the requirements of 37,600 tons for the support of twenty-one divisions. The total U.S. requirements and estimated port capacities in long tons for the early months are tabulated on this page.[106]

As shown earlier, the discharge performance had been erratic in June, chiefly because of the vagaries of the weather, and the cumulative deliveries to the far shore at the end of the month totaled only 71 percent of planned capacities. The lag was not entirely due to difficulties at the beaches, which handled more than 98 percent of all supplies and equipment brought in during the first month. Cherbourg was planned to have a capacity of 5,000 tons per day by the end of June, and the smaller Normandy ports at least 2,500 tons. At the end of the month the port of Cherbourg still lay in ruins, and the ports of Isigny and Grandcamp had received a total of less than 5,000 tons. Instead of the planned capacity of approximately 25,000 tons, therefore, discharges at the end of June were averaging 19,000 tons per day. The planned port capacity and actual tonnage discharged from 6 June to 30 June are summarized below.

Planners had pinned their hopes on Cherbourg; it was the first major objective of the U.S. forces. Because it required an enormous amount of reconstruction, however, the port could not begin operations until 16 July, a full three weeks after its capture. By 25 July it had been expected to discharge upwards of 150,000 tons. But on that date it had received only the first trickle of supplies, totaling less than 18,000 tons.[107]

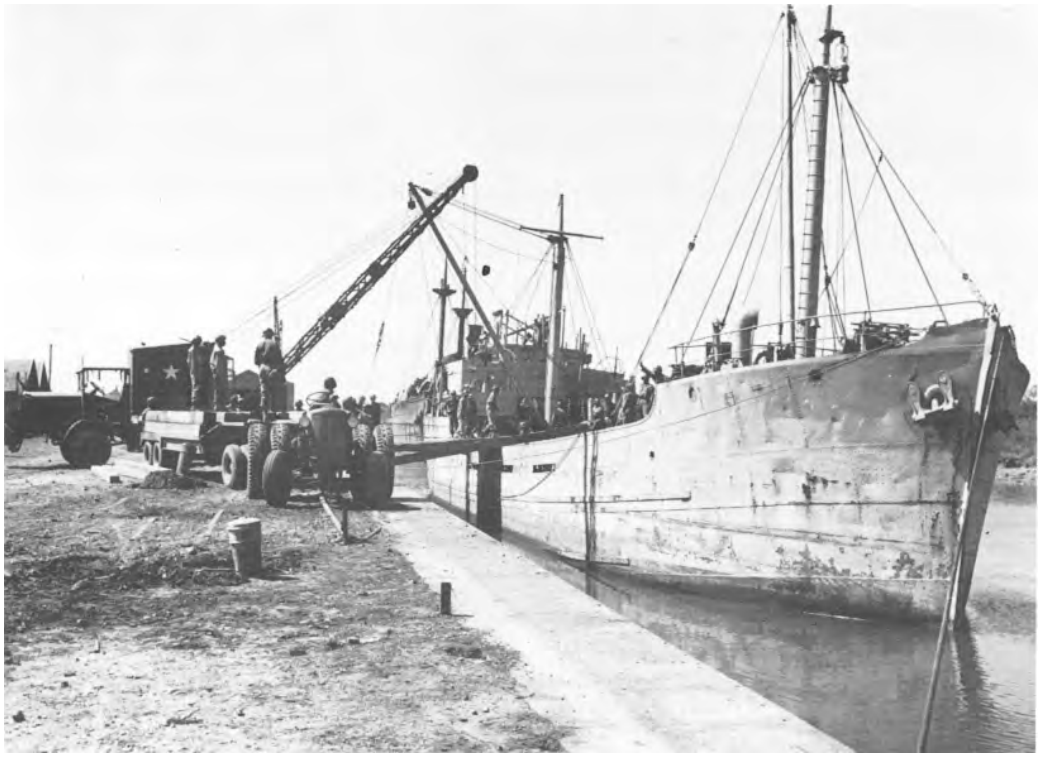
The minor ports naturally assumed a greater importance than anticipated, and

	Total	*Omaha*	*Utah*	*Cherbourg*	*Minor Ports*
Planned capacity	408, 550	226, 500	133, 450	34, 000	14, 200
Actual discharge	289, 827	181, 691	108, 136	——	[a] 4, 558

[a] Included in OMAHA Total.

[106] SHAEF G-4 Post-NEPTUNE Adm Appreciation, 17 Jun 44, SHAEF G-4 381 NEPTUNE 44, I.

[107] The story of Cherbourg's reconstruction is deferred to Vol. II.



COASTER BEING UNLOADED *at the minor port of Isigny on 24 June 1944 after coming up the canal from the Channel coast.*

steps were taken to develop all of them beyond the capacities originally planned. Even Carentan, originally ruled out because of its very limited facilities, was cleared and put to use. But these efforts did not lead to very spectacular performance. Isigny and Grandcamp occasionally topped the 1,000-ton mark in July, but for various reasons, among them the lack of materials-handling equipment and the fact that these ports could receive only certain types of vessels, they averaged only 600 tons per day and accounted for a total of only 30,000 tons in the period from 1 to 25 July.[108] St. Vaast made no contribution before the middle of July. Granville and St. Malo, scheduled to begin operations by about D plus 27, were still in enemy hands at D plus 49 (25 July). As a result, the great bulk of supplies and equipment continued to be brought to the Continent via the beaches. Of a total of 447,000 tons of supplies landed between 1 and 25 July, 392,000 tons, or 88 percent, were brought across the open beaches. The planned capacity and actual discharge from 1 to 25 July are tabulated on next page.

OMAHA and UTAH together averaged 15,680 tons per day, almost exactly as scheduled despite the fact that the MUL-

[108] ADSEC Operations History, pp. 34, 42–43.

	Total	*Omaha*	*Utah*	*Cherbourg*	*Minor Ports*
Planned capacity	725, 000	300, 000	175, 000	150, 000	100, 000
Actual discharge	446, 852	273, 698	144, 314	17, 656	[a] 37, 362

[a] Of which 26,180 tons are included in the OMAHA total for July. Figures on minor ports from ADSEC Operations History and Summaries of Operations, OMAHA Beach Command, prep in Control Sec, OMAHA Beach Comd, ETO Adm 230 OMAHA Beach Comd.

BERRY had been destroyed and abandoned. But while the beaches thus more than lived up to expectations, it was apparent that they could never overcome the lag in discharge which had developed. The average daily discharge in July, beaches and ports combined, was 17,875 tons, which had actually been adequate to meet the maintenance requirements of the forces ashore. In fact, it had sufficed to build up reserves at approximately the scale planned—fourteen days by 17 July.[109] But this feat had been possible only because of the low rates of consumption attending the slow advance and the unexpected low scale of demolitions. Reexamination of future operations in the light of current experience gave no assurance that maintenance tonnages of the future could be reduced.

On 25 July the beaches and ports were receiving supplies at the rate of approximately 22,000 tons per day. This did not accurately represent total capacity, since the minor ports actually had a higher capacity than could normally be utilized. Furthermore, the port of Cherbourg had just begun operating and was expected to improve its performance steadily. The support of U.S. forces was therefore not in immediate jeopardy. But in view of the uncertainty as to the dates by which additional ports would be captured, and the certainty that good weather could not be depended on indefinitely for the operation of the beaches, the slow tactical progress thus far gave sufficient cause for misgivings about the prospect of meeting requirements in the future.

In studies made before D Day and within the first weeks after the launching of OVERLORD logistic planners generally agreed that port capacity would be sufficient to support the planned build-up to D plus 90, but only by a very narrow margin, and only if the ports were captured as forecast. Beginning at D plus 120 port capacity was actually expected to fall short of requirements, with a serious deficiency continuing for several months. This unsatisfactory situation was therefore recognized from the beginning, and the planners appreciated that every effort would have to be made to increase capacity.[110] But the first month's experience upset even this forecast. By early July the slow tactical progress had already postponed the capture of Granville and St. Malo and made it almost certain that the other Brittany ports would not be taken as scheduled. The deficits in discharge capacity threatened to become even greater than anticipated.

[109] Ltr, Smith to Secy COS Com, War Cabinet, 19 Jul 44, sub: Shipping for OVERLORD, SHAEF SGS 540 Shipping Problems.

[110] Post-NEPTUNE Opns Adm Appreciation, SHAEF G-4, 17 Jun 44, SHAEF G-4 381 NEPTUNE 44, I; Memo, Napier for MOWT, 23 Jun 44, sub: Port Capacities on Continent, SHAEF G-4 825.1 Piers, Wharves, Docks and Berths, 44, II; Ltr, Hq COMZ to U.S. Adm Stf 21 A Gp, 23 Jun 44, sub: Build-up D plus 60 through D plus 90, SHAEF G-4 Stf Study 11, Opn NEPTUNE, Pts. I and II, U.S. Forces D 41/90 142/11 GDP-1.

The importance of Brittany in the OVERLORD plan can hardly be exaggerated. The very success of OVERLORD seemed predicated on the organization of that area as the principal U.S. base of operations. Cherbourg had been planned to develop a capacity of no more than 8,000 to 9,000 tons. The minor ports were from the start intended only to provide stopgap aid until the capacities of the major ports could be developed. Brittany was intended to have a much greater role. The first big depot area was planned to be organized in the Rennes–Laval region; the main flow of troops and their organizational equipment was planned to take place through Brest; and Quiberon Bay was to be developed into one of the principal supply ports, with an eventual capacity of 10,000 tons per day. These plans were now threatened to be voided by the delay in the advance.

The need for adequate port capacity had had a continuing influence on all tactical plans. Consideration had already been given in May to a 21 Army Group plan (known as AXEHEAD) which argued that for administrative reasons the Allied forces should aim at securing the Seine ports as early as possible. It suggested that, after establishment of the lodgment, alternate thrusts should be made eastward and southwestward in an attempt to deceive the enemy and compel him to disperse his forces, and that the Allied forces should then take advantage of the most favorable circumstances to drive either eastward to the Seine or toward Quiberon Bay. The Communications Zone opposed the plan on the basis that simultaneous drives in both directions could not be supported logistically, and it did not favor any operation that would be carried out at the expense of the Brittany objectives, which were considered paramount in importance.[111]

Early in July the Allies considered an alternate plan, known as LUCKY STRIKE, which called for an eastward drive with maximum strength in an effort to defeat the enemy forces west of the Seine, followed by a forcing of that river and the capture of the Seine ports. Neither the Communications Zone nor the SHAEF planning staffs regarded this scheme favorably. While they agreed that any deterioration in enemy resistance would have to be exploited, and admitted that an eastward drive could be supported up to a point, both staffs insisted that such an operation must not unduly interfere with the early capture of the Brittany ports, for on the development of those ports all subsequent operations by U.S. forces were then believed to depend. The early capture of the Seine ports, they held, would by no means compensate for the abandonment of the Brittany ports, and they therefore concluded that the proposed operation would fit current strategic concepts only if the capture of the Brittany ports was not appreciably delayed thereby.[112]

The full import of the port problem came to be appreciated early in July, when the possibility of an accelerated build-up was being considered, and occupied the minds of top commanders increasingly

[111] 21 A Gp Appreciation on Possibility of Operations to Secure a Lodgment Area, 7 May 44, 12 A Gp G-3; Ltr, Vaughan to C-in-C 21 A Gp, sub: Opn AXEHEAD—Capture of Seine Ports at Expense of Securing Biscay Ports, 15 Jun 44, EUCOM 381/2 War Plans General.

[112] Outline of possible developments, Operation LUCKY STRIKE, U.S. Adm Stf, Hq 21 A Gp, 30 Jun 44, and Appreciation of LUCKY STRIKE from COMZ standpoint, Hq FECOMZ, 2 Jul 44, EUCOM LUCKY STRIKE 381, I; Operation Lucky Strike, Beneficiary, and Hands Up, Examination by Plng Stf, SHAEF, 3 Jul 44, SHAEF SGS 381 LUCKY STRIKE.

throughout the month as tactical operations continued to drag and the prospective capture dates for the Brittany ports became more and more distant. Both General Eisenhower and General Montgomery repeatedly stressed the necessity of capturing the Brittany ports, and capturing them soon. Both recognized that without them the Allied forces would be greatly handicapped in developing their full potential.[113] Consideration was even given to plans for combined airborne and amphibious operations designed to "loosen up the right flank" and capture St. Malo (plan BENEFICIARY), Quiberon Bay (plan HANDS UP), and Brest (plan SWORDHILT). All were considered extremely hazardous, however, and it was agreed that such operations would be attempted only in the event complete stalemate occurred in the Normandy bridgehead area and the advance was so delayed that the Brittany ports could not be captured before 1 September.[114]

Throughout the month of July the estimated dates of capture and the capacities of the various ports were refigured again and again on the basis of alternate assumptions regarding the rate of advance, the possibility of raising the capacities of ports already captured, reduced requirements, and the availability of various types of shipping. In the first week of July the Movements and Transportation Branch of G–4, SHAEF, submitted revised estimates of port capacities in which the previous deficits were met on all dates and in which a sizable surplus was actually forecast for D plus 90. These upward revisions were made possible by a proposed increase in shallow-draft shipping (making it possible to take fuller advantage of the smaller ports), an increase in the capacity of Cherbourg from 8,800 to 15,000 tons, an increase in the capacity of the beaches through September, and an increase in the capacity of the minor ports.[115] But these estimates had been made on the assumption that the Brittany ports would still be captured according to original schedules, and as Maj. Gen. N. C. D. Brownjohn (Br.), the deputy G–4, pointed out, "We can rest assured that this will not in fact happen." [116]

By mid-July the original estimated capture dates were frankly recognized as unrealistic, and in the case of Quiberon Bay and Brest were postponed as much as thirty days (to D plus 85 and D plus 90 respectively).[117] Consequently, capacities were again scaled down. In their studies of the port problem in July it was normal for the planners to examine logistic capabilities in the light of the different courses which operations might take. They considered three alternate cases: operations might go according to plan, with both the Brittany and Seine ports being captured

[113] Ltr, Eisenhower to Montgomery, 7 Jul 44, and Ltr, Montgomery to Eisenhower, 8 Jul 44, SHAEF 381 OVERLORD.

[114] Operation Lucky Strike, Beneficiary and Hands Up, Examination by Planning Staff, SHAEF, 3 Jul 44, SHAEF SGS 381 LUCKY STRIKE; Memo, Eisenhower for Smith, 6 Jul 44 with atchd G–3 study, 11 Jul 44, sub: Opns in Brittany, and Outline Plan for Air Landing Operation in the Brittany Peninsula, Memorandum for the Planning Staff, SHAEF Plng Stf PS–SHAEF (44) 29 (Final) SHAEF G–3 War Diary.

[115] Memo, Col C. Ravenhill, Log Plans Br, for G–4, 8 Jul 44, sub: Port Capacities—Post-NEPTUNE, SHAEF G–4 Log Plans Br, 1062/6/Log P Post-OVERLORD—Port Capacities.

[116] Memo, Brownjohn for Mov and Tn Br G–4, 11 Jul 44, sub: Port Capacities Post-NEPTUNE, file cited above, n. 115.

[117] Memo, Col Vissering, Mov and Tn Br G–4 SHAEF, for Brig Blakey, 1 Jul 44, sub: Estimated Dates of Capture of Ports, and Memo, Whipple for Chief Mov and Tn Br G–4, 15 Jul 44, same sub, SHAEF G–4 825.1 Piers, Wharves, Docks and Berths, 44, II.

in accordance with the latest forecasts; operations might be stalemated at the Seine; and under the gloomiest assumption the bridgehead might congeal on the Avranches–Vire line, in which case no additional ports would become available in the near future.

Both port capacities and tonnage requirements would be different in each case. Paradoxically, because of the heavy requirements under conditions of extended lines of communications, deficiencies in port capacities were expected to be greater and appear earlier if ports were captured on schedule than if the armies were rendered immobile in a limited bridgehead. In the latter case there would be no deficiency until D plus 180 because of lower maintenance requirements, while an advance as scheduled threatened to create a deficit in port discharge capacity on D plus 120.[118] In any event, the outlook was not particularly hopeful. In a telephone conversation with General Lutes in mid-July General Lord appeared quite sanguine regarding the future, reporting that the beaches had recently handled more than 20,000 tons in a single day, and predicting that Cherbourg's capacity would reach 8,000 tons in August and later rise to 20,000.[119] But this optimism was not widely shared, and forecasts for the most part reflected varying degrees of pessimism. Colonel Stratton, the COMZ G–4, was frankly alarmed over the limited facilities presently available because troop strength on the Continent was increasing and Cherbourg's full capacity would not be developed until October. In his opinion it was no longer advisable to count on the Brittany ports to receive a large influx of troops and supplies by 1 September as originally planned. Troops scheduled for direct shipment from the United States to Brest would now have to debark elsewhere. Consequently, it was necessary to prepare staging facilities in the Cherbourg area and to develop beach discharge capacities to the maximum in order to give adequate support to operations and build up sufficient reserves.[120]

These basic changes in reception facilities were bound to have their repercussions on other aspects of the logistical plan. For example, as a result of the lag in tactical operations, tentative plans were now made to develop a temporary major depot area in the vicinity of Lison–St. Lô, a logical choice because of the continuing importance of the beaches for the reception of cargo, and because of the location of the main-line railway. Furthermore, consideration was now given to establishing the first permanent depot area farther eastward at Le Mans rather than at Rennes as originally contemplated.[121]

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[118] Stf Study, Col Whipple, 13 Jul 44, sub: Port Requirements for AEF, SHAEF SGS 800.1 MULBERRY Case A; Ltr, Napier to Log Plans Br G–4, 17 Jul 44, sub: Port Capacities, SHAEF G–4 Log Plans Br 1062/6/Log P, Post-OVERLORD—Port Capacities; Shipping Note for CAO, 15 Jul 44, SHAEF G–4 Mov and Tn War Diary 3014/22 Mov. COMZ believed that the deficiency would develop as early as D plus 90 in the event of a prolonged stalemate on the line Avranches–Vire–Caen unless the loss in the capacities of the beaches and small ports at the start of bad weather in September was compensated for by the progressive development of Cherbourg. Ltr, Hq FUSAG to CG COMZ, 15 Jul 44, sub: Adm Implications in Event of Prolonged Delay, and Ltr, Hq COMZ to CG 12 A Gp, 31 Jul 44, sub: Maintenance of U.S. Forces on Continent, ETO 381/430 Tonnage OVERLORD.

[119] Telephone Conf, Lord with Gen Lutes, 15 Jul 44, ETO 319.1 Transportation—Telephone Conversations 1944–46.

[120] Ltr, Stratton to Plank, 15 Jul 44, EUCOM FECOMZ 322.

[121] *Ibid.*; Memo, Stratton for Chiefs of Svcs ETO, 15 Jul 44, sub: Additional Cargo for Movement Through Period Ending D plus 90, ADSEC ASD 563.591 Tonnages, Estimates of.

In the plans for the development of Brittany high hopes had been held for the Quiberon Bay, or CHASTITY, project. Brest, because of its location at the very tip of the peninsula and because of the expected destruction of the railways, was intended to be used only for the reception of personnel and vehicles, and for supplies and equipment needed in staging. Quiberon Bay, however, was depended on to handle large tonnages of freight. Its development had been favored over existing ports, like Nantes on the Loire, because it would provide deepwater anchorage. The development of additional shallow-draft capacity would have been pointless, since port capacity of this type was already greater than could be served by the available coasters.

It was estimated in June that even with Quiberon Bay in Allied hands, port capacity would not be sufficient to maintain all the troops available in the theater until after D plus 180. Without this capacity the Allies were faced with a reduction by as many as eight divisions in the forces maintainable on the Continent by D plus 150, and a loss in discharge capacity amounting to 10,000 tons per day by that date. Quiberon Bay's early development had therefore been accepted almost as a *sine qua non* for the support of operations in southern Brittany, for the maintenance of the planned build-up, and for the attainment of the maximum rate of advance eastward across the Seine.[122]

CHASTITY consequently received marked attention in the July discussions of the port problem. There was an added reason for concern over the project because of the time element involved. Naval requirements dictated that Brest be captured before any attempt was made to sail convoys to the Quiberon Bay area, and bad weather would create towing difficulties later in the fall. These considerations began to worry SHAEF officials at an early date. On 3 July General Crawford, the G-4, General Gale, the chief administrative officer, General Bull, the G-3, and other staff officers held an informal meeting at Southwick House, Portsmouth, to consider, for one thing, the date by which the Quiberon area must be secured if it was to be developed to its maximum capacity, and whether substitute capacity could be made available. The first question was not definitely answered at this time, although General Crawford's Plans Branch had estimated that D plus 60 was the latest date by which the development of the Quiberon Bay area could be started. The possibility of capturing Le Havre and Rouen before the weather deteriorated was discussed, but the staff officers agreed that while these ports would add materially to discharge capacities they would not provide a secure base from which U.S. forces could operate and could not be looked upon as a suitable alternative to the Brittany peninsula.[123]

CHASTITY was still regarded as an essential part of the administrative plan to support the maximum build-up of forces, and its importance was thus reaffirmed, although it was apparent that the first doubts had already appeared as to the possibility of capturing the area in time to make it worthwhile.[124]

The course of tactical operations in the next two weeks was not very heartening,

[122] *Aide-Mémoire* on Quiberon Bay Project, Mov and Tn Br, SHAEF G-4, 15 Jun 44, SHAEF G-3 War Diary.

[123] Min of Informal Mtg, 3 Jul 44, SHAEF G-4 334 CAO Mtgs.

[124] Memo, Crawford for CofS, SHAEF, 19 Jul 44, sub: CHASTITY Project, SHAEF SGS 800.4 Quiberon Bay Project.

and by mid-July it was accepted that the Brittany ports would not be captured until a month later than planned. By that time the weather was expected to break, a development that would render the beaches less serviceable and would also complicate the towing problem around the Brittany peninsula. An additional factor now entering considerations was the possibility that major port reconstruction tasks, instead of being spaced at intervals as originally planned, would overlap and compete for allocation of engineer and transportation resources. The various factors affecting the development of the CHASTITY project were becoming even more unfavorable, and the SHAEF staff therefore asked the Communications Zone on 12 July to initiate a thorough reconsideration of the project.[125]

Within the next week an ETO committee, made up of both Army and Navy representatives, made a study of the entire Brittany port problem and submitted its conclusions to the SHAEF G-4. CHASTITY was by no means abandoned. But the increasingly unfavorable conditions surrounding the project convinced the logistical planners that they had to look elsewhere to develop the needed capacity. The recent experience with German demolitions at Cherbourg and the limited availability of coasters persuaded them that there was little point in seeking additional facilities in the Loire ports. The most promising possibility appeared to be the development of Cancale, on the north coast of Brittany, where deepwater anchorage was available for Liberty ships. The Rade de Cancale could accommodate twenty Liberties, was protected from south and west winds, and could be used throughout the winter. Its capacity would not be as great as Quiberon Bay, and naval officials noted that its beaches, which were flat and muddy at low tide, could hardly be described as good,[126] but its location actually gave it certain advantages over the CHASTITY area. The weather hazard would be largely eliminated, the towage problem materially lightened, the rail haul eastward shortened, and the rail construction problem reduced.

The committee also felt that additional capacity might be developed at Brest. With all its disadvantages, militating against its use for anything but personnel and vehicles, the committee thought that necessity might dictate that the sheltered roadstead be used for the discharge of Liberties, particularly if coaster tonnage fell below a certain minimum and further restricted the use of the smaller ports, and if the capture of Le Havre (originally scheduled for D plus 110) was postponed and demolitions were severe.

The committee was reluctant to rule out CHASTITY completely. It still thought that a capacity of about 6,000 tons could be developed by early November. But even a limited program would require high-level decisions and overriding priority for towage. The lateness of the season appeared to rule out the probability that the project would be worthwhile. Cancale, on the other hand, appeared to require a more economic outlay and to promise quicker results, and the committee therefore recommended its full development as an artificial port, wherein lighters could discharge Liberties to newly constructed

[125] Ltr, Napier to CofS ETO, 12 Jul 44, sub: CHASTITY, SHAEF G-4 Mov and Tn War Diary 3014/22 Mov; Min, Port Spearhead Plng Com Mtg, 15 Jul 44, 12 A Gp 337 Confs.

[126] Memo, Cmdr J. R. A. Seymour for Mov and Tn Br G-4 SHAEF, 31 Jul 44, sub: Brittany, SHAEF G-4 825.1 Piers, Wharves, Docks and Berths, 44, II.

pierheads. It also recommended that the chief engineer and the chief of transportation be directed to prepare plans for additional discharge at Brest and for adequate rail facilities to carry supplies to the Rennes depot area.[127] General Napier, the SHAEF Deputy G–4 for Movements, had meanwhile examined the whole port problem and arrived at almost identical conclusions.[128]

As a consequence of these findings it was necessary to revise somewhat the earlier estimates regarding an accelerated build-up. On 24 July, in accordance with General Crawford's instruction, the Logistical Plans Branch, G–4, of SHAEF made a significant addition to its recently written staff study on U.S. personnel build-up. Based on the more sober estimates resulting from the recent port studies it predicted a deficiency of about 12,000 tons per day for the support of the accelerated build-up (Plan Y), beginning in October when beach discharge was expected to fail. Capture of the Seine ports, it estimated, would ameliorate this situation somewhat, but not for some time. Crossing the Seine would extend the lines of communications and raise maintenance requirements tremendously, and additional port capacity to offset such demands would not be forthcoming for perhaps two months after the river was crossed. Consequently the build-up from October through December could not be accelerated as a result of a successful crossing of the Seine. Even assuming that the resources intended for the development of Quiberon Bay were shifted to the northern Brittany ports, it concluded that the postponement of the capture of the Brittany and Seine ports would reduce by six the number of divisions which could be maintained by December. This depressing prediction gave cause enough to reconsider the proposed abandonment of Quiberon Bay. The Logistical Plans Branch was definitely of the opinion that the decision to cancel CHASTITY should not be confirmed unless the project was proved clearly infeasible.[129] This view was also supported in the ETOUSA headquarters. General Lord, writing to the SHAEF G–4 at the end of July, asserted that the development of alternate facilities at Cancale and Brest would not satisfy requirements. He saw no administrative reasons which warranted the abandonment of the project, and he therefore recommended that efforts be made to overcome every obstacle in the way of an early implementation of the CHASTITY plan.[130]

In the atmosphere of uncertainty which prevailed at the end of July no final decisions were made regarding either the cancellation of CHASTITY or the speed of the build-up. At the end of the month representatives of the SHAEF G–3, the Communications Zone, and the War Department tentatively decided that preparations should be made to dispatch divisions to the ETO to meet the accelerated build-up under the optimistic Plan Y, but that the Communications Zone should be prepared to accommodate and administer a reserve of divisions in the United Kingdom in accord with the more realistic Plan X. Since the build-up would be deter-

[127] Ltr, Col Hugh A. Murrill, OCofT COMZ to G–4 SHAEF, 19 Jul 44, sub: CHASTITY Project, SHAEF G–4 825.1 Piers, Wharves, Docks and Berths, 44, II.

[128] Ltr, Napier to Log Plans Br G–4, 21 Jul 44, sub: Brittany, file cited above, n. 127.

[129] Stf Study 12, Pt. II, Delay in Capture of Brittany and Seine Ports, 24 Jul 44, SHAEF G–4 825.1 Piers, Wharves, Docks and Berths, 44, II.

[130] Memo, Lord for G–4 SHAEF, 30 Jul 44, sub: CHASTITY Project, ETO 381/800 Ports, Harbors, and Beaches—OVERLORD.

mined largely by the date of capture of the last of the Brittany ports, it would become evident by D plus 90, they thought, which of the various plans could be consummated.[131]

Although hope still remained in late July that the original plans could be carried out, the search for new ways to meet the threatened deficits continued. Besides deciding to develop Brest to the maximum capacity feasible and considering Cancale, the planners made studies of other Brittany ports, such as St. Brieuc, Binic, Morlaix, and Roscoff.[132] Meanwhile, they explored every possibility of expanding the capacity of existing facilities. General Lee urged an increase in the U.S. allotment of coaster tonnage, and advised a substitution of LST's and LCT's for MT ships in the shuttle service between the United Kingdom and the Continent in order to permit a better use of both dock labor and ferrying craft on the far shore and thereby enhance the performance of the small ports and the beaches. Preparations were made to raise Cherbourg's capacity to at least 20,000 tons per day,[133] and still greater attention was now given to the development of the smaller ports. The minor ports had already had their targets raised at the end of June. Following additional studies in July, plans were made for their maximum development—to a combined capacity of 17,000 tons—involving several months of work and the expenditure of considerable amounts of labor and materials. Pending the development of adequate capacity in the larger ports it was also decided to risk bad weather and extend the use of the beaches beyond September. Beach dumps at both UTAH and OMAHA were in a good position to give close support to the combat forces, and consideration was given to the construction of railway spurs to those dumps to permit more efficient support of the armies as they displaced forward.[134]

Meanwhile, as a hedge against the threatened logistical difficulties, top administrative officials had agreed in mid-July that the planned build-up of supplies would henceforth be disregarded in favor of delivery to the Continent by every possible means of tonnage to the full capacity of U.K. outloadings and far-shore acceptance. Because of the low tonnages required in the first month the British Chiefs of Staff had asked the Supreme Commander to review maintenance needs with a view toward easing the burden on shipping and the U.K. ports. General Gale, the chief administrative officer, did not believe that a reduction in maintenance was warranted simply on the first month's experience, and the proposal was therefore rejected in favor of the policy of continuing the maximum flow of supplies. General Crawford announced that an attempt would be made to transfer to France some million and a half tons of U.S. reserves then being held in the United Kingdom.[135]

Thus the port problem for the moment at least appeared to constitute the very root of future logistical difficulties. Experi-

[131] Memo, Osmanski for Chief Plans Br, 31 Jul 44, sub: U.S. Build-up, SHAEF G-4 Troop Flow 121/1 GDP-1.

[132] Memo, Mov and Tn Br G-4 SHAEF for DACOS G-4, Mov and Tn Br, 25 Jul 44, sub: Port Capacities, SHAEF G-4 825.1 Piers etc.

[133] Ltr, Lee to U.S. Adm Stf at 21 A Gp, 26 Jul 44, sub: Increased Beach and Port Capacity, ADSEC 323.3 Mil Depts and Divs—Ports.

[134] Memo, Lord for G-4 SHAEF, 30 Jul 44, sub: CHASTITY Project SHAEF G-4 Quiberon Bay (CHASTITY) 146/3 GDP-1.

[135] Min, CAO Mtg, 15 Jul 44, SHAEF G-4 334 CAO Mtgs; Draft Ltr, Gale to Smith, 19 Jul 44, sub: Maintenance—Opn OVERLORD, and Ltr, Smith to Secy COS Com, 19 Jul 44, sub: Shipping for OVERLORD, SHAEF SGS 540 Shipping Problems.

ence had revealed that estimates as to the time by which ports could be captured and put to use had been too optimistic. This was balanced in part by the fact that the ultimate capacity of all the ports captured thus far had been underestimated. In any event, Brittany s importance in the administrative scheme had by no means diminished at the end of July in the eyes of the logistical planners. This view was reinforced by General Eisenhower, who wrote to the 21 Army Group commander late in the month: "We must get the Brittany Peninsula. From an administrative point of view this is essential. We must not only have the Brittany Peninsula—we must have it quickly. So we must hit with everything."[136]

[136] Memo by Gen Smith re the part played by Gen Eisenhower in early days of OVERLORD, p. 9, Notes on Establishment of Lodgment Area, Gen Bd Item 46, Box 47.

CHAPTER XII

Breakout and Pursuit

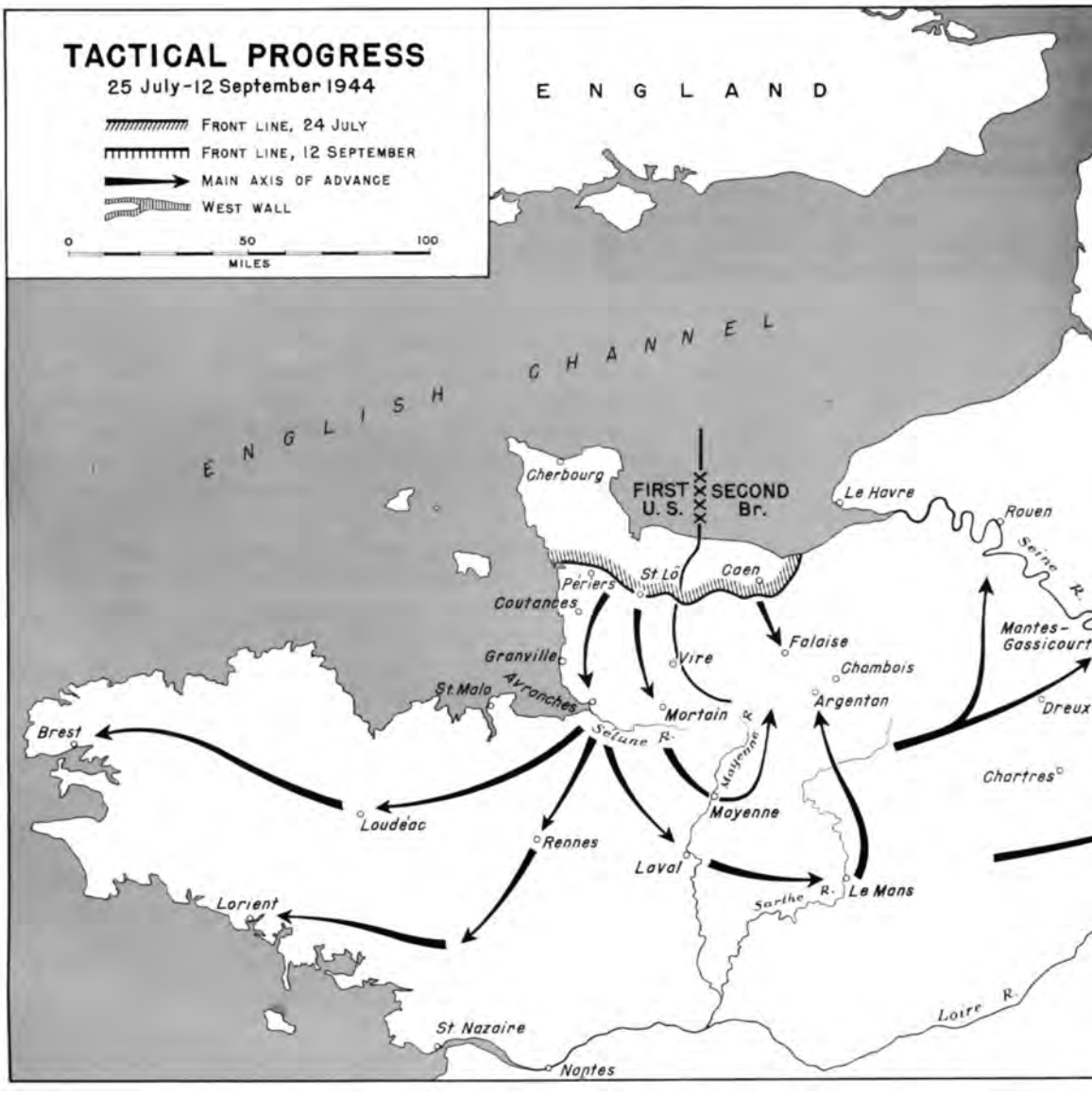
(1) Tactical Developments

For most of the month of July the First U.S. Army had been preoccupied with a series of attacks designed to win additional maneuver space and to gain the more favorable terrain—the higher ground between Coutances and St. Lô—considered essential as a line of departure for a general offensive. These attacks were halted on about 18 July, at which time the front line lay just north of the Lessay–Périers–St. Lô highway. This was somewhat short of the objective assigned early in the month. Nevertheless, the time now appeared propitious to launch an all-out attack to break through the enemy defenses in Normandy as a prelude to a drive into Brittany. Postponed for a week because of unfavorable weather, Operation COBRA was finally launched on 25 July. Following an air bombardment on an unprecedented scale, the heavily reinforced VII Corps (four infantry and two armored divisions) initiated the offensive on a narrow front between Périers and St. Lô. *(Map 15)* In the face of devastating blows from the air and on the ground the enemy lines soon gave way. On the second and third day of the attack telling strokes by the VII Corps ripped an ever-widening breach in the enemy's positions. Meanwhile, beginning on 26 July, the attacks were joined first by the VIII and V Corps, and then by the XIX Corps. On 28 July armored elements of both the VIII Corps (which also had a strength of four infantry and two armored divisions) and VII Corps converged on Coutances. They captured the town on the same day, completing the major part of the COBRA operation.

Taking full advantage of the enemy's disorganization, the VII Corps turned southward and together with the VIII Corps vigorously pressed the attack. By 31 July the Americans had captured both Granville and Avranches, thus unhinging the enemy's left flank and opening the door into Brittany.

On 1 August, with a total of eighteen U.S. divisions available on the Continent, the 12th Army Group became operational under the command of General Bradley, taking control of both the First Army (eleven divisions on 1 August), now commanded by General Hodges, and the Third Army, which also became operational at this time under the command of General Patton. The Third Army initially consisted of the VIII Corps, which was taken over in place, and the newly arrived XV Corps, and had seven divisions at its disposal.

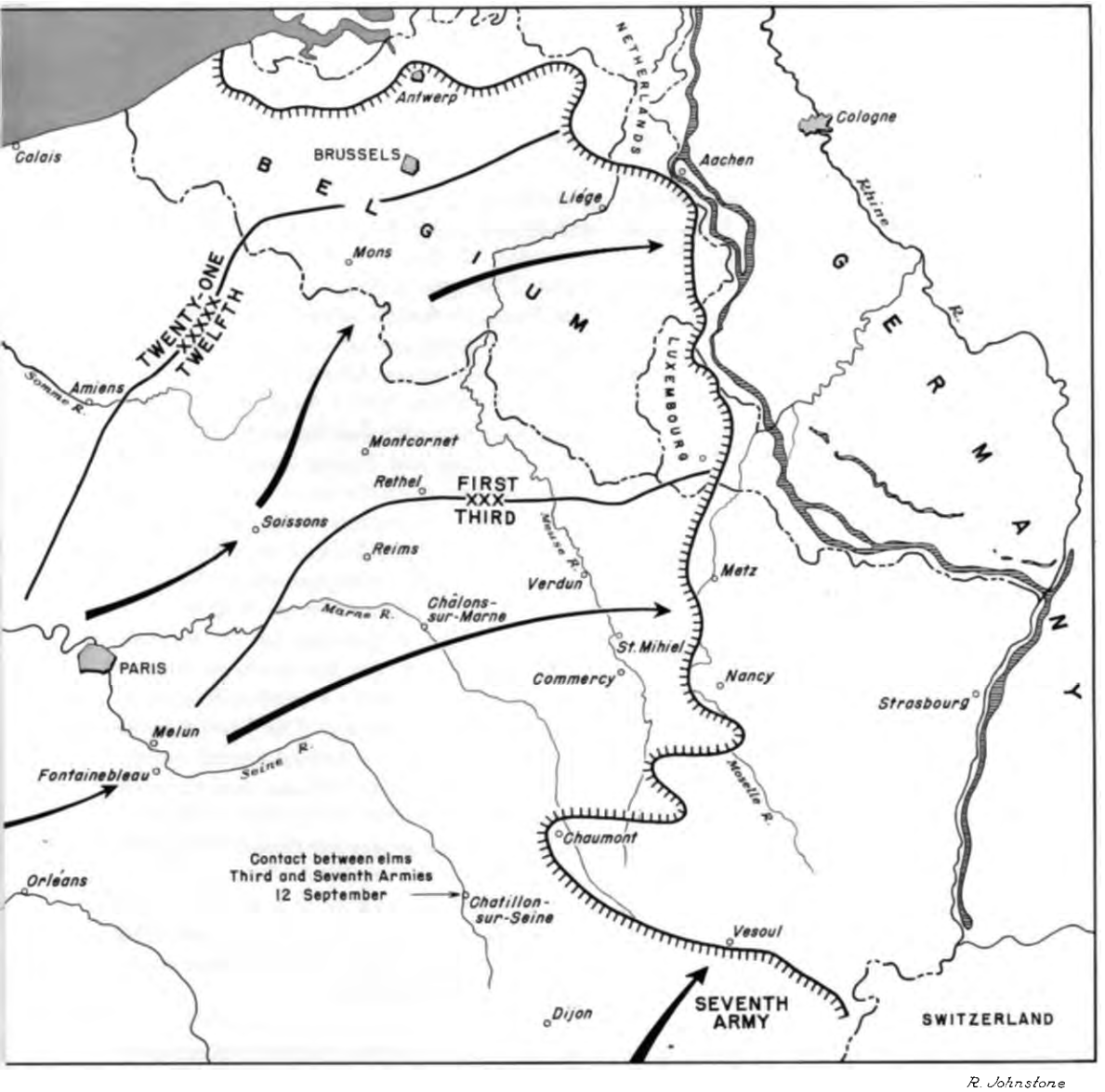
The attacks continued without interruption on 1 August. While the First Army drove back the enemy's center southeastward toward Vire, the Third Army struck southward through the Avranches gap with the mission of clearing Brittany. By 3 August Rennes was captured, and ar-



MAP 15

mored units had already knifed more than 80 miles into the heart of the peninsula, reaching Loudéac.

At that date the enemy still presented a cohesive defense in First Army's sector and offered stubborn resistance in the vicinity of Vire. South of the Sélune River, however, the enemy's defenses had been completely shattered by the breakout at Avranches, and resistance was for the most part un-co-ordinated, with some units in flight. In addition, warm, clear weather



R. Johnstone

enabled the Allied air forces to take full advantage of their superiority, providing continuous cover to friendly armored columns and relentlessly attacking all enemy movements and concentrations. Furthermore, the enemy had already denuded Brittany of all its mobile units, and a strongly organized French resistance now came forward to hasten the enemy's disintegration in the peninsula. Consequently there was little to impede the advance of U.S. forces in the area.

This very favorable combination of circumstances led to the first major alteration in the tactical plan. On 3 August the Third Army was directed to employ the minimum forces necessary to clear the Brittany peninsula and protect the southern flank along the Loire, and to make its main effort eastward to the Mayenne River. In accordance with these new instructions the XV Corps drove eastward, capturing the city of Mayenne on 4 August and Laval on the following day. Meanwhile the VIII Corps continued to push westward in Britanny. By 5 August the Quiberon Bay area was almost completely cleared and St. Malo was under attack.

Faced with the inviting prospect of delivering a decisive blow to German forces west of the Seine the 12th Army Group commander on 6 August directed the Third Army to continue its eastward drive to secure crossings over the Sarthe in preparation for an advance to occupy the Chartres plain and close the Paris–Orléans gap between the Seine and the Loire. Motorized infantry and armor accordingly pushed beyond the Mayenne, and on 7 August advanced to within twelve miles of Le Mans. By that time VIII Corps units had overrun most of the Brittany peninsula and prepared to invest the major ports, including Brest and Lorient. In the south the Third Army was reinforced by an additional corps (the XX), which took over the protection of the southern flank, twenty to thirty miles north of the Loire.

On the same day, 7 August, in a desperate attempt to sever the narrow Avranches corridor and restore a cohesive defense line anchored on the coast, the enemy launched a violent counterattack against the First Army westward from Mortain, employing many armored units. While the enemy persisted in his attacks for several days, attempting to isolate the Third Army, this threat was not considered serious enough to alter the latter's mission. In fact, it was decided to capitalize still further on the enemy's weakness and disorganization in the south and his deep commitment at Mortain without awaiting the outcome of the action on First Army's front. The spectacular advances of General Patton's forces appeared to offer the glittering prospect of trapping and destroying the entire German *Seventh Army* west of the Seine. On 8 August, therefore, in accordance with instructions from 12th Army Group, the Third Army captured Le Mans and then directed its main effort north toward Argentan while the 21 Army Group attacked southward toward Falaise in a huge double envelopment of the German forces. Armored elements of the XV Corps reached Argentan on 13 August, where the advance on the southern edge of the pocket was halted on instructions from General Montgomery. The First Canadian Army met determined enemy resistance in the vicinity of Falaise, and the trap was not closed until 19 August, at Chambois, only a few miles northeast of Argentan. The delay enabled the enemy to withdraw considerable forces, although the Allied air and ground forces inflicted heavy losses in personnel and even more severe losses in matériel.

As early as 14 August, meanwhile, taking advantage of the enemy's mounting confusion, the Third Army was ordered to resume the advance eastward. Leaving elements of the XV Corps on the southern edge of the pocket at Argentan to be taken over by First Army, the Third Army reinitiated its attacks eastward, with the XV Corps driving on Dreux, the XX Corps driving on Chartres, and the newly ar-

rived XII Corps advancing on Orléans. These objectives were captured within two days, and on 19 August, as Allied forces were closing the gap at Chambois, the Third Army established a bridgehead across the Seine at Mantes-Gassicourt, thirty miles below Paris. Leaving British units to mop up the encircled enemy forces in the Argentan–Falaise pocket, the First Army now also moved eastward and on 23 August took over the Mantes-Gassicourt bridgehead and the XV Corps and started across the Seine. South of Paris other Third Army units pressed eastward and forced additional crossings near Melun and Fontainebleau on the 24th.

Meanwhile, between 250 and 350 miles from the scene of these dramatic events, the battle continued for possession of the Brittany ports. At Lorient, Nantes, and St. Nazaire activity was limited to containing the enemy garrisons, and at Morlaix to the protection of the beaches. At St. Malo the enemy stubbornly resisted the siege for two weeks, finally surrendering the citadel on 17 August. In the middle of the month some of the armored units which had spearheaded the race for the Brittany ports began to be released for employment in the Third Army's eastward drive, and the VIII Corps received in their place some of the First Army infantry divisions pinched out in the closing of the Argentan–Falaise pocket. These divisions were transferred to Brest, where the attack on the port finally got under way on 25 August.

Except for the Brittany ports the "initial lodgment area," embracing the entire area between the Seine and Loire rivers, had been cleared by 24 August (D plus 79), virtually completing Operation OVERLORD. In fact, operations had already gone beyond the objectives of OVERLORD in the capture of bridgeheads across the Seine. Plans had contemplated a halt at this barrier. But with enemy forces in France greatly weakened and in flight there appeared to be little reason for adhering to original plans.

To exploit this favorable situation the Supreme Command on 19 August made the decision to continue the pursuit of the disorganized enemy forces at the maximum rate which logistical capabilities would allow. First Army's initial task after crossing the Seine was to encircle Paris, the intention being to avoid a battle for its possession. An uprising of partisans in the city, combined with reports of grave food shortages, brought a change in plans, however, and on 25 August French and American forces entered the capital to assist in its liberation.

At the same time both First and Third Armies, now comprising nine and six divisions respectively (an additional five divisions were engaged in Brittany and along the Loire), began their drives northeastward beyond the Seine. Continuing its giant strides, the Third Army by 29 August had crossed the Marne and captured Reims and Châlons-sur-Marne. Then, turning eastward, it advanced rapidly to the Meuse, crossing at Verdun, St. Mihiel, and Commercy on 31 August.

North of Paris, where the enemy had larger forces and where his retreat had been more deliberate and orderly, Allied advances were not initially as rapid, although the First Army right flank units (VII Corps) made spectacular gains, reaching Soissons on 29 August and Montcornet and Rethel on the last day of the month.

The pursuit of the retreating enemy forces was pressed by the Allied armies in the first days of September, although the

pace of the advance was now noticeably affected by lack of supplies, particularly fuel. On the extreme left the 21 Army Group crossed the Somme and captured Amiens on 31 August. Three days later British forces entered Brussels and on 4 September captured Antwerp, with its port facilities for the most part intact. The enemy clung tenaciously to Le Havre until 12 September and then surrendered a badly damaged port. By mid-September British forces stood at the Dutch border.

First Army continued its drive northeastward until Mons was captured on 3 September, and then reoriented its attacks directly eastward. Two days later First Army units crossed the Meuse, and on 11 September made the first pentrations of the German border. By 12 September almost all of Luxembourg was cleared, and with the exception of the left flank the entire First Army now held a line generally along the German border.

Farther south the Third Army continued to press eastward, and on 7 September established the first bridgehead over the Moselle near Metz. In the next few days it made additional crossings near Metz and in the vicinity of Nancy.

Stiffening enemy resistance characterized the fighting of all the Allied armies in the second week of September, and the momentum of the pursuit was abruptly reduced. By 12 September it was apparent that the sustained drive which had begun early in August had come to an end. In the north the enemy now faced the First Army from the formidable defenses of the Siegfried Line; farther south, increasingly favored by the terrain, the enemy fought desperately to halt the Third Army advances at the barrier of the Moselle, launching many counterattacks. In the entire area of the 12th Army Group the enemy had succeeded in stabilizing the front after a near-disastrous rout in northern France.

The VIII Corps continued to engage the enemy in Brittany. On 5 September Third Army was relieved of further responsibility for operations in that area and for security along the Loire, the VIII Corps now coming under the direction of the newly arrived Ninth U.S. Army, commanded by Lt. Gen. William H. Simpson. Fully appreciating the value which the Allies attached to the ports, the enemy successfully resisted the attacks on the Brest fortress for almost four weeks. When the siege finally came to an end on 18 September (D plus 104) he surrendered a thoroughly shattered port.

Meanwhile in southern France Allied forces struck still another blow in an operation subsidiary to OVERLORD. On 15 August the Seventh U.S. Army, with French forces attached, under the command of Lt. Gen. Alexander M. Patch, launched Operation DRAGOON, assaulting the Mediterranean coast of France between Cannes and Toulon. In co-ordination with an airborne drop by British and American paratroops the assaulting forces quickly won a beachhead. Striking both westward and northward, Allied forces captured Marseille on 28 August and by the end of the month closed in on Lyon, more than 200 miles up the Rhône valley. Matching the lightning sweeps of the 12th Army Group in northern France, the Seventh Army advanced more than 300 miles by 10 September, when it captured Dijon. On the following day armored reconnaissance elements operating west of that city made the first contact with forces of the 12th Army Group when they met a patrol from an armored unit of the Third Army, and within the next few days a

link-up between the two armies was made in force. By mid-September, therefore, virtually all of France, Belgium, and Luxembourg had been cleared of the enemy, and a continuous front from the North Sea to Switzerland had been established.

(2) The Logistic Implications of Changing Plans

In their pursuit of enemy forces across northern France and Belgium the Allied armies began to feel the full impact of logistic limitations. The detailed description of the supply problems of August and early September is reserved for the next chapter. To understand the basic causes for the difficulties and to appreciate the magnitude of the logistic feat of this period, it is helpful to recapitulate the forecasts and estimates of capabilities made by the OVERLORD planners in the months before the actual pursuit.

The OVERLORD plan had contemplated a more or less steady rate of progress which would have taken the U.S. forces to the line Avranches–Mortain by D plus 20, would have uncovered an area southward to the Loire and extending from Lorient to Le Mans by D plus 40, and would have completed the capture of the OVERLORD lodgment area by D plus 90. There was some skepticism concerning the possibility of supporting the operation on the desired scales, but it was generally held before D Day and throughout June that the operation was logistically feasible provided certain conditions were met, in particular that the operation should not proceed faster than scheduled and that the build-up be limited to the size then planned.[1]

While the plan had regarded the capture of Brittany as a prerequisite to the proper support of operations eastward, the Allied planning staffs in May and June had considered alternate schemes of maneuver which might be implemented should a weakening of the enemy to the south and east permit a drive on the Seine ports in place of the expected advance into Brittany. In LUCKY STRIKE an exploitation was proposed taking the form of a drive toward the Seine with maximum forces in an effort to defeat enemy forces west of the river, followed by a forcing of the Seine and capture of Le Havre and Rouen.[2]

The reaction to both LUCKY STRIKE and the earlier plan known as AXEHEAD had been lukewarm, mainly for logistic reasons. Granting the desirability of such an operation, the SHAEF planning staff was not very optimistic over logistical capabilities. It estimated that a highly mobile force of only six divisions could take part in the exploitation. Three divisions would be left in the vicinity of Le Mans to protect the flank, and an additional six operating at reduced scales of maintenance and a smaller allocation of motor transport would open St. Malo and continue operations in Brittany. Even this plan would require that the exploiting force be given first priority on supplies, and movements of reserves to support the forces in Brittany would have to be virtually suspended.

Exploitation across the Seine would obviously be desirable, but it was almost completely ruled out so far as U.S. forces

[1] Adm Stf Study 11, Logistical Situation of U.S. Forces D plus 41 to D plus 90, Log Plans Br G-4 SHAEF, 3 Jun 44, SHAEF G-4 Adm Stf Study 11, Item 14; Ltr, Hq COMZ to U.S. Adm Stf, 21 A Gp, 23 Jun 44, sub: Build-up D plus 60-D plus 90, SHAEF G-4 SS 11 Opn NEPTUNE, 142/11 GDP-1.

[2] Hq 21 A Gp, U.S. Adm Stf, Outline of possible developments Operation LUCKY STRIKE, 30 Jun 44, EUCOM LUCKY STRIKE 381, I.

were concerned. The staff believed that it would be logistically infeasible to maintain anything but the smallest American forces east of the Seine until the lines of communications were organized and stocks built up in forward areas. British and Canadian forces would be in a much better position to seize bridgeheads east of the river, but it was concluded that the participation of U.S. forces should be limited to protection of the British right flank in such operations. British and Canadian forces might in fact be able to launch an armored thrust to the Seine before U.S. forces were ready to participate, and the planners concluded that if enemy resistance weakened sufficiently to permit this, or if the enemy began to withdraw before U.S. forces could be ready, it would actually be unnecessary for American forces to participate even in the advance to the Seine. U.S. participation in LUCKY STRIKE, it was noted, would interfere with the rate of development of an adequate base and line of communications. It would therefore actually entail an administrative handicap which, it was vaguely hinted, might have serious consequences later. The prime consideration was that such an operation must not unduly interfere with the early capture of the Brittany ports.[3]

While the possibility of assigning a higher priority to the eastward drive and the capture of the Seine ports thus continued to be examined just before and after D Day, there was no alteration in the basic assumption that the possession of the Brittany ports was a prerequisite to sustained operations eastward. During July this concept became even more hardened as a result of the painfully slow tactical progress and in view of the predicted deficiencies in port capacity.

At the start of the COBRA operation on 25 July the front lines were approximately forty days behind the phase lines forecast in plans. At that time the Movements and Transportation Branch of G–4, SHAEF, again analyzed the possibility of supporting U.S. forces at the Seine, assuming that they could still complete the capture of the lodgment area by D plus 90 as originally planned. Since this would require an advance from the D-plus-15 to the D-plus-90 phase line in only forty-one days (from D plus 49 to D plus 90), a considerable acceleration was required. Movements and Transportation officers concluded that in such an advance U.S. forces would be certain to experience supply difficulties by the time they reached the D-plus-80 phase line, for they predicted a shortage of about twenty-nine truck companies. This difficulty might be overcome if an intensive effort was made immediately to move U.S. reserves well forward to temporary dumps in the vicinity of St. Lô. The accumulation of a large stock of supplies in that area would reduce the length of haul later when transportation resources were fully extended. The only other alternatives were to borrow trucks from the British or carry out additional rail reconstruction. At the D-plus-90 phase line (the Seine) the planners estimated that there would be a shortage of 127 truck companies, which could be compensated for only by additional rail reconstruction.[4] At the end of

[3] Ltr, G–3 SHAEF to SHAEF Stf, 4 Jul 44, sub: Opns LUCKY STRIKE, BENEFICIARY and HANDS UP, with atchd study, Operations Lucky Strike, Beneficiary and Hands Up, Examination by Planning Staff, 3 Jul 44, SHAEF G–3 War Diary.

[4] Total requirements at that time would be equivalent to 462 companies; actual facilities would total 227 truck companies and an equivalent of 108 in rail transportation, or total facilities of 335, leaving a deficit of 127.

July, therefore, it was estimated that transportation facilities would probably be inadequate to supply U.S. forces even on the D-plus-90 phase line at D plus 90.[5] This was indeed a pessimistic view of logistic capabilities.

When U.S. forces suddenly lunged forward at the beginning of August the speed of their advance almost immediately upset all the calculations of the staffs, and brought the planners face to face with the problem they so recently had been debating. On 3 August, with Third Army forces streaming through the Avranches corridor and fanning out to the south and west, General Bradley made a major alteration in the tactical plan when he directed the Third Army to make its main effort eastward, leaving only the minimum forces necessary for operations in Brittany. The importance of Brittany was by no means minimized by this decision; the rapid occupation of the peninsula, in the Supreme Commander's view, remained a primary task.[6] While the redirection of the Third Army's effort was expected to delay the capture of the Brittany ports somewhat, such a delay was expected to be a minor one and therefore acceptable. Nevertheless this decision marked the first step in a repeated subordination of logistic considerations to prospects of immediate tactical advantage.

During the next few days the easy successes of the Third Army opened up even greater possibilities. The sequence of events and circumstances which developed in the first week of August was remarkably like that upon which the LUCKY STRIKE plan was premised—namely, an open flank had been created in the absence of appreciable enemy forces either in Brittany or in the region of the Loire. These conditions offered the prospect of delivering a decisive blow to the enemy west of the Seine, and the decision was now made to execute the enveloping maneuver already described. On 14 August, after reaching Argentan, the Third Army was ordered to continue eastward, and a few days later its mission was still further extended to the seizure of bridgeheads across the Seine.

Supply planners had been quick to realize the administrative implications of pursuit operations. As early as 2 August, a day after the break-through, Colonel Whipple, chief of the Logistical Plans Branch, G–4, SHAEF, noted that logistic limitations would shortly assume major importance. Anticipating the questions of the operational planners, his group immediately began a study to determine the maximum rate of exploitation which might be supported eastward concurrent with operations in Brittany, and the logistic implications of an early drive to capture Paris.[7] Providing answers to these questions involved a thorough review of such factors as port capacities, scales of maintenance, and transportation resources.

By 11 August the G–4 Plans Branch had completed a tentative survey. At that date its estimate of logistic capabilities continued to be guarded. It concluded that four U.S. divisions could be supported in an exploitation to the Seine by 20 August (D plus 75) on the condition that U.S. forces in Brittany were main-

[5] Ltr, Vissering to Deputy G–4, Mov and Tn Br, 23 Jul 44, sub: Review of Stf Study 11, SHAEF G–4, Stf Study 11—Opn NEPTUNE, U.S. Forces D plus 41/90, 142/11 GDP–1.

[6] Cbl S–56667, Eisenhower to Marshall, 2 Aug 44, Eyes Only Cbls, Smith Papers.

[7] Ltr, Whipple to G–3 Plans *et al.*, 2 Aug 44, sub: Log Plng Preparatory to Crossing Seine, SHAEF G–4 381 War Plans General, I, 44.

tained entirely through Brittany ports or beaches by that date. Those four divisions could participate in a crossing of the Seine by 7 September if four British truck companies, currently on loan to U.S. forces, remained attached until that time, if British engineers assisted in rail reconstruction, and if all rail transport was allocated to U.S. forces. The construction of a 6-inch POL pipeline would have to be speeded and completed to Dreux by 30 August. If, in addition, an average of 1,000 tons of supplies could be made available by air in an advanced area from 20 to 30 August, and again after 7 September,[8] it was estimated that the attack across the Seine could be carried out three days earlier and with six U.S. divisions instead of four. Even these estimates were made with caution, for it was noted that there were various uncertainties owing to lack of information and possible variations in the tactical plan. For example, an early capture of Paris would impose an added burden because of the necessity of providing civil relief supplies, and would severely handicap a general offensive. The G–4 Plans Branch recognized that U.S. forces had by far the most difficult supply problem because of the greater distances involved, and would require assistance if they were to participate in the offensive in strength. Rehabilitation of the railways was expected to prove a major factor affecting the speed of the advance, and the most rigid economy in the use of all transportation resources would be necessary.[9]

In view of the developments of the next few days it would appear that logistical planners had certainly not overestimated the Allies' administrative potential. Tactical developments took place so rapidly during the time in which the above study was being considered that the premises on which it was based were invalidated by the time it was completed. Within two weeks the advance to the Seine was an accomplished fact, and it had been carried out with a total of seven divisions instead of four.

With the clearance of the left bank of the Seine on 24 August (D plus 79) Operation OVERLORD was virtually completed, eleven days earlier than planned. The decision to drive rapidly eastward following the Avranches breakout instead of employing large forces in Brittany as originally planned resulted in a major tactical victory. But it had already involved at least a temporary subordination of logistic factors, and the difficulties over supply which the armies began to experience as they crossed the Seine foreshadowed serious complications later.

That the lodgment area was cleared eleven days earlier than planned was in itself no measure of the difficulties caused by the rapid advance. More significant was the explosive manner in which the lodgment had expanded following a seven-week confinement in the cramped beachhead. In thirty days (D plus 49 to 79) an area had been uncovered which by plan was expected to require seventy-five (D plus 15 to 90). While the combat forces could easily accelerate their advance, there were definite limitations to the speed with which the lines of communications could be developed. By 25 August U.S. forces were beginning to feel the full effect of the sudden extension of the lines of communications, and the forewarnings which the SHEAF planning staff had made

[8] Assuming an interruption because of a planned airborne operation.

[9] Adm Stf Study 13, Logistical Implications of Rapid Exploitation to the Seine River, Log Plans Br SHAEF G–4, 11 Aug 44, SHAEF G–4 381 War Plans General, I, 44.

regarding the effect of U.S. participation in an early drive eastward on the development of a firm base and lines of communications already appeared to be coming true.

But the Allied armies were not to stop at the Seine, and the supply lines were destined to be stretched even farther and faster. In mid-August it was decided to continue the pursuit across the Seine—a decision which was to have considerably more far-reaching effects than that of 3 August. Plans had originally contemplated a pause of at least a month at the Seine, so that an adequate administrative organization could be developed to support further operations. The Allies had never intended to carry on a sustained drive into Germany, nor had they envisaged a decisive battle west of the Seine. Operation OVERLORD had been planned as a preparatory stage, its objective being the capture of a lodgment from which further operations could be carried out. The planning of the entire operation had been dominated by logistic considerations such as the capture of ports, the construction of pipelines, and the rehabilitation of railways. While the Allies hardly expected to capture the lodgment area ahead of schedule, particularly in view of the early delays, much less did they expect to support a drive beyond the Seine before D plus 90.

Planning for operations beyond the Seine (referred to as post-OVERLORD planning) had been initiated before D Day, and the broad course of action in the post-OVERLORD period had been determined by the time the invasion was launched. With the Ruhr, the industrial heart of Germany, as the primary objective, the Allies had decided to make the advance into Germany along two routes. The main effort with the bulk of the Allied forces was to be made along the axis Amiens–Maubeuge–Liége–the Ruhr, and a subsidiary effort with smaller forces on the line Verdun–Metz–Saarbruecken.

As usual, logistic factors figured prominently in determining this course of action. The two-pronged advance had initially been ruled out because of the disadvantage of maintaining forces on two widely separated lines of communications. It had finally been adopted in the belief that success along one axis would force enemy withdrawals in both areas, leaving adequate lateral communications between the two axes.

The requirement for ports was also a major determinant, since the capacity of those in the OVERLORD lodgment area was believed to be inadequate to build up and maintain forces required for the final defeat of Germany. The acquisition of additional port capacity before the onset of autumn gales was particularly essential to the support of British forces since the usefulness of the beaches and MULBERRY, on which they were initially dependent, was certain to come to an end in September. Logistical requirements therefore pointed to the earliest possible seizure of the ports of Le Havre and Rouen. Even with these, however, it was estimated that the available capacity would continue to limit the forces which could be maintained, and it was believed necessary to seize the Channel ports as far east as Antwerp to ensure satisfactory maintenance of the Allied forces. These considerations consequently supported the argument for a major effort northeastward paralleling the Channel coast.[10]

[10] SHAEF Plng Stf Study, Post-Neptune, Course of Action After Capture of Lodgment Area, Sec. I: Main Objective and Axis of Advance, 3 May 44, Sec. II: Method of Conducting the Campaign, 30 May 44, SHAEF 12 A Gp 370.2 Post-NEPTUNE G-3 Studies.

In outlining the course of action to follow the capture of the lodgment the planners had concluded, furthermore, that logistic difficulties precluded the mounting of an offensive south of Paris at an early date. For a long time U.S. forces would have very extended lines of communications, based in part on Cherbourg and the Brittany ports even after Le Havre was transferred to American use. Delays in the reconstruction of damaged rail lines were expected to limit the rate of advance for some time after the initial crossing of the Seine. Consequently the possibilities were considered best for mounting an offensive first across the lower Seine, between Paris and Le Havre.[11] Because of the handicap under which the U.S. forces would be operating, it was held that they would probably be unable to make their main thrust from the lodgment area before D plus 120, when the U.S. advance base would be firmly established in the Rennes–Laval area, with subsidiary depot areas in the vicinity of Chartres and Le Mans in addition to those in the Cotentin.[12] British forces were expected to be able to renew the offensive about one month earlier.

Allied planners continued to examine the various possibilities for launching an offensive from the lodgment in the weeks following the launching of the cross-Channel operation. In the middle of June they momentarily gave thought to a proposal to force an early battle west of the Seine and exploit across the river without waiting for the development of the longer U.S. lines of communications. This plan called for a concentration of the major Allied effort west of the lower Seine and a crossing of the river below Paris. Maintenance of both British and American forces under this plan would be effected mainly along the British supply routes.[13]

The planners had not changed their views appreciably by early August. At that time they still estimated that, because of transportation deficiencies on the long U.S. lines of communications a maximum of not more than four U.S. corps could be supported as far east as the Seine–Mantes–Loire line. Any advance beyond that line before October could be achieved only by reducing the road transportation commitment of other U.S. forces to the minimum by stationing resting divisions near depots and ports, by limiting the expansion of the American right flank to the southeast, and by utilizing airborne maintenance. Even then it was thought that only two U.S. corps could be maintained in an assault north or south of Paris in September. Furthermore, the capture of Paris before late October would mean burdening transportation with additional commitments for civil affairs supplies (food, coal, medical supplies) and would thus impose a severe limitation on the maintenance of operating divisions. For this reason it was desirable to postpone the capture of Paris until rail facilities could be developed from the ports in Brittany and Normandy and until the Seine ports were captured. From the above factors the planners concluded that any advance in strength east of the Seine–Mantes–Loire line before October would have to be conducted mainly by British forces and would have to be made along the lower Seine, between the Oise and Rouen. In fact, in view of the urgency of opening the Seine ports they thought that it might be necessary to employ one to three U.S. corps

[11] *Ibid.*

[12] SHAEF G-4, Post-Neptune Administrative Appreciation, 17 Jun 44, SHAEF G-4 381 NEPTUNE 44.

[13] SHAEF Plng Stf Study, Post- Neptune, Sec. III: The Crossing of the Seine, 17 Jun 44, first draft, SHAEF G-3 SHAEF/18008/Plans 44.

north of the Oise if delays in operations were to be avoided.[14]

Toward the end of the month, with Third Army units already across the Seine at Mantes-Gassicourt and preparing for additional crossings above Paris, the planners began to consider bolder actions than they had thought possible a few days before. On 22 August they analyzed the capabilities of supporting a drive across the Seine near Mantes to seize Amiens and Abbeville, employing thirteen U.S. divisions in the main effort and thirteen British divisions in a secondary attack. Such an operation they regarded as feasible, but only by ruthlessly subordinating all considerations other than the support of the main effort. The attack would have to be launched with less than the normal scale of reserves; maintenance in army areas was to be partly at normal rates (535 tons per division including POL) and partly at reduced rates (407 tons); the rail system would have to be reserved for U.S. support; two U.S. divisions were assumed to be immobilized in the Brittany peninsula, and were to give up their organic truck companies plus improvised companies; and a loan of forty-nine British truck companies was assumed. Deficiencies in rail transportation, which was expected to reach Dreux and Chartres by 1 September, were expected to be met by air supply or by temporarily pushing trucking units beyond their rated capacities.[15]

On the following day G–4 officers at Supreme Headquarters, envisaging more ambitious plans for a rapid advance beyond the Seine, issued an estimate of the special measures which would be necessary to insure the maintenance of forces engaged in such an advance. Even at that date, however, it was inconceivable to the administrative planners that sufficient support could be provided to maintain the advance on the scale and at the speed of the past few weeks and carry the Allied armies to the German border. They assumed, for example, that only eleven U.S. divisions (four armored and seven infantry) could take part in a continued drive, all others remaining in defensive positions along the Loire or in Brittany, or entirely static in the Alençon–Le Mans area. Scales of maintenance would have to be drastically reduced for even the eleven divisions participating—to 162 tons per day for infantry divisions and 247 tons for armored divisions fully engaged, and 108 and 141 tons per day respectively for divisions not fully engaged. Advancing divisions, furthermore, were to take with them none of their heavy artillery and only 50 percent of their medium artillery, and ammunition expenditures were to be limited to one third of the normal expenditures of divisions in the line. Reserves were to be reduced to half of normal, and accumulated only for divisions actively engaging in the advance.

On these "iron rations" and through various expedients, such as the organization of provisional truck units from inactive divisions, the planners thought that the advance could be continued and supported by road and rail. Should actual requirements prove heavier than those estimated, especially in ammunition and in engineer and civil affairs supplies, maintenance by air would definitely be necessary. The margin was therefore admittedly closely drawn, and support of the operation was made additionally precarious by serious shortages of service

[14] SHAEF Plng Stf Study, Post-Neptune, Sec. III, 17 Aug 44, SHAEF G–3 SHAEF/18008/Plans 44.

[15] Stf Study, Logistical Support of a Major Envelopment, Log Plans Br G–4 SHAEF, 22 Aug 44, SHAEF G–3 SHAEF/18008/Plans 44.

units, particularly ordnance depot companies and heavy truck maintenance companies, engineer truck companies and maintenance companies, and quartermaster truck units. With the above scales of support the planners foresaw an advance only to the Somme River and slightly beyond Laon, Châlons-sur-Marne, and Troyes by 20 September, and just beyond Sedan, Metz, Nancy, and Chaumont by 20 October.[16]

In the midst of these calculations the Supreme Command decided that Allied forces would cross the Seine without pause, and subsequently extended the objectives of the armies farther and farther eastward. Furthermore, the earlier plan providing for a secondary effort along the Reims–Verdun–Metz axis by only a small force was now expanded to provide for an advance in considerably greater strength along the subsidiary axis. Early in September the Third Army was directed to continue eastward with the mission of occupying that portion of the Siegfried Line covering the Saar, and then crossing the Rhine to capture Frankfurt.

A comparison of the administrative appreciations of this period with the actual course of operations presents sharp contrasts. The progress of the Allied armies in the six weeks following the breakout on 1 August appears to have invalidated the conservative estimate of logistic capabilities. Ignoring even the most optimistic estimates of what was possible, the armies by D plus 98 (12 September) advanced to the line which the forecasts had indicated they would reach on approximately D plus 350. Between 25 August and 12 September they had advanced from the D plus 90 to the D plus 350 phase line, thus covering 260 phase-line days in 19 days. The record was actually more phenomenal than these figures indicate, because in the earlier dash to the Seine the armies had overcome an initial lag of 30 days. Moreover, Paris had become an additional supply liability as the result of its liberation 55 days ahead of schedule, and whereas it had been estimated that only 12 U.S. divisions could be supported as far east as the Mantes–Orléans line at D plus 90, 16 divisions were being maintained in the vicinity of the Seine at D plus 79, and an additional 5 divisions in Brittany. In mid-September 16 U.S. divisions were being maintained 200 miles beyond the Seine, albeit inadequately, plus several divisions on combat scales in Brittany. By unusual exertions this feat was accomplished despite the fact that few of the conditions laid down in administrative estimates, such as the maintenance of Brittany forces via the Brittany ports and beaches, or extension of POL pipelines to Dreux, were met.

Supporting the advance to the German border and the Moselle by mid-September in a gamble for a quick victory entailed a ruthless disregard for an orderly development of the communications zone. The cost at which this overexertion was made was to be fully revealed in succeeding months.

[16] Adm Stf Study 14, The Logistical Implications of a Rapid Advance by AEF Beyond the Seine, Log Plans Br G–4 SHAEF, 23 Aug 44, SHAEF G–4 381 War Plans General, I, 44.

CHAPTER XIII

"Frantic Supply"

(1) The Character of Supply Operations in the Pursuit

A German general is once said to have remarked that blitzkrieg is paradise for the tactician but hell for the quartermaster. Ernie Pyle, the popular wartime newspaper columnist, described the operations of August and early September as "a tactician's hell and a quartermaster's purgatory." Whatever the sentiments of the tactician with regard to pursuit warfare, there can be no doubt of the appropriateness of these observations as applied to supply operations. As the Allied armies crossed the Seine and outran their supply lines toward the end of August logistical support became more and more "frantic" in nature, the needs of the combat forces being met almost wholly on a hand-to-mouth basis. With final victory believed to be almost within grasp in the first days of September, small wonder that the logistic limitations became exasperating.

As of 25 July the development of the rear areas in Normandy had progressed as far as possible except for port reconstruction. Discharge was being developed to maximum capacity at the beaches, the minor ports, and Cherbourg; a double-track railway was in operation from Cherbourg to Lison Junction, and single-track lines connected Barfleur and St. Sauveur-le-Vicomte with the main trunk line. In preparation for the coming offensive the Advance Section had taken over all army installations in its area except POL dumps in the beach maintenance area, and also had begun to take over the army maintenance area in the vicinity of St. Lô and La Haye-du-Puits. Emphasis had been placed on the storage of supplies as far forward as practicable—in the OMAHA Beach–St. Lô area.[1]

The supply situation was regarded as good at the beginning of August, although reserves were not evenly distributed in the army area and there were certain shortages in Classes II and V. Neither of the armies had anything like the authorized 7 units of fire, but the Communications Zone had a minimum of 9 days of supply of ammunition (11.1 days of artillery ammunition), and there was no critical shortage in any category. There was no shortage of rations (Class I), and the Communications Zone had approximately 16 days of supply of POL (Class III). Army reserves were badly distributed because a large portion of the supplies were still under the control of First Army, which had stocks of certain supplies in excess of authorized levels. On 6 August First Army had 10.5 days of supply of POL as against Third Army's 1.3 days. But there were no over-all shortages, and no immediate difficulties were antici-

[1] Operations History of the Advance Section, COM Z ETOUSA, prep by Hist Sec ADSEC, 1945, mimeo (hereafter cited as ADSEC Operations History), pp. 67–70.

pated.[2] Third Army presented the most immediate problem, but while General Patton's forces by this time had penetrated deep into Brittany the Advance Section commander, General Plank, felt that they could be supplied without embarassment.[3]

In the first few weeks in August deliveries to the armies were indeed substantial, the heaviest shipments going to Third Army in an effort to effect a more equitable distribution of reserves. In the ten days between the 7th and 16th the Communications Zone recorded average daily deliveries of 6,144 tons to the First Army and 13,250 tons to the Third Army, more than half of the latter's receipts consisting of POL.[4] By the fourth week in August, however, when it became necessary to maintain American forces at the Seine and at the tip of Brittany, deliveries to combat units fell off rapidly. Forced to carry their loads farther and farther forward, trucking units required more and more time to complete round trips between the Normandy depots and front-line units. In the last few days of August deliveries to the armies dwindled to a few thousand tons, and the logistical support of U.S. forces reached the most precarious state during operations in northwest Europe.

Difficulties in supplying the American forces in the pursuit did not suddenly appear in the final week of August. They had begun almost simultaneously with the breakout at the beginning of the month, for it was impossible from the start to maintain the armies on the run at desired scales. When the 12th Army Group became operational on 1 August it had issued administrative instructions authorizing the armies to establish reserve levels of 7 days of rations and POL and 7 units of fire.[5] Even at that time the armies did not have their full allowances, however, and once they began their rapid advance it shortly became difficult to move even daily maintenance supplies forward, to say nothing of establishing authorized reserve levels in the army areas. On 27 August the army group took belated cognizance of this situation and reduced the authorized army levels of Class I and III supplies to 5 days and the Class V level to 3 units of fire. This was a meaningless gesture in view of the difficulties of moving even daily maintenance forward.[6]

At that time the decision had already been made to continue the advance as far as it could be sustained. The army group fully recognized that supply capabilities had become the governing factor, and that the Communications Zone might not be able to keep up with the rate at which the combat elements were moving forward. Nevertheless it was decided that the armies should continue their advance as far as practicable, using every available means of transportation at their disposal to supplement COMZ deliveries, and that they should pause only when it became necessary to rebuild supply stocks.[7]

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[2] 12 A Gp G-4 AAR for Aug, 6 Sep 44, Opns Rpts AGO; 12 A Gp G-4 Periodic Rpt for 1-6 Aug, SHAEF G-4 400.192 Supply Rpt, I, 44. Another source states that the corresponding levels of POL reserves in First and Third Armies on 5 August were 20.2 and .9 days respectively. Ltr, 12 A Gp to SHAEF, 11 Aug 44, sub: Reserve Supplies Available in Army Areas as of 5 Aug, SHAEF G-4 Maintenance Factors 153/4 GDP-1.

[3] Comd and Stf Conf, COMZ, 6 Aug 44, EUCOM 337/3 Confs, Stf-Weekly, I, 44.

[4] Ltr, COMZ to CG 12 A Gp, 19 Aug 44, sub: Average Daily Tonnages, EUCOM 400 Supplies, Svcs and Equipment, General, 44, IV.

[5] 12 A Gp Adm Instruction 1, 29 Jul 44, SHAEF G-4 322 Twelfth Army Group Adm Inst, I.

[6] Mechanics of Supply in Fast Moving Situations, Gen Bd Rpt 27 (hereafter cited as Mechanics of Supply), p. 19.

[7] FUSA Rpt of Opns, Bk. I, p. 36; 12 A Gp Adm Instruction 13, 27 Aug 44, SHAEF G-4 322 Twelfth Army Group Adm Inst, I.

At the end of August First Army estimated its daily average tonnage requirements as 5,500 tons (including 2,200 tons of POL and 1,100 tons of ammunition); Third Army requested daily maintenance of 6,000 tons (1,411 of POL and 2,545 of ammunition), and in addition requested 12,500 tons of ordnance Class II and IV supplies to complete its authorized T/E allowances and 15,000 tons of ammunition to build up a reserve.[8] The delivery of these tonnages was out of the question at the moment, not for lack of supplies, but because of the limited transportation facilities. In the drive across northern France the Communications Zone gradually despaired of developing the lines of communications at the speed of the armies' advance, and emphasis necessarily shifted more and more to moving the barest essentials forward to using units on a day-to-day basis. The armies had quickly exhausted their meager reserves, and it became impossible to establish stocks in advance depots. Sustained operations became entirely dependent on daily replenishment from the rear. By the end of August 90 to 95 percent of all the supplies on the Continent lay in the base depots in the vicinity of the beaches, and there were virtually no stocks between Normandy and the army dumps 300 miles away.[9]

The precariousness of conducting operations under these conditions was keenly felt at all echelons in both the communications and combat zones, and particularly at the various tactical headquarters. The inability to take advantage of a favorable tactical situation produced an understandable frustration as supply deteriorated in the last days of August, and this helplessness was only heightened by the lack of information as to what actually was being delivered to the forward areas. On 30 August General Bradley and his G–4, General Moses met with General Stratton, the COMZ G–4, to survey the entire situation and to assess prospects for the immediate future. General Stratton estimated that by 2 or 3 September the Communications Zone could deliver 11,400 tons per day to the Chartres area (6,000 tons by truck and 5,400 by rail). After the deduction of minimum requirements for the air forces, the Communications Zone, and civil affairs, the net tonnage available for the armies was expected to be 7,000.[10]

On the basis of these predicted movement capabilities the army group commander made an allocation of this tonnage to the armies. Third Army was to receive a minimum of 2,000 tons per day; the balance up to 5,000 tons was to go to the First Army; anything in excess of 7,000 tons was to be divided equally between the two until First Army's total requirements were met, the remainder going to the Third.[11] General Moses seriously doubted the Communications Zone's ability to place 7,000 tons of useful supplies in the forward areas.[12] He had become thoroughly vexed with the failure of supply and tended to fix the blame for the current crisis on the Communications Zone.[13] Unfortunately his pessimism was at least partly justified, for General Stratton's

[8] Ltr, FUSA to 25th Regulating Station, 27 Aug 44, sub: Maintenance Supplies for Period 29 Aug–7 Sep 44, and Ltr, TUSA to CG 12 A Gp, 28 Aug 44, sub: Estimated Daily Tonnage Requirements, 12 A Gp 400 Supplies, III.

[9] Memo, Hass for G–4 SHAEF, 29 Aug 44, sub: Availability of Supplies in ADSEC, COMZ, SHAEF G–4 Maintenance Factors 153/4 GDP–1; 12 A Gp Rpt of Opns, VI (G–4), 34.

[10] Memo for record, Moses, 30 Aug 44, sub: Conf held by Gen Bradley, 12 A Gp Memos 1944.

[11] Memo for record, Moses, 30 Aug 44; TWX, Bradley to Armies, 31 Aug 44, FUSA 400 Supply.

[12] Memo for record, Moses, 30 Aug 44.

[13] Ltrs, Moses to Col William L. Barriger, Deputy G–4 12 A Gp, 29 and 30 Aug 44, SHAEF 12 A Gp G–4 Memos for Record.

commitments were not immediately within the COMZ capabilities.

The picture of actual accomplishment in these critical weeks is obscure. Poor bookkeeping, lack of standardized reporting, the diversion of supplies, all becloud the record of shipments. Third Army left no record at all of its daily tonnage receipts. In the week of 27 August–2 September, the darkest period of the pursuit, the Advance Section recorded average daily shipments of about 3,700 tons to First Army. The latter indicated deliveries of only 2,225 tons, although it was able to record total daily receipts of about 3,000 tons by employing its own trucks for line-of-communications hauling. On 3 and 4 September, by which time the Communications Zone was committed to the delivery of 5,000 tons per day to the First Army under the army group's recent allocation, the Advance Section was able to lay down an average of only 3,600 tons in the army area. On 5 September the army recorded receipts in excess of 7,000 tons via ADSEC transportation. On that day 12th Army Group altered its allocation, dividing the available tonnage equally between the two armies (3,500 tons each). First Army thus lost the priority which it had temporarily enjoyed. But the record of actual deliveries in the following week is again contradictory. First Army recorded average daily deliveries of 3,700 tons via ADSEC transportation from 3 to 9 September plus 2,640 tons through use of its own transport. The Advance Section indicated daily deliveries averaging 4,500 tons. In any case the volume of movement met the prescribed tonnage allocations. Deliveries to the Third Army, according to the Advance Section, meanwhile averaged only 2,620 tons in this period despite the equality of status it supposedly enjoyed. Deliveries began to improve in the week of 10–16 September when the Advance Section claimed average movements of 5,700 tons to First Army and 3,700 tons to Third.[14]

These figures indicate that in the second week of September the armies for the first time received tonnages approximately in accord with the latest allocations. On 14 September 12th Army Group had once more altered the allocation, continuing the equal sharing of the first 7,000 tons, but favoring First Army with a priority for any additional supplies up to 1,500 tons.[15] But even these tonnages failed to meet the minimum requirements stated by the armies early in September, First Army having requested a minimum of 6,202 tons, and Third Army a minimum of 6,665.[16]

The record of actual shipments is further confused by charges and countercharges, the Communications Zone claiming that it was forwarding the tonnages requested within allocations and the armies insisting as early as 2 September that the Advance Section's shipments were far short of allocated tonnages.[17] Still worse, the armies claimed they were receiving useless items which they had not requisitioned and for which they had no need, and which were therefore wasting precious transportation.[18] Such contradictions and frictions reflected only too well the ex-

[14] FUSA G-4 Periodic Rpts 5-7, 12 A Gp G-4 319.1 G-4 Rpts; ADSEC Operations History, p. 80.

[15] Mechanics of Supply, p. 79.

[16] Ltr, FUSA to 25th Regulating Station, 27 Aug 44, sub: Maintenance Supplies for Period 29 Aug–7 Sep, with atchd requirements for 6–15 Sep, and Memo, Col Muller, TUSA G-4, for 12 A Gp, 4 Sep 44, 12 A Gp Estimate of Daily Maintenance by Div Slice.

[17] Memo, Col Thomas F. Taylor for Col Barriger, 2 Sep 44, SHAEF 12 A Gp G-4 Memos for Record.

[18] Mechanics of Supply, p. 79; FUSA Monthly AAR, Sep 44, p. 60.

asperations and tensions attending supply operations which had been reduced to a hand-to-mouth and catch-as-catch-can basis. In its effort to meet the demands of combat forces over the stretching supply routes the Communications Zone almost from the start of the pursuit was forced to abandon all thought of developing the lines of communications as planned. Under the continued pressure to sustain the momentum of the pursuit supply operations were soon characterized by the unorthodox and the expedient. After several weeks of overexertion and overextension, which were attended by many irregularities in procedure shared in by both the Communications Zone and the armies, the logistic organization inevitably developed weaknesses. Most of them are directly traceable to the forced accommodation to the emergency conditions of the period which prevented the proper organization of the Communications Zone. An examination of some of the more prosaic aspects of logistic organization illustrates the effect which these forced departures from orthodox procedures could have on supply operations.

One of the main elements of an adequate logistic structure is a good depot system. The Communications Zone had recognized this need, providing for the establishment of the principal storage area in the Rennes–Laval–Châteaubriant area, where the theater's main reserve stocks were to be accommodated. Because of limitations in storage space and transportation and because of the need for mobility, the Advance Section was authorized to maintain only a relatively small portion of the total theater reserves in its depots, although balanced as to type and sufficient to meet the daily anticipated needs of the armies. The ADSEC depots were to be replenished either by prearranged shipments or by requisition on the Communications Zone.

The planned depot structure and method of operation were upset from the start. The initial difficulties arose from the lengthy confinement in the restricted Normandy beachhead area, which caused a crowding of installations. These difficulties were unnecessarily compounded by the belated transfer of rear-area installations to the Communications Zone. The First Army persisted in retaining control of the bulk of all supply stocks until the end of July, and even after the breakout claimed possession of dumps no longer in its own area. The Communications Zone consequently had had little time in which to assume control of the base structure, and took over its operations just as it was about to be subjected to the severest stresses and strains. The refusal to turn over the base organization earlier was considered unconscionable by the Communications Zone, and could only be interpreted as a lack of confidence on the part of the field forces, which, as it developed, were themselves the heaviest sufferers from the later logistic difficulties.[19]

The explosive manner in which the lines of communications were suddenly extended in August voided the planned expansion of the depot system. The establishment of a depot system in depth, consisting of properly stocked forward and intermediate depots, became impossible, for the immediate task of delivering daily maintenance supplies quickly absorbed all transportation resources.

These developments had a recurring impact not only on the development of the

[19] Interv with Viney, 24 Feb 50; Ltr, Potter to OCMH, 30 Jun 51; Interv with Lord, 9 Aug 51; Interv with Moses, 13 Aug 51. All in OCMH.

Communications Zone but on the development of the army service areas. The difficulties of the First Army quartermaster service afford a good example. Early in August the army quartermaster turned over the army quartermaster installations in the OMAHA beach maintenance area to the Advance Section and chose a new site for a depot in the planned army service area north of St. Lô. So rapidly did tactical developments change in the succeeding days that the army abandoned all thought of stocking Class I, II, or IV supplies there. It immediately selected the Vire–Villedieu area as the next service area and began to receive supplies there. But the First Army tactical situation changed even more rapidly after mid-August, and the Vire area had to be abandoned almost as soon as it became operational. After briefly considering Alençon as the next service area, the army opened new Class I and III dumps at La Loupe, 100 miles east of Vire, and placed demands on the Advance Section for the movement of 62,000 tons to this area over a ten-day period. This was already beyond the capabilities of COMZ transportation, and the army therefore resorted more and more to using its own truck units in an attempt to make up the deficiency, in addition to carrying out heavy troop movements.

In a matter of days La Loupe was far to the rear. Awaiting the selection of a new service area, the army quartermaster received permission to establish temporary dumps at Arpajon, about sixty miles away. Shipments to this area began in the first days of September, and so urgent was the need for POL that issues from this dump were made on the same day it was opened. But Arpajon, like the other sites, had only a short utility as a service area. Meanwhile the army briefly considered plans for new dumps at Senlis, beyond the Seine, but so rapid was the advance of the VII Corps in the final days of August that a decision was finally made in favor of the La Capelle–Hirson area, 140 miles northeast of Arpajon, and the first installations were opened there on 6 September.

Within a month, therefore, the army service area had leaped approximately 300 miles. By the end of August hope was abandoned of establishing the authorized levels of supply in the service areas, and efforts were concentrated on bringing the daily maintenance needs forward. Once the pursuit began, the army's own cupboard quickly became bare, and by early September the army had corralled every available truck by immobilizing engineer dump truck companies, heavy and light ponton companies, and artillery and antiaircraft units to make the long trips back to the base depots and thus supplement the deliveries being made by the Communications Zone.[20] The opening of a succession of service installations inevitably placed heavy demands on army service troops, which became widely dispersed in the process. By mid-September, for example, the 471st Quartermaster Group was operating an army dump at La Capelle, the remnants of the dump at Soissons, and a railhead twelve miles north of that city at Coucy.[21] As the new dumps were established farther forward, installations in the rear were allowed to exhaust their stocks and then close. In this process the armies frequently left supplies behind which they still considered their own but which were taken over by ADSEC. Some of the discrepancies in the figures of ton-

[20] FUSA Rpt of Opns, 1 Aug 44–22 Feb 45, IV, 45–47, I, 28–29, 37; FUSA Monthly AARs, Aug, pp. 47–50; Sep, 55–56.

[21] FUSA Rpt of Opns, IV, 47.

nages forwarded are probably explained by the confusion in accounting for these stocks.

Third Army's experience was similar. For more than a week after the breakout army and ADSEC trucks picked up supplies near the beaches or in the Cotentin and delivered them directly at forward supply points without laying them down in the army maintenance area. All supplies for the Third Army initially had to be funneled through the narrow and congested Avranches bottleneck, where a single highway had to bear the main burden of supply and troop movements,[22] and where gas- and ration-carrying trucks frequently ran a gantlet of fire from the air until the enemy finally abandoned his attempts to choke off Third Army's lifeline. By the second week the distance from the beaches to Laval (135 miles) and Le Mans (175 miles) had become prohibitive for army transportation, and it was clear that another link was needed in the supply chain. Arrangements were accordingly made with the Advance Section to open a forward transfer point at Laval on 13 August, the intention being that ADSEC transportation would deliver to the transfer point and that army trucks would operate only forward of Laval to the supply points.

A week later the transfer point was moved another 50 miles eastward, to Le Mans, but the new site was already too far to the rear when it opened, since one corps had already crossed the Seine, 100 miles beyond. Third Army meanwhile began negotiations to have the transfer point moved to Fontainebleau, or preferably to the east bank of the Seine. Instead it was established at Ablis, 20 miles east of Chartres, still about 100 miles to the rear of the advancing front. There it remained until 7 September, by which time the army was already operating east of the Moselle, 200 miles away, although the Advance Section had begun to deliver a portion of Third Army's gasoline to a supply point in Fontainebleau forest on 31 August. Army vehicles thus had to cover distances of up to 250 miles just to reach the transfer point, and supply points were almost nonexistent.[23]

The Third Army's supply lines had also extended westward to the extremities of Brittany. Nourishing the fast-moving armored columns in the fluid operations in that area subjected many a truck convoy, both in bivouac and in column, to attacks by detached enemy groups.[24]

The experience of the Communications Zone closely paralleled that of the armies. Following First Army, the Advance Section had planned to establish a maintenance area in the Vire–Villedieu area. This area was soon too far to the rear to be of much value, and it was utilized only for small quantities of ammunition and quartermaster supplies. The Advance Section next chose Le Mans as a forward depot area. This area was also out of reach within a short time and was used only temporarily by the ordnance, engineer, and quartermaster services. An attempt was then made to develop a maintenance area in the vicinity of Chartres, where considerable quantities of supplies of all classes were stored in the open, and further attempts were made to establish installations at Soissons, Sommesous, and Reims. But

[22] Col. T. H. Nixon, "Across the Beachheads," *Army Ordnance,* XXVIII (May–June, 1945), 398.

[23] Col. Everett Busch, "Quartermaster Supply of Third Army," *The Quartermaster Review,* XXVI (November–December, 1946), 71–72.

[24] Jnl, 3803d QM Truck Co, 31 Jan–31 Dec 44, QMCO-3803-0.3 (12718) Opns Rpts.

the constant pressure on transportation precluded the establishment of stocks in the forward areas, and during the worst period of the pursuit the advance depots served primarily as distributing points for the ADSEC, Ninth Air Force, and 12th Army Group units.[25]

The inability to organize a depot system properly and to establish reserve stocks forward had its repercussions on the entire mechanics of supply. The basic supply procedures for operations on the Continent had been outlined in theater Standing Operating Procedure 7.[26] This document had provided that, after an army rear boundary had been established, the Advance Section was initially to receive requests and arrange for the supply of the armies, issuing supplies from designated depots within its own area so far as possible and extracting the unfilled items to the base section designated to support it. Shortly thereafter the Advance Section was to establish regulating stations as the principal links with the armies, and these were to process the armies' requests and arrange for the flow of supplies.

Up to the time the armies reached the Seine the requisitioning process developed approximately as contemplated. But the sudden extension of the lines of communications in August had made it impossible to move forward all the supplies requisitioned or to establish planned reserves in the Advance Section. The Advance Section met the armies' requests for Class I and III supplies as far as possible from its own depots. Since the great bulk of all stocks on the Continent was still in the Normandy depots, other items on the requisitions had to be extracted to Headquarters, Communications Zone, and filled from rear depots if available at all. Under these circumstances the procedure prescribed in SOP 7 became impracticable.

In an effort to relieve the critical supply situation in the forward areas, the long-distance, through-highway system known as "Red Ball" was inaugurated late in August with a large number of truck companies organized to move supplies from the Normandy depots to the forward maintenance areas.[27] This necessitated certain modifications in the supply procedures of SOP 7. Requisitions continued to be submitted through the regulating stations but usually bypassed the Advance Section when the requested supplies were known to be unavailable there. Instead, they were processed directly to Headquarters, Communications Zone, which in turn ordered the items released from the base depots. In such cases the supplies were forwarded directly from the rear depots through the regulating stations to the armies.[28]

Under the system of tonnage allocations instituted by 12th Army Group the supply services of each army (and other commands such as the Ninth Air Force) made daily bids for a portion of the available lift, the actual allocation within each command being made by the G–4. The approved requisitions were then submitted to the Advance Section's regulating stations, which arranged for the shipment of items available in ADSEC depots, and extracted those items not available in the forward areas to the Communications Zone for ap-

[25] ADSEC Operations History, pp. 74–75; Mechanics of Supply, pp. 34–35.

[26] ETO SOP 7, Supply Procedures on the Continent (Revised), 7 Jun 44.

[27] The operations of the Red Ball Express are described below, Ch. XIV, Sec. 2.

[28] Mechanics of Supply, pp. 66–67; ADSEC G–4 Periodic Rpt for quarter ending 30 Sep 44, ADSEC 319.1.

propriate action. Supplies furnished from ADSEC stocks were subtracted from the requisition and the weight of these supplies charged against the day's tonnage allocation.[29]

Because of the scarcity of transportation this system required the closest kind of co-ordination, and after it had been in operation for a time refinements were necessary. The army G–4, for example, did not always check the weight of requisitioned items against tonnage allocations, with the result that many items could not be shipped because the total weight of the consolidated requisitions exceeded the allocation for the day. Later in September the army G–4's were required to accompany their requisitions with a detailed breakdown of the tonnage by service.[30]

One vital agency of the logistic structure whose functions were affected by the critical developments of August was the regulating station. The regulating station was essentially a traffic control agency, organized for the purpose of insuring orderly and systematic movements into and out of the combat zone. It was not intended to act as a supply depot, to maintain any immobile reserves, or to make any transfer of supplies except for mail and a few small articles. As the nerve center for all traffic into and out of the combat zone, however, it was intended to perform an important function in the supply organization of the theater.

The regulating officer in command of the station was, by Field Service Regulations,[31] the direct representative of the theater commander. As such he was expected to control all rail movements forward of advance depots of the Communications Zone; to establish and enforce all traffic priorities; and to designate the location of railheads and truckheads in the combat zone. To do his job he had to be fully advised at all times of changes in the status of supplies, in the location of units and installations, and in military plans, and he had to receive full information on the allocation of credits in COMZ depots, priorities for supply, the status of rail equipment, the availability of rolling stock, and so on. With the aid of a small staff, including a representative of each supply service, the regulating officer consolidated all requests for transportation and finally made the necessary arrangements for shipments of supplies and replacements forward and for evacuation to the rear.[32]

During the planning of OVERLORD there had been divided opinion, first as to whether to employ regulating stations at all on the Continent, and then as to what headquarters would exercise command over them. The theater had finally decided to use regulating stations, but it made a major departure from Field Service Regulations, which specified that the stations be agencies of the theater commander, by assigning them to the Communications Zone.[33] The theater SOP's on supply procedure on the Continent provided that regulating stations were to be agencies of the Advance Section and that they were to be established at the earliest practicable date.[34] Beyond this the organization and function of the regulating stations were to conform in general to Field Service Regulations. They were to be established close to the army rear boundary, and the regulating officers were to

[29] ADSEC Operations History, p. 76.
[30] Mechanics of Supply, p. 67.
[31] FM 100–10, FSR (Administration).
[32] *Ibid.*, pars. 85–96.
[33] Mechanics of Supply, pp. 46–47.
[34] SOP 7.

receive and process all requests submitted by the combat forces and to control the movement to and from the combat zone. The ADSEC plan assigned responsibility for the establishment of the stations to the Transportation Corps.[35]

During June and July, when First Army was the only U.S. army on the Continent and in effect controlled all resources in the lodgment through its control of the Advance Section, there was no need for a regulating station, and none was established. When the Advance Section was finally detached from First Army, and a second army was introduced, two stations were placed in operation by the Advance Section, the 24th Regulating Station in support of the Third Army and the 25th in support of the First. Both organizations followed the policy of operating from the most logical traffic control centers in closest proximity to the army headquarters which they supported. In a deviation from Field Service Regulations, however, the regulating officers were designated as the direct representatives of the Advance Section with the armies and operated from the office of the G–4 section of the respective armies.

The Advance Section of necessity had a much closer working relationship with the armies than any of the other COMZ sections or the COMZ headquarters itself. It not only was the immediate supplier or "jobber" to the armies. It also determined the initial development of the communications zone and performed other tasks incidental to supply such as planning the extension of the railways, pipelines, and signal communications and the location of future service areas. For obvious reasons the Advance Section had to keep itself informed on the armies' future plans and therefore established an intimate liaison with the combat commands. The regulating officers thus performed an important function in co-ordinating the logistic activities of the Advance Section and the armies and provided the vitally important link between the combat and communications zones.

Although the 24th and 25th Regulating Stations had been activated several months before, they had received little or no technical training in the United Kingdom until early in July and crossed to the Continent just before the breakout operation was launched. Consequently they received little indoctrination in ADSEC procedures before they became active and had only the vaguest notion as to how they should function.[36] Even the "book" concept of their role went out the window when they were faced with the tactical conditions of August. Their mission and method of operation as laid down in Field Service Regulations were based largely on experience in World War I, in which operations were largely static and in which rail transportation was the principal means of shipment to and from the combat zone.[37] But rail traffic was virtually nonexistent in the forward areas in August 1944, and the main problem in connection with motor traffic was one of expediting rather than regulating. In the highly fluid situation of late August, when communications were bad and shipments were poorly documented, the armies above all needed information as to what they could expect in

[35] *Ibid.*; Mechanics of Supply, p. 47.

[36] Historical Report, 25th Regulating Station, pp. 5–7, ETO Adm 586; Rpt, Col G. S. Speidel, Regulating Officer, to CO 24th Regulating Station, 22 Jun 45, sub: Opns of 24th Regulating Station During Period 1 Aug 44–22 Jun 45, ETO Adm 585; Ltr, Col Speidel to Hist Div, 17 Apr 50, OCMH.

[37] Interv with Plank, 28 Jul 50, OCMH; Ltr, Col Potter to OCMH, 30 Jun 51.

the way of supplies, and turned to the regulating stations to get it. The regulating stations helped meet the emergency needs in a variety of ways. They sent personnel to railheads, truckheads, and airheads, and established traffic control detachments at strategic points of diversion. These detachments served a useful function by furnishing information on routes to convoy commanders and to drivers of straggler vehicles, and by maintaining information on the location of supply depots. They reconnoitered supply routes, furnished guides for the convoys, and inaugurated a courier system to overcome the inadequacy of signal communications. On administrative orders from ADSEC and frequently on verbal orders from the army G–4's they also diverted supplies from one point to another. After the inauguration of the Red Ball Express the ADSEC G–4 established a control group at the diversion point—initially Chartres, then Dreux, and later Versailles—where convoys were separated and dispatched to the proper army. In the rapidly stretching lines of communications in this period road discipline was poor and many convoys arrived at the diversion point without destination instructions or proper documentation. At this point the convoys were stopped and destination instructions reviewed, and by the use of check lists the ADSEC control group attempted to maintain the proper allocation of supplies. In this way the regulating stations aided materially in expediting the movement of supplies and attempted to keep the armies at least partially informed as to what they might expect to receive. Despite these efforts, many shipments arrived at their destination so poorly documented that it was almost impossible to connect deliveries with requisitions,[38] and the armies frequently received supplies they had neither requested nor needed.

Impatient with the confusions and uncertainties which attended the tumultuous events of these days, the armies frequently took matters into their own hands and "hijacked" convoys far from their destinations, and in many cases "diverted" COMZ truck companies to their own use in the army areas.[39] The Third Army was particularly notorious for the latter practice.

By hook or crook, therefore, a flow of the bare essentials, however inadequate and unpredictable, was maintained to the armies. By the end of August, however, the armies were being kept in motion by deliveries of only limited amounts of those essentials, such as fuel, rations, and ammunition. In the first days of September the maintenance of combat elements at scales required to permit a continuation of the aggressive pursuit became impossible. Whether the armies might have maintained the speed of their advance if adequate supplies (particularly gasoline) had been available is another question and will be considered later. In any event, the time was fast approaching when the combat forces would require more normal maintenance and the repair or replacement of their rapidly deteriorating equipment.

(2) Gasoline—"The Red Blood of War"

Until the Allied armies crossed the Seine supply shortages had not become

[38] Mechanics of Supply, pp. 49–50, 89–90; History of the 25th Regulating Station, and Report of Operations of the 24th Regulating Station.

[39] Memo, Barriger for Moses, 3 Aug 44, sub: Support of Future Opns, 12 A Gp G–4 Ltrs, Memos Assorted 1944; Intervs with Plank, 28 Jul 50, Viney, 24 Feb 50, and Lt Col Loren A. Ayers, 16 Aug 50, OCMH; Ltr, Col Robert C. Tripp to OCMH, 3 Jul 51.

serious enough to restrict their operations. But the cumulative effect of the various logistic difficulties created by the pursuit eventually began to be felt in the last days of August as the armies attempted to continue their rapid advance beyond the OVERLORD lodgment area. While shortages developed in nearly all categories, the first to reach critical proportions in the sense of threatening the success of tactical operations was the shortage of gasoline, a commodity which now dramatically demonstrated its claim to the role so aptly described by the French as *"le sang rouge de guerre."*

Contrary to plan, all POL requirements until the time of the breakout were met either by packaged deliveries or by the bulk system based on Port-en-Bessin and Ste. Honorine-des-Pertes. Construction and rehabilitation of the Cherbourg area were supposed to have progressed sufficiently to permit bulk reception by the Major System by D plus 18, and plans had called for the completion of at least one 6-inch pipeline to La Haye-du-Puits and several tanks at that location by D plus 21. But this schedule, like others, was voided by the delay in the capture of Cherbourg, and the construction of intake and storage facilities at the port had not even begun on D plus 21.

Cherbourg was captured on D plus 21, and ADSEC officers began reconnaissance of the area on the same day to determine the condition of existing facilities. It was known that considerable French commercial and naval facilities existed in the area, but it had been assumed that they would be destroyed, and that any storage captured in a usable condition would be a bonus. The Allies were happily surprised, therefore, to find that existing facilities were far from completely demolished. The survey eventually revealed storage capacity for nearly 500,000 barrels—far above the amount planned for the Cherbourg area—which could easily be rehabilitated and used.[40] In a struggle in which victory was determined largely by overwhelming material supremacy the capture of Cherbourg's storage facilities essentially intact, like the later capture of Antwerp, was a fortune of war which, though less dramatic, might well be ranked with the seizure of the Remagen bridge.

Much of the captured storage consisted of underground tanks grouped in three main tank farms about a mile west of the city of Cherbourg and directly south of the Digue de Querqueville. Many of the tanks had been used for diesel and other types of oils and had to be scoured and flushed before they could be used for gasoline. But this task entailed only a fraction of the work expected to be necessary, and the use of existing facilities therefore meant a tremendous saving in both labor and materials—resources which could be used in port reconstruction. The only storage construction initially contemplated was a single 10,000-barrel balance tank.[41]

The major construction task involved in the Cherbourg POL installation was the laying of the many connecting lines between the tank farms and the laying of intake lines from the Digue de Querqueville. Most of the supplies and equipment for these projects were brought in via UTAH Beach and the minor Cotentin ports and sent to a special POL supply dump on the western edge of Cherbourg. The supplies were generally ample, except for certain

[40] Cbl E-37496, Lee to ANPB, 13 Jul 44, SHAEF G-4 463.7 Gas and Motor Oil; Hist Rpt 13 of the Corps of Engrs ETO, p. 73, states that existing storage exceeded 635,000 barrels.

[41] Hist Rpt 13, Corps of Engrs ETO, pp. 70–73.



THE FIRST POL TANKER *alongside the Digue de Querqueville, Cherbourg, 25 July 1944.*

fittings, and shortages were met either by improvisation or by special airlift from the United Kingdom. Approximately thirty-eight miles of pipe were laid in the area, and one 12-inch and ten, rather than six, 6-inch unloading lines were laid from the tanker berth to storage.[42]

The provision of tanker docking facilities proved far more onerous and time consuming than the onshore construction projects, for the outer harbor was heavily mined and the planned berths were obstructed by many sunken vessels. The demining of the harbor waters and the removal of obstacles were perilous tasks and accounted for most of the prolonged delay in bringing the Major System into operation. Navy units eventually cleared the area sufficiently to permit the first POL tanker to dock alongside the Digue de Querqueville on 25 July, exactly four weeks after the fall of the port.[43]

Meanwhile the construction of the pipelines inland had also begun. By mid-July one 6-inch line had been completed to La Haye-du-Puits, twenty-nine miles to the south, and two storage tanks with a capacity of 15,000 barrels had also been constructed there. But on 25 July, the date on which Operation COBRA was launched, the bulk distribution system in operation on the Continent was still limited to the Minor System.[44] At that time the import of POL on the Continent consequently

[42] Final Report of the Chief Engineer, ETO, 1942-45, I, 311, OCMH.

[43] Hist Rpt 13, Corps of Engrs ETO, pp. 77–80.

[44] Ltr, Col C. G. Irish, Area Petroleum Ln Officer FECOMZ, to Col Barnes, Chief Petroleum Officer ETO, 25 Jul 44, sub: Rpt 2, ETO 463, POL 44.

lagged considerably behind planned receipts. By D plus 41 daily receipts were planned to average 7,350 tons (4,663 of which were to consist of MT80 gasoline) and a cumulative total of 216,000 tons of POL was to have been delivered on the far shore, about 180,000 tons of the total consisting of MT80.[45] On that date, however, daily receipts were averaging only 4,100 tons owing to the delay in bringing the Major System into operation. More than half the POL tonnage was still arriving in packaged form via the beaches. A fairly large and steady flow of packaged POL had been provided to meet all POL requirements in the first three weeks and later to build up the continental can population. This flow had been maintained approximately as planned. In mid-July an average of 2,600 tons of packaged products was being shipped to the far shore each day, and a cumulative total of 142,702 compared with a planned 147,703 tons had been dispatched to the Continent.[46] The Minor System, meanwhile, had by this time almost doubled its planned output, but its performance could not begin to compensate for the large tonnages that had been expected to be imported through Cherbourg.

The Major System was to have begun receiving bulk gasoline on D plus 18 at the rate of about 3,400 tons per day, and by D plus 41 was expected to average about 4,000 tons. By D plus 41 (17 July) the Cherbourg installation was to have received a cumulative total of more than 85,000 tons of MT80 gasoline in bulk and more than 100,000 tons of POL products in all.[47] But on that date it had yet to receive its first gallon of bulk POL.

The Major System finally began operating in the last days of July—almost six weeks later than scheduled. Despite the long delay and the loss of thousands of tons of intake capacity during this period the level of POL stocks was actually almost exactly as projected, and the supply of POL consequently was no cause for concern on the eve of the breakout. It had been planned that ten days reserve stock of POL would be built up on the Continent by D plus 41 based on an operational day of fifty miles for all vehicles. On this basis the stocks in mid-July already represented a reserve of eleven days. But daily consumption had actually been equivalent to about thirteen miles per day rather than the maximum fifty-mile planning factor, so that existing stocks represented far more than the eleven days' supply unless suddenly accelerated operations actually led to a much higher rate of consumption.[48] First Army's consumption of gasoline had been low in June, totaling less than 3,700,000 gallons, and averaging about 148,000 per day, or approximately 55 tons per division slice. In July, with the employment of larger forces, the total consumption rose to 11,500,000 gallons, averaging about 372,000 gallons per day, or 75 tons per division slice.[49] But this was still considerably below the consumption factor of 121 tons accepted for planning purposes before D Day.[50] Fortunately the low rate of consumption in these early weeks

[45] Communications Zone Plan, issued by Hq FECOMZ, 14 May 44, App. P, ETO Adm 376.

[46] ETO Progress Rpt CVI, 31 Jul 44, Statistical Sec, SGS ETO, ETO Adm 430.

[47] Memo, 21 A Gp for SHAEF G-4, 22 May 44.

[48] Ltr, Col Irish to Barnes, 20 Jul 44, sub: Rpt 1 POL Stock Positions on Continent, ETO 463 POL 44.

[49] FUSA Rpt of Opns, Annex 14, App. 15, VI, 224-25.

[50] POL plans for OVERLORD had been made on the basis of 214 tons per day per division slice of 40,000 men and 7,500 vehicles. Just before D Day this factor was changed to 153 tons, of which 79.08 percent, or 121 tons, was allotted for MT80 gasoline.

TABLE 10—GASOLINE SUPPLY OF FIRST AND THIRD ARMIES: 30 JULY–16 SEPTEMBER 1944

(Number of Gallons)

Week Ended	First Army				
	Daily Average Receipts	Daily Issues	Daily Consumption	Balance on Hand [a]	Days of Supply
5 August	[b]	[b]	429,039	[b]	10.5
12 August	[b]	274,000	292,458	4,055,930	4.4
19 August	[b]	338,000	337,000	3,486,600	3.9
26 August	[c] 454,300	453,000	501,500	253,320	0.7
2 September	[c] 546,400	436,000	485,190	206,340	0.3
9 September	[c] 540,000	370,000	530,218	[d] 350,255	0.0
16 September	[c] 475,600	498,000	[b]	[b]	0.0

Week Ended	Third Army				
	Daily Average Receipts	Daily Issues	Daily Consumption	Balance on Hand [a]	Days of Supply
5 August	121,500	105,000	[b]	515,415	1.3
12 August	396,800	313,000	[b]	846,600	1.0
19 August	367,900	360,000	[b]	193,260	0.3
26 August	285,700	[b]	350,000	[b]	0.6
2 September	200,100	[b]	202,382	[b]	[e]
9 September	423,300	333,173	[b]	[b]	1.1
16 September	[f] 428,600	464,800	[b]	[b]	0.7

[a] At end of period.
[b] Data not available.
[c] Based on assumption that 85 percent of total gasoline received was motor vehicle gas and resultant tonnage converted at 368 gallons per ton.
[d] Stored in First Army depot, but not available for issue because of distance to rear.
[e] Less than 0.1.
[f] Figure for 10–16 September based on tonnage received converted to gallons.

Source: FUSA receipts from FUSA AARs. TUSA receipts, through 19 Aug, from TUSA G–4 Periodic Rpts; 20 Aug–2 Sep receipts from TUSA AAR, II, QM, 4–6, and in part estimated; 3–9 Sep receipts from Summaries of Activities, G–4 Periodic Rpts; 10–16 Sep figures based on tonnages received, converted to gallons. FUSA issues from FUSA G–4 Periodic Rpts, 12 A Gp 319.1 G–4 Rpts. FUSA consumption figures from FUSA Rpt of Opns, 1 Aug 44–22 Feb 45, IV, 86–87. TUSA figures on daily issues and consumption from TUSA G–4 Periodic Rpts, 12 A Gp 319.1 G–4 Rpts. Balance on hand and days of supply from army G–4 periodic rpts. Army group reports indicate higher levels of Class III in the armies.

tended to cancel out the deficiency in planned receipts at Cherbourg. Stock levels were quite satisfactory and were believed sufficient for whatever contingencies might arise.[51] Furthermore, the Major System, with its pipeline to La Haye-du-Puits, was destined to begin operations within a few days.

The supply of gasoline was entirely adequate for a full month after the launching of COBRA on 25 July, and at no time in the next four weeks did the lack of fuel threaten to hamper operations. This is not to say that there were no difficulties in the supply of this vital commodity. Third Army was forced to operate with the most meager reserves from the very start of its commitment on 1 August and was almost wholly dependent on uninterrupted daily deliveries. It had planned to hold 1,500,000 gallons of gasoline as a reserve for emergency use. Instead it immediately plunged into a highly mobile type of warfare and quickly exhausted its small reserve.[52] On 5 August Third Army had only 515,400 gallons of motor fuel on hand, representing 1.3 days of supply. First Army, although it had at last drawn a rear boundary and relinquished control of the Advance Section, at that time still controlled a reserve of 10.5 days,[53] a fact which caused some bitterness. *(Table 10)*

Despite the hand-to-mouth character of supply, however, the Third Army did not actually suffer any want of fuel for its fast-moving vehicles. For two weeks—from 6 to 19 August—Third Army, operating at greater distances and setting a faster pace than the First Army, got the larger share of the gasoline brought forward, its receipts averaging 382,343 gallons per day as compared with First Army's 286,337, and its issues (and presumably consumption) 336,500 gallons as against First Army's 306,000. In this period the great disparity between the levels of supply in the two armies was partially eliminated. By arrangement with the Advance Section, First Army's excess stocks were gradually reduced and on 19 August stood at 3.9 days of supply.[54] This was undoubtedly a conservative estimate, however, for First Army's balance on hand on that date still totaled almost 3,500,000 gallons.[55] Third Army's on-hand balance had reached a low of less than 200,000 gallons, and was estimated to equal .28 day of supply.[56] But by mid-August the Third Army had become accustomed to operating on a slim margin, and the critical state of its fuel stocks evoked no expression of alarm as long as requirements continued to be met from day to day. Thus far the 12th Army Group G-4 weekly periodic reports had consistently included the reassuring statement: "There are no critical shortages which will affect operations."

The week of 20–26 August, which for the first time saw most of the elements of both armies simultaneously in pursuit and included the crossings of the Seine, brought the highest daily consumption of motor fuel to date—well over 800,000 gallons per day.[57] On 24 August the First Army alone

[51] Ltr, Irish to Barnes, 20 Jul 44.

[52] TUSA AAR, II, QM, 4.

[53] 12 A Gp G-4 Periodic Rpt 1 (1–6 Aug 44), 8 Aug 44, 12 A Gp 319.1 G-4 Rpts, I.

[54] 12 A Gp G-4 Periodic Rpt 3 (13–19 Aug 44), 21 Aug 44.

[55] FUSAG G-4 Periodic Rpt 3 (13–19 Aug 44), 21 Aug 44.

[56] TUSA G-4 Periodic Rpt 3 (13–19 Aug 44), 21 Aug 44.

[57] According to army G-4 periodic reports, FUSA's figures on issues and consumption are at variance, its G-4 Periodic Report 4 indicating a daily average issue of 453,000 gallons, and its Report of Operations (Bk. IV, pp. 86–87) recording an average daily consumption of 501,500 gallons.

burned up 782,000 gallons (2,125 tons) of gasoline.[58] By comparison, consumption of gasoline by U.S. combat forces in the Meuse–Argonne battle in October 1918 had reached the "enormous figure" of 150,000 gallons per day.[59] While the lengthening of the supply routes made deliveries more and more difficult, there was as yet no indication that the supply of gasoline was failing to meet needs. On 27 August General Lee, in discussing the theater's POL situation at a staff and command conference, could state with understandable pride, "I think it is fair to report that at no time in the fiighting on the Far Shore has there been a shortage." [60]

This claim, while warranted at the moment, could not have been made twenty-four hours later, at least so far as supply of front-line units was concerned. By 28 August the transportation resources of the Communications Zone were spread so thin and the lines of communications were so extended that daily deliveries could no longer be relied upon with certainty. First Army now reported that the Class III supply situation was critical,[61] and Third Army indicated that POL was no longer being received in sufficient quantities to maintain adequate operating stocks in the Class III supply points.[62] Both armies had reported less than one day's supply on hand on 26 August, and in the following week the level fell to .31 day in First Army and .007 in the Third.[63] On 28 August the Third Army reported a deficiency of 97,510 gallons against its daily telegram requesting 450,000 gallons. In the succeeding days these deficits grew worse. On the 29th deliveries to the Third Army were short by 141,520 gallons of the 325,000 gallons requisitioned, and in the next critical week deliveries dropped to token size, totaling a mere 31,975, 25,390, and 49,930 gallons on 30 August and 2 and 3 September respectively.[64]

Meanwhile the Third Army instituted a conservation program and began to ration fuel. On the 30th it notified the XV Corps that there was no gas available for issue, and held out no hopes for the following day.[65] The XII Corps alleviated its shortage to some extent by the fortuitous capture of about 115,000 gallons of enemy gasoline in the region of Châlons on 29 and 30 August,[66] and the army as a whole utilized a total of nearly 500,000 gallons of captured fuel.[67] The Third Army even resorted to commandeering the extra gasoline which Red Ball trucks carried for their return trips to the base areas. As a result of this shortsighted practice some convoys were stranded and available transportation facilities were consequently reduced.[68] It is hardly surprising that the Communications Zone, which was already losing entire truck companies through "diversions," became wary of sending its truck units into the army area.

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[58] FUSA Rpt of Opns, 20 Oct 43–1 Aug 44, Bk. IV, pp. 86–87; The FUSA G-4 Periodic Report for this period (No. 4) records that 898,050 gallons of MT80 were issued on that date.

[59] *Report of the Military Board of Allied Supply* (Washington, 1924), I, 220.

[60] Stf and Comd Conf Notes, COMZ Rear, 27 Aug 44, EUCOM 337/3 Confs, Stf-Weekly, I.

[61] FUSA G-4 Periodic Rpt 4, 30 Aug 44.

[62] TUSA G-4 Periodic Rpt 4, 29 Aug 44.

[63] FUSAG G-4 Periodic Rpt 5 (27 Aug–2 Sep), 6 Sep 44; TUSA G-4 Periodic Rpt 5 (27 Aug–2 Sep), 5 Sep 44.

[64] TUSA AAR, II, QM, 4, 6.

[65] TUSA G-4 Periodic Rpts 5 and 6, with daily summaries of activities.

[66] XII Corps AAR, Sep 44, Sec. III, as cited in Royce L. Thompson, ETO Field Commands Gasoline Status, August–September 1944, p. 65, OCMH.

[67] TUSA AAR, II, QM, 6.

[68] Ltr, Hq ETO to CG TUSA, 15 Sep 44, sub: Commandeering of Gasoline Supplies, 12 A Gp 463.7 Gasoline and Motor Oil, I.



GENERAL MULLER, *Third Army G–4. (Photograph taken in 1946.)*

In the seven lean days from 29 August to 4 September there was a rising chorus of appeals from combat units, many of them expressing anxiety over the extent to which the fuel famine was hampering operations. In some areas motorized reconnaissance continued only by the expedient of draining the tanks of other vehicles. As the situation worsened in the last days of August army trucks had to make longer and longer trips to the rear, for while it had been the policy to keep supply points as far forward as possible, the Third Army G–4, Col. Walter J. Muller, on 31 August ordered a delay in their displacement in order to give the Communications Zone an opportunity to improve its position.[69]

In the area of the First Army the experience was similar, the shortages of gasoline eventually influencing the tempo of operations. Reversing the situation west of the Seine, where Third Army had made the wider and longer sweep on the outer edges of a huge envelopment while the First Army advanced on a shorter inside arc, the First now found itself tracking the longer routes in the turning toward the German border. In the first days of September notice after notice reading "no gasoline" went up in the war room tents of tactical headquarters, as unit after unit reported the critical state of its fuel supply. With the freezing of truckheads divisional motor convoys were forced to return as far as La Loupe, 250 miles to the rear, to pick up supplies.[70] Early in September the First Army quartermaster instituted reconnaissance flights by cub planes to scout for forward-moving gasoline trains,[71] and at least one division, the 5th Armored, admitted resorting to hijacking gasoline, a practice of which other units were also guilty.[72]

The acute shortage of gasoline in the First Army had developed despite the fact that that organization had consistently held a more advantageous position than Third Army's with regard to POL supply. In the last ten days of August the First Army managed to get the lion's share of the available gasoline, partly because it possessed more truck transportation than the Third Army, and partly because it was

[69] Memo, Muller for G–4s XII and XX Corps, 31 Aug 44, as cited in Thompson, ETO Field Commands Gasoline Status, p. 79. Other references to the effect of the shortage on combat units are also from this survey of the operational records of the field units, pp. 79–80, 93.

[70] S–4 Jnl and AAR, Combat Comd Reserve, 5th Armd Div, Sep 44, and V Corps QM AAR, Sep 44, as cited in Thompson study, pp. 86 and 53.

[71] FUSA Rpt of Opns, 1 Aug 44–22 Feb 45, I, 46.

[72] S–4 Jnl and AAR, CCR, 5th Armd Div, 5 Sep 44, as cited in Thompson study, p. 86.



BRIG. GEN. R. W. WILSON, *First Army G–4. (Photograph taken in 1945.)*

accorded a general priority in initial reserves and maintenance for the northeastward drive beyond the Seine,[73] an advantage which it continued to enjoy for a short time after tonnage allocations were instituted at the end of the month. From 20 to 26 August the First Army consumed an average of 501,500 gallons of gasoline per day as compared with Third Army's 350,000.[74] Strangely enough, however, Third Army at that time was asking for only 250,000 gallons per day in its daily telegram requests despite a considerably higher consumption rate, indicating that its unfavorable position was in part self-imposed.[75]

The disparity in consumption between the two armies continued in the more critical period which followed, First Army burning an average of 485,190 gallons per day and Third Army 202,382 gallons.[76]

While the reliability of all POL statistics for this period is highly suspect, these figures would indicate that the First Army was considerably better off in the matter of Class III supply. But its needs were greater, for it was consistently the larger of the two organizations operating east of the Seine and, contrary to popular impression, possessed a substantial preponderance over the Third Army in all types of armored units, including armored divisions, separate tank battalions, and mechanized cavalry, in the critical days at the end of August and the beginning of September. In armored divisions alone in this period the First Army's preponderance was two to one, for it employed four divisions in the pursuit as compared with Third Army's two.[77]

The disparity in armored strength between the two armies was even greater than is indicated by this comparison, since two of the First Army's armored divi-

[73] 12 A Gp Adm Instructions 13, 27 Aug 44, SHAEF G–4 322 Twelfth Army Group Adm Instr, I.

[74] First Army's consumption figures exceed the issues. Comparative issue figures for the two armies are not available.

[75] Compare daily telegram requests, as given in TUSA AAR, II, QM, 4, with daily consumption as reported in G–4 periodic reports. This strange phenomenon appears to have been borne out on a larger theater-wide scale. On 2 September an officer in the Area Petroleum Office, ETO, pointed out that forward demands for gasoline on the far shore totaled only 1,358,238 gallons of MT80 per day for the period 16 August–4 September, while the average issues in the period 21–23 August and on 28 August were at the rate of 2,030,364 gallons per day, indicating that using organizations simply were not requisitioning enough gasoline. Memo, Lt Col H. C. Ferrell for G–4 POL, 2 Sep 44, sub: Forward Demands Far Shore—MT80, USFET 200.42B Capacity for Bulk POL on Continent.

[76] FUSA figures from Rpt of Opns, IV, 87; TUSA figures from G–4 Periodic Rpt 5.

[77] Third Army possessed an additional armored division, but it was occupied with operations in Brittany under the VIII Corps.

sions—the 2d and 3d—were organized on the basis of the older T/O&E and contained a substantially larger number of combat vehicles than the more recently activated units.

The shortage of gasoline in front-line units resulted less from any breakdown in supply than from the inability to meet ever-mounting demands. Deliveries to the forward areas actually did not fall off precipitately in the crucial weeks. Whereas the Third Army's consumption had declined from 397,000 gallons per day in the week of 6–12 August to 200,120 gallons in the week of 27 August–2 September, First Army's receipts had correspondingly risen from 234,760 to 434,857 gallons per day (or rather 485,200 as indicated by consumption figures). Deliveries had increased steadily each week through most of August, permitting daily consumption to rise from about 605,000 gallons in the second week to 851,500 gallons in the fourth. Deliveries had indeed fallen off somewhat in the crucial week bridging August and September, but they were still large enough to permit the consumption of about 688,000 gallons per day, approximately the daily consumption of mid-August.

The fact was that the momentum of the pursuit could no longer be maintained with the amounts of fuel which the armies had received in mid-August. The reason was not that the daily advances by the combat elements were greater than before, nor that a larger number of divisions were employed. As a matter of fact, only sixteen divisions were operational in the two armies on 12 September as compared with twenty-one in mid-August, the VIII Corps having been detached from the Third Army and placed under the control of the Ninth Army in Brittany. The constantly accelerating demand for gasoline must be explained rather by the round-the-clock hauling operations of not only the regular QM truck units but the many provisional organizations formed with the vehicles of artillery, engineer, and other types of units, and by the tremendous increase in mileage involved in lateral communications behind the greatly expanded army fronts. Not only had the lines of communications been extended several hundred miles, but the armies had fanned out as they advanced beyond the Seine, widening the army group front from less than 100 miles in mid-August to 200 miles in mid-September. The inevitable result was to add to the already heavy burden on transportation.

The armies had developed an insatiable thirst for gasoline and had demanded an ever-rising scale of deliveries. The First Army had raised its demands early, estimating its requirements at 567,000 gallons per day beginning on 15 August.[78] After the institution of tonnage allocations its bid for upwards of 2,000 tons per day of Class III supplies constituted more than 60 percnt of its total tonnage allocation.[79] Third Army's daily telegram requests remained at 250,000 gallons per day until 26 August, when they were almost doubled.[80] These soaring demands were beyond the capabilities of the Communications Zone, and could not be met even by the use of army transport. Nevertheless, sizable quantities of gasoline were moved forward even in the most crucial week. Meanwhile consumption of gasoline in the rear areas had also risen as a consequence

[78] Ltr, ADSEC to CG COMZ, 11 Aug 44, sub: Estimate of POL Requirements, ADSEC 463.7 Gasoline and Motor Oil.

[79] FUSA AAR, Sep 44, Sec. 4, Exhibit I (Daily Tonnage Bids).

[80] TUSA AAR, II, QM, 4, 6.

of round-the-clock use of all available transportation. Daily requirements for the refueling of Red Ball trucks alone were estimated at more than 300,000 gallons.[81]

At no time during the period of the pursuit was the gasoline shortage attributable to inadequate stocks on the Continent. Despite the long delay in bringing the Major System into operation, approximately eleven days of supply of POL based on a fifty-mile day had been built up by mid-July. At the end of the first week in August a stock of 25,851,000 gallons of gasoline was held in Normandy, representing fourteen days' supply at the current rate of issue of 1,809,000 gallons per day and based on the current troop strength.[82] Two weeks later, on 19 August, continental holdings had actually risen to 27,000,000 gallons of MT80, which was now equivalent to between eleven and twelve days of supply.[83]

That continental reserves of POL finally did shrink in the fourth week of August was not immediately attributed to greatly increased consumption. The Chief Petroleum Officer, Col. Elmer E. Barnes, thought at first that the "apparent" drop in reserves had been caused not by heavy consumption but by heavy withdrawals made to fill newly constructed pipelines, by the transfer of mobile reserves in cans to the armies, and by laying down depot stocks in the combat zone, none of which would be reported as stocks. When the trend continued, however, it was realized that this explanation was not valid, and it became apparent that the abnormally high issues of mid-August represented a rising rate of consumption, one which toward the end of August was greatly exceeding the planned maintenance factors. In addition, gasoline was accounting for a much higher percentage of the total POL tonnages than anticipated—about 90 percent rather than 80.[84] These trends eventually led to a revision of the POL maintenance factors. Actually, despite the soaring rate of consumption toward the end of the month the average consumption of POL per division slice for the entire month did not exceed planning factors, and the temporary drop in the continental stock position apparently was not serious at the moment and had no bearing on the shortages currently being experienced in the forward areas. On 3 September, when the gasoline supply situation in the forward areas was at its worst, Colonel Barnes reported that stocks of all types of POL products on the Continent had actually increased despite the high consumption rates.[85]

It is clear from the foregoing that the gasoline shortage can be explained only by the deficiency of transportation facilities. Inadequate transport was in fact the chief limiting factor in the logistic support of the American forces throughout the period of the pursuit, and when the First Army first reported a critical quartermas-

[81] Memo, Capt A. M. R. Jacobs of G-4 Petroleum SHAEF for Col W. C. Pew, 11 Sep 44, SHAEF G-4 Tonnages—Class III, POL 137/5/GDP-1.

[82] Memo, Chief Statistical Sec SGS ETO, 18 Aug 44, USFET 400.42B Capacity for Bulk POL on Continent.

[83] This was equal to about 75,000 tons. In addition, there were 10,800 tons of Avgas and 17,800 tons of diesel oil on hand. Note for record, Col Irish, 19 Aug 44; 12 A Gp G-4 Periodic Rpt 3 (13-19 Aug 44), 21 Aug 44.

[84] Memos, Lee for Chief Petroleum Officer, 26 Aug 44, Col Carl E. Cummings, Deputy Chief Petroleum Officer for Lee, 26 Aug 44, Barnes for Lee, 28 Aug 44, and Barnes for G-4, 28 Aug 44, sub: Actual Issues vs. Estimated Requirements POL, USFET 400.42B Capacity for Bulk POL; Memo, J. M. D. Heald, Chief Plng and Requirements Br to Chief Petroleum Officer, sub: Plng Logistics, 25 Sep 44, USFET 400.42B Petroleum.

[85] Stf and Comd Conf, COMZ Rear, 3 Sep 44, EUCOM 337/3 Confs, Stf-Weekly, I.

ter supply situation on 26 August it recognized that the major difficulty was not so much one of inadequate supply levels as it was a problem of moving supplies forward into the army area.[86]

POL was carried forward by all of the principal means of transportation—motor, rail, air, and pipeline. Since the last was designed specifically and exclusively to meet the special problem of bulk POL movement it is apropos to describe at this point the extent to which the pipeline system was brought to function in this period. With the launching of the COBRA operation on 25 July ADSEC engineers had immediately resumed the extension of the major pipeline southward from La Haye-du-Puits. Upon reaching Lessay, however, a major alteration was made in the planned route. On the assumption that large forces would be employed in Brittany the original plans had contemplated running the pipelines southward through Avranches to Fougères (whence a branch line was to be extended to Rennes), to Laval (where the Major System would be joined by a line running up from Quiberon Bay), and thence to Le Mans and eastward. *(See Map 9.)* In accordance with General Bradley's decision of 3 August, by which relatively small forces were allotted Brittany and the main effort was shifted eastward, the pipeline route was now also shifted to bring it into closer support of the main forces operating to the east. Beginning at Lessay the pipeline was redirected southeastward to St. Lô and then projected south and southeastward to Vire, Domfront, and Alençon, generally paralleling the earlier route but from twenty-five to thirty-five miles farther inland. *(Map 16)* From Alençon the lines were planned to extend eastward to Chartres and the Seine, crossing that river either above or below Paris and continuing on to the northeast. The new route had the obvious advantage of being considerably shorter and thus involving less labor and fewer materials. The construction of an additional line eastward from Quiberon Bay was no longer contemplated.[87]

Construction continued to be pushed vigorously after the above decision. In the second week of August the pipeline reached St. Lô, where the Major and Minor Systems were linked. Construction then proceeded simultaneously on various segments of the line. On 8 August work began on all three lines forward from St. Lô, two of the lines, each seventeen miles long, reaching Vire on the 29th. Meanwhile construction of two lines from Vire to Domfront, a distance of twenty-five miles, was undertaken on 19 August and completed on the 23d. The extension of these lines forward to Alençon, another thirty-nine miles, was begun on 22 August, one of the lines reaching that point by the end of the month. By the end of August, therefore, one MT80 line had been pushed to Alençon, eighty-one miles forward of St. Lô, a second was completed to Domfront, and a third (for Avgas) was also nearly complete to the latter location.[88]

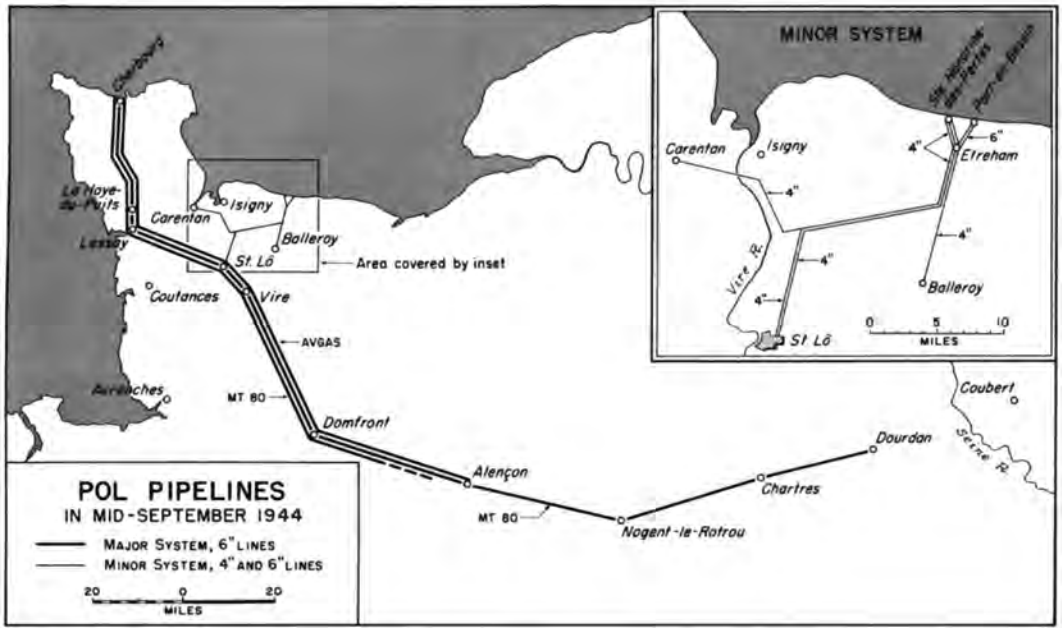
Up to this time the pipelines were extended at a good pace, with more than 7,200 troops and at least 1,500 prisoners of war employed on the projects.[89] But both the construction and operation of the

[86] FUSA G-4 Periodic Rpt 4 (20–26 Aug 44), 30 Aug 44.

[87] Hist Rpt 13, Corps of Engrs ETO, pp. 81–82; POL Plan, POL Br G-4 ETO, 4 Aug 44, EUCOM G-4 POL Plan ETOUSA 14 Apr 44.

[88] Monthly Rpt, Construction and Quartering Div OCofEngrs ETO, Aug 44, ADSEC Files. See also 12 A Gp G-4 Periodic Rpt, overlays of supply installations.

[89] Monthly Rpt, Construction and Quartering Div.



MAP 16

pipelines were attended by increasing difficulties forward of Vire, and the progress of the lines was hardly an accurate measure of their usefulness. Partly because of the inexperience of personnel, and partly because of the pressure for speed, the lines were not always properly constructed. Rather than take the time it often would have required to break through hedgerows and remove mines in order to lay the pipe on the far side of drainage ditches, the troops regularly laid the lines on road shoulders and in some cases in ditches. As a result there were numerous breaks and pipeline failures.[90] In addition, there was much indiscriminate tapping of the lines by the simple process of punching holes in the pipe, a small part of which was attributed to sabotage. On 29 August, for example, breaks occurred in the lines north of Domfront, making it necessary to draw all gasoline at St. Lô, eighty miles farther to the rear, until repairs could be made. Consequently the turn-round distance which trucking units were forced to cover between the forward areas and the pipeline dispensing points was increased by an additional 160 miles. Such breaks reduced the amount of gasoline which could be forwarded to the armies and aggravated the fuel shortage in the most critical period of the pursuit.[91]

Lack of an adequate communications system prevented maximum efficiency in the operation of the pipeline. POL planners had appreciated the importance of communication facilities along the pipeline and had recommended a permanent

[90] Final Report of the Chief Engineer, ETO, p. 312, OCMH.

[91] 12 A Gp Daily Jnl, Transportation Sec, 27–30 Aug 44.



WELDING A SECTION OF THE POL LINE *as it is extended eastward across France.*

type of telephone system which would permit conversation betwen any two installations. Such facilities had not been made available, and the troops therefore relied on the organic equipment of engineer units, which proved quite unsatisfactory. Communication between extremities of the line and even between tank farms was largely impossible, and communication between on-the-line pump stations was only indifferently successful. Pump stations and maintenance crews frequently could not be informed of line breaks except by dispatch riders using jeeps, and gasoline was often lost while word was transmitted by this slow means. Operating crews at one end of the line were normally in ignorance of what was being done at the other end, and as the pipeline was being extended toward Alençon the interruptions in deliveries became frequent. Late in August the decision was finally made to install a semipermanent telephone network, and Signal Corps troops eventually built such a system.[92]

Meanwhile the forward extension of the pipeline had itself begun to lag. It had long since become apparent that the pipelines could not keep pace with the fast-moving armies. In mid-August, however, even the normal speed of pipeline con-

[92] Report on POL Plans and Construction to 8 May 45, ADSEC Engr, ADSEC Completion Rpts Bulk POL installations.

struction was retarded by a lack of construction materials. As was the case with most other supply shortages the deficiency was caused not by a shortage of pipeline equipment, but by the inability to bring the available equipment forward. Paradoxically, pipeline construction, itself designed to provide an added transportation facility, felt the impact of the one limiting factor which was determining the extent of all logistic support—that is, transportation—and found itself in sharp competition with supply movements for the limited rail and motor transport available. Faced with a choice between the certainty of long-term savings through the allotment of a portion of the transport for construction purposes, and the more urgent needs of the moment, the Communications Zone tended to choose the latter and divert truck units to the higher priority forwarding of gasoline, rations, and ammunition. Indeed, so persistent was the demand for gasoline that the use of forward dispensing points on the completed pipeline was frequently delayed by the continued withdrawals from pipeheads farther to the rear, for such withdrawals so exhausted the supply of gasoline that it was impossible even to fill the most recently completed portion of the pipeline.[93]

On 22 August General Plank, the Advance Section commander, pointed out to the COMZ staff that the pipeline had assumed an overriding importance in the support of the armies and urged that additional rail transportation be allotted for the movement of pipe, tanks, pumps, and fittings so that construction could be accelerated.[94] High priority was given to the movement of POL engineer materials at the end of the month, and for a period of about ten days between 500 and 1,500 tons of equipment were hauled by railway to the Alençon–Chartres area each day.[95] These measures permitted construction to continue, but they did not help alleviate the fuel crisis which was already upon the armies. By 2 September one 6-inch line had reached Nogent-le-Rotrou, about thirty-eight miles east of Alençon, and within the next week the line was extended another thirty-five miles to Chartres.[96] But the dispensing of gasoline did not begin with the arrival of the pipeline at these points. After the shutdown of the lines west of Alençon for repairs on 29 August, First Army did not begin to draw gasoline at Alençon again until 2 September. Third Army at that time was receiving its fuel via motor transport from Domfront.[97] At the height of the fuel crisis, therefore, the armies were approximately 250 miles from the operating pipehead.

The fuel situation began to improve on 4 September. The supply of gasoline was by no means ample after this date, however, and current receipts did not allow the build-up of reserves. The G–4's of both armies continued to complain that quantities coming into the truckheads were issued as fast as they were received and that they did not meet daily maintenance requirements.[98] Nevertheless, deliveries in the following week were sufficient to permit a record average daily consumption of more than 863,000 gallons. Third Army twice in this period received amounts well in excess of 700,000 gallons and took ad-

[93] Engineer Rpt 13, p. 88; Report on POL Plans and Construction to 8 May 45, ADSEC Engr.

[94] TWX R–50025, Plank to COMZ CofT, G–4, and Engr, 22 Aug 44, EUCOM 825 Tunnels and Pipelines, Decks, Piers, Jetties, etc.

[95] ADSEC Completion Rpt; SHAEF G–4 War Diary/Jnl, 30–31 Aug 44, SHAEF War Diary.

[96] 12 A Gp G–4 Periodic Rpts 5 and 6, overlays.

[97] 12 A Gp Daily Jnl, Transportation Sec, 3 Sep 44.

[98] FUSA G–4 Periodic Rpts 6 (3–9 Sep) and 7 (10–16 Sep); TUSA G–4 Periodic Rpt 6 (3–9 Sep).

vantage of these receipts to build up a reserve of about 1.1 days on the basis of estimated daily needs of 650,000 gallons.[99] In this period deliveries by air substantially enhanced the tonnages moved by rail and motor transport. In the following week—10–16 September—the two armies made daily average issues of more than 1,000,000 gallons of gasoline.

In the meantime the pipeline had been advanced still farther and was dispensing considerably farther forward. By mid-September one line had reached Dourdan, about twenty miles from the Seine, and was dispensing at Chartres. In addition, the Major System at this time comprised a second MT80 line extending beyond Domfront and dispensing at that city, and a third line, for Avgas, completed to Alençon and dispensing there.[100] This progress represented an improvement over the situation two weeks earlier, but it was largely illusory, for the bulk distribution system was far from adequate. The distance between the forward dispensing points and the armies was still as great as before—270 miles in the case of the First Army and 200 in the case of the Third. Furthermore, the pipehead at Chartres was capable of delivering only about one third of the estimated needs east of the Seine—that is, 400,000 of a required 1,215,000 gallons. A minimum of 815,000 gallons had to be obtained farther to the rear, a portion of it at Domfront, the great bulk of it at St. Lô and Etreham, and some of it even as far back as Cherbourg. This was obviously an unsatisfactory arrangement in view of the uneconomical use of truck transportation which it entailed.[101]

Nevertheless it was decided to suspend temporarily a further extension of the pipelines. The acute shortage of transportation continued to present something of a dilemma. Lack of a pipeline extending far enough forward already meant a costly use of motor transportation to bring gasoline from the base areas; on the other hand, adding to the Major System meant using precious rail tonnage for the movement of construction materials over a distance of about 250 miles from the Normandy ports. Because rail transportation was more urgently needed to move other supplies to the forward areas, the use of it for pipeline construction materials was no longer felt to be justified. A re-evaluation of the POL situation at Headquarters, Communications Zone, led to the conclusion that the Major System should be terminated at approximately the line of the Seine, and planners now considered construction of shorter lines based on the easternmost of the north coast ports, preferably Antwerp.[102]

The Major System was actually extended to Coubert, about ten miles beyond the Seine, although construction was carried on at a much reduced pace and the first line was not completed to that point until early October. By interesting coincidence, the overriding importance which the supply of gasoline had held for several weeks was already diminishing when the above decision was made, for in the second week of September the pursuit came to an end. Although POL require-

[99] TUSA G-4 Periodic Rpt 6 (3-9 Sep).

[100] Memo, Capt Paul A. Ludolph, Chief Highways Br, for Lt Col Mack, 13 Sep 44, sub: Gen Ross's Buck, and Ltr, Ross to Gross, 15 Sep 44, EUCOM 319.1 Rpt—Misc.

[101] Memo, Capt Jacobs of G-4 Petroleum SHAEF for Col Pew, 11 Sep 44, SHAEF G-4 Tonnages—Class III, POL 137/5/GDP-1.

[102] TWX E-46157, Hq COMZ to SHAEF, 11 Sep 44, SHAEF AG 463.7-1 POL Tankers and Targets 1944.

ments continued to be large, it became increasingly evident as operations became more static and plodding in nature that the demand for other classes of supply, particularly ammunition, would grow more and more urgent and that they would compete for a larger and larger portion of the available tonnage allocated. Such a shift was portended in the first week in September by the bloody battles which the Third Army fought to win bridgeheads over the Moselle. As early as 8 September Colonel Muller, the army G–4, pointed out to General Stratton and General Plank that changes in the tactical situation might necessitate a sudden shift in demand from POL to certain types of ammunition,[103] and two days later the G–4 actually took measures to increase the supply of ammunition at the expense of equal tonnages of POL.[104] A similar shift in emphasis was made in the First Army about a week later.[105]

The total effect of the gasoline shortage is difficult to assess, although its immediate consequences for the conduct of operations are quite apparent. Since each day's deliveries were consumed and the establishment of reserves was out of the question, tactical operations became wholly contingent on day-to-day deliveries. The crisis came when these could no longer be depended on, and the unpredictability of deliveries acted as a depressant on all planning and cast a pall of uncertainty over all operations, even as much as twenty-four hours in advance. In the closing days of August the mobility of the American forces was noticeably reduced, with the result that they could not take full advantage of their potential striking power and could not maintain the momentum of the pursuit. In the period of the shortage some units were allowed to continue their advance until their tanks ran dry, in spite of all the risks entailed.

Measuring the end effects of the gasoline shortage is a more speculative matter. At the time of the shortages there was strong belief in some quarters, particularly the Third Army, that the pursuit might have continued unabated and might have led to decisive results had there only been sufficient fuel to power the vehicles. Lack of gasoline, however, was not the only factor influencing the speed and extent of the eastward advance. By design, the main effort was still being made in the north, and General Bradley repeatedly placed restrictions on the Third Army's operations, authorizing only limited advances with the thought that General Patton's forces should not overextend themselves and possibly jeopardize the accomplishment of the army group's mission.[106]

Furthermore, while it was true that the Third Army encountered relatively weak delaying forces as it forced crossings of the Meuse on the last day of August, captured documents later revealed that the enemy had already begun building up substantial forces along the Moselle. Certainly the deceleration of the advance occasioned by the gasoline shortage gave the Germans additional time for these preparations, but the formation of the Moselle defenses had already proceeded farther than was realized by U.S. forces.[107] Similar developments had taken place in the area of the

[103] TUSA G–4 Periodic Rpt 6 (3–9 Sep), with Summary of Activities, 8 Sep.

[104] TUSA G–4 Periodic Rpt 7 (10–16 Sep), with Summary of Activities, 10 Sep.

[105] FUSA AAR, Sep 44, Sec. IV, Supply, Exhibit I (Daily Tonnage Bids).

[106] Ltr, Moses to Hist Div, 18 Nov 50, OCMH.

[107] For details of this build-up see Hugh M. Cole, *The Lorraine Campaign* (Washington, 1950), pp. 47–48.

First Army farther north. There the enemy had already begun to man the prepared fortifications of the Siegfried Line while delaying forces, aided by the fuel shortage, slowed the advance of the Americans. Although the gasoline shortage was a decided handicap in pressing the pursuit with full vigor, therefore, it is certain, in the light of developments on the enemy side of the hill, that the American forces would have encountered increasing resistance regardless of the fuel situation.

(3) Class I, II, and IV Supply

While the supply of gasoline assumed overriding importance in the pursuit, shortages developed in every other class of supply, again not primarily because of the lack of stocks in the theater or on the Continent, but because of inadequate transportation. The limited lift available to meet the urgent demand for gasoline and the strong rivalry for transportation among all supplies meant that not even the barest essentials of many items would be moved forward.

Since rations are consumed in fairly uniform amounts regardless of tactical conditions, Class I requirements placed a minimum daily demand on transportation resources. But shortages developed even in this class of supply, and the character of operations had a definite effect on the type of rations issued. In the first month following the landings in France Class I issues consisted almost wholly of operational rations—that is, the packaged C, K, and 10-in-1, with a much higher consumption of the last than anticipated. Beginning in the second week of July a fairly rapid shift was made to the bulk-type B ration, in part to offset the heavy drain on 10-in-1 stocks, and by the end of the month approximately 75 percent of all the troops on the Continent were receiving the B ration with its greater variety and palatability.[108]

Plans had also been made to add perishable items to the diet and thus gradually to convert the B ration into a type A. Issues were to begin on D plus 30 to approximately 40 percent of the troops and eventually were to extend to all troops on the Continent. By mid-July the Quartermaster Corps indicated its readiness to inaugurate this program. But the sudden change in the tactical situation, plus difficulties over the handling of perishable foods, made it impossible to implement this plan fully. The provision of refrigerated transport and cold storage created a special problem along the entire line of communications. Because of the shortage of coastal reefers (refrigerated vessels), in which perishable foods were to be transshipped to the Continent, and because of the lack of cold storage facilities in France, the chief quartermaster had insisted that refrigerated ships be sent directly to continental waters where they could serve as floating storage until the foods could be accepted ashore.

The War Department refused to permit such a practice, insisting that reefers must be discharged promptly and returned. Furthermore, there were not enough refrigerated rail cars to handle shipments of perishables inland. About thirty American cars were supposed to move to the Continent in July, but they did not arrive until mid-August and constituted only a fraction of the requirements. In the critical days of the pursuit cross-Channel lift could not be spared to move refrigerator

[108] Quartermaster Supply in the ETO in World War II, QM School, Camp Lee, MS, II (Subsistence), 101-02, 250, OCMH.



RATIONS STACKED AT A QUARTERMASTER DEPOT *near Chartres.*

cars, nor could precious inland transport be used to move materials for the purpose of constructing cold storage facilities.[109]

Besides being circumscribed by these limitations the ration plan was upset by the nature of tactical operations. Pursuit operations did not lend themselves to the issuance or preparation of either the A or B ration, and the movement of large quantities of bulk supplies would only have added to the burden on transport. Consequently the breakout was accompanied by a rapid shift back to operational rations. No B rations were drawn by the Third Army after the second week of August, and thereafter its heaviest issues were of the 10-in-1 type.[110]

In the First Army the shift was more gradual, reflecting the more static character of its operations in the first few weeks of August, and the complete reversion to operational rations—mostly 10-in-1's—was not effected until the last week of August.[111] Thus, as in the first month of operations, U.S. troops subsisted mainly on the C, K, and 10-in-1 rations, and the goal of providing a large percentage of the troops with fresh foods was not realized.

Class I deliveries had the same difficulties as the forward movement of other types of supplies. Rations were regularly requisitioned by the daily telegram which gave the strength of the command, with a normal delivery expectancy of three days. With supply lines being extended many miles every day, the time lag lengthened to as much as ten to seventeen days.[112] Third Army had its first warning of Class I difficulties in the second week of August. In a period of three days shipments fell short by 350,000 rations. As a result of the

[109] *Ibid.*, II, 113–22, 127–29.

[110] TUSA G-4 Periodic Rpts.

[111] FUSA Rpt of Opns, 1 Aug 44–22 Feb 45, IV, 81.

[112] *Ibid.*, IV, 47.

interruption in the flow of supplies, the army's reserves and even a portion of the unit reserves were temporarily exhausted. For the remainder of the month the daily deliveries were sufficient for maintenance and for reconstituting unit reserves. The army's reserves remained precarious, although at no time during August did they drop below 2.7 days.

Shipments were again short in the second week of September, when the average daily receipts totaled only 152,580 rations against a troop strength of about 265,000 men, and when the level of supply temporarily dropped to .59 day. This was actually the only period of the pursuit in which the Third Army judged its ration situation critical. The shortages were partially relieved by the use of captured food, particularly canned and frozen beef. Captured flour was also used by the field bakeries, which continued to bake bread at each of the Class I supply points, aiding considerably in relieving the monotony of the C and K rations.[113]

Experience in the First Army was similar, although its position was slightly better throughout August. The Class I supply level reached its lowest point in the second week of September, when it dropped to .43 day based on a troop strength of 400,000. On the 11th and 12th deliveries had to be supplemented by 75,000 and 52,000 captured rations.[114] Despite the occasional interruption in the flow of rations and the hand-to-mouth nature of supply, and although U.S. troops for short periods were forced to eat captured rations, the most unpopular component of which was a tasteless canned fish which American Army cooks were unprepared to cope with, the supply of food for the most part was adequate and never seriously threatened to affect the conduct of operations.

Rations, POL, and ammunition—Classes I, III, and V respectively—can be referred to as the "staples" of combat maintenance, and for obvious reasons had the highest priorities in the forward movement of supplies. Taken together, these three classes of supply placed a steady and fairly fixed daily demand on transportation facilities. Rations imposed the most unvarying demand on movement capabilities. The changes in the course and nature of tactical operations resulted in fluctuations in the demand for POL and ammunition, but an increase in the requirements for one was normally balanced by a decrease in the demand for the other. A highly mobile type of warfare, made possible by a low scale of enemy resistance, resulted in enormous demands for fuel and relatively small quantities of ammunition; conversely, static operations brought about a higher expenditure of ammunition and an accompanying reduction in the consumption of fuel.

In August and early September the minimal requirements for rations, gasoline, and ammunition could easily have absorbed all available lift, and it is not surprising, therefore, that Class II and IV supplies had to bear the brunt of the sacrifice, as is clearly revealed in both the allocation of the available tonnage and in the actual deliveries to the armies. In the first week of September, after tonnage rationing began, First Army permitted less than one seventh of its 3,500-ton allocation to be devoted to Class II and IV supplies. The record of receipts actually shows that, of the 20,742 tons of supplies delivered to the army by the Communications Zone in the first week of September, only 1,643

[113] TUSA AAR, II, QM, 3-4, 6; TUSA G-4 Periodic Rpt 6 (3-9 Sep).

[114] FUSA G-4 Periodic Rpts 4-7 (20 Aug-16 Sep).



GENERAL ROWAN, *Chief Chemical Warfare Officer, ETOUSA.*

tons constituted Class II and IV.[115] In the Third Army Class II and IV supplies received early in September averaged less than 300 tons per day, less than one tenth of the total allocation.[116]

Of the thousands of items furnished by the six services, Medical and Chemical Warfare Service supplies were certainly the least critical in the period of the pursuit. In fact, they were the only supplies of which fairly consistently adequate levels were maintained in the armies throughout the period. This good record in the case of chemical supplies was due in part to the fact that chemical warfare had not been resorted to, although the Chemical Warfare Service was responsible for the maintenance and supply of the effective and popular 4.2-inch mortar and its ammunition. Since some Chemical Warfare units, such as decontamination companies and chemical processing companies, could not be employed in the special functions for which they were trained, many were utilized in related roles, such as fire fighting, laundering of salvaged clothing, and providing showers, depending on the adaptability of their equipment and personnel.[117]

Medical supplies constituted but a small fraction of the tonnages moved forward, and deficiencies could be alleviated fairly easily by air shipment from the United Kingdom. One of the unique features of medical supply in World War II was the provision of whole blood, an item which performed an incalculable service in saving human life. The distribution of refrigerated whole blood was organized by a theater blood bank, consisting of a base depot and advance blood depots for the Communications Zone and the field armies. In the first three months all blood was flown from the base depot at Salisbury, England. Whole blood was not plentiful in the early stages of continental operations; it became the most critical item of medical supply early in August and had to be allocated to the armies by the army group surgeon. The shortage came to an end in mid-August, when increasing quantities of blood began to arrive from the United States.[118]

The shortages of various types of signal, quartermaster, and engineer equipment developed primarily as a result of the in-

[115] These figures from the AAR for September. The G-4 periodics show total deliveries via army and COMZ transportation of 36,956 tons, of which 2,783 tons were Class II and IV items.

[116] TUSA G-4 Periodic Rpt 7 (10–16 Sep).

[117] ADSEC Operations History, p. 88.

[118] ADSEC Operations History, pp. 90–91; 12 A Gp Rpt of Opns, VI (G-4), 31; TUSA AAR, II, Medical, 12.



GENERAL RUMBOUGH, *Chief Signal Officer, ETOUSA.*

adequate means of transportation. In Signal Corps equipment the First Army's position was relatively satisfactory in August, but the Third Army was badly in need of many items, particularly field wire and radio parts. On 10 August representatives from the major commands met with General Rumbough, the theater chief signal officer, and agreed that Third Army's shortages should be alleviated by transfers from First Army's stocks.[119] Air shipment from the United Kingdom, whose depots held considerable stocks of signal equipment, met some of the most critical needs at the end of August. But forward movements from the base areas were small, and there was extensive use of captured enemy equipment as well as a considerable amount of cannibalization.[120]

Quartermaster Class II and IV supplies had an even lower priority for movement than most other equipment. In view of the more urgent needs for other supplies there was a tendency, therefore, to postpone the replacement of quartermaster equipment to a later date, with the result that quartermaster supply became increasingly critical toward the end of August. There was virtually no replacement of clothing, for example, in the very period when the replacement factor reached an unexpectedly high rate, and in the Third Army approximately 80 percent of all issues before mid-September were made from renovated salvage.[121]

The limitations of transport had an acute effect on the movement of engineer supplies because of the bulkiness and weight of major engineer items. In order to carry out their most important engineer functions, therefore, such as bridging, the armies attempted to "travel light" and eliminated as much tonnage as possible from their forward dumps. The Third Army met its transportation problem in part by converting an engineer combat group consisting of four heavy ponton battalions into a provisional transport group and using it throughout August to move heavy equipment and supplies forward from the beaches. Even so, there were critical shortages of treadway bridging, water purification equipment, and other items.[122]

Ordnance Class II and IV supply, normally accounting for a major portion of tonnage movement, likewise felt the full brunt of the limitations of transport, al-

[119] 12 A Gp G-4 Periodic Rpt 2 (7–12 Aug 44).

[120] ADSEC Operations History, p. 96; TUSA AAR, II, Signal, 7.

[121] TUSA AAR, II, QM, 6.

[122] 12th A Gp Rpt, VI (G-4), 29; TUSA AAR, II, Engr, 5.

though ordnance supply was further aggravated by the unexpectedly high demand for many replacement items. The Normandy hedgerow fighting had taken a heavy toll of such items as 60-mm. mortars, grenade launchers, and automatic rifles (BAR's), creating shortages which persisted after the breakout. The mobile warfare of August now created additional problems of maintenance and replacement through the heavy wear on both general purpose and combat vehicles.

Part of the difficulty over spare parts and replacements in August stemmed from the inability to provide both armies with full authorized loads before D Day. In the preparation for the OVERLORD operation the First Army, as the force designated to launch the assault and secure the initial beachhead, was given first priority for both its T/E requirements and its reserves of major items and spare parts. These requirements, together with the various special authorizations for the assault so drained theater reserves that it was impossible to meet all the Third Army's needs for operating reserves or its basic loads of spare parts and tools.[123] In July, during the build-up of Third Army units in the Cotentin, efforts were made by direct representation at Cheltenham to expedite the shipment of spare parts and tools, and some of the army's deficiencies were eventually made up in this way.[124]

Measures were also taken to eliminate the discrepancy in the supply positions of the two armies. On 1 August at a conference at ADSEC headquarters, the COMZ G-4, General Stratton, decreed the immediate release to Third Army up to its requirements of all stocks in COMZ depots of those items in which First Army reported excesses above its T/E and PROCO needs.[125] Two weeks later it was agreed that Third Army was to be given preference until it had built up a reserve equal to that held by First Army.[126] This policy led to some improvement in Third Army's supply position. But both armies were by this time outdistancing the capabilities of the available transport, and it became increasingly difficult to bring forward the items in stock in the rear depots. Consequently many of the shortages of the previous month—of mortars and BAR's, for example—continued throughout the period of the pursuit.

In the meantime the hard driving of August created even more critical shortages in major items such as tanks and general purpose vehicles, and a severe maintenance problem demanding greater quantities of tires, tank motors, and other spare parts.[127] The Communications Zone was fully aware of these shortages and many of the items needed in the combat units were available in the rear depots or in ships lying offshore. Because of transportation limitations and unloading difficulties, however, equipment could not be laid down at the point where it was needed.[128]

Other factors besides transportation and unloading inadequacies were at work as well. The unexpectedly heavy attrition of many items in the first three months of invasion had caused shortages in the theater. At the end of August General Eisen-

[123] Ordnance Class II and IV Supply in the ETO, Gen Bd Study 99, pp. 5-6; TUSA AAR, II, Ord, 6; Statement by Col Thomas H. Nixon, TUSA Ord Officer, cited in History of the General Purpose Vehicle, II, 303, OCMH; 12th A Gp Rpt of Opns, XII, 128.

[124] TUSA AAR, II, Ord, 6.

[125] 12th A Gp Ord Jnl, 1 Aug 44.

[126] *Ibid.*, 14 Aug 44.

[127] FUSA and TUSA G-4 Periodic Rpts, Aug; FUSA Rpt of Opns, IV, 6-8; 12 A Gp Rpt of Opns, XII, 128-30.

[128] 12 A Gp Ord Sec Jnl, 15 Sep 44.

hower highlighted some of the more outstanding losses for the commanding general of the ASF in response to the latter's request for forecasts of future matériel needs. He noted that in the first seventy days of operations more than 2,400 BAR's, 1,750 ¼-ton trucks (jeeps), 1,500 mortars, 2,000 planes, and 900 tanks had been swallowed into the maw of battle, and emphasized the imperative need for more and more "trucks of all kinds and sizes."[129]

One of the major items in which an ominous shortage had begun to develop was the medium tank. First Army had sustained large tank losses in the assault and in the subsequent hedgerow fighting in Normandy. In June it reported 187 casualties, or 26.6 percent of its average T/O&E strength of 703, and in July it reported 280 lost, equivalent to 24.4 percent of the average authorized strength of 1,153. These figures indicated that losses were running at a rate at least three times as great as the 7 percent replacement factor authorized by the War Department, with the result that the theater reserve was quickly drained.[130]

Theater officials had predicted such a development even before the experience of the first months had shown this trend. Insisting that tank casualties in the assault would be higher than normal, they had stated before D Day that the existing reserves did not constitute a safe margin for support in the initial stage of the invasion, and had asked for a 20 percent replacement factor for medium tanks. An analysis of the medium tank position early in June revealed a potentially dangerous stock position by 1 August, and a shortage of almost 600 tanks by 1 September was predicted if current replacement policy was followed. The theater had therefore asked the War Department to expedite the shipment of tanks already released, and to release several hundred additional tanks to meet the anticipated shortage.[131]

The theater's fears were not unfounded, as was indicated by the loss experience of the first two months. On 15 August the Communications Zone informed the War Department that its reserves of medium tanks were exhausted. Current War Department policy allowed the theater a reserve of 75 days (based on the 7 percent replacement factor) plus a shipping factor of 60 days (the time required for delivery)—a total of 135 days' supply. But against the 75-day reserve requirement of 435 tanks there was no reserve in the theater at all at that time, although against the shipping factor requirement of 371 there were currently 336 on manifest and 425 on release.

Theater reserves had thus been eliminated by heavy losses, and shipments from the zone of interior had not kept pace with them. Reserve and shipping factors based on current War Department replacement factors, the theater claimed, were obviously too low to provide an adequate cushion if normal editing procedures in the War Department were relied on to effect resupply. ETO officials felt that the

[129] Cbl S-58776, Eisenhower to Somervell, 30 Aug 44, SHAEF G-4 400.192 Supply Rpt, I.

[130] 12th A Gp AAR, XI (Armored), 67. The evidence on this subject is conflicting. The 12th Army Group figures are cited for the sake of consistency, but they appear to exaggerate the percentage loss rate. One source lists losses of only 6.4 percent in June and 7.3 percent in July, and a report prepared at the end of the war gives losses of 15 percent in June and 5.8 percent in July. See Memo, Maj Gen W. A. Wood, Actg Dir Plans and Opns ASF, for Somervell, 4 Jan 45, sub: ETO Replacement Factors or Days of Supply for Tank, Medium, Mortars, Radio Sets, and Ammo, with incls, Hq ASF notebook of memos, ltrs, etc., on supply, Somervell file; Final Hist Rpt, AFV&W Sec ETO, App. G, ETO Adm 540.

[131] Ltr, Lord to AG WD, 9 Jun 44, sub: Supply Status of Medium Tanks This Theater, 12 A Gp 470.8 Tanks and Armored Cars.

135-day total would afford an adequate reserve only if the pipeline was kept filled by prompt weekly releases and shipment of losses as reported to the War Department. The theater therefore asked that its loss reports, rather than the inadequate replacement factor, be accepted as a firm basis for immediate release and shipment. Allowing eight weeks from the theater's cabled loss reports until delivery, the 135 days' reserve would just about cover the anticipated loss rate of 20 percent per month, and the theater noted that the accuracy of this loss rate was being fully confirmed by experience. Further adjustments would be needed if deliveries could not be made in eight weeks.[132]

In mid-June the War Department had raised the replacement factor from 7 to 9 percent on the basis of loss figures from the North African Theater, but had refused to grant the theater's request for a 20 percent factor in view of the lack of experiential data at the time. The War Department had also announced that it was expediting the flow of tanks already released, as requested, but that it could not ship additional tanks without taking them from troop units destined for the theater.[133] Meanwhile tank losses continued high. For the month of August they totaled 432, or 25.3 percent of the average T/O&E strength of 1,709 in the two armies, thus more than bearing out the rate predicted by the theater.[134] Nevertheless, by one expedient or another, including the diversion of certain tank shipments directly to the Continent and the utilization as replacements of tanks earmarked for units arriving later, it was possible to keep all armored units close to their authorized strength throughout August.[135] On 15 September the tank status in the armies stood as reflected in table on page 524.[136] By that time not only were reserves almost nonexistent, but it was becoming increasingly difficult to maintain armored units at their T/O&E strength. This situation was destined to become even more critical before it began to improve.

In the meantime continuing efforts were also made to overcome the other major handicap under which U.S. armored units operated—the recognized inferiority of U.S. tanks to the German Panthers and Tigers in both armament and protective armor. Early in August the 12th Army Group commander requested theater headquarters to take immediate action to convert M4 tanks by replacing the 75-mm. gun with the British 17-pounder, a weapon of superior penetrative power. It was hoped that sufficient conversions could be accomplished initially to provide one 17-pounder gun tank for each medium tank platoon engaged on the Continent, pending the arrival of the 90-mm. gun tank, then under production in the

[132] Cbl, EX-43321, Lee to AGWAR, 15 Aug 44, and Ltr, ETO to WD, 23 Aug 44, sub: Supply of Medium Tanks, EUCOM 470.8 Combat Armored Cars and Tanks.

[133] Ltr, Gen Holly, Chief AFV&W Sec ETO, to Lord, 20 Dec 44, sub: Chronological Analysis of Attempts Made by This Theater to Improve Supply of 75-mm. and 76-mm. Medium Tanks, with remarks by Maj Gen W. A. Wood, Actg Dir Plans and Opns ASF, Hq ASF Notebook of Memos, Ltrs, etc., re Supplies, Gen Somervell.

[134] This total is from the 12th A Gp AAR, XI, 67. First Army reported 223 casualties, Third Army 210. Other evidence again indicates that the percentage loss rate was exaggerated. Theater later reported a loss rate of only 20.6 percent for August, and an average cumulative loss rate of only 14.7 for the first eleven weeks of operations. Memo, Wood for Somervell, 4 Jan 45. See Volume II, Chapter IV, Section 3, of *Logistical Support of the Armies*, now in preparation, for the later history of this problem.

[135] 12 A Gp Rpt of Armored Sec Activities for Aug 44, 4 Sep 44, AAR Armored Sec 12 A Gp 99/12-38 (7659) Aug, Opns Rpts AGO.

[136] TWX 22080, 12 A Gp to SHAEF, 29 Sep 44, SHAEF G-3 O&E 370.8 Tanks, I.

Army and type of tank	Troop units: Armd Divs	Troop units: Separate Tk Bns	Troop units: Cav Gps	Number of tanks: Author-ized	Number of tanks: On Hand	Number of tanks: Service-able	Number of tanks: Repair-able
Total 12th Army Group	7	16	8	2,279	2,147	1,965	182
First Army, total	3	9	3	1,079	1,055	941	114
75- and 76-mm. gun tanks				1,010	995	887	108
105-mm. howitzer tanks				69	60	54	6
Third Army, total	3	6	4	1,077	983	922	61
75- and 76-mm. gun tanks				975	889	829	60
105-mm. howitzer tanks				102	94	93	1
Ninth Army, total [a]	1	1	1	123	109	102	7
75- and 76-mm. gun tanks				111	103	97	6
105-mm. howitzer tanks				12	6	5	1

[a] Ninth Army became operational in Brittany on 5 September.

United States, or until ammunition with performance at least equal to the 17-pounder became available in quantity.[137] Nothing came of the proposal at the time, primarily because its implementation would have required withdrawing tanks from the already meager reserve, a step which could not be risked in view of the current operational requirements.

Additional shipments of the new 105-mm. howitzer tank arrived in August, but even though this weapon had a high-explosive round superior to the 75-mm. gun's it did not meet the need for a tank fighter. Meanwhile, heartening news had been received that a new type of high-velocity armor-piercing (HVAP) round was being produced for the 76-mm. gun which would provide the penetrative properties so badly needed. The first shipment of the new ammunition arrived in August. Firing tests proved the new ammunition greatly superior to that used in the obsolescent 75-mm. gun, although it was still no match for the front armor plate of even the Panther (Mark V) at ranges over 300 yards. Unfortunately the production of the new round was extremely limited, and the quantities received in Europe restricted its use to purely emergency situations.[138] Thus, the requirement for an adequate armor-piercing weapon, as well as the problem of providing adequate tank replacements and re-

[137] Ltr, 12 A Gp to CG ETO, 13 Aug 44, sub: 17-Pounder Tank Guns for M4 Series Tanks, 12 A Gp 470.8 Tanks.

[138] 12th A Gp Rpt of Opns, XI, 39–40.

serves in the ETO remained unsolved as the U.S. armies came to a halt in mid-September.

(4) Ammunition

The problem of Class V supply, like the tank problem, was two sided. Chiefly because insufficient quantities of ammunition were being unloaded on the Continent, limitations on expenditures had been imposed within the first weeks of the invasion, long before it became necessary to superimpose tonnage allocations because of the shortage of inland transportation. Rationing of ammunition had therefore become the rule rather than the exception.

During the pursuit the uncertainty of ammunition deliveries was heightened by lack of exact knowledge as to the adequacy of continental stocks and as to the quantities arriving in the theater. In view of the unpredictable status of ammunition the 12th Army Group, when it became operational on 1 August, therefore continued the policy of rationing which had been initiated by the First Army. This took the form of restrictions on expenditure of the more critical types, published every eight days on the basis of the best information obtainable as to future availability. While this was not as orthodox or desirable as a credit system, it was continued in part because it was already in operation, and because any other procedure was impracticable until sufficient depot stocks were available against which credits could be established.

In making its allocation the 12th Army Group at first hoped to maintain reserves of seven units of fire in the armies. But the unsatisfactory continental stock position made this goal impossible, and in the succeeding allocations the authorized army levels were steadily decreased, as they had been for other classes of supply.[139] Later in the month these reductions in the army reserves resulted more from the inability to deliver ammunition than from an actual shortage on the Continent. Limitations on expenditure actually came to have little meaning, for not enough ammunition was available to fire at even the restricted rates.[140]

Because of the great amount of labor involved in handling ammunition, both armies attempted to keep their Class V stocks as mobile as possible. To secure the maximum efficiency in the use of its transportation the First Army centralized the operational control of all truck units assigned to ammunition hauling under the commanding officer of the 71st Ordnance Group. At the end of August this group consisted of two ammunition battalions (six companies each), two quartermaster truck battalions (three companies each), and a provisional field artillery truck battalion (with four companies of thirty-four trucks each), and was supported by a medium automotive maintenance company attached for the sole purpose of servicing this transportation. All trucks were to carry double their rated capacity and be capable of making a daily round trip of 160 miles. In order to meet the needs of the fast-moving VII Corps, which paced the First Army's advance beyond the Seine, a motorized ammunition supply point (ASP) was organized. This rolling supply point carried approximately 500 tons of ammunition, limited for the most part to a minimum number of fast-moving items in accordance with anticipated expenditures, and was protected by two

[139] 12th A Gp Rpt of Opns, XII, 131–32.

[140] FUSA, TUSA, and 12 A Gp G-4 Periodic Rpts for Aug and FUSA Rpt of Opns, III, 24.



HANDLING SUPPLIES IN THE FIELD. *Ammunition being sorted, above, and stacked in open fields, below.*



batteries of self-propelled antiaircraft artillery. While somewhat wasteful of transportation, this supply point on wheels was extremely economical of labor and provided close support for the corps in its drive across northern France.[141]

Meanwhile, the First Army attempted to establish new ASP's farther forward. At the end of August its ammunition supply was based on the La Loupe service area, although ASP's were already established in the vicinity of Paris and Soissons. On 5 September a new ASP was established at Hirson, 230 miles beyond La Loupe. But within a few days even this point was far to the rear. On 11 September an ASP was opened near Liége, and fortunately rail service to this point was available almost immediately. But the task of moving the army's ammunition stocks forward, first from La Loupe and then from Hirson, required the constant use of nearly a thousand trucks. On one occasion every available ordnance vehicle was employed to move 3,000 tons of ammunition in one lift from a depot on the south bank of the Seine (ASP 117 in the vicinity of Corbeil) to Hirson.[142] Despite these efforts First Army's stocks were reduced from 157,000 to 12,000 tons by the end of August.[143]

The Third Army also tried to maintain a rolling reserve of ammunition and for a time in September established a mobile ASP for XX Corps, but the Third Army's meager transportation resources made the use of this expedient less feasible. As in the First Army, ammunition companies were augmented by the formation of provisional truck companies (utilizing the vehicles of ordnance maintenance units, for example), and the army's ammunition stockage at times remained on wheels for three or four days. The army's stocks fell to their lowest point in one four-day period at the end of August when transportation was almost immobilized because of the gasoline shortage. This threat was a temporary one, and the army's inability to keep its reserves mobile was in part compensated for by authorizing combat units to carry ammunition in excess of their basic loads and to the limit of their carrying capacity.[144]

Fortunately heavy firing was not required in this period, with one or two exceptions. Throughout August the daily expenditure in the First Army averaged only 100 tons per division slice.[145] The contrast between operations in July and August is reflected in the record of First Army expenditures tabulated on page 528.[146] The comparison given in the table is not wholly accurate, for while the expenditure in rounds per gun per day was in several cases higher in August than in July, it was made by a considerably smaller number of guns, and by artillery units which in several cases were in action only ten or twelve days in the month. The contrast between the two months is more accurately revealed by comparing the total expenditures, which were lower in all categories in August, substantially so in most, although some allowance must be made for the fact that the First Army was somewhat smaller in size that month.

[141] Ltr, Lt Col John E. Ray, Ammo Officer, FUSA Ord, to Ord Officer, FUSA, 13 Sep 44, sub: Ammo Supply Rpt, Western Europe, 1–30 Aug 44, Gen Bd Files, Ammo Supply for Fld Arty, Entry 31.

[142] FUSA Ammo Officer's Rpt for 1–30 Sep 44, 25 Oct 44, file cited above, n. 141.

[143] FUSA Ammo Officer's Rpt for Aug.

[144] TUSA AAR, II, Ord, 10–12.

[145] *Ibid.*

[146] FUSA Ammo Officer's Rpt for Aug, Gen Bd Files, Ammo Supply for Fld Arty, Entry 31; FUSA Ammo Officer's Ammo Supply Rpt, France, 1–31 Jul 44, 11 Aug 44, Gen Bd Files 471/1 Arty Sec, Entry 39.

Type	Total expenditures in rounds		Average guns in action per day		Average rounds per gun per day	
	July	August	July	August	July	August
81-mm. high explosive	60, 990	16, 507	774	546	2. 5	1. 3
4.2″ mortar	74, 412	9, 066	139	35	17. 6	21. 8
75-mm. gun	94, 962	29, 290	1, 000	770	3. 35	1. 42
75-mm. howitzer	47, 034	17, 848	131	144	12. 4	5. 13
105-mm. howitzer M2	723, 907	366, 952	590	440	40. 83	27. 38
105-mm. howitzer M3	113, 420	42, 630	192	124	19. 3	15. 4
155-mm. gun M12	14, 096	14, 030	37	25	12. 4	17. 8
155-mm. gun M1	65, 484	35, 140	107	57	19. 7	20. 6
155-mm. howitzer M1	272, 973	100, 578	310	190	28. 4	18. 0
4.5″ gun	25, 162	19, 689	38	25	20. 7	25. 0
240-mm. howitzer	2, 624	2, 084	14	23	6. 2	7. 5
8″ howitzer	11, 240	8, 204	39	29	9. 2	12. 2
8″ gun	1, 264	831	6	6	7. 0	13. 8

No tabulation of expenditures of course serves as a reliable guide to actual ammunition *requirements*. Ammunition was rationed almost from the beginning, and the armies had not been able to fire at desired rates in June or July, or even at the rationed rates later in August. Restrictions on firing had already hampered the conduct of operations in July, although some commanders had ignored them in what they regarded as "emergency" circumstances.

Despite the generally low scale of resistance in August, in at least two instances relatively heavy expenditures of ammunition were required, and the limited allocations had adverse effects. The first was the counterattack at Mortain, in which the First Army did its only heavy firing of the month. While the effects of the ammunition expenditure restrictions were not of major consequence, the First Army artillery officer reported that important interdiction fire by certain155-mm. gun battalions designed to prevent reinforcement or withdrawal of the enemy forces east of Mortain had to be canceled on the night of 11–12 August for lack of ammunition.[147]

Far more serious was the experience of the VIII Corps in Brittany, where a combination of circumstances produced one of the most critical supply shortages to date and one which had a decided bearing on the conduct of operations. Shortages in the Brittany area were not limited to Class V. As the lines of communications extended into the peninsula the VIII Corps, like the units racing eastward, suffered shortages in all classes. Artillery battalions, for example, were reported unable to move out of danger when taken under fire because of the lack of gasoline.[148] The siege type of operation which the VIII Corps was soon forced to undertake against such fortified places as St. Malo and Brest, however, quickly made lack of ammunition rather than gasoline the severest limiting factor. The experience

[147] Memo, Brig Gen John H. Hinds, 12 A Gp Arty Officer to CofS 12 A Gp, 17 Aug 44, sub: Ammo Supply, 12 A Gp 471 Ammo General.

[148] Lt Col William H. Harrison, Ex O G-4 TUSA, Rpt of Lt Col R. J. Campbell, 543d QM Gp, representing TUSA QM with VIII Corps, 24 Aug 44, ADSEC AG 400 General.

of the VIII Corps in Brittany provides a case study rewarding in its lessons in military supply.

Shortages of artillery ammunition had already begun to hamper the corps on 6 August, when the attacks on St. Malo were initiated. Enemy strength there had been greatly underestimated by the Third Army staff (the citadel held out for ten days),[149] and inadequate allocations forced severe curtailment of the fire plans. For several days some of the heavy corps artillery battalions were reduced to expenditures of four rounds per gun per day. With this experience in mind, corps warned army as early as 10 August of the heavy ammunition demands anticipated for the reduction of Brest. A week later, at the invitation of Colonel Muller, the Third Army G–4, the VIII Corps G–4, Col. Gainer B. Jones, and the corps ordnance officer, Col. John S. Walker, drove to the army command post near Le Mans and submitted more formal estimates of the corps ammunition requirements for the Brest operation. They asked that three units of fire be laid down before the attack and that five additional units be set up for delivery for the first three days of the attack. Translated into tonnages, this request called for an initial stockage of 8,700 tons, plus maintenance requirements totaling 11,600 tons for the first three days. These estimates were based on the expenditure experience at St. Malo and on the expected employment of one armored and three infantry divisions and thirteen battalions of corps field artillery.

The Third Army ordnance officer, Col. Thomas H. Nixon, refused to approve the corps request for these amounts on the grounds that they were excessive. He noted, first of all, that the corps had been misinformed as to the number of troops it would have for the operation, since only two divisions and ten corps artillery battalions would be allotted. (Actually, three infantry divisions, a separate task force, and eighteen corps artillery battalions were employed in the attack on Brest.) Second, army stated that corps had overestimated the strength of the enemy garrison at Brest. Despite the experience at St. Malo, army believed that Brest would surrender after a show of force, and set 1 September as the target date for completion of the mission. To the dismay of the corps staff the army allotted only about 5,000 tons of ammunition for the operation, the bulk of which was already laid down in ASP's in the vicinity of Pontorson and Dinan, near St. Malo.[150]

The VIII Corps supply position was by this time beginning to suffer the adverse effects of a rapidly changing tactical situation. The bulk of the Third Army was already engaged in the eastward drive, with a portion of the command about to cross the Seine. While General Patton was still vitally concerned with the army's mission in Brittany, the main attention of the army naturally was concentrated on the pursuit, and it was becoming apparent that the Third Army was not willing to divert a large portion of its meager logistic support to an operation which had definitely become subsidiary to, or at least far removed from, the main effort. Control and support of the Brittany operation, furthermore, were daily becoming more difficult because of the increasing distance between the several commands involved. On 17 August, the day on which the corps

[149] Ltr, Lt Gen Troy H. Middleton to author, 19 Jun 50, OCMH.

[150] VIII Corps AAR, Aug 44, AG Hist Records 208–0.3; Ltrs, Col Walker to author, 15 May 50, and Col Jones to author, 9 Jun 50, OCMH.

supply officers met with members of the army staff, the army headquarters was already in the vicinity of Le Mans, 100 air-line miles from the corps command post near St. Malo. Within a few days the two headquarters were 270 miles apart, the Third Army having moved eastward to the vicinity of Chartres and VIII Corps to the northwestern tip of Brittany.

At the meeting of 17 August Colonel Muller called attention to the increasing difficulty in handling the supply of the Brittany forces as a result of the great distance between the army and the corps, and informed the corps officers that the Brittany Base Section was being organized with headquarters at Rennes to provide administrative support for the corps. Whatever the army's intention may have been in this regard, the VIII Corps staff, either from what it was told at this meeting or shortly thereafter, concluded that from then on it was to look to the Brittany Base Section for supply support and that it had been granted authority to deal directly with the new base section on such matters.[151] At any rate, on 20 or 21 August, corps submitted a new requisition to the Communications Zone for additional ammunition to meet the requirements of its troop allotment which had been augmented beyond the strength on which army had based its allowances. The requisition was also sent to 12th Army Group headquarters, where it was reviewed by the Artillery, Ordnance, and G–4 Sections. With the approval of the G–3 these sections decided that the corps requirements could be filled from the Third Army allocation and agreed that about 3,500 tons should be released immediately.

Allocation of the ammunition was only part of the problem. Getting it to the VIII Corps was another matter. Since the Communications Zone's transportation facilities were already committed to the fullest extent it was recognized that delivery could not be made unless a proportionate amount of lift was diverted from the maintenance of the armies. This proposal did not meet with the approval of the Third Army. When informed of it the ordnance officer, Colonel Nixon, asserted, first of all, that the requisition had not been forwarded through command channels; furthermore, it was his opinion that the VIII Corps had ample ammunition available for its task, and that if additional ammunition was required it could be supplied by the Third Army. He therefore requested that the army group take no action on the corps requisition and that the request be forwarded to the army as a matter pertaining to that headquarters. Colonel Muller supported the ordnance officer in his recommendation, and the army group accordingly advised the Communications Zone to take no action on the corps requisition.[152]

The fate of VIII Corps' requests thus far had already led some officers to conclude that there had been a misunderstanding concerning the supply responsibility for the Brittany forces. Brig. Gen. John H. Hinds, the 12th Army Group artillery officer, located at the rear headquarters and lacking adequate contact with the forward echelon, was not even certain whether VIII Corps was still operating under Third Army command. He had favored the immediate shipment of at least one half of the VIII Corps' requisition so that there would be no question about ade-

[151] Ltrs, Walker and Jones to author, 15 May and 9 Jun 50.

[152] Memo, Col Hass, Chief Supply Br G–4 12th A Gp, for G–4, 21 Aug 44, sub: VIII Corps Requisition for Ammo, 12 A Gp 471/1 Ammo Allocations.

quate support of the attack on Brest.[153] The army group G–3, Brig. Gen. A. Franklin Kibler, also emphasized the importance of the VIII Corps mission, and on 22 August he discussed the Brittany operation with General Patton, who again gave assurances that there would be sufficient ammunition.[154]

As a precaution, meanwhile, it had already been decided to send an officer from the army group G–4 Section to the VIII Corps to investigate the ammunition situation, and at about the same time Genrals Bradley and Patton themselves flew to the corps command post. In consequence of this visit the army group decided on 23 August to relieve the Third Army of all supply responsibility for the Brittany area, and authorized the VIII Corps to deal directly with the Communications Zone on supply matters. Tactical control remained with the Third Army for the time being.[155] Army group then sent a courier to the Communications Zone with instructions to ship approximately 8,000 tons of ammunition immediately. This allocation was believed to be large enough to provide the corps a reserve of three units of fire in addition to maintenance for six days, the time which the Artillery and G–3 Sections estimated would be required for accomplishment of the mission.[156]

While these actions removed all doubts regarding the responsibility for supply in the Brittany area they by no means constituted a guarantee that the needed ammunition would be delivered. On 25 August, with assurances that adequate resupply was on the way, VIII Corps launched its attack on Brest. Two days later, however, General Hinds, who had gone to the corps to check personally on the supply situation, reported that no ammunition had been received as a result of the allocation of 23 August. There were insufficient quantities to sustain the attack which had already begun. On 28 August, to add to an already frustrating situation, it was discovered that there was a basic misunderstanding between the army group headquarters and the corps as to the latter's ammunition requirements. On that day two officers from the corps appeared at the 12th Army Group headquarters, reporting that deliveries of ammunition had still not begun and, obviously suspicious that the corps' needs were being neglected, asserting that they wished to establish "firm requirements" for Class V supply. They were then shown the army group directive to the Communications Zone of 23 August and told that it had been issued on the assumption that the requests made on 21 August to the officer from the army group G–4 Section, a Maj. Joseph Peters, represented the corps' full requirements. It was then learned from the two corps emissaries that that request actually represented only the minimum requirements which the corps regarded as necessary to have on hand before the launching of the attack.

Since the ammunition allocated earlier had not yet begun to arrive, the misunderstanding was not immediately serious. But it was now necessary for one of the corps officers to draw up new requirements that included both reserves and daily maintenance needs. These were reviewed by the army group G–3 and artillery officer, who scaled down the requests for the more

[153] Memo, Hinds for G–3, 21 Aug 44, sub: Ammo for VIII Corps, 12 A Gp 471/1 Ammo Allocations.

[154] *Ibid.*, 1st Ind, Gen Kibler, 23 Aug 44.

[155] Ltr, Gen Middleton to author, 19 Jun 50, OCMH; Memo, Muller for ADSEC, 25 Aug 44, sub: Supply of VIII Corps, ADSEC 400 General.

[156] Memo, Col Hass for G–4, 31 Aug 44, sub: Ammo Requirements for VIII Corps for Brest Opns, 12 A Gp 471/1 Ammo Allocations.

critical items and increased the allocation of items in less critical supply. The revised allocation provided for a 7,700-ton reserve and 1,400 tons per day for maintenance.[157] Based on these computations a new directive was dispatched via an officer courier to the Communications Zone on 29 August with the stipulation that the shipments were to have the highest possible priority for transportation.[158]

The courier who brought the latest directive to the Communications Zone was informed by General Stratton, the G-4, that the shipment of 8,000 tons of ammunition had already been arranged for as a result of the allocations of 23 August. Approximately 3,000 tons had been dispatched on six trains, and the shipment of another 5,000 tons had been arranged for in eleven LST's which were to sail between the 26th and 29th.[159] These vessels were to deliver their cargoes to a beach which had been opened at St. Michel-en-Grève, about fifteen miles northeast of Morlaix, through which the corps had already been receiving a portion of its supplies for the past two weeks. Unfortunately the ammunition allocated on 23 August had not arrived in the quantities scheduled. Some arrived by both rail and LST on 27 August, but the LST's were lightly loaded, three of them carrying less than 100 tons each, and in the period 27–30 August the corps received only 5,300 tons, which was insufficient to sustain its attacks. Because of the inadequate receipts, and because of the uncertainty of replenishment, expenditures were necessarily reduced after the first two days of the attack. Fires were restricted mainly to counterbattery, support of local operations, and defense against counterattack.[160]

The delay in providing satisfactory logistic support to the corps had caused increasing anxiety in the final days of August. In a message to General Lee on the 28th General Bradley expressed great concern at the possibility that the Brest operation was being hampered by lack of ammunition.[161] Lt. Gen. Troy H. Middleton, VIII Corps commander, made repeated appeals for the means to carry out the VIII Corps mission. On the 29th he re-emphasized the desperate straits of the corps in a radio message to the 12th Army Group commander. Because of the bad state of communications he took the precaution of repeating his message via letter. In it he was unequivocal in his statement of the corps supply position and its effect on tactical operations. "Our ammunition situation is critical," he noted, "due to failure to meet our initial request. If something is not done immediately I will have to stop offensive action." Thus far, he said, supply had not kept pace with a unit of fire per day, with the result that the corps in some cases had eaten into its basic loads. Once more he repeated his earlier request for three units of fire maintained in the corps ASP in addition to basic loads.[162] At the close of his letter he re-emphasized that the VIII Corps was battering against a strongly fortified area and that progress had been extremely slow. Ammunition was therefore the prime requirement; without it he believed the struggle could drag on indefinitely, for he was convinced that the German commander, General der

[157] Memo, Hass for G-4, 31 Aug 44.

[158] *Ibid.*; Ltr, 12 A Gp to COMZ, 29 Aug 44, sub: Ammo Requirements for VIII Corps, 12 A Gp 471 Ammo, III; 12 A Gp Ord Sec Jnl, 28 Aug 44.

[159] Memo, Hass for G-4, 31 Aug 44.

[160] VIII Corps AAR, Aug 44.

[161] Cbl QX-30047, Bradley to Lee, 28 Aug 44, EUCOM 471 Allocation of Ammo.

[162] A unit of fire for the corps as then constituted weighed 2,000 tons.

Fallschirmjaeger Hermann B. Ramcke, would expend all his resources before capitulating.[163]

By this date (29 August) the exasperation of the VIII Corps commander and his staff was quite evident, and understandable. Repeated assurance from higher headquarters had not been followed by adequate deliveries. Furthermore, in the view of the corps commander the entire problem had become unnecessarily complicated by red tape and excessive channels. The VIII Corps had been authorized to deal directly with Brittany Base Section at Rennes, which in turn dealt with its superior headquarters, Communications Zone. But the Communications Zone would deal with the corps only through the 12th Army Group. General Middleton could only conclude that the corps was being given the runaround.[164] In view of the many delays, plus the suspicion that its operation had become something of a sideshow, 450 miles from the principal theater of battle, it is not surprising that the corps should regard its position as little better than that of a stepchild.[165]

Upon the receipt of the second allocation on 29 August General Stratton had immediately taken steps to arrange the additional shipments by asking 12th Army Group for five LST's per day for seven days, plus three per day thereafter until the shipments were completed. As an added insurance the G–4 directed that three trains per day for four days be dispatched to the Brest area beginning on 31 August, loaded to capacity with the same types of ammunition. As of 30 August, then, arrangements had been completed for shipment via water of 2,500 tons of ammunition per day for seven days and 1,500 tons per day thereafter,[166] and an additional 1,500 tons per day by rail for four days. These shipments were to be in addition to those already authorized in the allocation of 23 August. Of the ammunition requested, stocks were not even on hand in the rear areas to satisfy the requirements of certain types.[167]

Pending the arrival of the scheduled shipments the VIII Corps commander continued to send urgent requests for items which were most critically needed. On 31 August, for example, the corps made a special request for 90-mm. gun ammunition and for air shipment of one million rounds of caliber .30 ball cartridges (in eight-round clips).[168] Both requests were approved, but the supply of the corps continued to be plagued by endless difficulties. The air shipment proved impossible because of bad weather and had to be transferred to trucks. In the meantime Supreme Headquarters also became involved in the problem and sent officers to both the Communications Zone and VIII Corps to check on the supply situation and do what they could to expedite matters. Discussions with both General Stratton and the corps commander on 2 September revealed that the progress in meeting the corps' requirements was still discouragingly slow. Receipts of ammunition up to that date had either been expended or were included in the stock position which the corps commander on 2 September had indicated amounted to less than one unit

[163] Memo, Middleton for Bradley, 29 Aug 44, in "VIII Corps Ammunition Supply During Brest Campaign, 25 August–18 September 1944," a collection of documents of the combat units made by Royce L. Thompson, OCMH.

[164] *Ibid.*

[165] That this feeling prevailed is suggested in the memo of 31 August from Hass to Moses.

[166] On the basis of 500 tons per vessel.

[167] Memo, Hass for G–4, 31 Aug 44.

[168] Cbls, Middleton to 12th A Gp, 31 Aug 44, 12th A Gp 471 Ammo Allocations and Credits, I.

of fire. Stocks of some items were completely exhausted.

One of the troubles, it was revealed, arose from the failure to follow through on shipping orders. In the opinion of Lt. Col. Joe M. Ballentine, the SHAEF officer who had gone to COMZ headquarters, the Communications Zone had assumed that its orders were being executed, while shipments actually were not being accomplished as scheduled. There was no way of knowing, he noted, whether deliveries were being made or not.[169]

One of the best illustrations of the lack of follow-through was the experience with a special truck convoy which General Stratton had scheduled for the shipment of approximately 2,000 tons of critical items. On 6 September it was revealed that the ten truck companies which a regulating officer had designated to fall out of the Red Ball run had not been dispatched to OMAHA Beach for loading, as scheduled. They had been instructed by the Advance Section not to leave the Red Ball under any circumstances, and they had complied with those orders. Since the situation had gone undiscovered for eighteen hours still another delay had resulted.[170]

Despite all the efforts to expedite the flow of ammunition the entire problem continued uncertain. A big air effort against the enemy fortifications was made on 3 September, but an all-out attack which was planned for the following day was again deferred because of the ammunition shortage.[171] On 6 September both of the officers sent out from SHAEF, Lt. Col. Edwin N. Clark and Colonel Ballentine, were at the VIII Corps headquarters and on the basis of performance thus far were pessimistic about the prospects of building up the quantities which General Middleton insisted he must have before resuming the attack—that is, three units of fire and the assurance that an additional unit would be delivered on each succeeding day. LST arrivals thus far had been sporadic, vessels had arrived without manifests, and the loadings had averaged only 300 tons as against the planned 500. Receipts had therefore barely sufficed to meet daily maintenance needs.[172]

Most exasperating of all was the lack of information as to what could be expected. On 5 September Colonel Clark had attempted to arrange a radio conference with General Stratton but had received no response to his message to the Communications Zone. Impatient with the latter's silence he addressed a second message to both General Lord and General Stratton the following morning. Re-emphasizing the urgency of the Brest situation, he noted: "Getting ammunition out here is vital matter which your office does not seem to understand. We must have not only ammunition but also information relative thereto. . . . What in the name of Pete is wrong with Com Zone?"[173] Under the authority delegated him by Generals Crawford and Smith of the Supreme Commander's staff, Colonel Clark then requested complete information on all shipments.

The doubts and uncertainties over the supply of the VIII Corps reached their

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[169] Memo, Col Ballentine for Col Clark, 3 Sep 44, sub: Ammo Shipments to VIII Corps, SHAEF G-4 471 Ammo.

[170] Memo, G-4 SHAEF for Col McCarthy, 6 Sep 44, 12th A Gp 370.2 Post-NEPTUNE Operations—Logistic Studies; Rad FWD-13914, Crawford to Clark at VIII Corps, 6 Sep 44, SHAEF G-3 O&E Ammo 471.

[171] Ninth U.S. Army Operations: (I) Brest-Crozon, Sep 44, MS, 4th I&H AG Hist Records.

[172] Msg, Clark and Ballentine to Crawford, 6 Sep 44, 12 A Gp 370.2 Post-NEPTUNE Opns—Logistic Studies.

[173] Rad, Clark to Lord and Stratton, 6 Sep 44, SHAEF G-3 O&E Ammo 471.

height on 6 September. On that date still another officer sent to investigate the corps supply difficulties—Lt. Col. Leander H. Harrison from the Ordnance Section of the 12th Army Group—reported his findings. He noted that General Middleton and his staff were of the opinion that so many people and agencies had become involved in the ammunition problem that the whole matter was hopelessly entangled and beyond clarification. They were convinced, Colonel Harrison reported, that no one really knew how much ammunition was actually available or en route or on order.[174] On that date, however, General Stratton at last gave specific advance information regarding deliveries to the VIII Corps. His assurances to Supreme Headquarters that the corps supply situation would soon be in a healthier state[175] were shortly substantiated. Receipts on 7 September raised the ammunition stocks in the corps ASP to an average level of two units of fire. While this was below the minimum which General Middleton had specified as a prerequisite for the resumption of the attack, he nevertheless ordered the attack on Brest launched on 8 September on the assurance that a steady stream of ammunition was now on the way.[176]

One of General Crawford's representatives had promised the VIII Corps commander that ammunition would soon pour into the corps ASP in such quantities that General Middleton would cry "Uncle." In the succeeding days the ammunition picture did brighten considerably, and on 12 September the corps ASP held more than 13,000 tons, with a minimum of three units of fire in all types. Additional shipments were en route via LST, rail, and truck, guaranteeing sufficient Class V supply to support sustained operations.[177] By the date of Brest's capture nearly 25,000 tons of ammunition lay in the corps ASP, much of which later had to be reshipped.[178]

The VIII Corps, which on 5 September had come under the operational control of the newly arrived Ninth Army headquarters (Lt. Gen. William H. Simpson commanding), finally captured Brest on the 18th. The port had been completely demolished and was never put to use. To the Supreme Command the capture of Brest had continued to hold high priority in September, a fact which Colonel Clark, one of the SHAEF representatives sent to VIII Corps, suspected was not fully appreciated by General Lee's staff. A basic divergence of opinion as to the advisability of pressing the attack on Brest had in fact developed between logistical and operational staffs. Believing that the need on which Brest's capture was originally premised had been invalidated by the capture of Le Havre and Antwerp, COMZ planners regarded the costly siege of Brest as a wasteful and unnecessary campaign carried out in blind obedience to an outdated plan. They had been ready in the first week of September to recommend that it be abandoned except for a small containing force.[179]

The SHAEF staff was not so ready to write Brittany off in light of the vulnerability of Antwerp to blocking and min-

[174] Memo, Col Harrison for Col Harold A. Nisley, 10 Sep 44, sub: Status of Ammo Supply to VIII Corps, Gen Bd Files 471/1 Ammo Supply for Fld Arty.

[175] TWX J-14489, Stratton to Crawford and Clark, 6 Sep 44, SHAEF G-4 471 Ammo.

[176] VIII Corps AARs, Aug and Sep 44.

[177] Rad, Ballentine to Clark, 8 Sep 44, SHAEF G-3 O&E Ammo; TWX, Ballentine to Crawford, 9 Sep 44, and Memo, Col Fulton G. Thompson, Chief Requisition Sec to Clark, 12 Sep 44, SHAEF G-4 471 Ammo.

[178] *Conquer: The Story of Ninth Army, 1944–45* (Washington, 1947), p. 53.

[179] Memo, Col Watson for Moses, 5 Sep 44, 12 A Gp G-4 Memos for Record; Interv with Lee, 8 Aug 51, and with Lord, 9 Aug 51, OCMH.

ing, and the consequent unpredictability as to when that port could be brought into use. General Bradley of the 12th Army Group, looking at the problem from a more strictly operational point of view, justified the battle for the port on the grounds that the containment of the fanatical Brest garrison would have required an even more prohibitive diversion of badly needed troops.[180]

The difficulties over ammunition supply in Brittany were a vexing and harrowing experience for everyone concerned. In some respects they simply evidenced the overextension of the entire logistic structure which had accompanied the sudden successes of August. The difficulties in filling the VIII Corps' requirements centered largely on the by-now chronic lack of transportation. Competition for overland transport was at its height at the time, the ammunition shortage occurring in precisely the same period as the gasoline shortage. Transportation by water was also beset with difficulties, principally bad weather and the problem of loading LST's at the beaches. Additional complications resulted from the diversion of vessels from Normandy. Loaded in the United Kingdom and intended for discharge at OMAHA or UTAH, these ships had often been bulk loaded with the separate components of heavy artillery ammunition, the shells on one and the propelling charges on another. Sudden diversions to the emergency beach near Morlaix caused confusion and resulted in unbalanced stocks, so that many a heavy caliber shell lay unfired for want of the proper propelling charge.[181] Many vessels arrived off the beach at St. Michel-en-Grève with only a partial load and without manifests.

In addition to transportation difficulties, however, there were failures of a more purely command and administrative nature. There was no assurance that shipments had actually been made once orders were issued, and the corps was left in the dark as to the logistic support it could depend on. Plaguing the entire operation, furthermore, was the bad state of communications. General Bradley's urgent message to General Lee on 28 August regarding the support of the VIII Corps, for example, required two days for delivery, and a message to Brittany Base Section at Rennes required sixty hours.[182] For a time Third Army had no telephone connections with either the Advance Section or the Communications Zone.[183]

Not least important was the initial confusion produced by the ambiguity concerning the supply responsibility for VIII Corps. In view of a statement purporting to come from the 12th Army Group commander assuring the corps an ample supply of ammunition, General Middleton did not consider the so-called rationing of expenditures as applying to him. The Third Army's denial of the corps' requests was therefore regarded as an arbitrary one, and in the opinion of the corps chief of staff constituted a confusion of tongues which was never entirely cleared up. Colonel Harrison, one of the last officers sent to the VIII Corps by the army group to investigate the ammunition situation, probably made the fairest assignment of "blame" for the sad experience. He noted that the recent difficulties had been due to the lack of proper planning for the oper-

[180] Omar N. Bradley, *A Soldier's Story* (New York, 1951), p. 367.

[181] *Conquer: The Story of Ninth Army*, p. 29.

[182] Memo, Lee for Rumbough, Theater Chief Signal Officer, 30 Aug 44, EUCOM 471 Allocation of Ammo.

[183] Memo, Muller for ADSEC, 25 Aug 44, sub: Supply of VIII Corps, ADSEC 400 General.

ation by all agencies, lack of proper supply co-ordination by all agencies, lack of proper follow-through by the Communications Zone, hysterical requisitioning by VIII Corps, overoptimistic promises of impossible deliveries by the Communications Zone, and "too many parties giving instructions and too few parties carrying them out."[184]

The experience of the VIII Corps highlighted a problem which was to reach serious proportions in the coming months. While the immediate cause of the difficulties in Brittany and elsewhere was the inadequacy of transportation, behind it lay the potentially more serious matter of the actual shortage of ammunition in the theater. For this reason ammunition continued to be a rationed item throughout the period of the pursuit, and the special allocations which were made two or three times in August were in reality command decisions to commit portions of the theater's reserves. The extra shipments of heavy caliber ammunition to the VIII Corps at Brest placed a severe drain on army group reserves, and in the case of 8-inch gun ammunition reduced them almost to the vanishing point.[185]

The origin of the ammunition problem actually antedated the invasion. Theater ordnance officers had begun planning ammunition requirements in the fall of 1943 on the basis of data provided by COSSAC. In January 1944 ETOUSA submitted estimates of its needs to the War Department. Two months later these estimates underwent a radical upward revision—in most cases doubled—on the basis of recent experiential data from Italy and revised activity factors for artillery weapons.[186] In mid-April, however, the War Department informed the theater that there were shortages in all types of artillery ammunition of 105-mm. caliber and larger, and that it contemplated allocating production to the various theaters.[187]

In anticipation of the shortage the theater immediately instituted a survey of its ammunition position. On 5 May the Communications Zone (or SOS) submitted ammunition availability figures to the 1st Army Group and asked that the combat requirements for critical types of ammunition be reviewed to determine whether the theater's resources were adequate for OVERLORD.[188] The upshot of this request was a complete review of the ammunition situation by representatives of First Army, Forward Echelon Communications Zone, Headquarters, ETO, and the 1st Army Group at the army group's headquarters on 9–10 May. The meeting produced a rather shocking discovery: the theater and the tactical commands had been calculating ammunition requirements on quite different bases. The theater, for one thing, had been using an obsolete troop basis; furthermore, the two had been employing different measurements for their calculations—the army and the army group calculating daily requirements on the basis of one-third unit of fire, the theater using the day of supply as a measure. One thing was clear. The Communications Zone and the tactical commands had to arrive at mutually acceptable factors and then recalculate the ammunition requirements for the operation.

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[184] Memo, Harrison for Nisley, 10 Sep 44.

[185] Ltr, Gen Hinds, Arty Officer 12th A Gp, to AG 12th A Gp, 9 Sep 44, sub: Monthly Rpt of Sec Activity, 12th A Gp 319.1 Rpts.

[186] Ammunition Supply for Field Artillery, Gen Bd Rpt 58, pp. 4–9.

[187] Memo, Lt Col James H. Reynolds for Col Clark, G-4 SHAEF, 17 Apr 44, sub: Arty Ammo, SHAEF G-4 471 Ammo.

[188] Ltr, Lord to Bradley, 5 May 44, sub: Ammo, 12 A Gp 471 Ammo.

Ordnance and artillery officers immediately worked out expenditure rates after carefully considering the role of each weapon. These were accepted at the meeting on 10 May, and it was agreed that requirements would be refigured and compared with data on availability, and that steps would then be taken to obtain whatever ammunition was needed to overcome any shortages.[189]

Representatives from the tactical commands had been especially perturbed by the theater's request that they review their predicted expenditures in the light of "availability," and that they offer "justification" for any increases. General Moses who attended the meeting as a representative of 1st Army Group, felt that the estimates of their needs ought to serve as justification enough. General Bradley seconded this reaction, asserting that it was hardly the responsibility of the tactical commands to try to revise their needs to match reports on availability. Such a practice would only be self-deluding.[190]

The army group nevertheless checked its rates thoroughly to make sure that it had not requested more ammunition than was actually needed. On 20 May it submitted its revised estimates, based on the "agreed rates" of expenditure, and asked that it be informed whether its requirements could be met.[191] The recalculation of the theater's requirements had resulted in increases in many categories, and the Communications Zone accordingly submitted requests for additional ammunition to the War Department. Less than a week before D Day the War Department approved the requests except for certain items in critically short supply.[192]

On the very eve of the invasion, therefore, the ammunition picture appeared much more hopeful, and General Stratton, the theater G-4, even assured the armies and the army group that their total requirements "of virtually all types" for the period D Day to D plus 70 could be laid down on the far shore when desired.[193]

The War Department had made important exceptions to its ability to meet the theater's needs. There were shortages in several categories, but the most critical were in 60- and 81-mm. mortar ammunition, and in 105-mm. howitzer ammunition. Production in the United States simply could not meet the demand which the theater had made for those types.[194] Within the next month the Communications Zone realized that War Department releases were falling short of the theater's needs and asked for accelerated shipments.[195] In July after a month's combat experience, the theater reported that cer-

[189] Conf on Ammo, 9 May 44, 12 A Gp 337 Confs; 12 A Gp Ord Sec Jnl, 9–10 May 44.

[190] Memo, Bradley for Eisenhower, 14 May 44, Gen Bd Files 471/1 Ammo Supply for Fld Arty.

[191] 1st Ind to 5 May Ltr, 20 May 44, 12 A Gp 471 Ammo.

[192] Cbl, AGWAR to ETO, 29 May 44, 12 A Gp 471 Ammo; Cbl E-29855, Eisenhower to Marshall, 26 May 44, Eyes Only Cbls, Hq ETO.

[193] TWX EX-30691, Stratton to armies and 1st A Gp, 31 May 44, Gen Bd Files 471/1 Ammo Supply for Fld Arty; Memo, Col Twitchell, O&E Sec SHAEF, for G-3, 5 Jun 44, sub: Ammo, SHAEF G-4 471 Ammo.

[194] On the basis of stocks on hand and releases up to 31 May the theater informed the 1st Army Group that there would be shortages in 60- and 81-mm. mortar, 105-mm. howitzer, 8-inch howitzer, 240-mm. howitzer, and 155-mm. gun ammunition at D plus 30. At D plus 60 the main deficiencies were expected to be in mortar ammunition, 4.5-inch gun, 155-mm. gun, and 8-inch howitzer ammunition. 2d Ind to 5 May Ltr, ETO to 1 A Gp, 31 May 44, 12 A Gp 471 Ammo.

[195] Cbls, WARX-55848, ASF to ETO, 24 Jun 44, and CX-81426, ETO to WD, 5 Jul 44, SS&P Plng Div Cbls, 201.02 Ammo; Extract from ETO G-4 Periodic Rpt for quarter ending 30 Jun 44, Tab C to Memo, Crawford for CofS, SHAEF, Stock Position of Certain Types of Ammo, 6 Aug 44, SHAEF G-4 471 Ammo.

tain items, including 105-mm. howitzer, 155-mm. gun, 8-inch, and mortar ammunition, were already in the critical category, and that continental levels were not being built up as planned. Failure by the War Department to ship the quantities requested, it noted, had made it necessary to meet all continental needs from U.K. stocks with the result that the balances in the United Kingdom were insufficient to provide units with their basic loads before crossing the Channel and had dropped so low that training even had to be curtailed.[196] There was particular concern over the shortage of 81-mm. mortar ammunition, and the War Department shortly thereafter acceded to the theater's repeated requests to increase the day of supply rate. The upward revision was meaningless at least for the moment, since the quantities required to meet the new resupply rate could not immediately be made available because of shortfalls in production occasioned by a shortage of propellent powder.[197]

As an additional argument for expediting ammunition shipments the theater reported that the full continental port and beach capacity for discharging ammunition was not being used, and soon thereafter it again asked for additional shipments in order to take maximum advantage of expected continental handling capacity in September and October.[198] In making this request it was certainly being overoptimistic if not actually exaggerating its own capabilities.

At the end of July a tabulation of the First Army's expenditures revealed the extent to which the rationing of ammunition had kept the expenditure rate from equaling the "agreed rates" of 10 May.[199] But the initial restrictions in June and July had been imposed by the failure to discharge sufficient ammunition on the far shore. At the end of July the theater ordnance section was not particularly worried about supply in the next thirty days except for two items—155-mm. howitzer M1 and 81-mm. light mortar ammunition. The only recourse on these items appeared to be additional requisitions on the War Department,[200] and on 6 and 8 August respectively both General Lee and General Eisenhower requested additional shipments of both types.[201] General Eisenhower considered it imperative that the tactical commanders' requirements for the next thirty days be met in full, and he requested General Somervell's personal assistance in arranging for the quickest possible shipments of the additional quantities as well as the unshipped balances of the July releases. The personal appeal by the theater commander brought immediate assurances from the ASF that addi-

[196] Cbls, EX-37085, ETO to WD, 9 Jul 44, and EX-39011, ETO to WD, 21 Jul 44, SS&P Plng Div Cbls 201.02 Ammo.

[197] Cbls, C-84056, ETO to WD, 30 Jul 44, and WAR-76148, ASF to ETO, 5 Aug 44, SS&P Plng Div Cbls, 201.02 Ammo.

[198] Cbls, EX-39011, ETO to WD, 21 Jul 44, and EX-41661, ETO to WD, 5 Aug 44, SS&P Plng Div Cbls.

[199] First Army in fact established new "desired rates" which raised the agreed rates still further in many categories. Memo for record, J.C.C., n. d., summarizing correspondence since 27 Jul, and 2d Ind, 16 Sep 44, to Ltr, FUSA to COMZ, 27 Jul 44, 12 A Gp 471 Ammo; Memo, Col L. Wilkinson, Ord Sec COMZ, to Sayler, Chief Ord Officer ETO, 3 Aug 44, sub: Ammo Supply, Gen Bd Files 471/1 Ammo Supply for Fld Arty.

[200] Memo, Col Wilkinson for Sayler, 3 Aug 44.

[201] The theater asked for 270,000 rounds of 155-mm. howitzer and 250,000 rounds of 81-mm. mortar ammunition before 1 September, the amounts required to permit firing the two types at the rates of forty-eight and nineteen rounds per weapon per day respectively, and to permit a reserve of seven units of fire. Cbl EX-41797, Lee to Somervell, 6 Aug 44, SS&P Plng Div Cbls; Cbl FWD-12707, Eisenhower to Somervell, 8 Aug 44, P&O Cbl Files.

tional ammunition would be released.[202]

The ASF response promised only temporary relief, however, for it dealt with August shipments. The picture for succeeding months became more and more clouded with uncertainties. Most disturbing from the theater's viewpoint were the doubts which the War Department expressed regarding the theater's stated needs. In August and early September the War Department repeatedly questioned the theater's demands, stating in one instance that the quantities of certain items requested appeared to be out of line with the weapons reported in the hands of troops, and asserting another time that the theater's required level in most instances exceeded that approved by the War Department. The theater's requests were accordingly cut, the War Department justifying its "editing" of requisitions on the ground that it was necessary in order to effect proper distribution of available resources among theaters and to prevent the accumulation of excesses in the ETO.[203] Such action on its requests was not likely to reassure the theater despite protestations by the War Department that all concerned were keyed to the urgency of the theater's needs. ETOUSA wanted approval of its demands and releases of ammunition, not merely sympathetic consideration of its requests.

In the meantime the theater had to meet the purely internal problem of how to distribute and apportion its inadequate resources. One problem which persistently vexed tactical commanders in connection with scarce items of supply was the difficulty of getting accurate information on both present and future availability. Such information was essential for long-range planning, and it was information which the Communications Zone was not always able to provide. In an attempt to meet this deficiency the army group in mid-August asked the Communications Zone to send a representative to attend all ammunition allocation meetings for the purpose of furnishing information on stocks in the rear areas and of giving a forecast of quantities becoming available in the succeeding forty-five days.[204] But even assuming that the Communications Zone could indicate the total theater resources as of any given date (and this prediction was becoming more and more difficult in view of the uncertainty of War Department releases), it could not necessarily give assurances that ammunition would be in depots *on the Continent* when required. As one officer pointed out, "You can't shoot manifests or releases."[205]

Meanwhile the theater determined its policy on expenditure of the limited resources available. Tactical commanders had naturally chafed under the restrictions on expenditures and protested an economy which to them seemed illogical. In July some commanders had in fact taken advantage of a proviso in the allocations which permitted expenditures in excess of allowances in emergency situations. The 30th Division, for example, expended three times the authorized allowances of medium artillery ammunition and double the ration of light artillery ammunition

[202] Cbl WX-78272, Lutes to SAC, 9 Aug 44, SHAEF G-4 471 Ammo.

[203] Cbls, WARX-79973, ASF to ETO, 12 Aug 44; WARX-84862, ASF to ETO, 22 Aug 44; and WARX-26353, WD to ETO, 6 Sep 44. All in SS&P Plng Div 201.02 Cbls, Ammo, A46—371.

[204] TWX Q-20456, 12th A Gp to COMZ, 16 Aug 44, EUCOM 471 Allocation of Ammo, II; Ltr, 12th A Gp to CG COMZ, 20 Aug 44, sub: Arty and Mortar Ammo Requirements for 12th A Gp, and Ltr, FUSA to 12th A Gp, 18 Aug 44, sub: Allocation of Ammo, 12th A Gp 471 Ammo, III.

[205] Memo, Col Hass for SHAEF G-4, 20 Aug 44, sub: Status of Ammo, SHAEF G-4 471 Ammo.

during one week in July. First Army's inevitable inquiry into these excessive expenditures evoked a vigorous defense by the division's artillery commander, Brig. Gen. Raymond S. McLain. Sixteen enemy counterattacks against the division in a period of seven days, he noted, had created situations which he had considered emergencies and which fully justified the extra expenditures. He also accepted responsibility for the expenditures by elements of the 3d Armored Division which had fired in excess of allowances chiefly at the 30th Division's request. General McLain re-emphasized that the casualties had always been considerably lower when the ammunition supply was plentiful and expenditures were unrestricted.[206]

The army group nevertheless had decided to continue First Army's rationing policy, having little choice in view of the current availability data. In the first weeks of August it restricted expenditures of some types to rates as much as 50 percent below those agreed to on 10 May.[207] Meanwhile the Communications Zone, apparently encouraged by the ASF's additional releases in the two critical categories, saw no reason for worry and repeatedly assured the field commands that there was plenty of ammunition. General Sayler, Chief Ordnance Officer, actually predicted a "surprise for the people back home," certain that the theater would soon be able to cable stop orders on ammunition as well as other ordnance supplies.[208] The army group, on the basis of its own reading of availability figures, put little faith in the Communications Zone's estimates. Rather than risk disaster as the result of an unnecessary limitation on expenditures, however, General Hinds, the army group artillery officer, decided to take the Communications Zone at its word, and challenged the necessity for the restrictions which the army group G–4 laid down. Arguing that the tactical situation dictated allocations at least equal to the average agreed rates, General Hinds succeeded in persuading the G–3 and G–4 to authorize expenditures at those rates. Allocations up to this time had been made with a view toward building up twelve



GENERAL SAYLER, *Chief of Ordnance, ETOUSA.*

[206] Ltr, Gen McLain to CG 30th Div, n. d., sub: Ammo Expenditures, Incl to 12th A Gp Observers Rpt 10 of 1 Aug, atchd to Memo, Hinds for CofS 12th A Gp, sub: Ammo Supply, 17 Aug 44, 12th A Gp 471 Ammo General.

[207] The lowest rates were for 60-mm. mortar, 8-inch howitzer, 155-mm. gun, and 105-mm. howitzer M3 ammunition. Ltr, Deputy G–4 12 A Gp to FUSA, 31 Jul 44, sub: Ammo Expenditures, 12 A Gp 371 Ammo, III; Memo, Hinds for CofS 12 A Gp, 17 Aug 44, 12 A Gp 481 Ammo General.

[208] Stf and Comd Conf, COMZ (Rear), 20 Aug 44, EUCOM 337/3 Confs.

units of fire on the Continent. But this had become clearly impossible, and any attempt to attain that target was now abandoned.[209] It was known even at this time that expenditures at the higher rates would leave many items in the critical category within a period of a month.[210] Nevertheless the policy for the remainder of August was to recommend the maximum expenditures possible without completely dissipating reserves.[211] This was one way of determining whether there actually was a shortage of field artillery ammunition in the theater.

Despite the risk which this policy involved, the rates were renewed on 30 August when the next army group allocations committee meeting was held to set the expenditure policy for the period 3–11 September.[212] Only a few days later the entire ammunition situation assumed an even gloomier aspect as a result of the suddenly increased demands from the armies. On 7 September the Third Army asked for a sizable augmentation of both its transportation and ammunition allocations so that it might cope with both the increasing enemy resistance along the Moselle, where it was already heavily engaged, and the anticipated opposition at the Siegfried Line. One corps (the XX) had requested nearly 10,000 tons of ammunition for stockage in its ASP, and estimated that its expenditures would reach 3,000 tons per day when it arrived at the Siegfried Line. At this time the transportation allocated to the entire Third Army totaled only 3,500 tons per day for all classes of supply, and of this total only 1,280 tons were allocated to ordnance. The desperate shortage of transportation made it obviously out of the question to meet the demands of the XX Corps, much less those of the entire army. In the words of one staff officer who reviewed the demands, Third Army was asking for the moon.[213]

Although such exorbitant demands could not be met, the 12th Army Group nevertheless continued to make relatively large allocations of ammunition considering the theater's worsening stock position. When the next allocation meeting was held on 8 September (covering the period from the 11th to the 19th) it was realized that the current expenditure policy was resulting in a gradual but certain depletion of reserves. Both the army group artillery officer and the G–3, General Kibler, nevertheless advocated a continuance of the current expenditure policy on the ground that it would be much easier to penetrate the Siegfried Line at this time than later. The G–4, General Moses, was understandably hesitant to approve such a policy because of the dangerous level to which it would reduce reserves, and he was therefore constrained initially to withhold his concurrence.[214]

In the end he did not object to the high expenditures, but he made certain that the risks which they involved were fully understood. The entire matter was referred

[209] Ltr, Hinds to AG 12 A Gp, 9 Sep 44, sub: Monthly Rpt of Sec Activity, 12 A Gp 319.1 Rpts on Arty Matters; Ltr, Col Thomas B. Hedekin, Asst A Gp Arty Officer at the time, to OCMH, 20 Jun 51; Ltr, Hinds to OCMH, 6 Jul 51.

[210] Memo, Hinds for G–3 12 A Gp, 15 Aug 44, sub: Ammo Allocations, 12 A Gp 471/1 Ammo Allocations; 12 A Gp Ord Sec Jnl.

[211] Ltr, Hinds to AG 12 A Gp, 9 Sep 44.

[212] 12 A Gp Ord Sec Jnl, 30 Aug 44.

[213] Ltr, TUSA to 12 A Gp, 7 Sep 44, sub: Ammo Requirements for Attack on Siegfried Line, with 1st Ind from 12 A Gp, 24 Sep 44, and Memo, Ord Sec 12 A Gp for G–4, 13 Sep 44, 12 A Gp 471/1 Ammo Allocations.

[214] Memo, Hinds to G–3 and G–4, 8 Sep 44, sub: Recommended Allocation for Period 11–19 Sep, with comments by the G–4, 12 A Gp 471/1 Ammo Allocations.

to the chief of staff, Maj. Gen. Leven C. Allen, for decision. Influenced by General Bradley's known desire for a quick breakthrough of the Siegfried Line, the chief of staff accepted the recommendations of the artillery officer and the G–3 for a continuance of the relatively high expenditure rates with full knowledge of the policy's implications.[215] The decision was admittedly a calculated risk.

The logic of the above decision is better appreciated when viewed in the light of the unbounded optimism which pervaded the American forces at the time. In the area of the First Army the enemy was still in headlong retreat, and while the Third Army was encountering increasing resistance along the Moselle a quick penetration of the enemy's main defense positions along the German border was still hoped for and expected. Should the desired early break-through fail, it was certain that logistic limitations would force a prolonged waiting period during which depleted stocks would have to be rebuilt.

The gamble had not succeeded by mid-September, and at that time the forecast on ammunition supply was indeed pessimistic. On 16 September the 12th Army Group estimated that all reserves of 81-mm. mortar, 105-mm. howitzer, and heavier-caliber artillery ammunition would be depleted by 10 October, and in a few types before the end of September.[216] Nor were the long-range prospects any brighter. The Communications Zone reported at this time that, although large quantities of ammunition were en route to the Continent, much of it would not be available for at least thirty days because of inadequate discharge facilities. In the case of the heavier calibers it revealed that not only was there insufficient ammunition available or en route, but that the War Department had failed to release adequate quantities for the next two months.[217] There was little cause for complacency as the armies entered the long period of static warfare in mid-September.

[215] 12 A Gp Ord Sec Jnl, 8–9 Sep 44.

[216] Ltr, 12 A Gp to CG COMZ, 16 Sep 44, sub: Items of Ammo in Critical Short Supply, Gen Bd File 471/1 Ammo Supply for Fld Arty.

[217] 12 A Gp Ord Sec Jnl, 15 Sep 44.

CHAPTER XIV

Transportation in the Pursuit

(1) The Railways

At the end of July the main concern of the logistical planners had still been the threatening deficit in port discharge capacity. That problem was no nearer solution in the first week of August. But the sudden expansion of the lodgment area brought with it an inevitable shift in emphasis. For the next six weeks transportation was the lowest common denominator of supply operations, as the Transportation Corps found it increasingly difficult to carry out the injunction which had become so familiar to all movement orders: "The TC will furnish the necessary transportation."

With the extension of the lines of communications the railways at last began to play their intended role. They had moved only negligible tonnages in June and July, in part because rail operations were uneconomical over short distances, in part because Cherbourg, the terminus of the main line, was not yet receiving supplies in great volume. But the logistical planners always intended, and in fact deemed it necessary, that the railways bear the main burden of long-distance hauling, and with the deepening of the lodgment in August the way was finally opened for them to assume that task.

France possessed a good rail network, totaling nearly 26,500 miles of single- and double-track lines. Until 1938 it had been divided into seven big systems (two of them state owned). In that year these were combined into a single national system know as the *Société Nationale des Chemins de Fer Français.* The densest concentration of lines was in the north and west, and Paris was the hub of the entire network. In physical characteristics and method of operation the French system was similar to others on the Continent. In general, its equipment, including rolling stock and loading and unloading facilities, was light in weight and small in capacity, and it relied heavily on manual labor. Rolling stock built in the United States for use on the continental lines had to be specially designed.[1]

Although the OVERLORD logistic planners did not expect to have an elaborate rail network operating on the Continent in the first few months, they hoped to open at least one line along the main axis of advance. Plans had been made to rehabilitate a north-south line from Cherbourg via Lison Junction, St. Lô, Folligny, Avranches, and Dol to Rennes, where the first big depot area was expected to be established. From there one line was to be opened south and westward to the vicinity of Quiberon Bay, and a double-track line eastward from Rennes to Le Mans was to be reconstructed. *(See Map 9.)*

[1] History of the TC, ETO, Vol. V, 2d MRS Sec., pp. 1–3, ETO Adm 582.



U.S.-BUILT WORLD WAR I LOCOMOTIVES *at the roundhouse in Cherbourg.*

At the time of the breakout at the end of July rail lines had been rehabilitated as far as tactical progress permitted. The main double-track line from Cherbourg to Lison Junction was in operation, a few branch lines in the Cotentin had been restored, and construction was about to start on two large marshaling yards south of Cherbourg in anticipation of the heavy shipments from that port.[2]

Railway operating units had been scheduled to enter the Continent via Cherbourg within the first three weeks of the landings. Because of the delay in opening the port, however, the first units were brought in across the beaches. They consisted mainly of the three operating battalions and two shop battalions which operated the existing lines under the direction of the 707th Railway Grand Division.

The movement of equipment was likewise delayed, and the first rolling stock, a work train consisting of a 25-ton diesel engine and ten flatcars, was mounted on heavy trailers, ferried across the Channel on an LST, and brought in across the beaches early in July. The movement of rolling stock to Cherbourg by train ferry, seatrain, and LST did not get under way until the end of the month. The seatrains *Texas* and *Lakehurst* brought in the first heavy equipment, including diesel and steam locomotives, tank and box cars, trucks, and bulldozers. Even then the con-

[2] History of the TC, ETO, Vol. IV (Jul–Sep 44), Sec. IV, pp. 2, 7.



GONDOLA ROLLING OUT OF AN LST, *specially equipped to carry rolling stock, Cherbourg, July 1944.*

dition of the port was such that the ships could not be berthed, and the heavy equipment had to be transferred to barges, transported to the quay, and then hoisted to the quayside tracks by crawler cranes.[3] A large portion of the rolling stock was eventually ferried across the Channel in LST's which had been fitted with rails.

The first important demand for deliveries by rail resulted directly from the Third Army's forward lunge at the beginning of August. Rail transportation suddenly became economical and essential, for the long hauls to the army area immediately placed a heavy strain on motor transport. In anticipation of the need for rail facilities one engineer general service regiment was withdrawn from Cherbourg and put to work on the line running south from St. Lô immediately after the breakout from Avranches.[4] Within a few days it was apparent from the speed of the advance that extraordinary efforts would be required to provide rail facilities in support of the army, and additional engineer regiments were therefore assigned to restore the lines south and east of Folligny. *(Map 17)*

The reconstruction of damaged rail lines could hardly keep pace with the advance of the combat forces. Nevertheless, every

[3] *Ibid.*, p. 13; ADSEC NEPTUNE Plan, 30 Apr 44, Annex 14 (Transportation), ETO Adm 377.

[4] Operations History of the Advance Section, COM Z ETOUSA, prep by Hist Sec ADSEC, 1945, mimeo (hereafter cited as ADSEC Operations History), p. 69, ETO Adm 583.

effort was made to meet a request made by the Third Army on 12 August to open a line to Le Mans, where the army wanted delivery of approximately 25,000 tons of ammunition and POL within the next three days. The decision of 3 August by which the main effort was directed eastward rather than into Brittany made it desirable to develop other lines in addition to the one already planned. But much of the parallel line farther north, which ran from Vire eastward to Argentan and beyond, was still in enemy hands.

The line running southward to Rennes and then eastward could not be restored to operation quickly because of time-consuming bridging jobs at both Pontaubault, on the Sélune River south of Avranches, and Laval. Fortunately the condition of secondary lines made it possible to select an alternate route for temporary use pending the reconstruction of the main lines.[5] The temporary route ran eastward from Avranches to St. Hilaire-du-Harcouët, south to Fougères, east to Mayenne, and then south to join the main line at La Chapelle. The reconstruction of even this route required several major bridging projects, the largest one at St. Hilaire,[6] and beginning on 12 August elements of eleven engineer general service regiments were assigned to work on it.[7] On 17 August, after many delays, the first of a scheduled thirty-two trains bearing supplies for the Third Army arrived at Le Mans.[8]

The first major movements of cargo via rail were carried out under something less than ideal conditions. Most of the route restored to operation thus far was single track, and there was virtually no signal system. Since two-way traffic on single-track lines was prohibited it was not long before congestion developed between Avranches and Le Mans. Meanwhile the inevitable shortage of empty freight cars developed at the loading points in the base areas.

The difficulties at Le Mans were aggravated by the severe damage to the yards. Here was a pointed example of the effect which Allied air bombardment could have on Allied ground operations, for the big terminal at Le Mans had been almost completely demolished by air raids. One roundhouse was completely destroyed, the other badly damaged, and the machine shop about two-thirds demolished. In addition there were the usual torn-up tracks and damaged locomotives. Lack of tools and equipment necessitated a high degree of improvisation. In the absence of a signal system, for example, flagging of trains during darkness was at first accomplished largely with flashlights, cigarette lighters, and even lighted cigarettes. Blacksmiths immediately went to work fashioning badly needed hand tools. Meanwhile, French railway workmen gradually began to appear with tools and missing parts from repair and maintenance machinery which had been hidden from the enemy. In some instances the men made use of spare parts that had been brought to France by the Americans during World War I.[9]

The condition of the Le Mans rail yards was typical of the destruction which the Allied air forces had inflicted on all important rail centers, junctions, and choke points in their efforts to isolate and pre-

[5] History of the TC, ETO, Vol. IV, Sec. IV, pp. 12, 17.

[6] Railroad Reconstruction and Bridging, Hist Rpt 12, Corps of Engrs ETO, pp. 57–58.

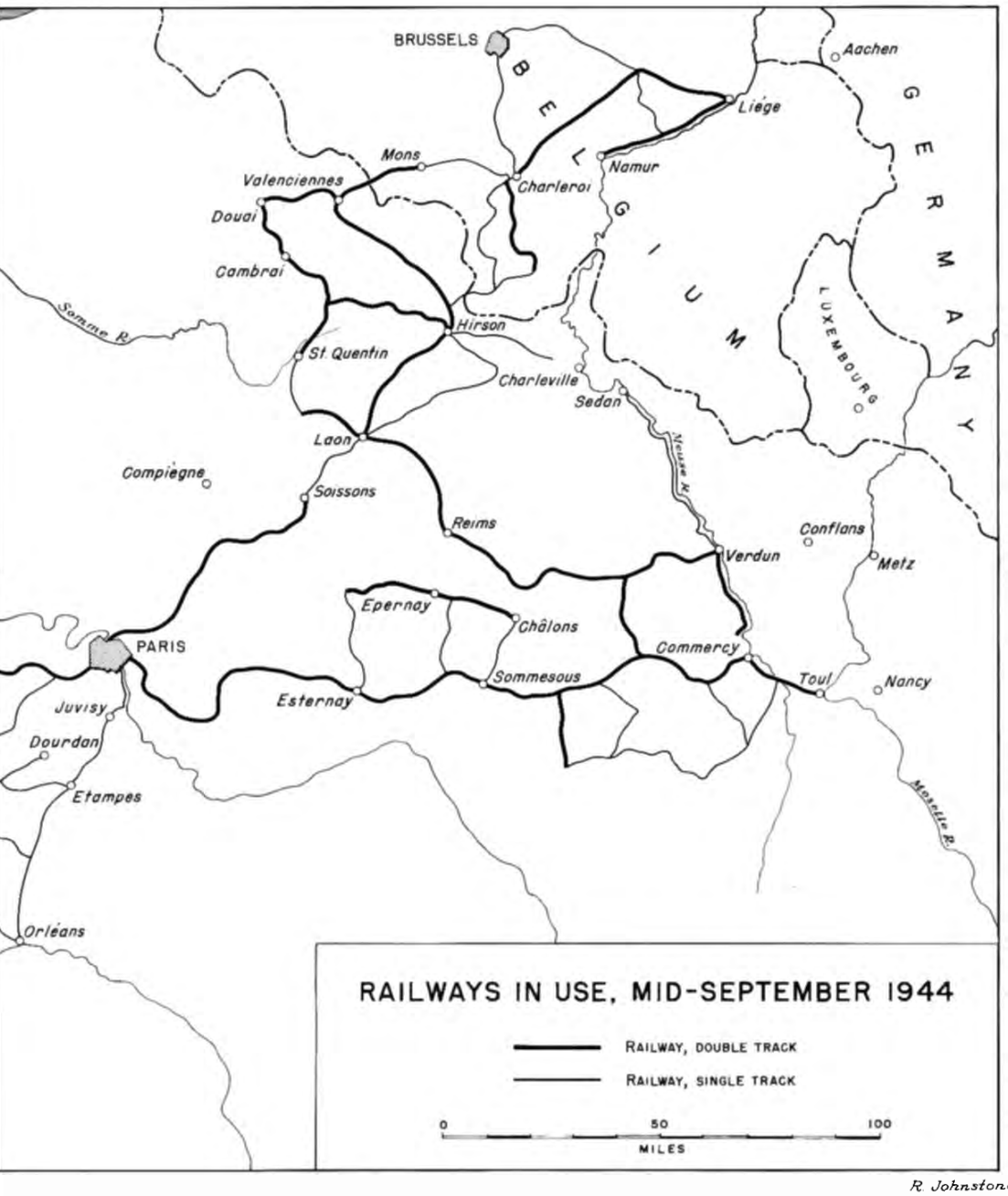
[7] ADSEC Operations History, p. 69.

[8] Ltr, Moses to Graham, 17 Aug 44, 12 A Gp Supply, Transportation of.

[9] History of the TC, ETO, Vol. IV, Sec. IV, pp. 18–20; Sec. V, p. 8.


ENGLISH CHANNEL
Cherbourg
Barfleur
St. Vaast
St Sauveur-le-Vicomte
Carentan
Lison Junction
St. Lô
Seine R.
Falaise
Folligny
Vire
Argentan
Laigle
Dreux
Pontaubault
Dol
St. Hilaire-du-Harcouët
Maintenon
Alençon
Chartres
Fougères
Mayenne
Rennes
La Chapelle
Laval
Châteaudun
Le Mans
Vendome
Château-du-Loir
Loire R.
Angers
St Nazaire
Nantes
Tours

MAP 17


BRUSSELS
BELGIUM
GERMANY
LUXEMBOURG
Aachen
Liége
Namur
Charleroi
Mons
Valenciennes
Douai
Cambrai
Somme R.
St. Quentin
Hirson
Charleville
Sedan
Meuse R.
Laon
Compiègne
Soissons
Reims
Conflans
Verdun
Metz
Epernay
Châlons
PARIS
Commercy
Sommesous
Toul
Nancy
Esternay
Juvisy
Dourdan
Etampes
Moselle R.
Orléans
RAILWAYS IN USE, MID-SEPTEMBER 1944
RAILWAY, DOUBLE TRACK
RAILWAY, SINGLE TRACK
0
50
100
MILES

R. Johnstone

vent enemy reinforcement of the lodgment area. Folligny had also suffered extensive destruction, and its yards were a mass of burned cars and twisted steel. Enemy destruction of rail lines, in contrast, was not extensive, and rehabilitation was much simpler than expected. In the demolition of bridges the enemy was more methodical, although even there the amount of damage was only about half as great as expected.[10] Enemy-inflicted damage to equipment was also less than expected, and much rolling stock was captured and put to use. Nevertheless, the shortage of freight cars soon became a serious limiting factor because of the delay in moving equipment to the Continent and because of the losses resulting from Allied bombing of marshaling yards and locomotives. Destruction by the Allied air forces in fact threatened to have a more disastrous effect on the Allied logistic capabilities than on the enemy's operations. Beginning late in June supply and transportation officials repeatedly asked that railway bridges, tunnels, and viaducts, whose repair entailed large expenditures of effort, be spared in the hope that the enemy would not destroy them in retreat.[11]

At about the time the first trains entered Le Mans the Allies completed their envelopment of the enemy forces in the Falaise area, making it possible to begin work on the northern line eastward via Argentan, Laigle, and Dreux. Reconstruction of that line was particularly important in view of the necessity of supporting an additional army over extended lines of communications, and the project was given a high priority.

The opening of the main route east of Rennes still awaited the reconstruction of a rail bridge at Laval.[12] This was completed at the end of the month. Meanwhile reconnaissance parties had pushed on from Le Mans to examine the lines farther east. As could be expected, they found the railways between Chartres and Paris heavily damaged, for the Allied air forces had made special efforts to cut enemy lines of communications along the Seine. Once again, however, by circuitous routing it was possible to push a line eastward beyond Chartres. On 30 August the first American-operated train arrived at the Battignolles Yards in Paris, only four days after the surrender of the city. The opening of this line did not immediately permit heavy shipments to the French capital, however, and aside from engineer supplies, hospital trains, and civil affairs relief, little tonnage actually went forward.[13] Most of the Seine bridges had been destroyed, and the Paris yards, which had only limited capacity at the time, provided only a narrow funnel for the supplies required beyond the Seine.[14] By the end of the month the northern as well as the southern line was open to rail traffic, and Dreux and Chartres were for the moment at least to become the important railheads for the First and Third Armies respectively.[15] The volume of traffic to these points was not initially large, however. Between 24 August and 2 September only seventy trains with slightly more than 30,000 tons were

[10] *Ibid.*, Sec. V. p. 7; Final Report of the Chief Engineer, ETO, 1942–45, I, 283, OCMH.

[11] The results are unknown. CAO Mtg, 26 Aug 44, SHAEF AG 337–14 CAO's Mtgs; Ltr, Plank to OCMH, with comments on MS, 10 Jul 51.

[12] Ltr, Mov and Tn Br G–4 SHAEF to COMZ, 12 A Gp, and 21 A Gp, 18 Aug 44, sub: Rail Development, 12 A Gp Rolling Stock 106.

[13] Memo, Maj Edward G. Wetzel for Col Calvin L. Whittle, 6 Sep 44, 12 A Gp Transportation Sec Daily Jnl, 4 Sep 44.

[14] 12 A Gp AAR, VI, 34–35.

[15] TWX JX–13704, Stratton to Base Secs, 31 Aug 44, EUCOM 520 Transportation of Supplies, I.

dispatched from Le Mans to Chartres, and at the latter date the daily movements to Chartres were averaging 5,000 tons.[16]

The sudden need to rebuild the railways in August had made it necessary to augment greatly the work force employed in reconstruction and to reorganize the work of the ADSEC engineers. Until mid-August the Railway Division of the ADSEC Engineer Section directly handled all reconnaissance, planning, matériel procurement, and project assignment to various engineer units. In order to relieve this division of some of the details three provisional engineer groups, designated as A, B, and C, were activated late in August with the sole mission of railway reconstruction. Each group included an experienced engineer general service regiment as a nucleus, plus additional regiments and other detachments. Two groups were immediately given the task of opening the railways behind the two armies; the third was initially placed in support of the other two and later assigned to support the Ninth Army. In this way close engineer support in railway reconstruction was provided for each army, while the Advance Section continued to exercise over-all direction of the reconstruction.[17] At the end of August more than 18,000 men, including 5,000 prisoners of war, were engaged in rail reconstruction projects.[18]

Despite the addition of limited rail transport to Chartres and Dreux the rapid extension of the lines of communications in the first days of September continued to outdistance the transportation resources. It was not immediately possible to move large tonnages across the Seine by rail because of damage to the bridges and lines in that area. On the southern edge of Paris the bridge at Juvisy-sur-Orge, a vital link connecting the area west of Paris with the rail net to the east, was a major reconstruction project.[19] Only two or three trains per day moved forward from Chartres at first, and only small tonnages could be forwarded eastward through the narrow bottleneck of Paris beginning on 4 September.[20] As long as the extension of rail operations attempted to match the speed of the pursuit operating units had to forego many of the facilities normal to railroading and adopt makeshift arrangements, particularly in connection with signaling. Operations often resembled those of a third-class Toonerville Trolley more than model railroading. Under those conditions the ghost of Casey Jones shadowed many an engineer on the forward runs, as it did on 5 September at Maintenon, northeast of Chartres, where a blacked-out trainload of high-octane gas roared around a downgrade curve and crashed into another train, sending flaming Jerricans into the night.[21]

Beyond the Seine the entire railway picture was considerably brighter. For one thing, a much more extensive network existed to the northeast, including many of the main lines of the French system, and it had been kept in much better repair. More important, the railways in that area were not as badly damaged. Allied planes had not attacked them as persistently, particularly in recent months, as they had the lines in the OVERLORD lodgment area, and the enemy had had even less opportunity

[16] 12 A Gp Transportation Sec Jnl, 3 Sep 44.

[17] ADSEC Operations History, p. 70; Gen Bd Study 122, pp. 53–54.

[18] Final Report of the Chief Engineer, ETO, App. 41A.

[19] Railroad Reconstruction and Bridging, Hist Rpt 12, Corps of Engrs ETO, p. 67.

[20] History of the TC, ETO, Vol. IV, Sec. IV, p. 22, and Sec. V, p. 7.

[21] "Destination Berlin," *Army Transportation Journal*, I (March, 1945), 31.

to destroy them in the rapid retreat to the German border. East of Paris the railways therefore offered every prospect of being restored to operation quickly and of being able to handle a large volume of traffic.

In order to make the best possible use of this network while the through lines along the Seine were being restored, logistical planners decided to continue the movement of as much tonnage as possible by truck to the Seine and to transfer supplies to the railways, which could then carry them forward to the army areas. Transfer points were eventually established just outside Paris, where the cargoes of the Red Ball convoys were transferred to the railways for movement to the armies.[22] At the railheads another transfer of supplies was necessary, this time to army transportation. While this entailed additional handling of supplies, it promised to effect great savings in the use of motor transport.

In the meantime ADSEC engineers had set about making the necessary repairs to the rail lines extending eastward. In the First Army area Engineer Group A quickly opened a line from Paris northeast through Soissons, Laon, Hirson, and via secondary lines to Charleroi and eventually to Namur and Liége. Farther south Group C opened a route to the Third Army from Juvisy to Sommesous, where a transfer point was established, and then on to Commercy and Toul.[23] An additional line was then opened from Laon (on the northern line) via Reims eastward to Verdun and Conflans. Later in the month a better route was opened still farther north in support of the First Army, running north and northeast from Paris to Compiègne, St. Quentin, and via Cambrai to Mons and then to Namur and Liége.[24] In all this work the Americans made extensive use of captured materials.

By mid-September upwards of 3,400 miles of track had been rehabilitated and more than forty bridges had been rebuilt. Nearly all of this work was accomplished after the breakout from St. Lô.[25] By the end of the month rail lines had been opened eastward as far as Liége in the north and Verdun and Toul in the south, and bridge reconstruction was in progress at all three places. The rehabilitation of the railway had therefore proceeded far beyond what had been planned by that date.

This progress was reflected in the increasing tonnages forwarded by rail. As of 1 August cumulative rail shipments had totaled only one million ton-miles. A month later the total had risen to 12,500,000, and by mid-September shipments were averaging nearly 2,000,000 ton-miles per day. Beginning with the first driblet of supplies forwarded via rail east of Paris on 4 September, the daily tonnages handled beyond the Seine by the middle of the month averaged 5,000 tons and continued to rise.[26]

Though the railways thus assumed a greater and greater portion of line-of-communications hauling, the burden on motor transportation was not immediately re-

[22] History of the TC, ETO, Vol. IV, Sec. IV, p. 21; Gen Bd Rpt 122, p. 55.

[23] The Third Army, utilizing personnel from the 6811th Traffic Regulating Group, who were experienced in railway operations, plus French personnel and equipment, quickly organized a Railway Division of its own and took the initiative in opening and operating this line to expedite the movement of badly needed supplies which it had laid down in the vicinity of Paris. The line made the first deliveries to Sommesous on 7 September. 12 A Gp Transportation Sec Jnl, 21 Sep 44; TUSA AAR, II, G-4, 18, 20–22.

[24] ADSEC Operations History, p. 79; History of the TC, ETO, Vol. IV, Sec. IV, p. 25.

[25] ADSEC Operations History, p. 79.

[26] History of the TC, ETO, Vol. IV, Sec. IV, p. 22, and Charts 1 and 2.

lieved, for requirements in the forward areas were also increasing. The demands of the armies consistently absorbed all available lift, and transportation resources were to fall short of needs for some time to come. In mid-September bottlenecks in the Paris area and shortages of rolling stock still constituted serious limiting factors, and the railways were only beginning to come into their own as the principal long-distance carriers.

(2) Motor Transport

Because the transition from rail to truck was necessarily a gradual process, motor transport inevitably played a much larger role than originally anticipated. It was a role for which the motor transport facilities of the theater were neither well suited nor prepared. Logistical plans had been consistently based on the assumption that trucks would not be used for supply hauling at distances greater than 150 miles on the lines of communications.[27] Nor had the Transportation Corps been able to obtain, even on this assumption, either enough vehicles of any kind, let alone the types which it had requested, or enough properly trained drivers.

Using troop basis and logistical planning factors of that period, the Transportation Corps had calculated in the summer of 1943 that the Communications Zone would require 240 truck companies to meet the needs for the three main types of hauling—port clearance, static interdepot operations, and long-distance line-of-communications transportation. Theater headquarters rejected this estimate and in November 1943, after attempting to cut the requirement to 100 companies, finally approved an allocation of only 160 companies. This requirement was then submitted to the War Department as a special procurement project (PROCO).[28]

The scaling down of its request was only the first of the handicaps under which Transportation Corps labored in its attempt to provide adequate motor transport for the continental operation. In two other important features the procurement plan fell considerably short of its target. The theater chief of transportation had originally directed that the vehicle procurement project be based on a proportion of two heavy-duty trucks to one light. The heavier transport, such as the 10-ton semitrailer and truck-tractor combination, was desired for long-distance hauling, while the lighter types, like the 2½-ton 6 x 6, were to be used for static interdepot movements, for clearance of railheads, and on the poorer roads in the forward areas. In the project which the theater submitted to the War Department, using the 160-company basis, the two-to-one proportion was not adhered to. Almost all of the companies were to be specially equipped for specific missions, however, and the request included a sizable allotment of heavy-duty transport. Only 25 companies of standard 2½-ton 6 x 6 trucks were provided. The remainder were to be made up as follows: 36 companies were to have the long-bodied 2½-ton COE (cab over engine) trucks, best adapted to hauling light but bulky engineer equipment such as Bailey bridging and POL pipe; 27 companies

[27] Ltr, Lee to Chiefs of Supply Svcs, 24 Jun 43, sub: Projects for a Continental Opn, SOS ETO AG 381 Troop Basis and Strength 1943; Special Info for Current Conf, Nov 43: Projected Operations, European and Mediterranean Theaters, OPD, Office of Div of Planning, ASF, prep by Strategic Log Br OPD ASF, 28 Oct 43, Rpt 11, Pt. I, OCMH.

[28] History of Motor Transport in the European Theater of Operations, prep by Motor Transportation Svc, OCof T ETO, Ch. VII, p. 2, TC Hist Sec; Interv with Col Ayers, 16 Aug 50, OCMH.



GENERAL ROSS, *Chief of Transportation, ETOUSA.*

were to have 750-gallon tank trucks; 9 companies were to have 2,000-gallon semitrailer tankers; 2 companies were to have 5-ton refrigerator vans (reefers); 2 companies were to have 45-ton tank transporters, which were suitable for port clearance of heavy out-of-gauge equipment in addition to the purpose for which they were designed; and 59 companies were to have the tractor-drawn 10-ton semitrailer.[29]

The production and delivery of this equipment was another matter. As the winter of 1943–44 passed it became increasingly doubtful that even the scaled-down program would be met. The War Department approved the request for heavy-duty vehicles in December, but production difficulties in the United States thereafter proved the major hindrance to the fulfillment of the theater's needs. At the end of March 1944 the theater had on hand only 66 of the 10-ton semitrailers against a requirement of 7,194. It had received none of the 4,167 4- to 5-ton truck-tractors required for towing. On this combination of semitrailer and truck-tractor General Ross, the theater chief of transportation, had depended to bear the principal burden of line-of-communications hauling.[30]

In April the theater G–4 decided to pool all PROCO projects and issue trucks on the basis of priorities, further dimming the Transportation Corps' prospects. Since equipment such as the truck-tractor was an item common to several other services there was no guarantee that the Transportation Corps would get what it needed, regardless of the foresight it might have shown in the early submission of its program. TC project equipment was issued to other services, and also to the armies in the spring of 1944, with the inevitable result of limiting the movement capabilities of the Transportation Corps.[31]

As D Day drew nearer the delay in the shipment of vehicles made theater officials increasingly fearful that serious shortages in cargo-hauling capacity would develop, and the whole problem of motor transport became of major concern. Early in April

[29] Eventually a reduction in engineer requirements eliminated some of the 2½-ton COE trucks, and the adoption of a 750-gallon skid tank which could be loaded on an ordinary 2½-ton 6 x 6 reduced the need for the small 750-gallon tank truck. The number of standard 2½-ton truck companies was correspondingly increased from 25 to 66. But this alteration in the PROCO project bore little relation to what the War Department in the meantime was able to provide the theater. History of Motor Transport in the ETO, Ch. VII, p. 3.

[30] History of the TC, ETO, Vol. II (Jan–Mar 44), MT Sec., p. 2.

[31] *Ibid.*, pp. 5, 7–8.

the chief of transportation submitted detailed data to the War Department supporting his claim that the theater would require all of the vehicles requested in order to carry out its missions.[32] By that time it was obvious that the vehicles requested by the theater could not be made available. Late in April the War Department therefore took steps to meet the deficiency by ordering the release of a variety of substitute types of equipment from the Army Ground Forces, the Army Air Forces, and the Army Service Forces. Included were several hundred 1½-ton truck-tractors with 3- to 6-ton semitrailers, 4- to 5-ton truck-tractors with 25- and 40-foot 12½-ton wrecking-type semitrailers, and other miscellaneous types. In addition, the ASF was ordered to divert from production 1,750 4- to 5-ton truck-tractors and 3,500 5-ton semitrailers which had been intended for the Ledo Road project in Burma.[33] By this last-minute roundup and diversion of transport Washington hoped to tide the theater over the critical period pending the arrival of the project equipment it had requested. Finally, where it was impossible to issue heavy-duty vehicles, units were equipped with the standard 2½-ton 6 x 6 truck. Theater transportation officers later were of the opinion that the War Department's inability to deliver heavy-duty vehicles contributed materially to the bogging down of operations in the first days of September.[34]

Planning for the theater's transportation requirements, like the planning for ammunition supply, was characterized by the absence of mutually acceptable planning factors and by disagreement between the various headquarters concerned as late as a month before D Day. Elaborate precautions had been taken to insure coordination of all planning and adequate liaison between the various staffs, but General Ross was not even represented at 21 Army Group headquarters and found that reliance on the theater general staff for planning data was not satisfactory.[35] The theater chief of transportation and the Forward Echelon, Communications Zone, had repeatedly asserted that the planned allocation of motor transport would be inadequate unless the planned build-up of reserves was scaled down, the build-up was reduced, or a larger portion of both reserves and troop units was held in the rear areas. The Forward Echelon had recommended an increase in the motor transport allocation of about a hundred companies.[36] The ETOUSA G–3 had disallowed these requests.

Meanwhile, the SHAEF G–4 instituted his own studies of transportation needs, branding the theater staff's computations as "unreliable" and "worthless." According to the SHAEF planners, the theater had based its studies on much higher tonnage requirements than they considered

[32] Memo, Brig Gen Robert H. Wylie, Asst Cof T ASF, for Dir P&O ASF, 11 Apr 44, sub: Motor Vehicle Requirements for ETOUSA, SHAEF G-4 Stf Study 8, Operation Neptune and Inland Transportation.

[33] Memo, Handy for Crawford, 29 Apr 44, sub: Motor Vehicle Requirements for ETOUSA, SHAEF G–4, Stf Study 8.

[34] History of Motor Transport in the ETO, Ch. VII, pp. 6, 13.

[35] Ltr, Col Vissering to OCMH, 19 Jun 51.

[36] Memo, Albrecht to G–4 FUSAG, 5 Apr 44, EUCOM 320.2 Strength Rpts, FECOMZ File I; G–4 FECOMZ Study, Estimate of Supply Situation Operation OVERLORD, D–D plus 41, 17 Apr 44, ETO 381.400 Estimate of Supply Situation D–D plus 41; G–4 FECOMZ Study, Estimate of Supply Situation Operation OVERLORD D plus 41 to 90, 24 Apr 44, ETO 381.400 Estimate of Supply Situation D plus 41–90; Rpt of Mtg, OCofS FECOMZ, 17 Apr 44, sub: Truck Company Requirements on Continent, Opn OVERLORD, ETO 381.451 Vehicles (OVERLORD).

necessary.[37] Estimates of transport capabilities naturally varied depending on the assumptions as to port capacities, the distribution of reserves, the type of motor transport available, and other factors.

By mid-May, after a recalculation of transportation requirements, the area of disagreement had narrowed somewhat. General Crawford reported to the War Department at that time that all headquarters were satisfied that the minimum motor transport requirements up to about D plus 50 could "just be met" if truck companies and vehicles became available as then scheduled.[38] Some staff officers were less sanguine, predicting a shortage as early as D plus 30. They believed that the deficit could be eliminated only if the railways assumed a portion of the movement burden at an early date.[39] Beyond D plus 50 the theater's position was even more unpredictable because of the uncertainty over the receipts of heavy equipment.

The lag in delivery of motor transport equipment had a direct bearing on another important aspect of TC preparations—the training of drivers. As it did in the case of other types of service units, the theater agreed to accept partially trained truck units with the hope of completing their training in the United Kingdom. The lack of vehicles—particularly the special heavy-duty equipment—made this all but impossible. The small depot stocks which existed in the theater were earmarked as T/E equipment for high-priority units. In the fall of 1943 the Transportation Corps requested that at least a few of these vehicles (one or two semitrailers and truck-tractors for each company scheduled to operate them) be issued for training purposes. The proposal was not approved until May 1944, and only superficial training could be given in the short time that remained. Its inadequacy was eventually revealed by the damage which the heavy equipment suffered at the hands of inexperienced drivers.[40]

In still another vital aspect—adequate numbers of drivers—plans for a satisfactory motor transport system were at least partially voided by failure to take timely action on the chief of transportation's recommendations. British experience in North Africa had long since demonstrated the value of having enough extra drivers to permit continuous operation of vehicles. With this knowledge theater TC officials had requested as early as August 1943 that an additional thirty-six drivers be authorized for each truck company so as to provide two drivers per vehicle (ninety-six per company) and thus make it possible to carry on round-the-clock operations. The ETOUSA G–3 initially disapproved the idea, insisting that it was unnecessary.

To the Transportation Corps the necessity to plan for twenty-four-hour operations was clear from the beginning, and the need for extra drivers became even

[37] Memo, Whipple for Clark, Chief Q "A" Br, and Vissering, Chief Mov and Tn Br, SHAEF G–4, 4 May 44, sub: Motor Vehicle Requirements for ETOUSA; Replies by Clark, 4 May, and Vissering, 5 May; Memo, Whipple for Napier, Mov and Tn Br, 11 May 44, sub: U.S. Tonnages at D plus 60. All in SHAEF G–4 Stf Study 8.

[38] Memo, Crawford for Handy, 17 May 44, sub: Truck Companies, SHAEF G–4 Stf Study 8; Ltr, Vaughan to C-in-C 21 A Gp for MGA, 17 May 44, ETO 381.451 Vehicles (OVERLORD).

[39] Memo, Vissering for Director General of Military Railways, 20 May 44, sub: Road Transportation, SHAEF G–4 Mov and Tn War Diary; Memo, Col Wilbur S. Elliott, Deputy Chief Mov and Tn SHAEF G–4, to G–4, 18 May 44, 2d Ind to Memo, Whipple to Chief Mov and Tn Br, 17 May 44, sub: Truck Companies, SHAEF G–4 Stf Study 8.

[40] History of the Motor Transport Service in the ETO, Ch. II, pp. 18–19, Ch. IX, pp. 2–4.

more urgent as the prospect of obtaining the original allocation of truck companies began to wane. It therefore persisted and at the end of the year succeeded in getting another hearing, this time buttressing its earlier arguments with additional experiential data from the Mediterranean theater. Early in 1944 General Lee personally interceded in support of the TC proposal, and approval was finally obtained from the theater to request the additional personnel. By that time the War Department had established a ceiling for the theater troop basis and refused to furnish additional men without making corresponding reductions elsewhere. Left with no other choice, the theater therefore took steps to make the necessary personnel available from its own manpower resources. In mid-April General Lee was ordered to transfer 5,600 men from units in the SOS in order to provide an additional 40 drivers for each of 140 companies. In ordering the release of the men General Lee warned chiefs of services and installations commanders that he would not countenance any unloading of undesirables. Despite this familiar injunction the truck companies were saddled with many individuals who could not be trained as drivers. The search for men, furthermore, fell short of the goal, and was too belated to permit adequate training before the units were called to perform their mission on the Continent.[41]

To compensate for these inadequacies the Transportation Corps resorted to still other expedients. Shortly before D Day most of the men in fourteen existing colored truck companies were transferred to other colored motor transport units, the intention being to fill the stripped units with other white troops. This did not prove immediately possible, however, and the fourteen companies remained inoperative as late as mid-August. Meanwhile, the loss of the fourteen units was temporarily compensated for by the transfer of their vehicles to two engineer general service regiments,[42] which were converted into trucking units. By an involved administrative sleight of hand, the results of which were not entirely satisfactory, the deactivation of these units was therefore avoided, and the two organizations retained their designation as engineer regiments, although they were used as truck units by the engineer special brigades at the Normandy beaches.[43] By such expedients some of the most urgent requirements were met, but the failure to furnish adequately trained men had its inevitable effect later, particularly in poor vehicle maintenance. Thus, still another of the Transportation Corps' farsighted proposals was largely negated.

The delay in implementing the Transportation Corps' recommendations on motor transport fortunately did not affect supply support in the first two months of operations. Despite the fact that only 94 of the scheduled 130 truck companies had

[41] *Ibid.*, Ch. II, pp. 14–15, Ch. VI, pp. 1–7; Ltr, H. Lehneis, formerly of Motor Transportation Svc, to H. Larson, 10 Jan 50, Inquiries, TC Hist Sec; Interv with Ayers, 16 Aug 50; Ltrs, ETO to Base Secs, 15 Apr 44, sub: Overstrength for SOS Truck Companies, ADSEC 320.2 Strength, I.

[42] The 1323d and 388th.

[43] Ltr, Plank to CG COMZ, 7 May 44, sub: TC Situation, Advance Section . . . as of 1600 hours; Ltr, Hq ETO to CGs U.K. Base Secs, 16 Jun 44, sub: Amalgamation of QM Truck Companies (TC) and Engr General Svc Regiments; Memo, Col Eugene F. Cardwell, ADSEC G-4 for CofS, 13 Jul 44; Memo, Col Hugh Cort, CofS, for ADSEC G-1, 14 Jul 44; Ltr, Col Clarence W. Richmond, CO MTB ADSEC, to Col Percy S. Haydon, 467th QM Gp (TC), 8 Aug 44, sub: Reconstitution of QM Truck Companies (TC). All in USFET 322 Amalgamation of QM Truck Companies and Engr General Svc Regiments; Interv with Ayers, 16 Aug 50, OCMH.

been brought to the Continent at the end of July, the available motor transport proved entirely ample for the short-distance hauling requirements in the period during which U.S. forces were confined to the Normandy lodgment.[44]

The breakout at the end of July quickly eliminated any existing cushion. The sudden success of early August brought heavy demands on all the available transport, for the amount of transportation in effect shrank with every extension of the lines of communications because of the longer turn-round required between the rear depots and forward dumps. Outstanding among the immediate tasks were movements of gasoline to the Third Army. On 11 August the daily POL hauling requirement for Advance Section was raised from 300,000 to 600,000 gallons. On 5 August 72,000 tons of ammunition were ordered to a dump forty miles inland from OMAHA Beach. A few days later a 10-ton flat-bed company was assigned a four-day haul of POL pipeline material. By mid-August hauling missions were more and more exclusively devoted to the movement of the barest essentials.[45]

In the second week of August the first steps were taken to meet the growing demands by augmenting the lift capacity of the Advance Section's Motor Transport Brigade. On 10 August two companies of 45-ton tank transporters were converted to cargo carriers. A few days later ten additional trucks were distributed to each of fifty-five companies equipped with the 2½-ton 6 x 6, and 1,400 replacements were obtained for temporary duty to handle the additional equipment.[46]

During August the Advance Section also had the use of three British companies. Between 300 and 360 trucks, of 3-, 6-, and 10-ton capacity, were loaned by the 21 Army Group for a full month, and were used mainly to carry supplies from railheads forward to Third Army depots.[47] In the armies, meanwhile, replacements were also used as relief drivers in order to make fuller use of available vehicles.[48]

By taking such measures and by increasing the use of army transport facilities for long-distance hauling, it was possible to support the forward elements at fairly adequate scales for the first three weeks of August. The decision to cross the Seine and press the advance eastward at this time, however, constituted an important departure from the OVERLORD plan and presented the Communications Zone with a much more serious logistic problem. To support the armies beyond the Seine the Communications Zone announced as its initial target the placing of 100,000 tons of supplies (exclusive of bulk POL) in the Chartres–La Loupe–Dreux triangle by 1 September. It assumed at first that approximately one fifth of this tonnage could be delivered by rail, leaving 82,000 tons to be moved by truck.[49] The planners immediately realized that meeting this de-

[44] Gen Bd Study 122, p. 43. A letter from the ADSEC adjutant general reported ADSEC as having 157 QM truck companies on 31 July, but this figure is highly improbable and is in conflict with the ADSEC Operations History. Ltr, AG ADSEC to CG ETO, 10 Aug 44, sub: Order of Battle, ADSEC 381 Order of Battle; ADSEC Operations History, p. 71.

[45] History of the TC, ETO, Vol. IV, MTB Sec., p. 14.

[46] *Ibid.*, p. 13.

[47] History of Motor Transport in the ETO, Ch. III, p. 9; Note by Lt Col A. Warhurst, 21 A Gp Historian, 30 Sep 49, OCMH.

[48] TUSA AAR, II, G-4, p. 14.

[49] One source states that 75,000 tons would have to be moved by truck. See Memo, Stratton for Technical Svcs, 24 Aug 44, sub: Ltr of Instructions for Loading at Depots and Dumps, SHAEF TC 505 Loading and Unloading (40); Plan, Col R. C. Tripp, Transportation Officer ADSEC, Red Ball Freight Haul, 26 Aug 44, ADSEC 523.091 Red Ball—XYZ Routes.

mand required a more effective marshaling of transportation resources. Out of this necessity the famed Red Ball Express was born.

Taking its name from railway parlance, the Red Ball Express was planned as a fast "through freight" which would have exclusive use of a one-way loop highway, operating round the clock and utilizing all available motor transport. Unfortunately there was little in the way of either plan or precedent which could be used in organizing the system. The Transportation Corps had given some thought to the problem during the planning period in the United Kingdom and had wanted to make a test run of continuous long-distance hauling for purposes of experimentation and training. It had planned to operate truck-tractor–semitrailer combinations over a 300-mile stretch continuously for several weeks with assumed stops for loading and unloading, regular halts for rests, meals, and maintenance, and alternating drivers. Such a trial run undoubtedly would have produced valuable data on such matters as maintenance, driver fatigue, requirements for various types of equipment and for drivers, and therefore would have aided materially in the preparation of SOP's for operations of this type. But neither the equipment nor the manpower was available in time for such a test.[50] The only training exercise which even faintly resembled the conditions of the later express system was a test run conducted to determine the efficiency of another Red Ball system—the *shipping* procedure devised to handle emergency shipments of supplies from the U.K. depots to the far shore. This procedure involved both rail and motor movements from the depots to the U.K. ports as well as cross-Channel shipping. Trucking units carried out a test run of this procedure on the night of 3–4 June, but the trial was of very limited duration, and while it revealed many defects it hardly served as a test of the type of continuous and large-scale motor transport operations which were now attempted.[51]

The urgency of the mission allowed little time for deliberation or planning, and the Red Ball Express therefore was largely an impromptu affair. Not until 23 August was the Advance Section questioned concerning its ability to make the desired deliveries.[52] Two days later the convoys began to roll eastward. The Red Ball plan was worked out jointly by officers of Headquarters, Communications Zone, and the Advance Section, two of the officers most instrumental in its implementation being Lt. Col. Loren A. Ayers, chief of the Motor Transport Service, Headquarters, Communications Zone (later deputy commander of the Motor Transport Brigade), and Maj. Gordon K. Gravelle, also of COMZ headquarters. The plan called for the pooling of almost all of the Communications Zone's motor transport facilities in one organization—the Advance Section's Motor Transport Brigade (MTB), then commanded by Col. Clarence W. Richmond. It was agreed that the Advance Section should be given 141 truck companies with the understand-

[50] History of Motor Transport in the ETO, Ch. IX, p. 6.

[51] Ltr, CWS COMZ to Supply Officers, Chemical Secs General and Ord Depots, and COs CWS Depots, 16 Jun 44, sub: Red Ball Express, with Incl, Ltr, Hq ETO to CGs Southern Base Sec and Western Base Sec, 13 Jun 44, sub: Red Ball Test 1, ETO Adm 281 Red Ball Express.

[52] There is disagreement concerning this date. One source states that TC officers at Headquarters, COMZ, did not discuss the mission until 24 August. Ltr, Col Ayers on the MTS to H. Larson, Hist Div, 6 Dec 49, TC Hist Sec.

ing that all would be placed on line-of-communications hauling with the exception of five companies reserved for railhead distribution in the Le Mans–Chartres area.[53] Initially 118 companies were designated for Red Ball use.

More than seventy companies were already operating under the Advance Section, which on the first day was able to place sixty-seven companies in operation and deliver 4,482 tons of supplies to the Dreux–Chartres area. An additional forty-one companies were immediately allocated to Red Ball from the motor transport of the recently activated Normandy Base Section. The speed with which the system was organized is indicated by the fact that the Red Ball reached its peak performance within the first five days of operation. On 29 August 132 companies with a strength of 5,958 vehicles were committed and on that day 12,342 tons of supplies were delivered forward, a record which was not again equaled in the succeeding eleven weeks during which the express service continued to operate. Some of the initial confusion attending the organization of the express route is indicated by the fact that traffic control personnel were sent to Verneuil, west of Dreux, only to find after three days of waiting that the route had meanwhile been altered.[54]

Red Ball fell slightly short of its objective of 82,000 tons to be delivered by 1 September. The time was then extended several days, and the tonnage target was also increased because of the inability of the railways to move the tonnage originally assigned them. By 5 September, the date at which the Red Ball's original mission was considered completed, approximately 89,000 tons of supplies had been delivered to the Dreux–Chartres service area via motor transport.[55] On that date Col. Ross B. Warren replaced Colonel Richmond as commander of the Motor Transport Brigade. Deliveries in the first days had averaged approximately 7,400 tons. In addition, however, trucks of the Motor Transport Brigade hauled about 48,000 tons forward from railheads at Le Mans, Chartres, and Dreux.[56]

In this initial phase the Red Ball route consisted of two parallel highways between St. Lô and Chartres, one for outbound traffic and one for the return. *(Map 18)* Red Ball trucks actually traveled northward to the base depot in the vicinity of the beaches and even to Cherbourg to pick up their cargo, but St. Lô was the control point from which the convoys were dispatched forward. The entire express highway route was marked with the characteristic red ball marker which pointed the way for drivers. Because of the density of traffic, and in order to assure the most efficient control of traffic, specific rules were laid down to govern the operation of Red Ball trucks. Use of the highway, for example, was reserved exclusively for Red Ball vehicles; all traffic was to move in one direction; all trucks were to be organized into convoys which in turn were divided into serials; the maximum allowed speed was to be twenty-five miles per hour; convoys were not to halt except for the specific ten-minute "break" at exactly ten minutes before each even hour; a sixty-yard interval was to be maintained between all vehicles and there was to be no passing; stragglers were to fall in at the end of convoys hauling similar commodities and eventually rejoin their own

[53] Plan, Col Tripp, Transportation Officer ADSEC, 26 Aug 44, sub: Red Ball Freight Haul, ADSEC 523.091 Red Ball-XYZ Routes.

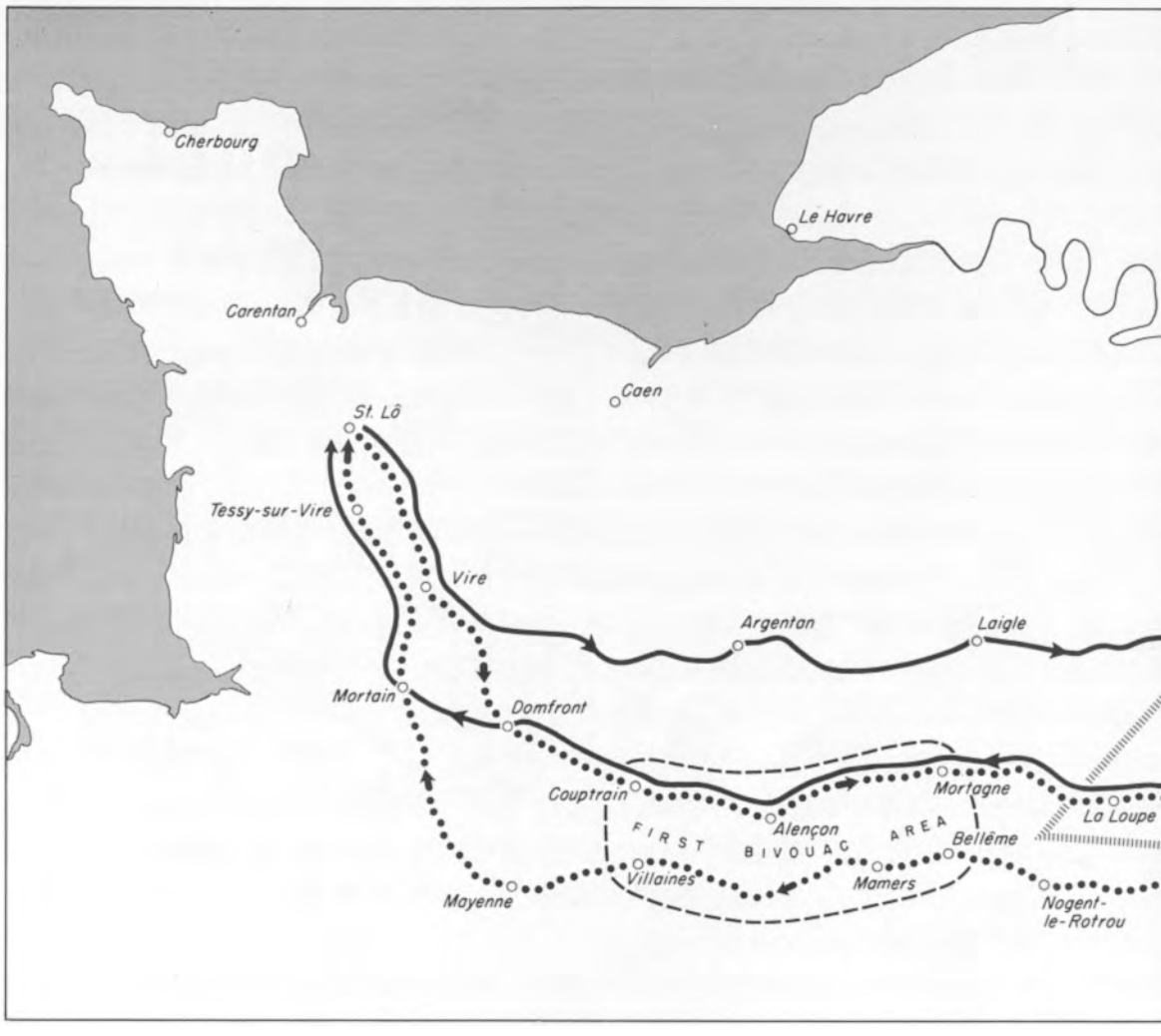
[54] COMZ G-4 History, III, 3, 10.

[55] *Ibid.*, III, 3; Gen Bd Rpt 122, App., p. 23.

[56] COMZ G-4 History, III, 3.



DIRECTING TRAFFIC ALONG THE RED BALL ROUTE. *Sign shows tonnage target for the day, 5 September 1944.*

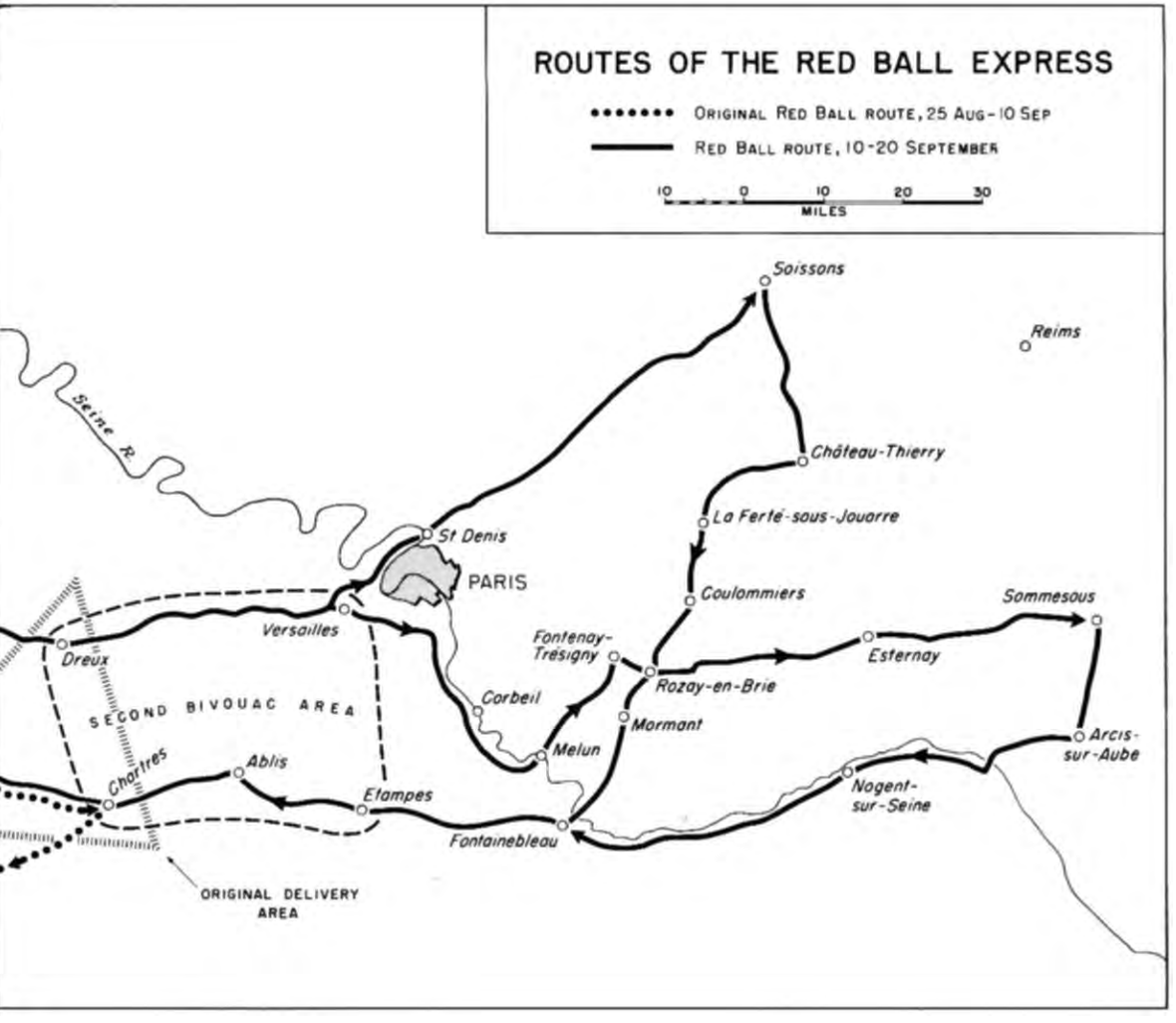


MAP 18

units upon return; disabled vehicles were to pull to the side of the road until evacuated or repaired by ordnance patrols.[57]

Such regulations were obviously needed if the stream of traffic was to be kept flowing smoothly and without congestion. Operations were to continue twenty-four hours per day, and in order to allow the best possible speed at night Red Ball convoys were freed from the usual restrictions regarding the use of "cat eyes" and were permitted to employ full headlights, initially as far east as Alencon and later throughout the Communications Zone. This relaxation of normal blackout regulations was made possible by the almost

[57] History of the TC, ETO, Vol. IV, Sec. III, pp. 15–16.



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total absence of the German Air Force west of the Seine. Bivouac areas for the truck companies assigned to the Red Ball Express were located south of Alençon, approximately midway along the express system and astride the outgoing and returning routes, thus permitting a change of drivers at the halfway mark on each run.[58]

Operating the Red Ball Express proved a tremendously complex affair entailing much more than simply driving trucks, for it required a multitude of ancillary services provided by services other than the Transportation Corps. In addition to actually operating the convoy the Transpor-

[58] COMZ G-4 History, III, 5; Min, CAO Mtg, SHAEF, 9 Sep 44, SHAEF AG 337-14 CAO's Mtgs.

tation Corps, in co-ordination with military police units, regulated the movement of traffic. Traffic control points were initially established in all the main towns to record the movement of convoys, check their destination and cargo, and inform convoy commanders on the location of refueling and water points and of ordnance maintenance units. Military police units aided in this control by regulating traffic at intersections and defiles, enforcing the restriction on the use of the Red Ball route, directing casual vehicles and stragglers, checking improper use of lights, and in general policing and patrolling the routes. Maintenance of the routes was a responsibility of the Corps of Engineers, which designated two general service regiments for the task and assigned specific sections of the highway to platoons bivouacked along the routes.[59] Engineers also made several thousand road markers and additional signs in both French and English warning unauthorized vehicles to stay off the Red Ball routes. Ordnance units—mainly automotive maintenance companies—were initially stationed at eight of the principal towns along the route to afford repair facilities and provide replacement vehicles. In addition, ordnance maintenance shops sent patrols and wreckers out along the route. Signal Corps units provided radio communications between bivouac areas and diversion points, and a courier service was established between regulating stations and the forward dumps. Finally, the Medical Corps established an aid station in the bivouac area and provided ambulance service for the evacuation of casualties to near-by hospitals.[60]

The Red Ball plan was thus a well-conceived one. Unfortunately the actual operation of the express service, particularly in its early stages, left much to be desired. Many of its difficulties centered around the problem of traffic control. From the beginning Red Ball suffered a chronic shortage of MP's to police the route, with the result that it was next to impossible to reserve routes for the exclusive use of Red Ball trucks and supporting vehicles. First Army, Third Army, and the Ninth Air Force all ran convoys over the routes without clearing with the Advance Section, and other vehicles, both military and civilian, attempted to move against the stream of traffic.[61] Red Ball drivers regularly disregarded convoy discipline and the twenty-five-mile-per-hour speed restriction. The latter was a common violation of convoys attempting to make up lost time, and of stragglers determined to catch up with their convoys.[62] Among British units gossip had it that to avoid a U.S. convoy one must "not only get off the road but climb a tree."[63]

Meanwhile vehicles were often used uneconomically, both through loading to less than capacity and through delay and loss of time in loading and unloading. Only a few days after Red Ball began operations Colonel Ayers, following a study of the first tonnage reports, asked the COMZ G-4 to set minimum tonnages for each type of vehicle, in some cases 50 to 100 percent above rated capacity.[64] In the early stages the loss of time resulted in

[59] Hist Rpt 14, Corps of Engrs ETO, p. 46; ADSEC Operations History, p. 72.

[60] COMZ G-4 History, III, 8-10.

[61] 12 A Gp Transportation Sec Jnl, 3 Sep 44.

[62] History of the TC, ETO, Vol. IV, MTB Sec., p. 16.

[63] Annex to Ltr, Whipple to G-4 SHAEF, 21 Sep 44, sub: Advance Across the Rhine, SHAEF G-4 381 War Plans General, I.

[64] Memo, Ayers for COMZ G-4 Mov Div, 28 Aug 44, sub: Insufficient Loading of Trucks, Red Ball Express, SHAEF TC 505 Loading and Unloading (40).

part from the scattered location of dumps at both ends. Even in late September an analysis in Normandy Base Section revealed that the fastest loading time for a convoy was 11.5 hours, while in a few cases 34 to 39 hours were required. Unloading in the forward areas was equally unsatisfactory. There were other factors which contributed to the delays in the base areas. Trucks were often sent to depots in advance of the time loading could begin, sometimes arriving before the depot received the order to ship. In other cases the number of trucks sent to the depots was inadequate to take loads with high bulk ratios. This difficulty was eventually remedied by requiring the chiefs of services to furnish cubage as well as tonnage estimates on requisitions so that traffic control regulating points could allot the proper number of vehicles.[65]

Maintenance of motor transport equipment also fell far short of the ideal. In mid-September it was discovered that no ordnance service was available on the return route between Chartres and St. Lô, and that twenty-seven companies of one truck group had been without maintenance between 10 and 12 September. In one survey eighty-one loaded vehicles were found unserviceable along the highway between Vire and Dreux.[66] The lack of such service was particularly noticeable after the Red Ball route was extended on 10 September.

Another difficulty that plagued Red Ball operations was the "losing" of convoys through diversion to points other than ordered. The Communications Zone had complained as early as the first week in August about the armies' practice of asking ADSEC drivers to deliver supplies to division supply points, admittedly an abnormal procedure. COMZ officials insisted that ADSEC drivers were not prepared to deliver supplies that far forward, that they were unfamiliar with routes in the forward areas, and that such a practice slowed the turn-round of trucks, entailed a loss of time, and generally limited the Communications Zone's ability to meet the armies' requirements.[67] But that problem was soon put in the shade by the necessity to travel greater and greater distances to put down supplies even as far forward as the army maintenance areas. Convoy movement instructions were issued at the base depots in Normandy Base Section, which designated the regulating station through which cargoes were to be routed. The regulating station in turn designated the dumps at which convoys were to unload their supplies and notified the dumps of the approach of the convoy.[68] This planned co-ordination and synchronization often broke down in practice. Regulating stations frequently did not get advance information from the bivouac area of the approach of convoys, and the dumps consequently often received notice of the approach of a convoy only a few minutes before its arrival instead of the six or seven hours intended. The Communications Zone attempted to correct this deficiency by directing the agencies dispatching convoys to inform regulating stations twice daily by TWX of the number of convoys and class of supply dispatched.

Such measures met only part of the difficulty. Convoy commanders found within only a week of the establishment of the ex-

[65] COMZ G-4 History, III, 8.

[66] *Ibid.*, p. 18.

[67] Ltr, Hq COMZ to CG 12 A Gp, 8 Aug 44, sub: Movement of Supplies and Equipment by Motor Transportation, EUCOM 400 Supplies, Svc and Equipment, General, IV.

[68] COMZ G-4 History, III, 4.

press that they had to travel farther and farther to reach the army dumps, and in some cases could not even find them. Despite the fact that Chartres had been designated as the terminus of the Red Ball, convoys were regularly diverted from the dumps west of the Seine to new ones farther east, with the result that within the first ten days of the operation the turn-round time was increased by 30 percent. Convoys often traveled an additional 50, 60, or even 100 miles before locating an appropriate dump, and after the Red Ball route had been extended to Hirson and Sommesous, in support of the First and Third Armies respectively, they sometimes went as far as Maastricht, Verdun, and even Metz, far beyond the official termini of the Red Ball routes.[69] At times army dumps actually closed while convoys were en route from the regulating station. Commodity-loaded convoys, which were ordered to dumps of a particular class of supply, were often forced to "peddle" their loads until their cargoes were finally accepted.[70]

In the initial stages of the operation the control of Red Ball vehicles was extremely loose. The original injunction that convoys move in company strength was immediately violated, and was then relaxed to permit convoys of platoon strength.[71] But detachments of a few vehicles were frequently sent to the base depots to pick up small consignments and then dispatched forward. Early in September Normandy Base Section noted that less than one third of all trucks were moving in organized convoys, and in the middle of the month the Communications Zone again forbade this practice. It directed that where the dispatch of a full company to the loading points was not warranted trucks were to be marshaled into convoys as complete company units before being cleared for the run forward of St. Lô.[72]

Part of the early confusion undoubtedly arose from the haste with which the Red Ball enterprise had been organized and the lack of experience in conducting such an operation. The fluid conditions in the army areas also contributed to the difficulties, for the constantly shifting maintenance area resulted in longer and longer turn-rounds, increased the difficulties of control, stretched the meager resources of the maintenance service, and upset all schedules of delivery.

In addition, the operation was conducted under what the Transportation Corps regarded as an unsatisfactory control arrangement for motor transport. The organization of motor transport on the Continent presented no great problem as long as the command and organizational structure remained fairly simple. Until early August all hauling was carried out by the truck units of either First Army or the Advance Section, and centralized direction was achieved by virtue of First Army's command of the entire lodgment area. Anticipating the time when it would have a role independent of the armies the Advance Section, barely a month before D Day, had organized its truck units into the provisional Motor Transport Brigade in the firm conviction that centralized control of motor transport was desirable. In the early phases the MTB did not actually control truck units assigned to the

[69] Ltr, Col Ayers to H. Larson, 6 Dec 49, TC Hist Sec; ADSEC G-4 Periodic Rpt for quarter ending 30 Sep 44, ADSEC 319.1 G-4 Periodic Rpts.

[70] 12 A Gp Transportation Sec Jnl, 4 Sep 44, with Memo, Maj Wetzel for Col Whittle, 6 Sep 44.

[71] Ltr, Plank to OCMH, with comments on MS, 10 Jul 51.

[72] COMZ G-4 History, III, 11.

beach brigades or those assigned to port clearance at Cherbourg. After the drawing of the army rear boundary, centralized control of motor transport in the base area was in effect for only a short period early in August during which the Advance Section was the sole base section on the Continent.[73]

When the Red Ball Express was organized later in the month, centralization was achieved to the extent that the MTB, operating under the command of the Advance Section, was assigned responsibility for carrying out the mission and given the use of the bulk of the motor transport resources in the Communications Zone. The brigade's control of movements was not actually complete, however, for a second COMZ section—Normandy Base Section—had been activated in the meantime, and the brigade theoretically did not have control beyond the Advance Section's boundaries. This limitation was not serious at first, for the Advance Section initially controlled the entire area between St. Lô and the army rear boundaries. Normandy Base Section controlled the area north of St. Lô and was responsible for loading convoys and issuing movement instructions. But the control of motor transport operations became considerably more complex as commands were further multiplied, as the Red Ball route was extended, and as ADSEC responsibility was shifted farther eastward.

The Red Ball completed its original mission on 5 September, but necessity dictated that its life be extended, and the following day it entered its second and lengthier phase of operations. Five days later the Red Ball route was altered somewhat and extended eastward through Versailles, where it diverged into two routes, one extending northeast to Soissons (in support of the First Army) and returning via Fontainebleau, Etampes, and Alençon, and the other branching off from Versailles eastward to Rozay-en-Brie and Sommesous (in support of the Third Army) and also returning via Fontainebleau. On 20 September the northern route was extended still farther to Hirson, and there were other minor alterations in the routes followed.[74]

In the course of these changes additional base sections were also created and given area command. By early October Red Ball convoys were required to pass through as many as five sections, with all the delays entailed in the co-ordination of changes in route, supply, and traffic control. Even though the Motor Transport Brigade, an ADSEC organization, continued to operate the express system, many aspects of the enterprise, such as the provision of road and vehicle maintenance, policing, signal communications, and other services, were divided among the various base sections. The proper co-ordination of all these activities created an impossible administrative burden. The new sections did not always immediately assume responsibility for all these functions. In some cases they lacked military police or signal or engineer troops; often the new sections were not informed of the most recent operational instructions. Attempts were made to eliminate these difficulties by issuing clearer instructions to base sections, but the confusion and misunderstandings about the extent of control and responsibility of one base section vis-à-vis an adjacent one did not immediately clear up. Contrary to the

[73] History of Motor Transport in the ETO, Ch. III, pp. 4–5, and Ch. XIII, pp. 8–9.

[74] ADSEC TC Periodic Rpt to G–4 ADSEC, 26 Oct 44, ADSEC Supplements to G–4 Periodic (Quarterly) Rpts; COMZ G–4 History, III, 21.

theory on which the base section system had been established, the Advance Section meanwhile attempted to exercise over-all supervision of movements along the entire Red Ball route and only incurred the criticism of other commands for its pains. Late in September the Seine Section (comprising the Paris area) complained that ADSEC representatives were making unauthorized diversions and changing consignments at truck-to-rail transfer points which were within Seine Section territory. Not until December, after the Red Ball had come to an end, was a system of uniform traffic regulations adopted.[75]

The difficulties inherent in decentralized control of an intersectional activity such as motor transportation illustrated an age-old problem—the conflict between the functional and regional division of responsibility. The Transportation Corps had fully recognized that jurisdictional problems would inevitably arise in a system of regional control and repeatedly advocated centralized control of operations which traversed sectional boundaries. But its recommendations had not been approved.

By the end of the pursuit in the middle of September Red Ball had delivered a total of 135,000 tons to the army service areas.[76] The number of truck companies available to the MTB for the Red Ball runs fluctuated considerably, and the average was far below the peak strength of 132 attained within the first few days. In the first weeks of September approximately 115 truck companies were used, although the MTB sometimes had upwards of 130 companies assigned and the Communications Zone as a whole had 185 companies on the Continent.[77]

To muster this amount of transportation the Communications Zone had to resort to many expedients, among them the elimination of all unessential hauling and the temporary creation of provisional truck companies out of a variety of both service and combat organizations. At the very start forty companies were transferred from the Normandy Base Section to the MTB, and both base sections had to exercise the most stringent economy. The Communications Zone immediately called for surveys of all organic cargo-carrying vehicles of every unit assigned or attached to static or semistatic units and ordered that all vehicles, with drivers, that could be spared for four or more hours per day be made available on a temporary basis to base section transportation officers for interdepot hauling and for port and beach clearance.[78] In a further effort to meet requirements for line-of-communications hauling the Communications Zone reduced the activities at the beaches and ports by 50 percent and forbade the shipment of any supplies from the U.K. depots for which there was not an urgent need.[79]

To augment the available transportation, provisional truck companies were

[75] COMZ G-4 History, III, 23-24; Interv with Col Ayers, 16 Aug 50, OCMH.

[76] Gen Bd Rpt 122, Red Ball App. Since it continued to operate another two months, the bulk of its activities fall in the succeeding period, and its accomplishments will be summarized in Volume II.

[77] 12 A Gp Transportation Sec Jnl, 3 Sep; Memo, Capt Ludolph, Chief Highways Br, for Col Mack, 13 Sep 44, sub: General Ross's Buck, *EUCOM* 319.1 Rpt—Misc; COMZ G-4 History, III, 26; Cbl FWD-14583, Lee to Somervell, 12 Sep 44, P&O Div files.

[78] Ltr, Hq COMZ to COs Brittany and Normandy Base Secs, 28 Aug 44, sub: Critical Shortage of Motor Transportation, ADSEC 537 Automobiles and MT Transportation.

[79] Ltr, 12 A Gp to Armies, 25 Aug 44, sub: Conservation of Transportation, 12 A Gp Supply, Rpts of Status of; COMZ Stf and Comd Conf, 3 Sep 44, as cited in William M. Hines, Sr., History of the General Purpose Vehicle, 1941 to 1945, II, 350, OCMH.







TRACTOR-TRAILER COMBINATIONS *used on the Continent: 4–5-ton, 4 x 4, truck tractor, COE, with 2,000-gallon gasoline semitrailer, top; 1½-ton, 4 x 4, truck tractor with 3½-ton stake and platform semitrailer, center; 12-ton, 6 x 4, truck with 45-ton trailer (tank transporter), bottom.*

organized in the meantime from both service and combat units. In Normandy Base Section two engineer general service regiments were reorganized into seven truck companies each, and a chemical smoke generating battalion was reorganized as a truck battalion, its four companies being equipped with standard 2½-ton 6 x 6 trucks.[80] An additional ten companies were organized from antiaircraft units. Finally, three infantry divisions recently arrived on the Continent—the 26th, 95th, and 104th—were immobilized and their vehicles were used to form provisional truck companies. More than forty companies were organized in these divisions with the aid of 1,500 vehicles which the Communications Zone drew from stocks intended for issue to other units.[81]

The Red Ball Express by no means accounted for all the hauling during the period of the pursuit, nor even for all the long-distance hauling. A considerable amount of transport was used in clearing ports, and the MTB devoted a sizable portion of its transport to hauling forward of the railheads.[82] The armies also accounted for a substantial portion of long-distance hauling, although the extent and volume of it are not recorded. Like the Communications Zone, the armies took special measures to marshal all transportation resources and pressed every cargo-hauling vehicle into service. Both First and Third Armies made progressively greater use of both combat and service units that could be spared for cargo hauling. On 22 August General Bradley instructed both armies to leave their heavy artillery west of the Seine and to use the freed cargo trucks for supply movement, and the Communications Zone was asked not to move heavy-caliber ammunition beyond the Seine.[83] Thereafter extensive use was made of all types of units. By the end of August the First Army was using engineer tactical transportation—three heavy ponton battalions, two light ponton battalions, and two dump truck companies—for supply movement.[84] Within another two weeks it was using a total of eighteen battalions of its artillery, with approximately 450 trucks of the 2½-ton type or larger and more than 200 lighter vehicles (¾-ton). By the end of September these converted field artillery battalions alone had hauled 17,200 tons of supplies.[85] Meanwhile 340 trucks were taken from antiaircraft artillery units to form provisional truck companies, and units of other services also assigned their organic transport to hauling army supplies. In this way vehicles were drawn from evacuation hospitals, gas treatment battalions, mobile refrigerator companies, salvage and repair companies, engineer camouflage units, signal depot and repair companies, ordnance maintenance companies, and other types of units.[86] Third Army resorted to similar expedients.

There is no doubt that but for these special measures in marshaling the transportation resources in both the communications and combat zones the advance of the armies could not have been sustained as far as it was. Throughout the period of the pursuit motor transport, contrary to all expectations, bore the preponderant

[80] History—Normandy Base Section D Day to VE Day, issued by Hq CHANOR Base Sec, Aug 45, p. 34, ETO Adm 595.

[81] 12 A Gp G-4 AAR for Sep, dated 7 Oct 44, p. 2, Opns Rpts AGO 99/12-4.

[82] COMZ G-4 History, III, 13–14.

[83] Memo for record, Kibler, 22 Aug 44, sub: Notes on Conf held by A Gp Comdr at 2100 hours, 12 A Gp G-4 Memos for Record.

[84] FUSA Rpt of Opns, 1 Aug 44–22 Feb 45, III, 145.

[85] *Ibid.*, p. 6.

[86] FUSA AAR, Sep 44, p. 58.

burden of supply movement over distances up to 400 miles. By far the most lavishly publicized for this feat was the Red Ball Express. The campaign by which praise was heaped on the Red Ball driver in such public organs as *The Stars and Stripes* and *Yank* and in commendation from Headquarters, Communications Zone, undoubtedly served a useful purpose, dramatizing the urgency of moving supplies forward and enchancing the morale of men performing a duty which was monotonous, devoid of glamor, and normally unpublicized. Although his later performance in the XYZ operation, the express service organized to support the final drive into Germany in the spring of 1945, far surpassed that of September 1944, it was for the latter that the Red Ball driver was to be remembered and even memorialized in song in a Broadway musical show entitled "Call Me Mister." [87]

But Red Ball was carried out at a terrible cost. As early as mid-September the mounting strain on both personnel and equipment was already clearly evident. The almost continuous use of vehicles without proper maintenance could have only one result—rapid deterioration of equipment. Just such a deterioration was reflected in the rise in major repairs, from 2,500 in mid-September to 5,750 by the end of the month.[88] Contributing to this increasingly dangerous maintenance problem was the constant abuse of vehicles. Drivers habitually raced their trucks at double the established twenty-five-mile per hour speed limit, and overloading by 100 percent was an accepted practice as a result of authorization granted before D Day by the War Department.[89] But the conditions under which overloading had been tested and approved by the Ordnance Department over improved roads at Aberdeen, Maryland, were not always duplicated on the grueling runs in northern France. In tires alone the replacement figure for the 8-ply 750 x 20 tire, the type most commonly used, rose from an average of 29,142 in preceding months to 55,059 in September, and in mid-September 40,000 of that type awaited repair.[90] Theater stocks of tires were rapidly nearing exhaustion, as were spare parts and tools. Repair facilities simply were not equal to the task suddenly thrown upon them.

A similar strain was felt by personnel. Extreme fatigue not only resulted in accidents but also led to sabotage and malingering. In some instances drivers tampered with motor mechanisms with the express purpose of incapacitating their vehicles and falling out of a column.[91] The Red Ball Express had even more sordid aspects. In the absence of enough MP's for traffic and convoy control, the least scrupulous drivers sold their cargo on the French black market.[92]

Red Ball bore many of the defects of an operation hastily organized under the pressure of events to meet an emergency: there had been insufficient time for planning; extensive use had to be made of hastily organized provisional units, with all the disadvantages inherent in such practice; and there was a costly attrition

[87] Written by Harold Rome and first produced in 1946.

[88] Hines, History of the General Purpose Vehicle, II, 387, citing a report of the Transportation Section, Normandy Base Section.

[89] *Ibid.*, II, 388n, citing testimony of Maj. Gen. Everett S. Hughes; History of the TC, ETO, Vol. III, Ch. XII, p. 3.

[90] Hines, History of the General Purpose Vehicle II, 394–95, citing Normandy Base Section report.

[91] *Ibid.*, II, 381, citing G-4, COMZ, report on Red Ball, and 382n, citing a Normandy Base Section history of Red Ball.

[92] *Ibid.*, II, 381.

of equipment due to the necessity of temporarily suspending many of the normal precautions of maintenance. Red Ball was part of a gamble, part and parcel of the tactical decision to cross the Seine and exploit to the full the existing tactical advantage. That gamble had prospects of great rewards, and in the light of the optimistic tactical outlook at the time the all-out logistic effort was undoubtedly justified despite its great cost. But the result was debilitating to the logistic structure, and the effects were to be felt for several months to come.

(3) Supply by Air

To alleviate the desperate shortage of transport in the period of the pursuit it was natural that air transport, like other movement facilities, should be exploited as fully as possible. Supply by air was no magic solution, however. The advantages it had of speed and freedom of movement were offset by many limitations, including low volume and tonnage capacity, uncertain availability of suitable aircraft, inadequate ground facilities at both loading points and landing fields, enemy interference, and hazardous weather. In recognition of the costliness involved in using troop carrier and transport aircraft for routine large-scale supply, field service regulations specified that supply of ground units by air was intended only as an emergency expedient. The normal mission for air transport as a medium of supply for other than airborne units included only the resupply of units which had been cut off from normal channels of supply by terrain, distance, or enemy activity.[93]

Subject to these restrictions the OVERLORD administrative plans had definitely contemplated the use of aircraft for both supply and evacuation. At the end of April 1944 Supreme Headquarters set forth the conditions and procedures for supply by air. It specified two types of supply—scheduled and emergency. The former was defined as supply by air provided to meet predetermined commitments normally anticipated and planned for in advance of an operation, such as the resupply of an airborne unit for a short period following a drop. Emergency supply was defined as that provided to meet demands resulting from unforeseen situations requiring urgent movement of either supplies or personnel.[94]

SHAEF also outlined the entire procedure by which bids for air supply were to be submitted and aircraft were to be allocated, and directed the Allied Expeditionary Air Force to establish an agency to control all air transport which might be allocated for supply and evacuation. In accordance with this directive the air commander in chief directed that the Combined Air Transport Operations Room (short title, CATOR) be established at Stanmore, England, as a special staff section of Headquarters, AEAF.

In effect CATOR was to serve as a regulating station for the control of all air traffic involving the use of Allied troop carrier and transport aircraft on supply missions other than those for airborne forces. The employment of all craft for such purposes was actually subject to the control of the Supreme Commander, who determined the allocation of craft in all cases of conflict between demands for emergency air supply and for airborne op-

[93] FM 31-40, Supply of Ground Units by Air, pars. 4, 5, 8.

[94] SHAEF Operational Memo 29, Supply by Air, as cited in Gen Bd Study 26, Supply and Evacuation by Air, pp. 2-3.

erations.[95] Subsequently both ETOUSA and 1st Army Group also issued instructions to their respective commands outlining the procedure to be followed in requesting air movement of supplies.

The use of air transport in June and July barely indicated the extent to which it was later to be developed, although the movement of both supplies and personnel by air filled an important gap in the meeting of emergency needs even in the first two months. The first supply by air in the OVERLORD operation consisted of prescheduled movements to the airborne units in the Cotentin and immediately revealed some of the difficulties inherent in the use of air for that purpose. Of 208 craft dispatched to the 82d Airborne Division on D plus 1, 64 were forced to return to base with their loads by the sudden development of bad weather en route. Of the 250 tons dispatched, 155 were dropped, of which 90 percent was recovered by the ground units.

Supplies for the 101st Airborne Division were set up on an "on call" basis, but a misreading of ground panels by reconnaissance aircraft led to the dispatch of 118 planeloads of cargo which, it later developed, had not been requested and which the division was not prepared to receive. How large a portion of these supplies was recovered is unknown. Other aircraft flew successful on-call missions to the 82d Airborne Division in the first week, however, delivering supplies by either parachute or glider, the gliders carrying mainly 105-mm. howitzers and heavy machine guns.[96]

Twice in June supplies were flown to units other than airborne forces. On 8 June fifteen pounds of ether were dropped to a field hospital in the vicinity of Carentan, and two weeks later, during the period of the storm, food and water were dropped to an antiaircraft artillery unit isolated on the Iles St. Marcouf off UTAH Beach. Emergency deliveries by parachute were again necessary early in August when an infantry battalion was cut off by the enemy counterattack at Mortain. Lack of marking panels and prearranged drop procedure made it extremely difficult to locate the battalion accurately. On 10 August twelve aircraft successfully dropped loads of food, ammunition, and medical supplies on a hilltop east of Mortain, but of twenty-five craft dispatched on the following day less than half made successful deliveries, the remainder dropping their cargo a mile and a half short of the area as the result of poor visibility.[97]

In the meantime aviation engineers opened emergency landing strips in the beachhead area, the first of them within the first week of the invasion, making it possible to air-land supplies and personnel on a larger scale. Small shipments of supplies began in the third week of June. Air transport was used most heavily during the period of the storm, a total of approximately 1,400 tons of supplies, mostly ammunition, being shipped in the week of 18–24 June. By the end of July the IX Troop Carrier Command had flown approximately 7,000 tons of supply to U.S. forces on the Continent.[98] Meanwhile air transport was increasingly employed for the evacuation of casualties. By the end of July about 20,000 troops, approximately one fifth of all U.S. casualties, had been

[95] *Ibid.*; Directive, Hq AEAF, 2 Jun 44, sub: Supply by Air—Organization and Functions of CATOR, SHAEF G-3 GCT 373.5-1/Ops(A) Air Lift for Movement of Supplies and Personnel.

[96] Supply by Air, prep by IX TCC, I (20 Nov 44), 2, SHAEF AG 581.2-1 Supply by Air 1945.

[97] *Ibid.*, pp. 4–5.

[98] *Ibid.*, p. 3.

evacuated to the United Kingdom via air.[99]

Although the cumulative tonnage transported to the Continent in the first two months was not large, air transport had definitely proved its worth. First Army, having tasted its advantages, was anxious to establish air service on a scheduled basis. In fact, there was suspicion in July that the army was already making unauthorized use of air transport, for the First Army supply services in mid-July began to call regularly for delivery of over 400 tons per day by that means. By informal agreement with the Ninth Air Force these demands were reduced to a maximum of 250 tons. But CATOR began to question the "emergency" nature of the army's requests, and both the U.S. administrative staff at 21 Army Group and SHAEF shortly thereafter issued reminders that air shipments were to be called for only when supplies were urgently needed and no other means of transportation was available. They gave instructions that all items not in the emergency category be stricken from supply-by-air demands (known as SAD's).[100]

As this attempt was made to keep the use of air transport within prescribed bounds, steps were taken to develop the theater's airfreight capacity to its full potential. In mid-June Supreme Headquarters directed the AEAF to prepare and submit plans for supply by air at the rate of 1,500 tons per day by D plus 30–35, and 3,000 tons per day by D plus 45. The main problem involved in developing such capacity lay in the provision of landing fields on the Continent, and within a few days the AEAF responded with a plan outlining the requirements for fields and the supplies and units needed to build them. SHAEF approved the plan and on 11 July directed the 21 Army Group commander and the Commander-in-Chief, AEAF, to provide the airfields and other facilities as early as possible.[101] By mid-July, then, plans had been initiated to provide landing facilities on the Continent capable of receiving a total of 3,000 tons per day, half in the British sector and half in the American.[102]

This goal had not yet been reached at the end of the month, but the Allies intended shortly to test the expanded organization to the extent of a 500-ton lift to each sector.[103] The desirability of developing the largest possible airlift potential became even more apparent within the next few weeks. Only a few days after the breakout at Avranches logistic planners at SHAEF began to study the possibility of supporting a rapid advance to the Seine. Included in their calculations was a con-

[99] FUSA Rpt of Opns, Annex 16 (Medical), App. 20; ADSEC Operations History, App. E; Supply by Air, IX TCC, p. 3. Statistics on air evacuation vary from 18,000 in the IX TCC report to 28,000 in the ADSEC history.

[100] Gen Bd Study 26, p. 14. Memo, Maj Harry D. Henshel of 12 A Gp Movements Br for Chief Movements Br G-4, 28 Jul 44; Ltr, Viney, ADSEC G-4, to G-4 ETO, 27 Jul 44, sub: Supply by Air; Memo for record, Henshel, n.d. All in 12 A Gp Supply by Air 133.

[101] Ltr, Smith to AEAF, 17 Jun 44, sub: Emergency Supply by Air; Ltr, AEAF to Smith, 20 Jun 44, sub: Emergency Supply by Air Plan; Ltr, Crawford to Smith, c. 22 Jun 44, sub: Supply by Air; Ltr, SHAEF to Air C-in-C, AEAF, and C-in-C 21 A Gp, 11 Jul 44, sub: Supply by Air. All in SHAEF G-3 GCT/373.5/Ops(A) Air Lift for Movement of Supplies and Personnel. Cbl S-54454, Lee to Lord, 24 Jun 44, SHAEF G-4 Supply by Air 1-1.

[102] The average landing strip was assumed capable of handling 500 tons per day. Three strips would therefore be required in each sector. The delivery of 1,500 tons required 600 sorties using C-47 aircraft.

[103] Memo, AEAF Stf at SHAEF Forward for Brig Gen Edmund C. Langmead at SHAEF, 29 Jul 44, sub: Supply by Air, SHAEF G-4 Supply by Air 1-1; Ltr, Bull to Smith, 1 Aug 44, sub: Airlift, SHAEF G-3 GCT/373.5-1/Ops(A).

sideration of the extent to which such a drive might be supplied by air. At that time there were plenty of aircraft that could be utilized to deliver the 3,000 tons per day to the Continent, the only question being whether they should be used in planned airborne operations.

Far more serious a limiting factor was the inadequacy of reception facilities on the Continent. To make full use of the available airlift six strips, each with an estimated capacity of 500 tons per day, would have to be either captured or constructed. At the beginning of August the Allies had only one administrative field on the Continent, at Colleville, near OMAHA Beach, and the airlift organization had thus far been tested only to the extent of delivering about 500 tons per day to the U.S. sector.[104]

There was little doubt that air supply would add substantially to Allied offensive capabilities. It was estimated that the delivery by air of 1,000 tons per day would expedite by several days the accumulation of reserves necessary for crossing the Seine and would increase by two divisions the force that could be supported in an offensive across that river. On 12 August SHAEF announced to the major subordinate commands its intention of making air transport available up to 1,000 tons per day to the forward areas should the army groups desire such support. It indicated that aircraft would be withdrawn temporarily for contemplated airborne operations, but could thereafter be released in larger quantity for the support of U.S. forces beyond the Seine.[105] The 21 Army Group accepted the offer with alacrity, replying on 14 August that it desired, subject to a small lift for British account, more than 2,000 tons per day for support of U.S. forces, initially in the Le Mans area and later shifting to the region of Chartres–Dreux.[106] One day later SHAEF approved the immediate expansion of deliveries by air up to 2,000 tons per day to the Le Mans area, although it had little expectation at first that deliveries could average more than 1,000 tons. SHAEF tentatively limited the use of aircraft for this purpose to ten days—that is, until 25 August.[107]

The SHAEF offer proved timely indeed. On 15 August Third Army was already nearing the Seine and was experiencing critical shortages of many items, particularly gasoline. On the very day on which the SHAEF authorization was made it therefore requested daily air shipment of at least 1,500 tons of supplies directly to airfields in the army area.[108] In view of its extended position and the speed of its advance, Third Army's needs were obviously the most pressing, and it was natural that the expanded airlift capacity should be devoted initially to meeting that army's requirements. Shipments under the new program did not get under way until 19 August, when the first deliveries, consisting of rations, were made to a newly

[104] 12 A Gp Rpt of Opns, VI (G-4), 28; Stf Study, G-4 Div SHAEF, Notes on Supply by Air, 7 Aug 44, SHAEF G-4 Supply by Air 1-1; Cbl ASCZC-485, ADSEC to 12 A Gp, 7 Aug 44, and Draft Ltr, SHAEF to A Gps and AEAF, early Aug 44, sub: Movement of Stores, Supplies by Air, SHAEF G-4 581.2 Transportation by Air of Supplies and Equipment.

[105] Cbl S-57489, SAC to A Gps, AEAF, COMZ, CG Allied Airborne Forces, 12 Aug 44, Cbl (out) Log 1944-45, Smith Papers; Memo, Crawford for CAO, 10 Aug 44, sub: Supply by Air in Advanced Areas, SHAEF G-4 581.2 Transportation by Air of Supplies and Equipment 1944, I.

[106] Cbl, 21 A Gp to SHAEF, 14 Aug 44, SHAEF G-4 581.2 Transportation by Air of Supplies and Equipment, II.

[107] Cbl FWD-12901, SHAEF to 21 A Gp, 15 Aug 44, SHAEF G-4 581.2; 12 A Gp G-4 Periodic Rpt 3 (13-19 Aug).

[108] Gen Bd Study 126, p. 15; TUSA AAR, II, G-4, 12.

opened field at Le Mans.[109] In the next few days deliveries averaged less than 600 tons per day, and it soon became apparent that the critical supply situation in the forward areas would not be appreciably relieved by 25 August, the date up to which the enlarged airlift had been authorized.

The entire logistic situation was actually worsening. On 20 August the Third Army had already started across the Seine and was operating with less than two units of fire and less than one day's reserve of rations and gasoline under its immediate control. Both Third and First Armies were getting only the barest daily maintenance forward. The increasingly acute supply situation impelled Third Army on 22 August to ask that the airlift be extended an additional ten days.[110]

In forwarding this request to Supreme Headquarters, the 12th Army Group took the occasion to reinforce it with additional argument. It described the dire supply situation in both its armies and asserted that regardless of the bad weather and the construction difficulties at Le Mans, which had prevented full use of the available lift, supply by air had already been of unquestionable value. The army group was hopeful that some of the initial handicaps—particularly the scarcity of landing fields—would soon be overcome, for deliveries were shortly expected to begin at newly opened fields at Orléans. General Moses estimated that the need for air-transported supplies would continue at least until 10 September.[111]

Fully aware that the continued allocation of troop carrier and transport aircraft would hamper the training and preparations of the Allied airborne forces, SHAEF nevertheless decided to permit the airlift of supplies to continue, although at reduced capacity. On 25 August it directed the First Allied Airborne Army to prepare to make a daily allotment of 200 aircraft with a daily lift capacity of 500 tons beginning on 26 August. The allotment was to be increased to 400 craft with the return of aircraft (425 planes) which had been loaned to Allied forces in the Mediterranean for the southern France airborne operation.[112]

Up to 25 August the performance of the airlift had been something less than spectacular, although the 4,200 tons delivered in the first week undoubtedly aided in maintaining the momentum of the pursuit. Several factors had operated to frustrate the development of the airlift's full potential. The lack of continental airfields imposed the greatest restriction at first, and backlogs of both loaded planes and requisitions developed. On 22 August 383 loaded C–47's were held at U.K. airdromes for lack of forward terminal airfields, and CATOR was forced to ask the army group G–4 to indicate priorities for supplies ready for air delivery.[113]

Scarcities bred scarcities. Airfields for both tactical and administrative use were urgently needed. To restore captured fields and to build new ones, engineer materials had to be shipped in transport that was already desperately inadequate. Army group at one time found it necessary in the midst of the pursuit to allocate as much as

[109] TUSA G–4 Periodic Rpt 3 (13–19 Aug).

[110] Cbl 3613, TUSA to COMZ, 22 Aug 44, SHAEF G–4 581.2 Transportation by Air of Supplies and Equipment, I.

[111] Cbl QX–20630, Moses to Bull, 23 Aug 44, SHAEF G–3 Resupply by Air 24518/Ops.

[112] Cbl FWD–13231, SHAEF G–3 to First Allied Abn Army, 25 Aug 44, SHAEF G–3 Resupply by Air 24518/Ops.

[113] Cbl Q–241, CATOR to Ninth AF, 22 Aug 44, SHAEF G–4 581.2 Transportation by Air of Supplies and Equipment.

2,100 tons per day of the meager transportation resources for forward fighter field construction.[114] The air forces were naturally reluctant to release tactical fields needed for their operations, and supply operations were therefore restricted to fields not occupied by tactical air units, or to fields which they had abandoned or which were unsuitable for tactical aircraft.[115] Meanwhile, imperfect "mounting" arrangements in the United Kingdom, aggravated by a shortage of trucks, created delays in the loading of planes, further hindering the optimum development of the airlift in its early stages.

Toward the end of August a limiting factor that heretofore had been almost nonexistent threatened the potentialities of supply by air. Competing demands for the supply support of the armies, for the civil relief of Paris, and for airborne operations suddenly eliminated whatever surplus in aircraft had existed in the preceding weeks. The capture of Paris ahead of schedule aggravated the entire supply and transportation shortage, for the relief requirements of 2,400 tons per day in the days immediately following the city's liberation cut deeply into Allied resources. The needs of Paris presented the 12th Army Group commander with a difficult decision, for with him rested the determination of priority between military and civil supplies. On 27 August he allocated 500 tons of the available airlift to meet the city's relief requirements.[116] Two days later the army group requested the Communications Zone to take action at once to meet at least 2,000 of the 2,400-ton requirement for Paris, and authorized the diversion of 500 tons at the direct expense of military supplies. Later the same day additional information indicated that the civil relief of Paris was sufficiently urgent to require additional sacrifices, and the army group therefore authorized the Communications Zone to divert 1,500 tons per day to Paris regardless of the cost to the military effort.[117]

Just as this extra burden on transportation resources developed, the Allied airborne forces renewed their demand for the return of their aircraft. The SHAEF directive of 25 August ordering the continuation of the airlift met with a strong protest from General Brereton, commander of the First Allied Airborne Army. The difficult airborne operations then being planned, General Brereton argued, made it essential that all resources under his command should be freed from all duties not directly connected with the preparations for those operations, and he made a vigorous plea that the added commitment of aircraft to supply missions be canceled.[118]

The SHAEF G-3 was won over to this view and reversed his recent decision. On 28 August Supreme Headquarters notified the 12th Army Group that because of other operational requirements all troop carrier aircraft assigned to the First Allied Airborne Army were being withdrawn from supply missions effective that date.[119] SHAEF did not intend that supply by air should be completely discontinued, however, and took measures the same day to

[114] Cbl QX-20630, Moses to Bull, 23 Aug 44, SHAEF G-3 Resupply by Air 25418/Ops.

[115] Supply by Air, IX TCC, p. 18.

[116] Cbl Q-227, CATOR to 12 A Gp, 27 Aug 44, SHAEF G-4 581.2 Transportation by Air of Supplies and Equipment 1944, II.

[117] Cbls QX-21026 and QZ-21043, 12 A Gp to COMZ, 29 Aug 44, SHAEF G-4 581.2 Transportation by Air of Supplies and Equipment 1944, II.

[118] Cbl V-25048, Brereton to SHAEF, 26 Aug 44, SHAEF G-3 Resupply by Air.

[119] Cbl FWD-13357, SHAEF G-3 to Moses, 28 Aug 44; Cbl FWD-13337, SHAEF to Brereton, 28 Aug 44, SHAEF G-3 Resupply by Air.

find substitute airlift capacity to replace that returned to the airborne forces. Instructions were immediately sent to the Commanding General, USSTAF, to make available for supply operations on the following day, 29 August, all C–47's assigned to the VIII and IX Air Service Commands not required for operations. In addition General Spaatz was instructed to convert 100 B–17's or B–24's for use as cargo planes, and to prepare to increase this commitment to 200.[120]

The use of bombers for supply purposes had been considered earlier, although somewhat unfavorably. On 17 August, when additional troop carrier aircraft were first being diverted for the expanded airlift, General Brereton had proposed that 250 B–24's be used instead. But SHAEF had rejected the proposal, in part because it did not favor the diversion of combat aircraft from normal commitments,[121] and in part because it thought then that the need for air supply might be only temporary. Furthermore, there were definite disadvantages in using bombers for supply purposes. Airdromes had to be much larger and better surfaced to accommodate the big B–17's and B–24's; because of the size and speed of the bombers the interval between landings was much longer than for the C–47's; and the time required to load and unload the bombers, either for bulk gasoline or other supplies, was considerably longer because they carried greater loads and because, with their bomb bay doors and hatches and cut-up interiors, they were not designed to carry cargo. The bombers had to undergo considerable modification—their gross weight in particular had to be reduced—before additional fuel-carrying tanks could be installed and the maximum amount of gasoline carried without exceeding the weight limitation for safe landing.[122] In almost all respects the C–47 was the more adaptable and versatile plane for cargo-carrying purposes.[123] Nevertheless on about 24 August, as a precautionary measure, SHAEF ordered twelve bombers placed at the disposal of CATOR to make comparative tests of their usefulness as supply transports, and preliminary measures were also taken to obtain the necessary materials for the possible conversion of 100 bombers.[124] By 28 August there was no longer any question of the necessity to use bombers for supply purposes in view of the urgent call for aircraft from all quarters, and orders were therefore sent out to convert combat aircraft.

By the use of bombers, supplemented by C–47's of the air force service commands, SHAEF planned that supply by air should continue at the rate of 500 tons per day. Meeting the increasingly urgent requirements for civil relief supplies for Paris, however, soon left little lift available for the support of the armies. Air shipments had reached their peak on 26 and 27 August, when deliveries totaled nearly 2,900 tons for the two days (including ton-

[120] Cbl FWD-13351, G-3 SHAEF to CG USSTAF, 28 Aug 44, SHAEF G-3 Resupply by Air.

[121] Cbls, V-25003, Brereton to SHAEF, 17 Aug 44, and FWD-12988, SHAEF to Brereton, 18 Aug 44, SHAEF G-3 Resupply by Air.

[122] Supply by Air, IX TCC, p. 25, App. A, p. ii. B-24's were capable of carrying from 1,545 to 1,836 gallons of gasoline in bulk, depending on the types of tanks installed. Supply by Air, App. A, p. iv. Comparisons of tonnages of all supplies carried by the bombers and the number of sorties, as given in CATOR reports, indicate that the loads carried by the bombers averaged only slightly higher than those of the C-47's—2.7 tons as against 2.2 tons.

[123] C-47's consumed about 4 tons of gas in delivering 10 tons of cargo from U.K. fields to Paris; bombers consumed about 4.5 tons of gas carrying that amount of cargo the same distance.

[124] Ltr, Bull to Smith, 24 Aug 44, sub: Supply by Air, SHAEF G-3 Resupply by Air.

nage to Paris). Thereafter they fell off precipitately as a result of the withdrawal of the C–47's on the 29th, and depended largely on the capabilities of the converted bombers. To the armies this loss was of major importance, as attested by the First Army, which on 30 August made a strong appeal that the airlift to the forward areas be continued at the maximum rate possible.[125] SHAEF responded promptly by directing USSTAF to provide air transport up to 500 tons per day to the 12th Army Group.[126] But for the next week the airlift was incapable of meeting either the Paris relief needs or the requirements of the armies in the volume desired.

The deficiency resulted in part from the tactical allocation of C–47 aircraft. In addition, however, both the U.K. loading and the continental reception facilities continued to constitute limiting factors which made it impossible to employ to maximum effectiveness even the aircraft available. USSTAF had made 200 bombers available for civil affairs supply by 1 September, but reception capacity at Paris was such that only 70 planes per day could be dispatched. Airfield accommodations for bombers were also insufficient to receive the 500 tons authorized the armies.[127]

Inadequate truck transportation at the U.K. base had contributed to the difficulties of the airlift. The main burden of providing transportation to the U.K. departure airfields had been borne by the British War Office, which in the first week of September daily transported about 200 tons of the POL intended for shipment to the Third U.S. Army, and also 50 to 100 tons of supplies set up for delivery to Paris. The War Office obviously had not bargained for this added responsibility, and there was every prospect that the truck transportation at its disposal in the United Kingdom would be drastically curtailed in the near future.[128]

The result of all these difficulties was inevitable— an increasing backlog of supply-by-air demands that could not be filled. In the week of 27 August–2 September deliveries to the 12th Army Group reached their lowest ebb, averaging barely 250 tons per day. By that time it was obvious that the airlift supply requirements could not be met by bombers alone. On 4 September 12th Army Group again outlined its desperate supply needs and requested immediate action to provide C–47 craft then frozen for the airborne army. The Communications Zone in turn reported to SHAEF that it had been unable to develop the full capabilities of air transportation and supported General Bradley's request for a daily 3,000-ton lift to move gasoline both from the United Kingdom and from the base area on the Continent to the forward areas.[129]

Supreme Headquarters had in fact already decided to restore at least a portion of the aircraft strength which the lift had lost by the order of 28 August. On 3 September SHAEF advised the First Allied Airborne Army that one half of its air

[125] Cbl Q–21068, FUSA to SHAEF, 30 Aug 44, SHAEF G–3 Resupply by Air.

[126] Cbl, SHAEF G–4 to USSTAF, 31 Aug 44, SHAEF G–3 Resupply by Air.

[127] Cbl QM3B, AEAF to SHAEF, 1 Sep 44, SHAEF G–3 Resupply by Air; Cbl S–58996, SHAEF to G–3 SHAEF FWD, 2 Sep 44, SHAEF G–3 GCT/373.5–1/Ops(A) Airlift for Movement of Supplies and Personnel.

[128] Ltr, C. M. Smith, Deputy G–4 SHAEF, to CG ETO Rear, 4 Sep 44, sub: Emergency Supply by Air, and Memo, Col Thompson, Chief Requisition Sec, Air Opns Supply Installations for Airfields in the U.K., 6 Sep 44, SHAEF G–4 581.2 Transportation by Air of Supplies and Equipment 1944, II.

[129] Cbls, QX–21280, 12 A Gp to SHAEF, 4 Sep 44, and JX–14045, Lee to SHAEF G–4, 4 Sep 44, SHAEF G–3 Resupply by Air.

transport resources must be released and made available to CATOR for the support of the ground forces.[130] This allocation amounted to 600 planes, which were released for use beginning 5 September.[131] By then the combined 12th Army Group bids for airlift totaled 4,000 to 4,500 tons per day exclusive of the Communications Zone's own bid for 3,000 tons of POL for the Paris and Reims areas. Neither the aircraft nor the loading and receiving facilities were capable of handling such tonnages. SHAEF therefore notified the major commands that all bids would be considered on a priority basis and the available lift allocated according to operational needs. SHAEF aimed at a lift of about 2,000 tons per day. It was the intention of the Supreme Commander that the airlift now be employed solely for the movement of supplies essential to the advance of the Allied forces into Germany. Relief needs for Paris were henceforth to be met by rail or motor transport if at all practicable, and bombers heretofore allocated for that purpose were to be diverted to the transportation of supplies needed by the tactical forces.[132]

On 8 September SHAEF allocated the available aircraft to the major commands as follows: 200 C-47's to the 21 Army Group and 400 to 12th Army Group, the latter aircraft to be used jointly by the army group and Ninth Air Force.[133] About half of the U.S. allotment was to operate from the United Kingdom and half from fields on the Continent. The Communications Zone a few days earlier had asked that 200 C-47's be moved to the Continent to carry packaged POL from airfields in the Normandy area to Reims because stocks in the United Kingdom were insufficient, and the SHAEF G-4 had subsequently authorized the transfer of two troop carrier groups totaling 220 craft to the Continent.[134] To carry out this portion of the plan the airfield at Querqueville (serving Cherbourg) had to be used as a refueling point and the runways had to be improved rapidly in order to handle the heavily laden transports. On the morning of 6 September the 342d Engineer General Service Regiment was assigned the task of laying pierced steel plank on a 4,600-foot runway and was ordered to complete the task by the following morning. By utilizing several crews starting at different points, by improvising means of joining the various sections as the crews met, and by working through the night, the engineers readied the runways for use in fourteen hours.[135]

The enlarged airlift got under way on 6 September and on the first day delivered approximately 1,200 tons to the 12th Army Group. Bombers employed in the movement of relief supplies to Paris were allowed to continue the lift at a diminished rate until 9 September when they were made available to haul bulk gasoline to the 12th Army Group.[136] The release of the bombers and the augmentation of the

[130] Cbl FWD-13709, SHAEF to G-4 to First Allied Abn Army and CATOR, 3 Sep 44, SHAEF G-3 Resupply by Air.

[131] Cbl Q-2496, CATOR to SHAEF, 8 Sep 44, SHAEF G-3 Resupply by Air.

[132] Cbl FWD-13994, SHAEF to major comds, 6 Sep 44, SHAEF G-3 Resupply by Air; Ltr, Nevins to G-3 SHAEF, 6 Sep 44, sub: Air Transport for Supply, SHAEF G-3 GCT/373.5-1/Ops(A) Airlift for Movement of Supplies and Personnel.

[133] Cbl S-59456, SHAEF to major comds, 8 Sep 44, SHAEF G-3 Resupply by Air.

[134] Cbls, J-14491, G-4 COMZ to SHAEF, 6 Sep 44, and FWD-14144, SHAEF G-4 to COMZ, 7 Sep 44, SHAEF G-3 Resupply by Air.

[135] History of Normandy Base Section, D Day to VE Day, 1945, p. 57, ETO Adm 595.

[136] Cbl S-49456, SHAEF to major comds, 8 Sep 44, SHAEF G-3 Resupply by Air; Cbl EX-46189, COMZ to armies and ADSEC, 11 Sep 44, SHAEF G-4 581.2 Transportation by Air of Supplies and Equipment 1944, II; CATOR Rpt for week ending 9 Sep, SHAEF G-4 580 Transportation by Air.

TABLE 11—CARGO TRANSPORTED BY AIR: 20 AUGUST–16 SEPTEMBER 1944

(Number of Tons)

Organization	Total	Week Ended			
		26 August	2 September	9 September	16 September
Total	[a] 23,216	4,535	4,470	7,278	6,933
Flown by					
U. S. Forces	20,367	4,185	3,553	7,094	5,535
IX Troop Carrier Command	17,498	3,599	2,480	[b] 6,119	[c] 5,300
IX AF Service Command	1,216	586	630	0	0
U. S. Strategic Air Forces (B-24's)	1,653	0	443	975	235
British Forces					
46th Group (RAF)	2,849	350	917	184	1,398
Received by					
12th Army Group	12,799	4,185	1,877	3,516	[d] 3,221
21 Army Group	7,766	350	917	2,787	3,712
Paris	2,651	0	1,676	975	0

[a] In addition to this four-week tonnage, 14,213 tons were transported prior to 20 August, a total of 37,429 since D Day.
[b] Includes 2,603 transported for 21 Army Group.
[c] Includes 2,314 transported for 21 Army Group. A IX Troop Carrier Command study shows 8,334 tons transported in this week.
[d] A 12th U. S. Army Group study shows 4,100 tons received in this week.

Source: CATOR Weekly Rpts, SHAEF G-4 581.2 Transportation by Air of Supplies and Equipment 1944, I and II, and SHAEF G-4 580 Transportation by Air 1944, I.

C–47 lift permitted the movement of a considerably greater volume, although the airlift continued to be beset by physical handicaps and had an uncertain future. On 10 September SHAEF again notified the major commands that aircraft of the First Allied Airborne Army (C–47's) would not be available for supply movements after the 11th.[137] But on 12 September it rescinded this order and instructed the airborne army to allot all available aircraft to CATOR for resupply purposes until further notice.[138] The extension proved short lived, for the C–47's were again recalled two days later in preparation for the Holland airborne operation.[139]

In the two weeks from 3 to 16 September,[140] Allied planes were able to deliver an average of 1,000 tons of supplies per day to the Continent, as compared with the 600 tons per day of the preceding two weeks. The great bulk of this tonnage was carried in U.S. planes, most of them drawn from the IX Troop Carrier Command. *(Table 11)* By no means all of this tonnage, which consisted principally of rations, POL, ammunition, medical supplies, and civil relief food, found its way to the combat units. While the cargo flown in by U.S. planes in the week of 3–9 September totaled 7,100 tons, half was for British forces (2,603 tons) and for the relief of

[137] Cbl FWD-14479, SHAEF to major comds, 10 Sep 44, SHAEF G-3 Resupply by Air.
[138] Cbl FWD-14676, SHAEF to major comds, 12 Sep 44, SHAEF G-3 Resupply by Air.
[139] Cbl FWD-14794, SHAEF to major comds, 14 Sep 44, SHAEF G-3 Resupply by Air.
[140] This period rather than that of 5 to 14 September is used because it corresponds to the weekly statistical reports of CATOR. Daily figures are not available.

Paris (975 tons), leaving an average of only 500 tons per day for the 12th Army Group. In the week of 10–16 September U.S. aircraft delivered a total of 5,535 tons; but, while the supply lift to Paris had by this time been terminated, a large portion (2,314 tons) was again flown in support of the British, who received in addition the tonnage delivered by their own 46 Group (RAF). The result was that the average tonnage received by the First and Third Armies was well under 500 tons. In the entire period from 19 August, when the airlift was undertaken in earnest, till mid-September, when the pursuit came to an end, U.S. planes carried a total of 20,000 tons of supplies, of which approximately 13,000 tons were delivered in support of the 12th Army Group.[141]

All the supplies delivered via troop carrier and transport aircraft in these weeks were items of vital importance to the armies in sustaining the momentum of their drive toward the German border. The airlift had not measured up to expectations, however, for it had fallen far short of the early goal of 3,000 tons per day. The failure to develop the full potential of air transport can be attributed in part to developments over which there was little control, but also to inexperience and inadequate planning. In the initial stages administrative difficulties constituted as serious a limiting factor as the lack of continental landing fields. The entire procedure by which supplies were requisitioned proved cumbersome, and in the early stages of operations it underwent serious growing pains. Likewise the coordination of movements often left much to be desired. Supply agencies frequently announced the availability of supplies and the approximate time of arrival at loading fields without verifying the availability of trucks for delivery. In other cases supplies were located in depots so far from loading fields that the emergency sometimes ceased to exist before delivery, loading, and the actual flight could be made.[142]

There were similar shortcomings on the far shore. The reception of supplies required a highly co-ordinated ground organization to insure immediate unloading of craft and removal and distribution of supplies as landed, and fully trained airfield control personnel on reception fields. Such an organization was not at first available, and for several days early in September either too few service troops were on hand to handle supplies or, as was frequently the case, they reported to one field prepared to unload cargo only to find that plans had been changed and that planes had landed at another field fifty or more miles away. In the circumstances plane crews themselves often performed much of the unloading.[143]

These deficiencies plagued the operation throughout the period and demonstrated pointedly that supply by air demanded the same high degree of advance planning and synchronization of effort that any other logistic activity did. It was

[141] CATOR weekly reports show that the total tonnages flown to the Continent by both British and U.S. aircraft were divided as follows among U.S. and British forces and Paris relief:

	U.S.	*Paris*	*British*
19 Aug–26 Aug	92.3%	0%	7.7%
27 Aug– 2 Sep	42.2%	37.3%	20.5%
3 Sep– 9 Sep	48.4%	13.4%	38.2%
10 Sep–16 Sep	46.4%	0%	53.6%

[142] Supply by Air, IX TCC, p. 15; Cbl E-46027, COMZ to SHAEF, 8 Sep 44, SHAEF G-4 591.2 Transportation by Air of Supplies and Equipment.

[143] Ltr, Moses to CG TCC, 11 Sep 44, sub: Supply by Air, 12 A Gp Supply by Air 133; Gen Bd Study 26, Supply and Evacuation by Air, p. 15; Air Supply for Advance into Germany after Occupation of the Ruhr, study prep by AEAF, 18 Oct 44, SHAEF G-4 Supply by Air 1-1; Interv with Plank, 28 Jul 50, OCMH.

obvious in the early stages that the administrative machinery was not equal to the task presented by the sudden expansion. The inadequacies of air transport were of course compounded in the last days of August when competition for the available aircraft reduced the supply lift capabilities. Tactical allocation of the C–47's for projected airborne operations, which had first call on troop-carrier aircraft, and the necessity to meet the emergency needs of the Paris area combined to reduce the deliveries to the armies to the lowest volume at the very time (27 August to 2 September) when other means of transportation were most desperately short.

While the difficulties over both air and motor transport supply gave unmistakable evidence of the tautness of the entire administrative fabric, the Allies only partly appreciated the implications of these difficulties in mid-September. At that time there was as yet no admission that the pursuit had come to an end. A heady optimism, tempered only by exasperation over supply shortages, pervaded the Allied forces, and as late as 12 September the Supreme Commander decided to permit the simultaneous offensives of both the U.S. armies to continue.[144]

The optimism of mid-September was understandable in view of the unchecked advances that followed the enemy's futile attempt at Mortain early in August, but it hardly squared with the logistic facts of life. After the momentary elation over the capture of Antwerp the threatened port deficit loomed more ominous than ever. The Allies had already found it impossible to maintain all of their available divisions at the front, and within the next few weeks they realized that additional combat formations might have to remain nonoperational and on a reduced diet in the rear areas. Vehicle maintenance was becoming more burdensome by the hour as the result of the ceaseless driving of the past six weeks. Serious shortages were developing in field artillery ammunition, armor, and spare parts. And bad weather was approaching inexorably, promising to close down the beaches.

Many of the weaknesses of the administrative structure were the product of the pursuit itself, and were not to be resolved overnight. The decision to cross the Seine and continue the pursuit had constituted a radical departure from plans so far as logistic support was concerned. The Communications Zone had undergone a sort of forced growth at the sacrifice of a sound administrative structure, and at the end of September logistic difficulties presented certain imperatives which could no longer be ignored.

The crippling impact which logistic difficulties were to have on plans for future operations was only gradually realized, but it was fully comprehended by the end of September, when the 12th Army Group began to dole out supplies to the armies through a strict rationing system based on assigned missions. The shortages experienced during the pursuit had provided only a foretaste of the real difficulties to come. For the next two months supply limitations were to dominate operational plans, and the Allies were now to learn the real meaning of the tyranny of logistics.

[144] The effects of the decisions of August and early September can be better appreciated when viewed in the light of later developments. At the risk of trespassing on chronology, therefore, a more searching discussion of the logistic situation of September and its implications for operational plans is postponed to the second volume.

Glossary

A–4	Assistant Chief of Staff for Supply on air staffs, corresponding to the G–4 on other Army staffs
AAR	After action report
Abn	Airborne
ACofS	Assistant Chief of Staff
Adm	Administrative
ADO(US)	Assistant Directorate of Organization (U.S.)
ADSEC	Advance Section, Communications Zone
AEAF	Allied Expeditionary Air Force
AF	Air Force
AFHQ	Allied Force Headquarters
AFSC	Air Force Service Command
AG	Adjutant general
AGF	Army Ground Forces
A Gp	Army group
Ammo	Ammunition
AMSO	Air Minister for Supply and Organization
ANCXF	Allied Naval Commander Expeditionary Force
ASF	Army Service Forces
ASP	Ammunition supply point
Avgas	Aviation gasoline
Bailey bridging	Military bridging designed by British engineers
BCC(L)	BOLERO Combined Committee (London)
BCC(W)	BOLERO Combined Committee (Washington)
Bd	Board
Belgian gates	Steel gates used either as barricades or beach obstacles. Also known as Element "C."
Br	Branch; British
BSCC	BOLERO-SICKLE Combined Committee
BUCO	Buildup Control Organization
CAO	Chief Administrative Officer
CATOR	Combined Air Transport Operations Room
Cbl	Cable
CCS	Combined Chiefs of Staff
CinC	Commander in Chief
C-in-C	Commander-in-Chief (British usage)
Cir	Circular
CG	Commanding General
Chespaling	A wood and wire matting laid on beaches wherever needed to provide footing for vehicles

Classes of Supply	
I	Rations
III	Fuels and lubricants such as gasoline and coal
V	Ammunition and explosives
II and IV	All other supplies and equipment for which allowances may (Class II) or may not (Class IV) be established, as, for example, clothing, weapons, construction and fortification materials
Cof Engrs	Chief of Engineers
Cof S	Chief of Staff
Cof T	Chief of Transportation
Com	Committee
Comd	Command
Comdr	Commander
COMZ	Communications Zone
Conf	Conference
COS Com	British Chiefs of Staff Committee
COSSAC	Chief of Staff to the Supreme Allied Commander (Designate)
CPS	Combined Staff Planners
CWS	Chemical Warfare Service
DCof S	Deputy Chief of Staff
Dir	Directive; director
Div	Division
DQMG(L)	Deputy Quartermaster General (Liaison) (British)
Dukw	2½ ton 6 x 6 amphibian truck
Dumb barge	An unpowered barge that could be beached
Engrs	Engineers
ETOUSA	European Theater of Operations, United States Army
EUCOM	European Command, successor to USFET
Exec	Executive
Ex O	Executive Officer
FECOMZ	Forward Echelon, Communications Zone
FUSA	First U.S. Army
FUSAG	1st U.S. Army Group
G–1	ACof S for personnel
G–2	ACof S for intelligence
G–3	ACof S for operations
G–4	ACof S for supply
Gen Bd Rpt	General Board Report
GFRS	Ground Force Replacement System
GHQ	General Headquarters
GO	General Order
Gp	Group
GPA	General Purchasing Agent
Hedgehog	Portable obstacle, made of three crossed angle irons
Hist	Historical
Incl	Inclosure

Ind	Indorsement
Int	Intelligence
Interv	Interview
ISS	Identification of Separate Shipments to Overseas Destinations
JPS	Joint Staff Planners
Jt	Joint
LBV	Landing barge, which was capable of carrying either supplies or vehicles and could be beached
LCI(L)	Landing craft, infantry (light)
LCM	Landing craft, mechanized
LCT	Landing craft, tank
Liberty ship	A cargo ship of approximately 10,000 tons which was designed for speedy construction early in the war and served as the work-horse in ocean shipping
Ln	Liaison
Lobnitz pierheads	Huge steel structures towed to the Normandy beaches to provide the unloading facilities for LCT's, LST's and coasters in the MULBERRIES
Log	Logistical
LST	Landing ship, tank
LVT	Landing vehicle, tracked
Min	Minutes
Mov and Tn Br	Movements and Transportation Branch
MOVCO	Movement Control
MT ship	Liberty ship converted for maximum vehicle-carrying purposes
MT80	Motor transport gasoline, 80-octane
MTB	Motor Transport Brigade
Mtg	Meeting
MTS	Motor Transport Service
NAAFI	Navy Army Air Force Institute (British)
NATO	North African Theater of Operations
NOIC	Naval Officer in Command
NUSA	Ninth U.S. Army
NYPOE	New York Port of Embarkation
OCof Engrs	Office, Chief of Engineers
OCof T	Office, Chief of Transportation
OCMH	Office, Chief of Military History
OPD	Operations Division, War Department
Opn	Operation
OQMG	Office of the Quartermaster General
ORC	Organized Reserve Corps
Ord	Ordnance
P&O	Plans & Operations Division, WD, successor to OPD
PC&R Gp	Port construction and repair group
Plng	Planning
PLUTO	From "pipeline under the ocean"—a cross-Channel underwater pipeline planned for bulk POL deliveries to the far shore

PMS&T	Professor of Military Science and Tactics
POL	Petrol, oil, and lubricants
prep	prepared
PROCO	Projects for Continental Operations, a system of requisitioning supplies and equipment for special operations
PSO	Principal Staff Officers
Q(L)	Quartermaster (Liaison)
QM	Quartermaster
RA	Regular Army
RAF	Royal Air Force
RAP	ROUNDUP Administrative Planners
Rhino ferry	A barge constructed of bolted ponton units and propelled by an outboard motor
RTO	Rail Transportation Officer
SAC	Supreme Allied Commander
SHAEF	Supreme Headquarters, Allied Expeditionary Force
Sommerfeld track	A matting made of wire netting reinforced with steel, used in the same manner as chespaling
SOP	Standing operating procedure
SOS	Services of Supply
SPOBS	Special Observer Group
Stf	Staff
SUP	Single unit pack, a method of crating vehicles
Svc	Service
T/BA	Tables of Basic Allowance
TC	Transportation Corps
TCC	Troop Carrier Command
Teller mine	A German land mine
Tetrahedra	Pyramid-shaped obstacles made of angle iron
TUP	Twin unit pack, a method of crating vehicles
TURCO	Turn-Round Control
TUSA	Third U.S. Army
T/E	Tables of Equipment
T/O&E	Tables of Organization and Equipment
TWX	Teletype message
USAAFUK	United States Army Air Forces in the United Kingdom
USAFBI	United States Army Forces in the British Isles
USANIF	United States Army Northern Ireland Force
USFET	United States Forces in the European Theater, successor command to ETOUSA
USSTAF	United States Strategic Air Forces
WD	War Department
WO	War Office
WPD	War Plans Division, War Department, predecessor of OPD

Code Names

ABC-1	The agreements resulting from the Anglo-American military staff conversations held in Washington in January–March 1941
ANVIL	Plan for the Allied invasion of southern France, finally executed as Operation DRAGOON in August 1944
ARCADIA	First of the major U.S.–British staff conferences following U.S. entry into the war, held in Washington in December 1941–January 1942
BEAVER	A training exercise held in the Slapton Sands area in England in March 1944, employing elements of the VII Corps and simulating the later assault on UTAH Beach
BOLERO	The build-up of U.S. troops and supplies in the United Kingdom in preparation for the cross-Channel invasion
BOMBARDONS	Cruciform structures designed for mooring off the Normandy beaches to provide floating breakwaters in deep water
CHASTITY	Plan for the construction of an artificial harbor in the Quiberon Bay area on the southern coast of Brittany
COBRA	The operation launched by First U.S. Army on 25 July 1944 designed to break out of the Normandy lodgment
DRAGOON	*See* ANVIL
DUCK I, II, and III	First in the series of training exercises held in the Slapton Sands area in England to test all aspects of an amphibious operation, including mounting, assault, and logistic support. The DUCK exercises involved mainly elements of the V Corps and were held in January and February 1944
FOX	Last of the major training exercises conducted by V Corps, held in March 1944
FABIUS I–VI	A series of final rehearsals for the cross-Channel operation, involving the U.S. V Corps and British forces, carried out in April and May 1944
GOOSEBERRIES	Partial breakwaters formed off the Normandy beaches by the sinking of blockships known as CORNCOBS
GREENLIGHT	One of the special OVERLORD supply procedures designed to expedite the delivery of ammunition and engineer fortification material in lieu of scheduled shipment of other supplies in the first phases of the cross-Channel operation.
HARLEQUIN	A British mounting exercise held in September 1943 to establish marshaling and embarkation procedures for a cross-Channel operation

LUCKY STRIKE	A plan calling for an eastward drive and the capture of the Seine ports as an alternative to plans for the earlier capture of Brittany, considered by planning staffs in May and June 1944
MAGNET	The plan that superseded RAINBOW–5 after U.S. entry into the war, providing for the shipment of American forces to Northern Ireland
MULBERRIES	The artificial harbors constructed off the Normandy beaches
NEPTUNE	Code word for the cross-Channel operation, naming the specific assault area and target date, and for which a special security procedure known as BIGOT was developed
OVERLORD	Code word which came to be applied to the general concept of a cross-Channel invasion in 1944
PHOENIXES	Concrete caissons towed across the English Channel and sunk to form the main breakwaters for the artificial harbors
QUADRANT	The first Quebec Conference, August 1943
RAINBOW–5	A U.S. military plan of action designed to implement that portion of ABC–1 which applied to the United Kingdom in the event of U.S. entry into the war
RHUMBA	Plan for reversing BOLERO and transferring U.S. forces, supplies, and logistic structure from the United Kingdom to the Continent
ROUNDUP	The name by which plans for cross-Channel invasion were known until the summer of 1943
SEXTANT	The Cairo Conference of November 1943
SICKLE	The name which in 1943 was given to the U.S. air force build-up in the United Kingdom to distinguish it from the ground and service force build-up, known as BOLERO
SLEDGEHAMMER	Plan for a limited-objective attack across the Channel in 1942
TIGER	The final rehearsal for the UTAH Beach assault by units of the VII Corps
TOMBOLA	A flexible 6-inch underwater pipeline designed to discharge POL tankers anchored offshore at Ste. Honorine-des-Pertes
TORCH	The Allied invasion operation in North Africa, November 1942
TRIDENT	The Washington Conference of May 1943
WHALE	Flexible steel roadway, made up of bridge spans and resting on pontons, forming the piers for the artificial harbors

Bibliographical Note

The task of the administrative historian is probably made somewhat easier than that of the historian reconstructing the story of tactical operations by the fact that the records of the relatively more settled headquarters were physically better preserved, and by the fact that fewer important decisions were lost through having been transmitted orally. But these advantages are at least partially offset by the manner in which administrative records were scattered after hostilities ended, and by the almost complete absence of the type of interview material which was collected from combat units in the field during the war and which helped fill important gaps in the record.

The official records of the various administrative headquarters in the European theater were never collected under one roof and, to make matters worse, were retired to U.S. repositories in piecemeal fashion over a period of several years. Research in ETOUSA records consequently was also piecemeal, proceeding neither by subject nor by chronology. Army regulations to the contrary, moreover, the records of the various technical services were not handled consistently. Some were sent to the main Army repository at St. Louis, Mo.; some were retained by the technical service chiefs and transferred directly to the respective technical service schools or camps in the United States. A number of officers retained official records for personal use.

The deficiency in interview material was remedied in part during the preparation of this volume by seeking the testimony of the principal commanders and staff officers who by reason of their participation possessed first-hand knowledge of events. Their testimony was secured through personal interviews conducted by the author, through correspondence on specific questions, and through comments made at the author's request on the manuscript in its first draft.

Primary Sources

Primary sources consist mainly of the official records of the various headquarters involved. They take the form of correspondence, interoffice memorandums, staff studies, cables, plans, minutes of conferences, journals, diaries, message files, and various periodic reports filed in accordance with the AGO decimal classification system. For the theater the main collections are those of SHAEF (principally those of the Adjutant General, Secretary of the General Staff, and the G–3 and G–4 Sections, including the War Diary of the last with key documents attached), and the papers of its predecessor, COSSAC; ETOUSA, SOS, and their successors ETOUSA-SOS and ETOUSA-COMZ; 12th Army Group; and the Advance Section. After the end of hostilities the U.S. Army command in Europe was successively renamed USFET and EUCOM, and some of the wartime records are filed under those designations.

The records of SHAEF, 12th Army Group, and the operational records of the

armies are in the custody of the Operations Reports Section, Departmental Records Branch, AGO, in Alexandria, Va. The records of the more strictly administrative headquarters—ETOUSA, SOS, and their subordinate commands such as the Ground Force Reinforcement Command, the Advance Section, and certain of the technical services—were consulted at the Records Administrative Center in St. Louis, Mo., but have since been transferred to Kansas City, Mo. Certain planning files of First and Third Armies were also consulted in St. Louis. The COSSAC papers are in the SHAEF SGS files.

Two "unofficial" collections which proved valuable in reconstructing the history of the war in Europe were the files referred to in footnotes as *ETO Adm* and *ETO Preinvasion.* These consist of miscellaneous planning papers, cable files, and correspondence, which for the most part were rescued from destruction by personnel of the Historical Section, ETO, and were transferred intact to the Departmental Records Branch, AGO, in the War Department in 1946.

Two bodies of primary source material originating in the War Department and proving highly useful were the correspondence files of the Army Service Forces, which threw particular light on the role of Generals Somervell and Lutes in the support of the U.S. forces in Europe, and files in the War Department Operations Division, including logs of incoming and outgoing cables and decimal files on the subject of the troop basis and troop flow. The author had access also to the papers collected by Lt. Gen. Walter Bedell Smith, consisting mainly of "Eyes Only" cables, which have been deposited with the Department of the Army Library in the Pentagon. Limited use was made of the diary kept for General Eisenhower by his naval aide, Capt. Harry C. Butcher, and cited in this volume as Diary Office CinC. Excerpts from this diary were published by Captain Butcher in the volume *My Three Years with Eisenhower* (New York, 1946). The author had complete access to all official records relevant to this history regardless of classification.

Secondary Sources

An extensive body of unpublished secondary material exists covering the activities of the U.S. Army in Europe, the most important of which are the following:

(1) Histories of the technical services, the staff sections of Headquarters, ETOUSA-COMZ, the base sections, and the Ground Force Reinforcement Command, all required by ETO regulation. These vary in quality, the most useful being those of the Office, Chief of Transportation, Office of the Chief Engineer, Office of the Chief Surgeon, the COMZ G–4, the Ground Force Reinforcement Command, the Advance Section, and Normandy Base Section. They are filed in the ETO Administrative File, Operations Reports Section, Departmental Records Branch, AGO, in Alexandria, Va.

(2) The Administrative and Logistical History of the European Theater of Operations, eleven studies on logistics and administration, prepared in the Historical Section, ETO, under the author's supervision, and based for the most part on primary source materials available in the theater in 1945–46. The most useful of these preliminary histories consulted in the preparation of the present volume are The Predecessor Commands: The Special Observers (SPOBS) and United States

Army Forces in the British Isles (USAFBI), by WOJG Henry G. Elliott; Organization and Command in the European Theater of Operations, by Robert W. Coakley; and NEPTUNE: Training for and Mounting the Operation, and the Artificial Ports, by 1st Lt. Clifford L. Jones. All are on file in the Office, Chief of Military History.

(3) General Board Reports, 131 studies covering all aspects of the war in the European theater by a special board of officers appointed after V-E Day. These are uneven in quality, but some are extremely helpful, particularly in their critical analyses of plans, preparations, and methods and techniques of operations. They are on file in the Office, Chief of Military History.

(4) After Action Reports of the First and Third Armies, the 12th Army Group, and in some cases of the divisions. They were consulted for the supply story from the point of view of the field commands.

(5) Miscellaneous monographs on a wide range of subjects prepared by personnel of the Historical Section, ETO, by historians of the ASF, the Transportation Corps, and the Quartermaster Corps. Included are such studies as Overseas Supply Policies and Procedures, by Richard M. Leighton, and those on Quartermaster supply in the ETO prepared at the Quartermaster School, Camp Lee, Va.

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THE FINAL OVERLORD PLAN

DROP ZONES
D DAY PHASE LINE
INUNDATED AREA

ELEVATIONS IN METERS
0 50 100 200 AND ABOVE

5 0 5 10
MILES

Cap de la Hague
Auderville
Beaumont-Hague
Fermanville
Barfleur
CHERBOURG
St Vaast-la Hougue
Iles Pieux
Quinéville
Montebourg
Ste Mère-Eglise
Iles St Marcouf
les Dunes de Varreville
UTAH
Pointe du Hoe
Grandcamp-les Bains
Vierville-sur-Mer
St Laurent-sur-Mer
Colleville-sur-Mer
OMAHA
Arromanches-les Bains
GOLD
Port-en-Bessin
JUNO
Courseulles-sur-Mer
SWORD
Lion-sur-Mer
Ouistreham
Cabourg
BAYEUX
Seulles R
Barneville
St Sauveur-le Vicomte
Portbail
St Lô d'Ourville
Prairies Marécageuses St Sauveur-de-Pierre-Pont
la Haye-du-Puits
Carentan
Isigny
Trévières
Aure R
Douve R
Merderet R
Taute R
Vire R
Drôme R
Lessay
Périers
St Jean-de-Day
Airel
Villiers-Fossard
Forêt de Cerisy
Balleroy
Berigny
Tilly-sur-Seulles
St Manvieu
CAEN
Orne R
Ouistreham
Dives R
ST LÔ
Caumont
Villers-Bocage
Coutances
Esquay
Bully
Avenay
Amaye-sur-Orne
Bourguébus
Vimont
Bretteville-sur-Laize
Bois du Homme
361
TO AVRANCHES
TO LE BENY-BOCAGE
TO FALAISE

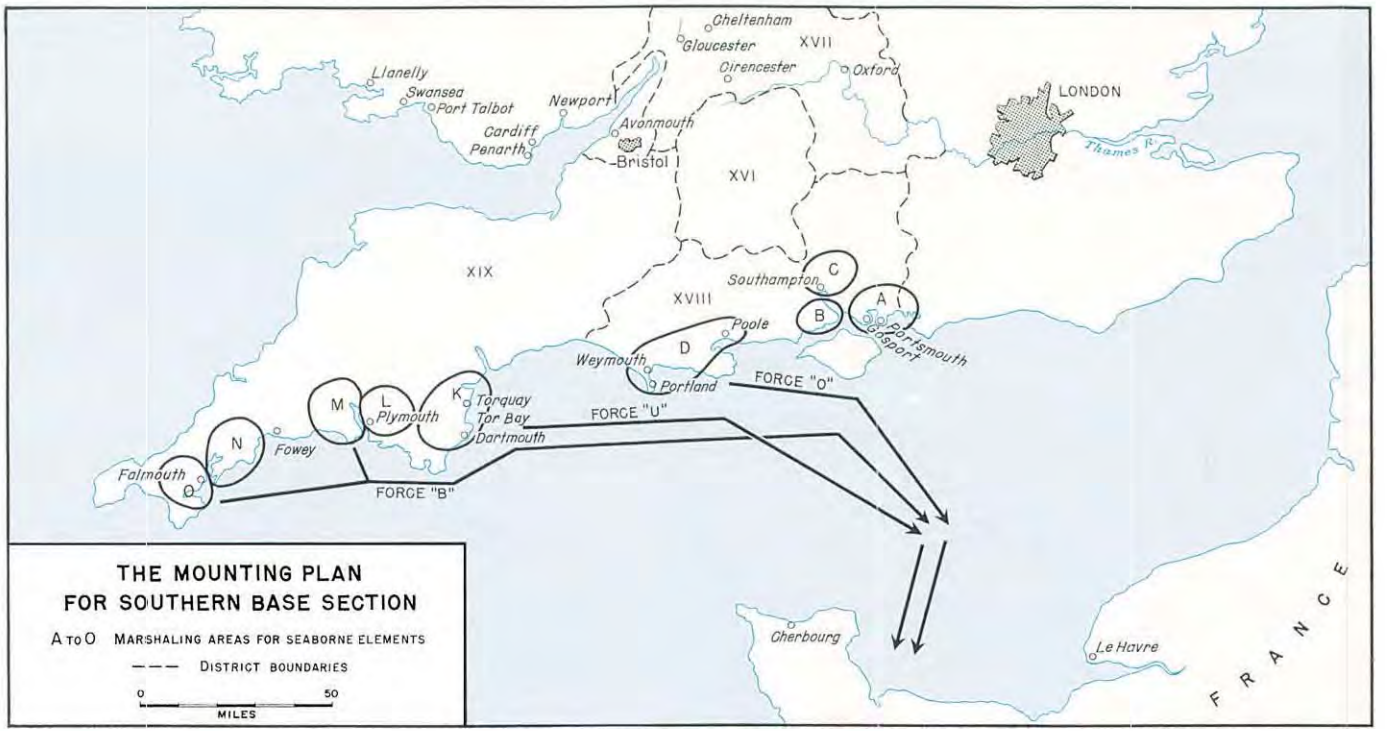
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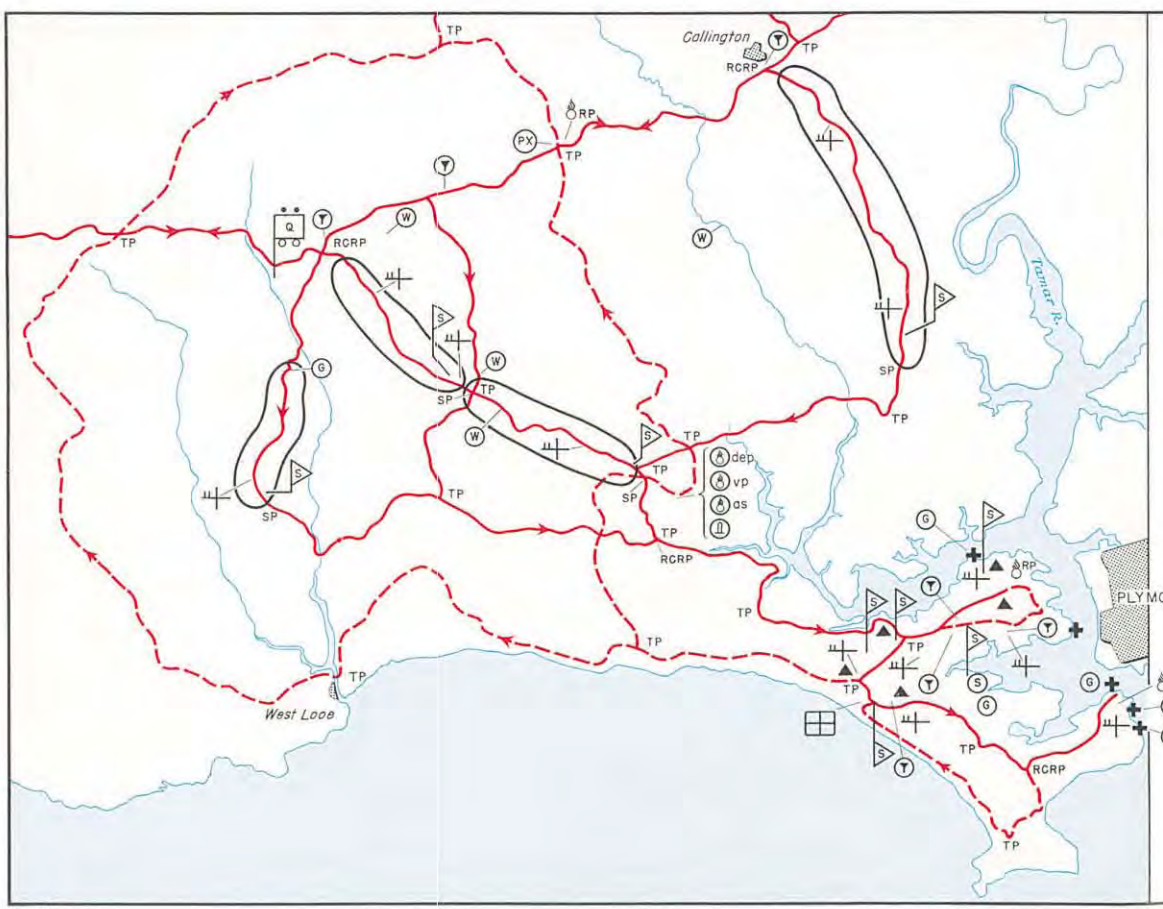
XXX VII — XX 4
XXX V — XX 29(-) — XX 1(+)
XXX 30 — XX 50
XXX 1 — XX 3 Cdn — XX 3
XX 6(-)

XX 82
XX 101

R.N. Hanson

MAP 5





MARSHALING AND EMBARKING INSTALLATIONS
AREA "M"

- SAUSAGE CAMPS
- OTHER CAMPS
- IN ROAD
- OUT ROAD
- SP — STARTING POINT
- RCRP — ROAD CONVOY REGULATING POINT
- TP — TRAFFIC POINT
- HARDS, PIERS, QUAYS
- FIELD HOSPITAL
- AID STATION
- QM STERILIZATION AND BATH UNIT
- POL DEPOT
- WATER POINT
- dep — ORDNANCE DEPOT
- vp — ORDNANCE VEHICLE PARK
- as — ORDNANCE ADVANCE SHOP
- RP — ORDNANCE RECOVERY POINT
- AMMUNITION DUMP
- G — CHEMICAL WARFARE DISTRIBUTING POINT
- S — SIGNAL SUPPLY DISTRIBUTING POINT
- SIGNAL INSTALLATION
- PX — POST EXCHANGE

Area "M" accommodations: 13,400 personnel and 2,001 vehicles

Static operating personnel requirements: 3,645 officers and men

1 0 1 2 3 4 5
MILES

R. Johnstone

MAP 10