

UNITED STATES ARMY IN WORLD WAR II

The Technical Services

THE QUARTERMASTER CORPS: OPERATIONS IN THE WAR AGAINST JAPAN

by

Alvin P. Stauffer



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. . . to Those Who Served

Foreword

This is the fourth and concluding volume of a series which records the experiences of the Army's Quartermaster organization in World War II. The first two volumes of this group describe the problems and achievements of the Quartermaster Corps in the zone of interior and the third, still in preparation, will relate operations in the war against Germany. This volume tells the story of Quartermaster supply and service in the war against Japan in the Pacific. The principal Quartermaster function during World War II was to supply items commonly required by all Army troops—food, clothing, petroleum products, and other supplies of a general character—regardless of their duties. In the Pacific, as elsewhere, Quartermaster supply responsibilities included the determination of requirements, the procurement of the items needed both from the United States and from local producers, and the storage and distribution of items after they had been received. Quartermaster troops also furnished numerous services, including the collection and repair of worn-out and discarded articles, the provision of bath and laundry facilities, and the identification and burial of the dead. The author has concentrated in this volume on the many problems which were inevitable in a distant and strange environment, and his narrative naturally reflects the viewpoint of the troops and the commanders in the field.

ALBERT C. SMITH
Maj. Gen., U. S. A.
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Washington, D. C.
15 February 1955

The Author

Alvin P. Stauffer holds a Doctor of Philosophy degree from Harvard University. For seven years he taught history at Simmons College, Boston, and then joined the staff of the U.S. National Park Service in Washington, where he produced many studies of historic sites administered by that agency. In 1943 he became a member of the Historical Branch, Office of The Quartermaster General. Dr. Stauffer prepared several treatises dealing with the Quartermaster Corps in the United States in World War II. One of these, *Quartermaster Depot Storage and Distribution Operations,* has been published in the monographic series entitled QMC Historical Studies. Since 1952 Dr. Stauffer has been Chief of the Historical Branch, OQMG.

Preface

The object of this volume is to increase the body of organized information easily available about Quartermaster support of the forces fighting the Japanese in the Pacific. Anyone who writes on military supply ventures into almost virgin territory, especially in dealing with Quartermaster supply activities. Only a few professional officers—and those mainly Quartermaster officers—are familiar with the subject, and they have gained this knowledge chiefly through their own experience and the oral traditions of the offices in which they have worked. When Quartermaster activities in theaters of operations is the subject of a volume, as in this case, readers lacking even elementary information are likely to be more numerous than when the subject is Quartermaster activities in the United States. For that reason the needs of these readers have been constantly borne in mind. The writer hopes particularly that the volume may furnish Quartermaster officers with facts that will prove useful in planning future field operations and in training Quartermaster troops.

No attempt has been made except in a very general way to tell the story of strategic decisions and tactical actions. In a work comprising part of the historical series on the UNITED STATES ARMY IN WORLD WAR II, that story would have been redundant. A consistent effort has been made to analyze Quartermaster activities in the three major territorial commands in the Pacific, whether these activities were conducted at higher headquarters, in base sections, or by Quartermaster troop units in support of combat operations. As the area in which the U.S. Army played its most important role in the war against Japan, the Southwest Pacific Area has been treated at greater length than have the two other major territorial commands—the South Pacific Area and the Central Pacific Area—but these areas are by no means neglected and many of their activities are dealt with in detail. In order to clarify the perplexing production and transportation problems presented to quartermasters as they procured, stored, and distributed supplies and equipment, this volume gives considerable attention to economic matters. At times the account of the activities of the Corps may appear lacking in homogeneity, but this impression is unavoidable in view of the wide diversity of Quartermaster tasks.

It should not be concluded from a reading of those sections which contain detailed descriptions of some of the troubles encountered in distribution activities that these difficulties were typical. They are discussed at length only because they demanded so large a share of the time and energy of supply officers and presented knotty problems not susceptible of easy solution. If the reader is occasionally

tempted to think that distribution activities were usually marred by inadequate performance, he will be in error. Quite the contrary, Quartermaster supply was in general satisfactory, but since the tasks connected with fully satisfactory accomplishment normally had few lessons to teach, the writer had no reason to consider such routine operations in as much detail as he did complicated operations that could not be completed either readily or quickly. Only through thorough knowledge of the bothersome supply problems that are likely to arise during the course of combat activities can future perplexities be anticipated and plans be made in time to cope with probable difficulties.

The writer performed virtually all the research for this volume, using chiefly the records of overseas commands, pertinent sections of which were obtained on loan from the Records Administration Center, AGO, St. Louis, where they were stored before their removal to the Kansas City Records Center. Mr. William H. Peifer rendered invaluable help in searching operational plans, after action reports, and unit histories kept in the Department of Defense. The volume also profited tremendously from his comprehensive knowledge of Quartermaster troop units. Many people responded willingly to frequent requests for files in their custody. The author wishes especially to thank Mrs. Julia R. Ross and her assistants in the Mail and Records Branch of the Office of The Quartermaster General, Mr. Wilbur J. Nigh and his co-workers in the Departmental Records Branch, AGO, and Mr. Israel Wice and his highly competent staff in the General Reference Office, Office of the Chief of Military History.

To Dr. Thomas M. Pitkin, Chief of the Historical Branch of the Office of The Quartermaster General until the spring of 1952, the author owes a special debt for constant and sympathetic encouragement. He is deeply obligated, too, to Dr. Louis Morton, Chief of the Pacific Section in the Office of the Chief of Military History, who made many suggestions for the improvement of the manuscript in its final revision. Without Dr. Morton's trenchant criticism, vast knowledge of Pacific problems, and keen sense of literary refinement, this volume would have been far less substantial than it is. The writer is also greatly indebted for sound advice and constructive criticism to Lt. Col. Leo J. Meyer, Deputy Chief Historian in the Office of the Chief of Military History during the writing of this manuscript, and to his successor, Dr. Stetson Conn. Some thirty officers, most of whom had participated in the activities of the Quartermaster Corps in the Pacific, read all or part of the manuscript. Of these officers, Col. James C. Longino, Assistant Quartermaster of the Sixth Army in the war against Japan, and Brig. Gen. Herbert A. Hall, formerly chief of the Management Division in the Office of The Quartermaster General and now commanding general of the Utah General Depot, made particularly valuable recommendations.

Mrs. Charlesette Logan, Mr. Irvin R. Ramsey, Miss Helene M. Bell, and Mrs. Hadasel W. Hill of the Historical Branch, Office of The Quartermaster General, in addition to typing many drafts of the manuscript performed the arduous task of interpreting the countless deletions and interpolations made by the author.

Special acknowledgments must be made to Mr. Joseph R. Friedman and his aides in the Editorial Branch, Office of the Chief of Military History, particu-

larly Mr. David Jaffé, the editor, and Mr. Allen R. Clark and Dr. Vincent C. Jones, the copy editors, who painstakingly prepared the manuscript for the printers; to Maj. James F. Holly, who provided maps to guide the reader through the Pacific; to Maj. Arthur T. Lawry and Mr. Henry U. Milne, who searched in remote corners for the pictures with which to illustrate this volume; and to Mrs. Faye F. McDonald and Mrs. Anne Mewha, who typed the final copy.

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ALVIN P. STAUFFER

Contents

Chapter		Page
I.	THE PHILIPPINES—THE OPENING OPERATIONS	1
	Quartermaster Preparations for War in the Philippines	2
	Quartermaster Operations in Luzon, 8 December 1941–1 January 1942	8
	Status of Quartermaster Supplies on Bataan	13
	Running the Blockade	18
	Bataan: Last Phase	26
	Quartermaster Operations on Corregidor	32
II.	PROBLEMS IN HAWAII, AUSTRALIA, AND NEW ZEALAND	36
	Hawaii, Mid-Pacific Supply Base	36
	Reaction to Japanese Victories, December 1941–May 1942	46
	Quartermaster Problems in Australia and New Zealand	47
III.	MISSION AND ORGANIZATION IN THE PACIFIC	55
	Quartermaster Mission	55
	Supply Organization in the Southwest Pacific	58
	Organization of Quartermaster Operations in the South Pacific	73
	The Central Pacific Quartermaster Organization	79
IV.	PACIFIC BASES	83
	Southwest Pacific	84
	South Pacific	91
	Central Pacific	95
V.	LOCAL PROCUREMENT IN THE PACIFIC	98
	Rationing by the Australian Army	99
	Procurement of Subsistence in Australia	102
	Procurement of Clothing and General Supplies in Australia	121
	Procurement in New Zealand	125
	Local Procurement Outside Australia and New Zealand	127
	Army Farms	129
VI.	SUPPLY FROM THE UNITED STATES	134
	Area Stock Levels and Requisitions	134
	Port-Depot System	140
	Automatic Supply	145
	Shipment of Organizational Equipment and Supplies	147
	Block Ships	150

Chapter *Page*

VII. STORAGE, TRANSPORTATION, AND PACKING PROBLEMS . 160
Quartermaster Storage 160
Distribution Problems 169
Packaging and Packing 177

VIII. CLASS I, II, III, AND IV SUPPLY PROBLEMS 191
Class I Losses 191
Supply of Subsistence in Advance Areas 193
Class II and IV Supplies 200
Class III Supply 212

IX. MORALE-BUILDING SERVICES 226
Bakery Operations 227
Laundry Service 232
Bath, Sterilization, and Fumigation Operations 237
Salvage and Reclamation 241
Graves Registration Service 248

X. LOGISTICAL SUPPORT OF COMBAT OPERATIONS 259
Development of Special Supply Requirements 261
Logistical Planning for Operations Against Yap, Leyte, and Okinawa . . 262
Quartermaster Units in Combat Operations 266
Special Problems of Logistical Support 271
Other Problems of Logistical Support 284

XI. SUPPLIES AND EQUIPMENT IN COMBAT USE 291
Jungle Supplies and Equipment 291
Operational Rations for Ground Combat Forces 302
Other Special Rations 313

XII. PROBLEMS OF VICTORY 321

BIBLIOGRAPHICAL NOTE 327

LIST OF ABBREVIATIONS 333

INDEX 343

Maps

No. *Page*

1. The Pacific Areas 47
2. New Guinea . . . . . *Inside back cover*

Illustrations

	Page
Troop Formation on Bataan	16
Quartermaster Corps Baker	18
Surrender to the Japanese	33
Storage Facilities in Australia	52
Salvage and Reclamation Activities	68
Quartermaster Truck Company Motor Pool	74
Section of the Quartermaster Salvage Depot	79
Clothing and Equipage Building	89
Cannery Operations in Australia	109
Storage of Meat	114
Vegetable Market Center	119
Quartermaster Farms	131
Thatched Roof Warehouses	161
Open Storage of Quartermaster Items	163
Prefabricated Refrigerated Warehouses	167
Damaged Subsistence	179
Corrugated Fiber Cartons	181
Open Storage of Canvas Items	205
Bulk Petroleum Products Storage	216
Field Bakeries in Operation	230
Laundry Facilities in the Southwest Pacific	233
Fumigation and Bath Company	238
Salvage Operations	242
Palletized Supplies	265
Trucks Operating From the Beaches	269
Small Boats Operating Close to Shore	272
Quartermaster Pack Train	282
Class III Supply Dump	285
Camouflaged Jungle Suit	295

All illustrations in this volume are from U.S. Department of Defense files.

THE QUARTERMASTER CORPS: OPERATIONS IN THE WAR AGAINST JAPAN

CHAPTER I

The Philippines—The Opening Operations

When Japan boldly opened war on the United States in December 1941, the Quartermaster Corps (QMC) in the Philippines, like other U.S. Army components, was ill equipped to shoulder the heavy burdens suddenly thrust upon it. From the time the United States took possession of the archipelago after the Spanish-American War, two basic factors had constantly operated to preclude the maintenance of strong military forces in the islands and the development of a defensive system capable of protracted resistance against vigorous attack. One factor was the persistent weakness of the Army; the other was use of the meager military resources of the Army mainly in Hawaii and Panama, protection of which was essential to the security of the continental United States. Acquisition of the Caroline, Mariana, and Marshall Islands by Japan, as part of its reward for entering World War I on the Allied side, added a third factor, since these central Pacific islands stretched directly across American lines of communication with the Philippines and thereby discouraged any strengthening of the forces in that archipelago. The naval limitation treaty negotiated at the Washington disarmament conference in 1922 constituted still another factor detrimental to defensive preparations by forbidding further fortification of the Philippines and by calling for a reduction of naval armaments that would give Japan control of western Pacific waters.[1]

In December 1934 Japanese denunciation of this treaty opened the way, after the lapse of the two years stipulated in the treaty, for renewed fortification of the Philippines, but the opportunity was not grasped. One reason may have been the passage in March 1934 of the Tydings-McDuffie Act, which provided for the recognition of Philippine independence after a ten-year interval. Army war planners as well as members of Congress felt that, since the archipelago would soon become independent, the United States should be relieved of heavy expenditures for its protection. More than ever the Army was now convinced of the futility of using its small resources in a costly attempt to defend the precarious American position in the Far East. Available military power, it was believed, was insufficient for protracted resistance against a foe that would operate not far from his home bases in Japan and that would probably possess naval superiority in the western Pacific. Until mid-1941, Army plans for defense of

[1] A. Whitney Griswold, *The Far Eastern Policy of the United States* (New York: Harcourt Brace, 1938), pp. 315–21.

the Philippines thus called for only the protection of the small area about Manila Bay and Subic Bay.

By then, as a result of growing international tensions, the United States was confronted with the danger of an early Japanese attack in the Far East. But since American Army strength in that area was rapidly increasing, it was possible for the first time to envision a strong defense of the Philippines. The War Department accordingly began to alter its strategic concepts along the lines favored by General Douglas MacArthur, U.S. Military Advisor to the Philippine Commonwealth. Strategic planners now thought in terms of defending all Luzon and the Visayan Islands rather than merely Manila and Subic Bays. The new trend was manifested in the establishment late in July of a new command, the U.S. Army Forces in the Far East (USAFFE). It embraced all American military activities in the Far East and absorbed both the Philippine Department, U.S. Army, and the Commonwealth Army, which was to be mobilized in force and integrated into the service of the United States.

Implementation of this ambitious defensive program required huge quantities of American equipment and supplies, particularly for the Philippine forces, which were designed to be the major source of military manpower. They were to furnish about 150,000 men by 1 April 1942, when the combined strength of American ground and air forces and Philippine Scouts would at best be only about 50,000. But in the summer of 1941 the Commonwealth Army was mostly a paper organization that needed at least the better part of a year to train the green Filipino soldiers. Time, too, was the element most needed to transport supplies and equipment from the United States to the remote archipelago. Yet little time remained. In four months Japan would strike.[2]

Quartermaster Preparations for War in the Philippines

Working under heavy pressure, the Office of the Chief Quartermaster (OCQM) at Headquarters, USAFFE, in Manila, devoted the late summer and the autumn of 1941 mainly to the support of the greatly expanded military preparations. Its major task was requisitioning Quartermaster items for the Philippine Army, which was to start its mobilization on 1 September 1941 and receive its supplies from the U.S. Army after 1 December. For planning purposes the strength of this force was set at 75,000 troops by 1 December 1941, at 90,000 by 1 January 1942, and at 150,000 by 1 April 1942.[3]

The Philippine Army itself had scarcely any supplies or equipment. For this lamentable situation the Commonwealth Government as well as the United States was responsible. That government had in fact

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[2] (1) Louis Morton, *The Fall of the Philippines*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1953), pp. 8–30, 61–71. (2) Maurice Matloff and Edwin M. Snell, *Strategic Planning for Coalition Warfare*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1953), pp. 2–3. (3) Mark Skinner Watson, *Chief of Staff: Prewar Plans and Preparations*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1950), pp. 412–17.

[3] Brig Gen Charles C. Drake, Rpt of Opns of QMC USAFFE and USFIP, 27 Jul 41–6 May 42 (Annex XIII to Gen Jonathan M. Wainwright, Rpt of Opns of USAFFE and USFIP in P. I., 1941–1942), pp. 1–4. DRB AGO. These reports will be cited hereafter as the Drake Rpt and the Wainwright Rpt. (See Bibliographical Note.)

made elaborate plans for the future defense of the islands as an independent state, but its implementation of these plans had proceeded slowly and in early 1941 the regular military establishment included only a few thousand troops. There were somewhat more than 100,000 reservists, but as a whole they had received only inadequate training. Creation of a truly modern army would have put an almost unbearable strain on the limited financial resources of so poor a land as the Philippines. Throughout the 1930's the Commonwealth Government had consistently maintained that as long as the United States retained political control and with it power to determine whether the Filipinos were at peace or war, that country had the primary obligation for defense. Actually, after the Tydings-McDuffie bill became law, the United States had not only done virtually nothing to strengthen the islands' defenses but had established the principle that American funds for equipping and supplying Filipino forces could be spent only in the archipelago and only under the supervision of the Commonwealth. Worst of all, it had appropriated no money for these forces even under these narrow conditions. In August 1940 and on several subsequent occasions President Manuel Quezon had appealed to the American government to make available the credits that for some years had been accumulating in the U.S. Treasury both from duties levied on Philippine sugar imported into the United States and through devaluation of the American dollar. He suggested that these funds, amounting to more than $50,000,000, be freed for defense preparations and spent under the direction of the United States. In September 1941 the War Department recommended that Congress authorize the expenditure of this money for these purposes, but that body did not take favorable action on this proposal until after Pearl Harbor.[4]

All this meant that in the summer of 1941 USAFFE had no funds for expenditure in the United States in behalf of the Commonwealth forces. When it became necessary to obtain supplies from the United States for the hastily assembling Filipino soldiers, the Chief Quartermaster was thus unable to requisition supplies direct from the depot at San Francisco, as was the normal practice. Instead he submitted his requisitions to the OQMG. Since this office also had no money for the Philippine Army, it sent them on to the Chief of Staff. Though he authorized the needed purchases with special U.S. Army allocations from the President's Emergency Fund, the unusual procedure held up approval of the requisitions until after the Filipino forces had begun mobilization on 1 September.[5] Even within the islands the OCQM was hampered in its procurement of supplies for these forces by the requirement that the Commonwealth Government approve all contracts for "open market" purchase or manufacture. Nevertheless a considerable number of such contracts were made for articles of outer clothing.[6]

In addition to sending requisitions for Filipino requirements to the United States the OCQM submitted others covering the

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[4] (1) Joseph Ralston Hayden, *The Philippines: A Study in National Development* (New York: Macmillan, 1942), pp. 731–32. (2) Gen. George C. Marshall, "Biennial Report of the Chief of Staff of the United States Army, July 1, 1941, to June 30, 1943, to the Secretary of War" in Walter Millis, ed., *The War Reports of General of the Army George C. Marshall, et al.* (Philadelphia and New York: J. P. Lippincott, 1947), pp. 67–68.

[5] Drake Rpt, App. E, Rpt, Col Richard G. Rogers, Traffic Control Opns, pp. 1–2.

[6] Drake Rpt, App. A, Rpt, Col Irvin Alexander, Sup Problems of USFIP, pp. 1–2.

supply deficiencies, created in July by the increase from 31,000 to 50,000 men, in the basis of defense reserve stocks for U.S. Army troops and Philippine Scouts. It also sent in orders for the supplies required by the rise in the authorized strength of the Regular Army and the Philippine Scouts from 18,000 to 22,000 troops. Among the food items requisitioned were dehydrated vegetables and boneless beef, both of which, recent tests in the archipelago showed, had special value in combat.[7]

Though low shipping priorities had been assigned to such Quartermaster supplies as food, clothing, and items of general utility, most of the articles requisitioned for the Regular Army and the Scouts arrived before the Japanese invasion. The situation was quite different with respect to defense reserve and Philippine Army supplies. Early in October the War Department notified Brig. Gen. Charles C. Drake, the Chief Quartermaster, that the first shipment on his requisitions for these supplies would arrive in Manila late in the month and that shipments would continue until the following spring. General Drake obtained sufficient wharfage in the Manila Port Terminal Area to discharge the vessels, but the shipment did not arrive at the scheduled time. Nor did it come late in November when a convoy was again expected. At the beginning of hostilities, it was at sea, bound for the Philippines, and was then diverted to Australia to lessen the danger of capture by the Japanese.[8] No Quartermaster supplies requisitioned for the Commonwealth Army and the defense reserves ever reached the Philippines. When war came, the defense reserves were less than half filled, and the Filipino forces took the field with only the few Quartermaster items that the QMC could buy locally or borrow from U.S. Army stocks.[9]

In the spring of 1941, even before the start of accelerated defensive preparations, OCQM had investigated the availability in the Philippines of items that would be particularly useful for support of combat troops in wartime. It found that no steel drums for distributing gasoline in the field could be obtained. Nor were there any individual rations for soldiers who might be cut off from their normal sources of supply. On learning this General Drake immediately requisitioned 500,000 C rations and enough 55-gallon drums to handle 1,000,000 gallons of gasoline. Both drums and combat rations had high shipping priorities and arrived at Manila late in June. Gasoline had not been requisitioned. Nor was it included in the defense reserves since there were ample commercial stocks in the Philippines and the local oil companies had agreed to meet all emergency requirements. The War Department nevertheless filled the drums with gasoline before they were shipped. Its action proved very fortunate, for when the defenders of Luzon withdrew to Bataan in late December, they had little more gasoline than was in the filled drums.[10]

When the drums reached Manila from the United States, the OCQM put them with the rations in defense reserve storage at Fort William McKinley on the eastern outskirts of Manila; at Fort Stotsenburg, sixty-five miles northwest of Manila; and at Camp Limay in Bataan on the shores of Manila Bay. The latter installation served as the principal depository for defense re-

[7] (1) Drake Rpt, p. 3. (2) Morton, *Fall of Philippines*, pp. 62–63.

[8] Typescript Monograph, James R. Masterson, U.S. Army Transportation in the Southwest Pacific Area, 1941–1947, p. 2. OCMH, 1949.

[9] Drake Rpt, p. 3.

[10] *Ibid.*, p. 4.

serves. It stored approximately 300,000 gallons of gasoline in 55-gallon drums, 100,000 C rations, and 1,145 tons of canned salmon. Fort McKinley and Fort Stotsenburg each had about 200,000 C rations and 300,000 gallons of gasoline. In addition, Fort McKinley had sizable stocks of canned meat and fish.[11] The defense reserves, as a whole, lacked rice, the principal food of the Filipinos; canned fruits and vegetables; and perishable provisions, for which, indeed, sufficient cold-storage warehouses could not be provided from either military or commercial sources.

Peacetime procedures for meeting current supply requirements did not permit the accumulation of stocks in quantities large enough to fill gaps in the defense reserves. The main supply installation, the Philippine Quartermaster Depot in Manila, requisitioned items for current use only in the quantities necessary to maintain a sixty-day level of supply for U.S. troops and Philippine Scouts. Since rice, sugar, coffee, and perishable foods were abundant in the commercial markets, the depot did not buy the items as they were needed but delegated their procurement to posts and stations. These installations, able to secure these foods whenever they were wanted, filled their immediate requirements by frequent purchases from nearby merchants but built up, normally, only a few days' reserve. This meant that when war came there were only small stocks of these essential supplies.[12]

The Manila Base Quartermaster Depot, hurriedly established in September 1941, was designed to perform for the Philippine Army the same functions that the Philippine Quartermaster Depot performed for the Regular Army, but the early outbreak of war gave it too little time to obtain adequate stocks for either current or reserve use.[13] Accordingly the Philippine Quartermaster Depot was given responsibility for supplying the Commonwealth Army, with the result that its limited stocks were soon almost depleted.

In the few months before the attack on Pearl Harbor, drastic changes in the detailed plans for Philippine defense profoundly influenced Quartermaster preparations. War Plan ORANGE 3 (WPO-3), which had been developed by the Philippine Department in 1940 and 1941 on the basis of Joint Plan ORANGE of 1938, still reflected the prewar skepticism regarding an effort to defend any part of the archipelago except Manila and Subic Bays. If a hostile landing could not be prevented or the enemy beaten back once he had landed, the defenders were to conduct a series of delaying actions while they withdrew to the Bataan Peninsula, the key to the defense of Manila Bay. Under WPO-3 the Commonwealth Army was to be used chiefly to help the American forces in central Luzon.

General MacArthur, who had become commanding general of USAFFE on its establishment, considered WPO-3 with its restricted objectives, a defeatist plan.[14] As Military Advisor to the Commonwealth Government and Field Marshal of the Philippine Army, he had devoted himself since 1936 to the preparation of a complete program for protecting the whole archipelago. When the War Department RAINBOW Plan received formal approval in

[11] *Ibid.*, App. A, Rpt, Col Otto Harwood, Storage of Gasoline on Bataan, p. 1; App. E, Rpt, Col Richard G. Rogers, Traffic Control Opns, p. 7.

[12] Drake Rpt., p. 4.

[13] Memo, G–4 for DCofS USAFFE, 19 Sep 41. Phil Records AG 430.2 (11 Sep 41).

[14] Gen. Jonathan M. Wainwright, *General Wainwright's Story*, Robert Considine, ed. (New York: Doubleday, 1946), pp. 8–10.

August 1941, it, like the ORANGE Plan, assigned the U.S. forces only the limited mission of holding the land areas around Manila and Subic Bays. MacArthur quickly pointed out that it gave no recognition to the wider view of defense implicit in the current mobilization of the Commonwealth Army and in the recent creation of an American high command for the Far East. He strongly urged that the plan be revised to provide for the protection of all the islands. As the War Department had already set the stage for a broader strategy, it concurred in MacArthur's views, and early in November formally altered the RAINBOW Plan in line with his tactical ideas.[15]

In contrast to WPO-3, which was now regarded as obsolete, the new RAINBOW Plan visualized no hasty withdrawal from beach positions. On the contrary, they were to be held at all costs. MacArthur believed that the contemplated increase in air power and in the total strength of all defending forces to about 200,000 men could be achieved by 1 April 1942, which was, he thought, the earliest probable date of a Japanese attack. There would then be available forces sufficiently strong, he concluded, to execute the new strategy.[16]

The changed concept of defense radically altered the plans for storage of Quartermaster supplies. Under WPO-3 movement of these supplies into Bataan would have started on the outbreak of war and continued until the depots in the peninsula had enough supplies to maintain 43,000 men for 180 days. In addition, that plan had provided for the storage of supplies on Corregidor for 7,000 men in the Harbor Defenses of Manila and Subic Bays. During the summer MacArthur's staff communicated to the OCQM his objections to the limited aims of WPO-3. Drake learned that the general, having determined to defend all Luzon, had decided not to place large quantities of supplies on Bataan but "to fight it out on the beaches." This decision largely established the nature of the Quartermaster storage program. Since far-flung and, if possible, offensive operations were to be conducted, supplies would have to be dispersed rather widely to support the scattered forces contemplating the defeat of the enemy on his as yet unknown landing beaches. This fact determined the choice of sites for three advance QMC depots that were to supply the Philippine Army in Luzon after 1 December.[17] The largest depot, intended to supply northern Luzon, was located at Tarlac, about seventy miles northwest of Manila and forty-five miles south of Lingayen Gulf. Another, charged with a similar function for southern Luzon, was at Los Baños, approximately thirty-five miles southeast of the capital, and a third was at Guagua, Pampanga Province, about thirty-five miles north of Manila and not far from Bataan Peninsula. A QMC advance depot for the Philippine Army was also established at Cebu City in the island bearing that name to supply forces in the southern and central Philippines.

To the QMC the most important part of the decision to "fight it out on the beaches" was abandonment of the WPO-3 plan for storing Quartermaster supplies on Bataan.

[15] (1) Watson, *Chief of Staff: Prewar Plans and Preparations*, pp. 413, 428–45. (2) Henry L. Stimson and McGeorge Bundy, *On Active Service in Peace and War* (New York: Harper and Brothers, 1948), pp. 388–89.

[16] (1) Lt. Gen. Lewis H. Brereton, *The Brereton Diaries* (New York: William Morrow and Co., 1946), p. 24. (2) Wainwright, *Story*, p. 13.

[17] Drake Rpt, pp. 5, 21; App. A, Rpt, Col Irvin Alexander, Sup Problems of USFIP, p. 1; App. E, Rpt, Col Richard G. Rogers, Traffic Control Opns, p. 4.

As a result, when M Day arrived for the Philippines on 8 December, the Corps instead of beginning the movement of supplies to the peninsula as the discarded plan had directed, accelerated shipments to the advance depots and to the railheads and motorheads of the fighting forces.[18] Stocks originally designed largely for the defense of Bataan were now scattered over much of central and southern Luzon. For some days the only Quartermaster supplies on Bataan were those sent to Camp Limay several months before.

From the very beginning of hostilities the activities of the Corps in Regular Army and Philippine Scout organizations were handicapped by the small number of experienced Quartermaster officers and enlisted men. In July 1941, Quartermaster units serving these military groups consisted of the 12th Quartermaster Regiment, with headquarters at Fort McKinley; the 65th and 66th Pack Troops at Fort Stotsenburg; the 34th Light Maintenance Company at the Army Port Area in Manila; and the 74th Field Bakery Company at Fort McKinley. In addition, each military station had separate American and Philippine Scout Quartermaster detachments. These detachments had about 700 enlisted men all together but they had no assigned Quartermaster officers not serving also in other administrative posts. At this time Quartermaster troops of the Regular Army and the Philippine Scouts totaled approximately 35 officers and 1,000 enlisted men. By 8 December the number of officers had been increased to 90 by calling local reservists and by detailing line officers. Enlisted strength then amounted to about 1,200 men, an increase of approximately 200.

The manpower situation in the Commonwealth Army was much worse. No corps, army, or communications zone Quartermaster units were scheduled to be inducted as such into this force until the spring of 1942, and so none had been mobilized when hostilities started. A school was set up at Manila in November, primarily for the instruction of Philippine Army division quartermasters in the handling of supplies, but this enterprise bore little fruit, for all division quartermasters were then attending a command and staff school at Baguio, and only subordinate officers were sent to Manila.

Though the Far East Air Force of about 8,000 men received from the United States during the summer and fall two truck companies and two light maintenance companies, these units did not come under the control of the USAFFE Quartermaster. General Drake, then, had less than 1,300 experienced officers and men to carry out Quartermaster functions for almost 100,000 men in the Regular Army, the Philippine Scouts, and the Philippine Army.[19]

Since a trained Quartermaster force amounting to at least 4 percent of the total troop strength was usually recognized as essential to efficient supply operations in the field, the force actually available, constituting only slightly more than 1 percent, fell far below the desired quota. Quartermaster responsibilities, moreover, still included extensive motor, rail, and water transportation functions that, within a few months, were to be transferred to the Ordnance Department and the newly organized Transportation Corps. Believing that if a large number of experienced officers and men were not secured before hostilities started, "we would be lost in the inevitable rush and confusion," Drake on several occasions during the summer and fall had informed The Quarter-

[18] Drake Rpt, p. 21.

[19] *Ibid.*, pp. 5–6, 8–9, 60–61.

master General of his needs, but that officer had no jurisdiction over this problem and could do nothing to help him. Drake had also asked Philippine Department headquarters to make qualified civilians residing in the archipelago commissioned officers, but that headquarters likewise lacked authority to grant his request. When the Japanese invaded Luzon, Drake was consequently obliged to rely on civilian volunteers and improvised units composed wholly of civilians. Among these units were labor battalions, repair detachments, graves registration, salvage, and truck companies, complete boat crews, and stevedore gangs.[20]

Quartermaster Operations in Luzon, 8 December 1941–1 January 1942

War came four months sooner than General MacArthur had anticipated. The Philippine Army was still scarcely more than half mobilized; only a fraction of the planes, supplies, and equipment necessary for the successful defense of the archipelago had arrived; and American tactical commanders had been unable in the few weeks available after the revision of RAINBOW Plan to finish the preparation of new plans of their own. MacArthur nevertheless hoped that the increases already made in his military strength, inadequate though they were, might suffice to carry out his war plans.

During the early fighting Quartermaster activities were centered chiefly on the task of assuring field forces enough supplies without drawing on the small defense reserves. Particular emphasis was placed on rations and petroleum products, for these were the items most sorely needed by the defending forces as they attempted vainly to check the advance of the enemy from his landing beaches. No figures on shipments from the Manila Depot are available, but thirty-five trainloads of Quartermaster supplies are estimated to have been delivered to the depots at Tarlac, Los Baños, and Guagua.[21] Shipments of rations to Tarlac, for example, comprised a five-day level of supply, and by 15 December an eight-day stock of food had been accumulated. Generally speaking, the advance installations looked to the Manila Depot for practically all their supplies except perishable food, rice, sugar, and coffee, which were still locally procured as they were needed. Even in the field, divisions filled their requirements for fruits, vegetables, meat, and fish partly by purchases from nearby markets.

Because of the growing air and naval superiority of the Japanese, replenishment of stocks from the United States, the major prewar source of supply, proved impossible; even procurement from neighboring islands was hazardous. Thus outside sources furnished only a diminishing trickle of Quartermaster supplies. Only maximum exploitation of local sources could provide a significant replenishment of dwindling stores.

There were approximately 10,000,000 gallons of gasoline in commercial storage on Luzon, mostly in Manila. Shortly after hostilities began, General Drake reached an agreement with the oil companies which allowed the Army to control the distribution of all commercial gasoline. Distributing centers, belonging to and operated by the oil companies, were available for military service at six strategic points in Luzon. These centers were each capable of handling from 75,000 to 100,000 gallons daily.

[20] *Ibid.*, pp. 9–10.

[21] Capt. Harold A. Arnold, "The Lesson of Bataan," *The Quartermaster Review* (hereafter cited as *QMR*), XXVI (November–December 1946), 12–15, 60, 63.

Rail tank cars from Manila supplied the centers, which in turn supplied some thirty issue points set up along the main traffic arteries out of Manila. Tank trucks, drums, and cans were all used in these operations.[22]

In Manila, the largest commercial storage center in the Philippines, the Quartermaster Depot exploited local supply sources to the maximum. It stressed particularly the procurement of subsistence, for from the beginning it realized that food might become critically scarce. Some polished rice was obtained from Chinese merchants, and large quantities of food and other scarce supplies from ships in Manila harbor. Arrangements were made with Armour and Company, Swift and Company, and Libby, McNeill, and Libby to take over their stocks of canned meats and other foods.

When it became obvious shortly after the Japanese landings that Luzon might soon come completely under enemy control, the increasing objection of the Commonwealth Government to measures that might reduce the food available to the Philippine public under Japanese occupation handicapped further accumulation of food reserves. This objection was reflected in the frequent refusal of Headquarters, USAFFE, to approve the commandeering of food, even the seizure of stocks owned by Japanese nationals.

An incident at the Tarlac Depot illustrates this difficulty. The commanding officer, Col. Charles S. Lawrence, planned the confiscation of 2,000 cases of canned fish and corned beef and sizable quantities of clothing, all of which were held in the warehouses of Japanese firms. But USAFFE disapproved the plan and informed Colonel Lawrence that he would be court-martialed if he took the goods.[23] Another incident of far-reaching importance involved the procurement of rice. Since there were only small military stocks of this vital commodity, both the Quartermaster Depot and the advance depots bought as much as they could from local sources. To their dismay they discovered that rice could not be removed from the province in which it had been purchased because of the opposition of the Commonwealth Government. Ten million pounds at the huge Cabanatuan Rice Central, enough to have fed the troops on Bataan for almost a year, and smaller amounts elsewhere in consequence never passed into military hands. A similar prohibition applied to sugar, large quantities of which were likewise held in storage.[24]

In mid-December military food stocks fell substantially short of the 180-day supply for 43,000 men on Bataan that was contemplated as a reserve in WPO-3. Yet the number of troops to be fed had increased to almost 80,000, and after the withdrawal to Bataan the number of persons to be supplied was further increased by about 25,000 civilians who had fled to the peninsula before the onrushing enemy. The QMC fully realized that transportation of food stocks, though relatively small, would entail serious difficulty in the event of a hurried retreat into Bataan. Before Pearl Harbor a logistical study made by General Drake had shown that even under good transportation conditions at least 14 days would be required to get into Bataan a 180-day supply for 43,000 men. Drake was alert to the danger of delay and after M Day unsuccessfully requested permission to start stocking of the peninsula. Despite this rebuff, Col.

[22] Drake Rpt, pp. 17–18; App. A, Rpt, Col Irvin Alexander, Sup Problems of USFIP, p. 3.

[23] Drake Rpt, App. A, Col Charles S. Lawrence, Tarlac QM Depot, pp. 4–5.

[24] Drake Rpt, pp. 19–20; App. A, Rpt, Col Irvin Alexander, Sup Problems of USFIP, p. 2.

Alva E. McConnell, Commanding Officer of the Philippine Quartermaster Depot, began the movement of small quantities of food, gasoline, and oil to Bataan some days before the order for a general withdrawal was issued on 23 December.[25]

An equally important preparatory measure was the dispatch of a Quartermaster officer, Col. Otto Harwood, to the peninsula with the mission of dispersing and otherwise protecting from bombing the food and gasoline stored there the previous summer as part of the defense reserve. After his arrival at Camp Limay on 14 December, Colonel Harwood and his Filipino laborers worked unflaggingly—chiefly at night in order not to be seen by the enemy. The American commander selected storage points well hidden from hostile air observers yet convenient for the supply of troops, locating them mostly under the cover of large trees along the Mariveles Road, which ran across the southern end of Bataan. Fifty-five-gallon drums, filled with gasoline, were camouflaged and placed in roadside ditches. Colonel Harwood's work materially facilitated supply operations when the withdrawal to Bataan began, but a general movement of rations and gasoline to the peninsula would have been much more helpful. Unfortunately, such a movement was not ordered until nine days after Harwood arrived.[26]

During this period the first and only effort was made to forward Quartermaster items from Luzon to the new but still unstocked depot at Cebu City. It ended in disaster on 16 December, when the motor ship *Corregidor,* carrying about 1,000 passengers and a substantial cargo, including over 1,000 tons of Quartermaster goods for Cebu City, struck a mine off Corregidor Island and sank within three minutes. All Quartermaster supplies were lost together with more than 700 persons. This shipping catastrophe, the worst suffered by American forces during their defense of the Philippines, left the Cebu Depot wholly dependent upon the Quartermaster supplies that it could procure in the industrially undeveloped southern provinces.[27]

On 23 December WPO-3 was put into effect. This action meant that withdrawal to Bataan had been decided upon. Brig. Gen. Richard J. Marshall, Deputy Chief of Staff, immediately authorized the movement of Quartermaster supplies to the peninsula but at the same time told Drake that the basis of the 180-day Corregidor supply reserve had been lifted from 7,000 to 10,000 men and that shipments to Bataan were not to start until all shortages in the Corregidor reserve had been filled.[28] Drake's first task, then, was the hurried transfer of additional stocks from Manila to the great harbor fortress. Within twenty-four hours this assignment was completed, but a precious day had been lost in beginning shipments to the peninsula.

These shipments presented what was under the circumstances the almost impossible task of moving within one week enough food and other Quartermaster supplies from widely scattered depots, motorheads, and railheads to keep nearly 80,000 troops in prime fighting condition for six months. Even with unhindered movement, this would have been a hard task. It was

[25] Drake Rpt, pp. 21–22; App. A, Rpt, Col Irvin Alexander, Sup Problems of USFIP, p. 2.

[26] Drake Rpt, App. A, Rpt, Col Otto Harwood, Storage of Gasoline on Bataan, pp. 1–3.

[27] Drake Rpt, p. 20; App. A, Rpt, Col Irvin Alexander, Sup Problems of USFIP, pp. 1–2.

[28] Brig Gen Charles C. Drake (Ret.), "'No Uncle Sam,' The Story of a Hopeless Effort to Supply the Starving Army of Bataan and Corregidor" (typescript), pp. 2–3. Hist Br OQMG.

rendered much more difficult by inability to move a large quantity of supplies by land. In central Luzon there was almost everywhere confusion created by defeat—abandoned railways, highjacked trucks, destroyed bridges, and roads congested by hundreds of vehicles and thousands of fleeing civilians and disorganized troops. Bataan itself was a mountainous region served only by primitive roads. For the movement of Quartermaster items there was only one fairly usable way into the peninsula, and that was by water through Manila Bay. Even that route was to be open for but a single week, and the Corps could not hope to accomplish in seven days what under much better conditions would probably have taken double that time for the supply of half as many men.

Loss of use of the Manila Railroad, running north to Tarlac, was a particularly heavy blow, for that line constituted the chief artery for evacuating stocks from advance depots and combat areas. As early as 15 December train and engine crews started to desert their jobs because of increased strafing and bombing, and by Christmas not a single locomotive was in operation.[29] WPO-3 had provided for a Department Motor Transport Service, and in the summer of 1941 such a service was organized with Col. Michael A. Quinn, a Quartermaster officer, as Department transport officer and commander of the service. In addition to the operation and maintenance of motor vehicles not assigned to combat units WPO-3 had charged the Department Motor Transport Service with the local procurement and the assignment of commercial vehicles to field organizations in time of emergency. But when Colonel Quinn submitted a plan for implementing this program, Headquarters, Philippine Department, disapproved it and informed him that arrangements had been made with the Commonwealth Government for the local procurement of vehicles by the Philippine Constabulary and for their distribution by that agency to units of the Philippine Army. This system proved an almost complete failure, for on the outbreak of war most of the Constabulary were withdrawn from the districts in which they operated, much like American state police, and were incorporated into the Philippine 2d Division, a combat infantry unit, assembling at Camp Murphy near Manila.[30]

When hostilities started, Colonel Quinn tried to alleviate the shortage of trucks by procuring commercial vehicles. He requested all automobile dealers in Manila to freeze their stocks. The dealers willingly cooperated, and Colonel Quinn leased about 1,000 cars, mostly trucks. Few trucks in the Philippines came with bodies; few even had cabs or windshields. But enough of these parts were improvised every day to equip thirty or forty vehicles. Yet in spite of Quinn's tireless efforts there were never enough trucks to meet military needs. The Philippine Army in particular suffered from the lack of these vehicles. When that army started mobilization in September, each of its divisions was assigned twenty trucks from Regular Army stocks. These trucks were still the only ones held by the Philippine Army when the fighting began. Both American and Filipino field commanders, uncertain how or from whom they could secure motor transportation and fearful that they would not be able to move their men and matériel, permitted their units to seize Motor

[29] Drake Rpt, p. 28.

[30] *Ibid.*, App. C, Rpt, Col Michael A. Quinn, MTS Opns, pp. 1–3.

Transport Service vehicles carrying supplies from Manila to motorheads in the combat zone. Unable to halt this practice, Headquarters, USAFFE, finally sanctioned it by authorizing division commanders to requisition vehicles to meet their immediate needs. Removal of Quartermaster stocks to Bataan therefore depended mainly upon the willingness of combat officers to load their trucks with food, gasoline, and clothing.[31] Unfortunately, while units took all they could, they did not always take what the QMC wanted. The commander of a Philippine Scout regiment, when asked to remove from Fort Stotsenburg whatever subsistence his unit could use, reportedly answered that he was "not even interested." [32]

Stocks in Manila and at Fort McKinley, which lay along the Pasig River, seven miles above Manila Bay, could be moved fairly easily by water, but elsewhere the loss of rail transportation and the shortage of trucks made shipments difficult. At Tarlac and Los Baños, division trucks moving through these points picked up some rations, but most of the food stocks had to be destroyed. At Fort Stotsenburg, only thirty miles north of Bataan, evacuation efforts achieved better results, thirty to forty truckloads, consisting mostly of subsistence, being removed. Some gasoline was also saved, but most of it had to be burned. Perceiving the impossibility of sending all food stores to Bataan, General Drake on 27 December advised field force commanders by radio to build up their stocks, especially of sugar and rice, by foraging. This expedient, he later estimated, added several days' supply to the ration hoards of those organizations that followed his advice.[33]

The Manila Port Terminal Area, with its ships and warehouses, was the main source of last-minute replenishment of Quartermaster stocks. Upon the declaration of war General MacArthur had directed Chief Quartermaster Drake to remove all militarily useful items from warehouses and freighters in the harbor.[34] The supplies thus obtained were ready for shipment several days before the withdrawal to Bataan commenced. Though about fifty truckloads were evacuated from Manila by land, water transportation was the chief means of getting the supplies out of the capital. The Army Transport Service, headed by Col. Frederick A. Ward, collected all the tugs, barges, and launches it could find and on Christmas Day, as soon as Corregidor had been completely stocked, started supplies moving to the peninsula.

Shipments, made mostly by barges, consumed considerable time, for this type of carrier could be towed at a speed of only three miles an hour and the round-trip distance from Manila to Bataan was sixty miles. Few barges could make more than one trip in the seven or eight days available before capture of the capital. In spite of this drawback, these vessels had to be employed because, with only three small piers and little handling equipment available on Bataan, they could be unloaded more speedily than other craft. Even so, docking facilities were so limited that only five barges could discharge their cargoes at one time.[35]

[31] Drake Rpt, pp. 20, 66–67; App. C, Rpt, Col Michael A. Quinn, MTS Opns, pp. 1, 3, 4, and Exhibit B.

[32] Drake Rpt, App. A, Col Irvin Alexander, QM Activities at Ft Stotsenburg, p. 2.

[33] (1) Drake, "No Uncle Sam," pp. 4–6. (2) Drake Rpt, pp. 22–23, 40–44; App. A, Rpt, Col Charles S. Lawrence, Tarlac QM Depot, p. 6; App. A, Rpt, Col Irvin Alexander, Sup Problems of USFIP, p. 3.

[34] Drake Rpt, App. B, Rpt, Col Frederick A. Ward, ATS Opns.

[35] Drake Rpt, p. 28.

At Manila occasional bombings and air raid warnings hampered stowing operations. Many stevedores fled at the first sign of hostile airplanes over the port area, and some never returned. Radio appeals for volunteers were made, and about 200 Americans and Europeans responded. Most of them were unused to manual labor, but they worked by the side of faithful Filipinos through the last three nights of December until all possible shipments had been made. Colonel Ward estimated that 300 barges sent approximately 30,000 tons of supplies of all technical services to Corregidor and Bataan. From these shipments came the greater part of the Quartermaster stocks in the hands of the fighting forces. But time was too limited to permit the evacuation of more than a small fraction of the 10,000,000 gallons of gasoline in commercial storage, and as the Japanese approached Manila, these stocks and the gasoline stores at Fort McKinley were set on fire. Substantial quantities of food that might have been shipped had more time been available were likewise left behind.[36]

On Bataan, Colonel Harwood was responsible for the storage of Quartermaster cargoes arriving from the capital between 24 December and 1 January. Among these cargoes were approximately 750,000 pounds of canned milk, 20,000 pounds of vegetables, 40,000 gallons of gasoline in 5-gallon cans, and 60,000 gallons of lubricating oils and greases as well as miscellaneous foodstuffs. Harwood also unloaded the *Si-Kiang,* an Indochina-bound ship captured at sea with its cargo of approximately 5,000,000 pounds of flour, 420,000 gallons of gasoline, and 25,000 gallons of kerosene. The petroleum products were removed, but unluckily for the food supply of Bataan, the *Si-Kiang* was bombed and sunk before the flour had been discharged.[37]

The Japanese occupation of Manila on 2 January ended the shipment of supplies from the capital. Quartermaster items that reached the peninsula after that date were chiefly those stealthily brought ashore at night from some 100 loaded barges that lay in Manila Bay between Corregidor and Bataan. These barges contained sizable quantities of gasoline in 55-gallon drums. There were also a few oil-company river tankers filled with that fuel.[38]

Status of Quartermaster Supplies on Bataan

The scarcity of food on Bataan was truly alarming. An inventory taken immediately after the defending forces had arrived there disclosed a dismayingly low supply of a very unbalanced ration.[39] There were at normal rates of consumption only a 50-day supply of canned meat and fish, a 40-day supply of canned milk, and a 30-day supply of flour and canned vegetables. Of rice, there was a mere 20-day supply. Stocks of such essential items as sugar, salt, and lard were extremely low; coffee, potatoes, onions, cereals, beverages, and fresh and canned fruits were almost totally lacking. For emergency use the defense reserve of 500,000 C rations was available. On such slender stores as these the combined U.S.-Philippine forces hoped to make a six-month stand.

Circumstances clearly demanded severe rationing. On 6 January half rations were

[36] *Ibid.,* App. B, Rpt, Col Frederick A. Ward, ATS Opns; App. C, Rpt, Col Michael A. Quinn, MTS Opns; App. E, Rpt, Col Richard G. Rogers, Traffic Control Opns.

[37] Drake Rpt, App. A, Rpt, Col Otto Harwood, Storage of Gasoline on Bataan, pp. 1–3.

[38] Drake Rpt, App. A, Rpt, Maj Thomas D. Patterson, Gasoline, Fuel Oil, etc.

[39] (1) Drake Rpt, pp. 31–32. (2) Wainwright Rpt, Annex VI (Rpt of Opns of Luzon Force), App. 2, pp. 1–2.

prescribed for both troops and civilians.[40] At best they provided less than 2,000 calories as compared with the nearly 4,000 calories needed by combat troops. A few fortunate units could supplement this scanty diet with the food taken along during the withdrawal and never turned in at ration dumps, but such supplies were limited and lasted only a short time.[41] As increasing difficulty was experienced in maintaining even a 2,000-calorie ration, quartermasters utilized to the maximum the few sources of supply in mountainous, jungle-bound Bataan.

One of these sources was the peninsula's rice crop, grown in a narrow belt along Manila Bay. It was the harvest season, and the grain stood in the open fields, stacked but still mostly unthreshed. Many fields were under artillery fire, and unopposed Japanese planes bombed and strafed laborers as they attempted to thresh the grain. Since there were no trees or other shelter, the constant danger made the Filipino farm hands reluctant to work in the fields, and insufficient labor constantly plagued efforts to have the grain husked. The QMC accordingly brought the rice to two mills that had been removed from their original sites between the attacking and defending forces and reassembled near the main ration dump.[42] These mills began operations in mid-January and continued to operate until the supply of palay (unhusked rice) became exhausted a month later. One Quartermaster officer estimated that, if modern farm machinery had been available, the amount of palay recovered could have been increased several times.[43] Nevertheless the mills in four weeks of operations turned out every day about 30,000 pounds, only 20,000 pounds less than the amount consumed.

Fresh meat was obtained principally by the slaughter of abandoned carabao, which, before the invasion of the peninsula, had been used as draft animals by Bataan farmers.[44] Cavalry horses, Army pack mules, and pigs and cattle from Cavite Province were also butchered. In conjunction with the Veterinary Corps the QMC established a large abattoir near Lamao on the lower east coast. Small slaughterhouses, consisting of little more than platforms, were built over rapidly flowing mountain streams whose fresh water permitted thorough cleansing of carcasses. More than 2,800 carabao and about 600 other animals were slaughtered. Carcasses were sent daily direct to Quartermaster dumps, where combat troops collected them. When forage and grazing areas ran out in February, the carabao remaining on Bataan were slaughtered and the beef so obtained was shipped to Corregidor for preservation in the cold-storage plant. From then on until the beef supply was exhausted, nightly shipments were made to Bataan for issue to troops. All together, approximately 2,000,000 pounds of fresh meat were made available to soldiers and about 750,000 pounds of edible offal to civilian refugees. Field units also secured an undetermined amount of fresh meat from some 1,200 carabao they themselves captured and butchered. They even consumed dogs, monkeys, iguanas—large lizards, whose meat tasted something like chicken—and snakes, of which there

[40] Ltr, USAFFE to CGs East Sector, etc., 6 Jan 42, sub: Conservation of Food. Phil Records AG 430 (8 Dec 41).

[41] Memo, G-4 for Asst G-4 USAFFE, 5 Feb 42. Phil Records AG 430.2 (11 Sep 41).

[42] (1) Drake Rpt, pp. 34-35. (2) Memo, Asst G-4 for G-4 USAFFE, 11 Jan 42, sub: Visits of Insp, 9-11 Jan 42. Phil Records AG 319.1 (8 Jan 42).

[43] (1) Arnold, "The Lesson of Bataan," *QMR*, XXVI (November-December 46), 14. (2) Rpt, Dept QM Field, 5 Feb 42, sub: Sup, Class I. Phil Records AG 319.1 (29 Jan 42).

[44] Rpt cited n. 43 (2).

was a plentiful supply, especially of large pythons, whose eggs are considered a delicacy by some Filipinos.[45]

Before the war lucrative fishing had been carried on in Manila Bay, which teemed with aquatic life, and the QMC naturally tried to tap this rich source of food. It established a fishery at Lamao, the center of the industry, and sent local fishermen out on nightly expeditions. Daily catches finally reached about 12,000 pounds, and the QMC expected to increase this figure. But the fishermen dashed this hope by refusing to work any longer under growing dangers that emanated from friend and foe alike. Beach defense troops, uncertain of the identity of approaching boats, persistently shelled them as they neared shore. To this menace was added that of Japanese artillery fire. Reluctantly, quartermasters abandoned an enterprise that might have supplied much needed food in the days of semi-starvation that lay ahead.[46]

Procurement of salt from sea water was still another Quartermaster expedient. Only limited supplies of this vital item had been brought into Bataan, and there were no salt beds for replenishing the original stocks, which suffered rapid depletion because of extensive use in baking bread and in preserving meat. Quartermasters alleviated the shortage by boiling sea water in large iron cauldrons. Production averaged approximately 400 pounds daily, about a quarter of the minimum requirement of 1,500 pounds. This was too small an amount to permit issue of salt more often than once every few days.[47]

The value of local food sources on Bataan in prolonging the defense can hardly be overestimated. While they did not provide a wide variety of food, they did furnish considerable additions to Quartermaster stocks of meat and rice.

The QMC had even smaller stocks of clothing than of food. These stocks, scarce at the beginning of the war, were almost depleted when the withdrawal to Bataan commenced. There were approximately 80,000 men to be clothed. Yet, according to a rough estimate that probably did not understate the amounts, clothing stocks early in January contained only 10,000 trousers and an equal number of shirts, drawers, and blue denim suits. Larger but still insufficient stocks were available in other important items. There were estimated to be 50,000 pairs of service shoes, 50,000 pairs of issue socks, 75,000 pairs of commercial socks, 20,000 issue undershirts, 50,000 commercial undershirts, and 25,000 commercial drawers. Obviously, these stockages could not meet the requirements of 80,000 men during a siege destined to last almost four months and to be waged in mountainous, forested terrain that quickly wore out even the best footwear and clothing. Tangled vegetation tore shirts, trousers, and underwear, and constant hard usage in rough country made the most substantial shoes unserviceable within a month. The QMC obtained some clothing and footwear through reclamation of articles salvaged from the battlefield, but the quantity was too small to help materially. Practically speaking, there

[45] (1) Louis Morton, ed., "Bataan Diary of Major Achille C. Tisdelle," *Military Affairs,* XI (Fall 1947), 141. (2) Wainwright Rpt, Annex XIV (Med Rpt), pp. 98–99.

[46] (1) Wainwright Rpt, Annex XIV (Med Rpt), p. 99. (2) Drake Rpt, p. 36. (3) Memos, Asst G–4 for G–4 USAFFE, 19, 24 Jan 42. Phil Records AG 319.1 (8 Jan 42).

[47] Frank Hewlett, "Quartermasters on Bataan Performed Heroic Feats," *QMR,* XXI (May–June 1942), 64.



TROOP FORMATION ON BATAAN, *10 January 1942.*

were almost no stocks that could be issued in place of worn-out garments.[48]

Whereas the U.S. Army and the Philippine Scouts were well clad and well equipped when they took the field in December the Philippine Army even then lacked many essential items. In general, its troops had no blankets, helmets, mosquito nets, or raincoats, all necessities in a malarial area like Bataan. Their shoes were conventional Filipino sneakers that the troops had nearly worn to pieces even by the time of arrival on the peninsula. As soon as the Commonwealth soldiers reached Bataan, they tried to buy footwear from the civilian population, but could obtain little in this way. The few available U.S. Army service shoes proved useless, for Filipinos, barefoot most of their lives, had feet far too broad for these narrow shoes. Commonwealth troops necessarily reverted to their custom of going barefoot. Even such military commonplaces as shelter halves and tentage were almost totally lacking, and their absence caused considerable hardship in the cool nights of mountainous Bataan. Indeed, the scarcity of clothing, footwear, and shelter in the Philippine Army played a prominent part in the large incidence of malaria, hookworm, and respiratory diseases.[49]

About 500,000 gallons of gasoline and a fairly satisfactory supply of kerosene and

[48] Drake Rpt, App. A, Rpt, Col Irvin Alexander, Sup Problems of USFIP, p. 4.

[49] (1) Wainwright Rpt, Annex XIV (Med Rpt), p. 24. (2) Wainwright, *Story*, p. 46.

motor fuel oil were on hand at the beginning of January. Although these supplies did not include large stocks of the most appropriate gasolines and lubricants, they could be made to last several months with strict economy and careful substitution. Accordingly, when mid-January reports revealed usage of gasoline at the alarming rate of 14,000 gallons a day, an amount sufficient to deplete stocks within a month, or almost two months before rations were expected to be exhausted, the QMC ordered gasoline and lubricants to be conserved so as to last as long as food. This objective was achieved by the severe curtailment of truck, ambulance, and road-machinery operations. Daily consumption of gasoline was cut, first to 4,000 gallons, and later to 3,000 gallons. Such drastic restrictions made it difficult for trucks to maintain regular supply deliveries.[50]

The Bataan Quartermaster Depot, with headquarters at Lamao, was charged with the supply of Quartermaster items and the establishment and management of all dumps and distribution points for rations, for clothing and equipage, and for gasoline and oil. It also operated field bakeries and salvage and reclamation services. The Motor Transport Service set up and ran motor pools and motor maintenance and repair shops, and the Army Transport Service supervised movements by water, a responsibility that included the ferrying of supplies and troops between Corregidor and Bataan and the chartering of blockade-runners and other vessels.

All these operations suffered from the shortage of officers and enlisted men and from the paucity of Quartermaster units. Units and labor pools both had to be improvised. Hastily established organizations increased their limited manpower by the more or less regular utilization of nearly 5,000 Filipino refugees. Some 1,500 civilian drivers were added to the enlisted men from the two truck companies of the 12th Quartermaster Regiment and from the 19th Truck Company (Air Corps) to form twenty-four provisional truck companies and one provisional car battalion. Refugees constituted the bulk of three improvised graves registration companies and did most of the work required in the establishment of cemeteries and the burial of the dead. Civilians helped enlisted men repair and reclaim several hundred trucks and large quantities of clothing. They formed the bulk of the labor pools employed in loading and discharging operations at navigation heads, dumps, distributing points, and salvage and reclamation centers. As many as 1,200 civilians were employed in discharging barges during the early days of the fighting on Bataan. Labor pools and improvised units were commanded by some 200 Quartermaster officers, half of whom had been commissioned in the Philippines under authority of a War Department radiogram of 10 December that gave General MacArthur the extraordinary power of making individuals, civilian or military, temporary officers.[51]

The Quartermaster units assigned to the Regular Army and the Philippine Scouts at the outbreak of war were used largely for the supply of front-line troops. This was the major function of the 12th Quartermaster Regiment, less the two truck companies as-

[50] (1) Drake Rpt, pp. 32, 44, 54. (2) Wainwright Rpt, Annex VI (Rpt of Opns of Luzon Force), Annex 5 (G–4 Rpt), pp. 1–2. (3) Ltr, CofS to CG Ft Mills, 22 Mar 42, sub: Ration and Motor Fuel Status. Phil Records AG 430 (8 Dec 41).

[51] Drake Rpt, pp. 25–26, 47, 62–63, 70; App. B, Rpt, Col Frederick A. Ward, ATS Opns, p. 6; App. C, Rpt, Col. Michael A. Quinn, MTS Opns, pp. 1–3; App. D, Rpt, Maj Albert L. Fullerton, Graves Registration Service, Bataan, pp. 1–3.



QUARTERMASTER CORPS BAKER *on Bataan baking biscuits for the defenders, 4 February 1942.*

signed to the motor pools, and of the two pack troops. At Lamao and later at Cabcaben the 74th Field Bakery Company provided about 25,000 pounds of bread a day as long as flour was available. It achieved this result by adding to its original meager equipment of six field ovens improvised Dutch ovens built of rice straw and mud.[52]

Running the Blockade

As the defense of Bataan continued, the growing scarcity of rations more than ever constituted the major Quartermaster problem. The only real hope of relief lay in help from the outside, but this hope waned as the hostile blockade around Luzon daily became tighter and more menacing and enemy aircraft and naval ships gained more effective mastery of the western Pacific. On land and sea and in the air the Japanese were a barrier between MacArthur's men and the replenishment of their swiftly dwindling food stocks. This barrier had to be pierced if starvation was not to cause the early surrender of Bataan. The best chance was by sea. Such an effort would demand the strictest secrecy and the utmost daring. Even if these requirements were met, loss of ships would be heavy and prospects of obtaining a significant volume of food far from bright.

Assistance from the outside, it was hoped, might come from Australia, which had sur-

[52] Drake Rpt, pp. 26–28, 35.

pluses of most of the meats, fruits, and vegetables familiar to American soldiers and which served as a receiving point for supplies coming from the United States; from the Netherlands Indies, producers of coffee and other tropical products; from Mindanao and the Visayan Islands in the central Philippines, still almost entirely in American possession, where rice, sugar, tobacco, bananas, and mangoes were available; or even from the fertile provinces of southern Luzon, which, though now in Japanese hands, provided rice, sugar, bananas, coffee, citrus fruits, coconuts, cattle, pigs, and chickens in abundance.

Early in January plans for sending rations and other scarce supplies through the blockade were developed by the War Department and USAFFE headquarters. These plans visualized Australia as the primary source of food, and the Netherlands Indies, the central and southern Philippines, and the provinces of Batangas and Cavite in southern Luzon as secondary sources. The Cebu Quartermaster Depot was to be responsible not only for procurement of supplies in the central and southern islands but also for assemblage of supplies brought in from other outside sources and for their shipment to Corregidor. From that island fortress supplies would be taken under cover of darkness across the two miles of water to Bataan.[53]

Interisland Efforts

Large ships were unsuitable for running the blockade between the southern islands and Luzon because they could be too easily sighted by hostile air and naval patrols and because Corregidor lacked the means of berthing and unloading them. Nor could coal- and oil-burning vessels be employed, for they emitted telltale smoke that would reveal their presence to the enemy. Small but fast interisland motor ships had to be used. Col. Manuel A. Roxas, detailed by President Quezon as liaison officer to General MacArthur, helped Drake obtain such ships from the Philippine Government and Filipino citizens. All together forty-nine motor ships, each with a capacity of 300 to 1,000 cargo tons, were secured by the Army Transport Service at Corregidor and Cebu City. Of that number, a large majority were eventually lost, destroyed, or captured while engaged in blockade-running.

Two 400-ton motor ships, the *Bohol II* and the *Kolambugan,* were assigned to the dangerous run through the mine fields between Corregidor and Looc Cove, the collecting point for food procured by American agents in Cavite and Batangas. Looc Cove lay just south of Manila Bay and only fifteen miles from the island fortress. Since it was in enemy-held territory, these ships had to make the trip from Corregidor and back in one night to avoid detection. Accordingly, one of them started out on its hazardous mission on practically every moonless evening during the three weeks following 20 January. Japanese patrols were so active on shore, however, that American agents usually gave the vessels a warning signal to turn back. The ships actually made only two round trips apiece and in mid-February had to abandon their operations altogether. Though they completed few passages, the vessels did add about 1,600 tons of food, chiefly rice, to the Bataan food stocks.[54]

The other motor ships were stationed at Cebu City, Iloilo, or other ports that lay 400 miles or more below Manila Bay.[55] Of

[53] *Ibid.,* pp. 37–39.

[54] (1) *Ibid.,* p. 39. (2) Memo, G–4 for CofS, 18 Jan 42. Phil Records AG 430.2 (11 Sep 41).

[55] Drake Rpt, pp. 39–40.

these ports Cebu City was the most important. The Quartermaster depot at that place since the start of hostilities had been procuring supplies in the Visayan Islands and Mindanao for shipment north to Corregidor. Established in November 1941, this installation had originally been scheduled to receive from the Manila Depot all the stocks required to feed and clothe the troops in the central and southern provinces, troops organized as the Visayan-Mindanao Force under Brig. Gen. William F. Sharp. Now, instead of securing rations and clothing from the north, it had to canvass Mindanao and the Visayan Islands for the supplies needed not only by the troops in its distribution area but also by the 80,000 troops on Luzon. To carry out this huge new mission, it set up district procurement offices in the provinces of Cebu, Negros Oriental, Negros Occidental, Panay, Bohol, Leyte and Samar, and Mindanao. By 10 April 1942, when the Japanese captured Cebu City, it had acquired locally a twelve-month food supply for troops in Cebu and Panay, and at least a six-month supply for those on other central and southern islands. In addition, it had collected in the hills back of Cebu City and in warehouses in Cebu Province and in Panay and Mindanao some 12,000 tons of food, medicine, gasoline, and miscellaneous supplies for shipment to Corregidor. In part these large stocks had come from Australia; in part, from the central and southern provinces.[56]

The Cebu Depot utilized the interisland motor ship fleet to start thousands of tons northward. The first ship to perform this feat was the 1,000-ton *Legaspi*. In accordance with arrangements previously worked out by the Governor of Panay and General Drake, the *Legaspi* on 20 January picked up a cargo of foods assembled by American agents at Capiz, a small but well-protected port in northern Panay, and two nights later delivered its load at Corregidor. It made one other successful run, but on its third trip the *Legaspi,* entering a small port in northern Mindoro for concealment during the daytime, was sighted and shelled by a Japanese gunboat. The crew ran the hapless ship ashore and scuttled it.[57]

Two other motor ships from the southern Philippines successfully penetrated the blockade. The *Princessa,* sailing from Cebu City with 700 tons of rice, flour, corn meal, sardines, dried meats, sugar, and pineapple juice, all of which had been procured in the southern islands, reached Corregidor in mid-February. Later in the same month *El Cano,* carrying 1,100 tons of balanced rations, which the 3,000-ton Army-chartered freighter, *Coast Farmer,* had brought from Australia to Arrakan in northern Mindanao, arrived at the island fortress. But three other motor ships, also carrying balanced rations from the *Coast Farmer,* were shelled and sunk by Japanese naval vessels off Mindanao. Ten other motor ships, loaded in the southern islands with cargo for Corregidor, were sunk by the enemy or scuttled by their crews to avoid capture. General Drake estimated that 7,000 tons of food, gasoline, and oil were lost on their way to Luzon. He ascribed this disaster not only to increased enemy activity but also to excessive use of radio communication and to failure to observe the strictest secrecy. These losses ended blockade-running by motor ships out of the central and

[56] *Ibid.,* App. A, Col John D. Cook, Cebu QM Depot, pp. 1–5; Wainwright Rpt, Annex XI, Col Melville S. Creusere (QM Sup—Visayan-Mindanao Force), pp. 1–6.

[57] (1) Memo, CQM for G–3, 21 Jan 42. (2) Ltr, USAFFE to CG Panay Force, 6 Feb 42. Both in Phil Records AG 430 (25 Dec, 18 Dec 41).

southern Philippines. Unless American air and naval support was available to convoy ships attempting to pierce the apparently impenetrable screen of Japanese naval vessels, further blockade-running was almost certainly hopeless. To attempt it would probably sacrifice gallant crews in a futile gesture.

Recognizing the realities of the situation, Maj. Gen. Richard K. Sutherland, MacArthur's chief of staff, instructed Drake about 1 March that no more vessels were to try to run the blockade either from Corregidor or from the southern islands unless he issued express orders for such efforts. When General MacArthur and his party left Corregidor for Australia on 12 March, General Sutherland repeated these orders to Drake. No instructions came to resume blockade-running, and the vessels remained at their moorings until they fell victim to Japanese bombs or naval gunfire or were destroyed to prevent seizure. No supplies reached Corregidor from the outside world during the five weeks before Bataan surrendered, except for very limited quantities brought in by plane and submarine. These deliveries almost surely helped prolong resistance on the peninsula. Yet in relation to Bataan's requirements, they were insignificant.[58]

Australia

Meanwhile, U.S. forces in Australia had been attempting to carry out their part of the relief program. When they first reached that continent in December 1941, they were directed by the War Department to ship air equipment, ammunition, and weapons to the Philippines; rations, significantly, were not mentioned.[59] But at the start Army supplies in Australia were limited, and part of them was needed to stock the Air Corps in the Netherlands Indies. Moreover, the U.S. forces had as yet no organization capable of quickly making the long hazardous voyage to Luzon and no sense of urgency such as they later developed. Nevertheless "Most of the supply activities in the early weeks related to supplying the Philippines. Boats were chartered by the QMC. Crews were engaged and stevedoring gangs engaged to load boats with supplies." [60] The *Willard A. Holbrook,* an Army transport, which had arrived in Australia in mid-December, started from Brisbane for the Philippines on 28 December with the 147th Field Artillery and the 148th Field Artillery (less one battalion) and their ammunition, supplies, and equipment but was diverted to Darwin in northern Australia because it was feared that no Philippine port would be open to receive it.[61] This fear indeed prevented attempts to send any ships northward during the month and a half following the arrival of American troops in Australia. Yet December and early January were perhaps the best times for an attempt at running supplies through to MacArthur's men since the blockade was then far from airtight and the Visayan Islands were still in American possession.

When the defense of Bataan began, Drake immediately informed the U.S. forces in Australia, both by radio and by air mail, of his pressing need for food. He requested that balanced field rations be shipped to

[58] (1) Drake Rpt, pp. 37–40, 54, 65–66; App. A, Rpt, Col John C. Cook, Cebu QM Depot, pp. 2–3. (2) Wainwright, *Story,* pp. 166–67. (3) Wainwright Rpt, p. 21.

[59] Rad, WD to CG USAFIA, 19 Dec 41. DRB AGO USAFIA F-9.

[60] OCQM USASOS, History of Major Activities of the Quartermaster Section (hereafter cited as QM SWPA Hist), I, 3. Hist Br OQMG.

[61] Rpt of Organization and Activities of USAFIA, pp. 7–8. DRB AGO.

Cebu and that they be sent in 1,000-ton lots to facilitate handling. He made a detailed breakdown of the required ration in pounds for each component so that the specific needs of the Luzon forces would be known. Having received no reply by the end of January, Drake sent a personal letter by special courier to Lt. Gen. George H. Brett, Commanding General, U.S. Army Forces in Australia (USAFIA), emphasizing the critical scarcity of food and urging haste in the dispatch of rations.[62] Meanwhile, on 18 January, following an insistent message from MacArthur, Gen. George C. Marshall, Chief of Staff, had radioed Brett that delivery of rations was imperative. He ordered money to "be spent without stint," and suggested that "bold and resourceful men," well supplied with dollars, fly to islands not yet in Japanese hands to buy food, charter ships, and offer cash bonuses to crews for actual delivery of cargoes.[63]

The Joint Administrative Planning Committee, operating under U.S. Army Forces in Australia, thereupon immediately formulated plans for blockade-running from both Australia and the Netherlands Indies. The latter islands were selected because substantial amounts of rations and particularly of ammunition were already there in the hands of American air forces or were at sea en route to the Dutch archipelago, because these islands lay closer to the Philippines than did Australia, and because it was believed that small, fast coasters could be procured easily from local sources. The committee set the first objective of both Australia and the Netherlands Indies as the shipment of 3,000,000 rations, a 60-day supply for 50,000 men, and of large quantities of ammunition. Shipments would be made roughly in the proportion of six tons of rations to one ton of ammunition.[64]

The task thus undertaken was a formidable one. There were few small, fast ships capable of carrying enough fuel for the long voyage of 2,500 or more miles. Moreover, the few which could meet this requirement were usually unprocurable because all vessels were controlled by one of the Allied governments, and so widespread was the defeatist attitude toward blockade-running that these governments almost invariably withheld permission to use them. Finally, if a ship could be chartered, its crew was reluctant to embark on so perilous an enterprise.

In Australia suitable ships were not procurable in the early days of the program, and the *Coast Farmer,* which had recently arrived from the United States in convoy, was earmarked for blockade-running in spite of its inability to attain a speed of more than ten knots an hour. It departed from Brisbane on 4 February with a cargo that included 2,500 tons of balanced rations, and fifteen days later pulled into Arrakan, a port which, though inferior, had been selected because of fear that the slow speed of the *Coast Farmer* would prevent it from reaching the finer and better-protected harbor of Cebu.

One other vessel, meanwhile, the small Filipino freighter *Don Isidro,* had been obtained. On the same day that the *Coast Farmer* left Brisbane the *Don Isidro* sailed from Fremantle in southwestern Australia

[62] (1) Memo, CQM USAFFE for G–4 USAFFE, 5 Jan 42. ORB AFWESPAC QM 430. (2) Drake, "No Uncle Sam," pp. 11–12.

[63] Rad, NR 134, CofS WDGS to CG USAFIA, 18 Jan 42. DRB AGO Opns Rpts, Material Relating to USAFIA History.

[64] (1) Min, Jt Adm Plng Com, USAFIA, 19 Jan 42, sub: Australian-American Co-operation. (2) Hq USAFIA, Rpt of Organization of USAFIA, 7 Dec 41–30 Jun 42. Both in DRB AGO Opns Rpts, F-17.

and headed for Batavia, Java, to pick up a cargo of ammunition from Army stocks there.[65] Rations for both ships were obtained from stocks that the Australian Government, in accordance with previous arrangements, had sent to Brisbane and Fremantle, the two ports chosen for use by blockade-runners.

Eventually, about ten or twelve vessels, mostly old and rather decrepit Filipino or Chinese coasters, were procured in Australia. Though they were few in number, their total tonnage was enough to furnish the Bataan forces with the supplies needed to prolong their resistance. But while arming of ships and use of dummy stacks and neutral or Axis flags—in fact, "all imaginable types of deceit"—were authorized to protect boats from bombing, shelling, and capture, only two vessels, aside from the *Coast Farmer,* ever reached the Philippines.[66] These were the *Dona Nati* and the *Anhui,* both of which started from Brisbane in mid-February and arrived at Cebu early in March. The *Dona Nati,* it was estimated, carried 5,000 tons of rations, and the *Anhui,* 2,500 tons. Two other ships, the *Hanyang* and the *Yochow,* started from Fremantle, but mutinies broke out when the dangerous waters north of Australia were reached, and the vessels made for Darwin, where they were discharged.[67]

[65] (1) Rad, Brett to AGWAR, 25 Mar 42. DRB AGO Opns Rpts, F-17. (2) Rpt, Col William C. Hutt, QM Base 3, n. d., sub: Hist of QM Sec, 22 Dec 41–31 Mar 44. ORB ABCOM AG 314.7.

[66] (1) Ltr, CG USAFIA to CO Base 3, 20 Jan 42. DRB AGO Opns Rpts, Material Relating to USAFIA History. (2) Ltr, CofS USAFIA to CO Base Sec 1, 21 Jan 42, sub: Philippine Relief. DRB AGO Opns Rpts, History of Effort to Sup the P.I.

[67] Rads, CG USAFIA to AGWAR, 11 and 25 Mar 42. DRB AGO Opns Rpts, Material Relating to USAFIA History.

Netherlands Indies

In the Netherlands Indies, Col. John A. Robenson, a cavalry officer who had commanded some 5,000 troops at Darwin in northern Australia, was in charge of the blockade-running program. He had been ordered to Java for this purpose on 19 January, the day after General Marshall's message stressing the need for intensive blockade-running efforts was received. On his departure from Australia ten million dollars had been placed at his disposal to be spent in any fashion he considered advisable, and he was empowered to request co-operation from all military and civilian authorities.[68]

Colonel Robenson had been informed that MacArthur had called the breaking of the blockade a matter of "transcendent importance," "the key to my salvation," and he acted in accordance with this conception of his mission. But soon after his arrival at Soerabaja, Java, he discovered that his objectives were not to be easily achieved. The U.S. Navy at first would not release any ships, and requests for British and Dutch ships were likewise turned down. Even a request for small coasters from Singapore met a similar fate, though it was made after the British, obviously about to take a final stand in Malaya, had retreated across the causeway that joined Singapore Island to the mainland. Naval opinion in general plainly thought the release of ships tantamount to their destruction.[69]

Better results attended Robenson's attempts to procure rations and ammunition as cargo for such ships as he might later be able to charter. Late in January the *Presi-*

[68] Bogart Rogers, "Help for the Heroes of Bataan," *Cosmopolitan,* CXIX (November 1945), 46–48.

[69] *Ibid.,* pp. 49, 134–35.

dent Polk, a medium-sized American freighter, arrived at Soerabaja with a full load of these supplies, and after several days of discussion Robenson obtained permission to use them. About this time a courier brought him the report that Drake had prepared for Brett on the plight of the Bataan Force. Robenson found it "pretty shocking." [70]

Early in February, Rear Adm. William A. Glassford permitted Colonel Robenson to use the *Florence D,* a Filipino freighter controlled by the U.S. Navy, though he regarded the effort to break the blockade as a forlorn hope. At the same time the *Don Isidro* arrived at Batavia from Fremantle. Thus, after nearly two weeks of unrewarded work, Robenson finally had supplies and at least two ships. But a crew had to be secured for the *Florence D.* To get it, Robenson offered the ship's Filipino crew, anxious in any event to get home, handsome bonuses, ranging from more than $10,000 for its captain to lesser amounts for his subordinates, and life insurance of $5,000 to $500. All the Filipinos volunteered for the voyage, and on 14 February the *Florence D* set sail. About the same time the *Don Isidro* departed from Batavia. Both vessels proceeded through the Timor Sea until they reached Bathurst Island north of Darwin. Here they turned north and on 19 February Japanese planes, roaring overhead on their way to the Netherlands Indies, bombed the blockade-runners and left the *Florence D* a burning, sinking wreck and the *Don Isidro* a disabled hulk that had to be beached on Melville Island.[71]

The Japanese had meanwhile begun to bomb the chief centers in Java and plainly indicated that they would soon attempt a landing in force. On 14 February, therefore, the Dutch at last released four rusty old freighters, one of which, the *Taiyuan,* Robenson designated for immediate use. Its Chinese crew, however, refused to sail. Only by offering large bonuses and other financial inducements was it finally possible to obtain a crew. The *Taiyuan* sailed on 26 February, the day the Battle of Java commenced, with a cargo of 720,000 rations. It was never heard from again.[72]

Though disappointingly few ships ran the blockade to the Philippines, the three that did arrive there from Australia discharged about 10,000 tons of rations, or 2,000 more tons than had been set as a goal for that continent's initial contribution. In addition, they landed 4,000,000 rounds of small-arms ammunition, 8,000 rounds of 81mm. ammunition, and miscellaneous medical, signal, and engineer supplies. Unfortunately, the arrival of these ships at Philippine transfer points did not materially alleviate the desperate plight of the hungry forces on Luzon, for, of the supplies received from Australia, only the few miscellaneous items and the 1,100 tons of rations that *El Cano* carried ever reached Corregidor. These rations normally would have represented about a 4-day supply for about 100,000 soldiers and civilians, but the quantity actually available was considerably reduced by the "heart-breaking condition" of the shipment. "Practically all containers were broken and their contents piled together" in the holds.[73] Onions and potatoes, transported on the deck of the ship, had become so rotten that they were inedible. All the food had to be carefully inspected, and much of it thrown out before issues could be made. Drake attributed these deplorable losses to

[70] *Ibid.,* p. 135.
[71] *Ibid.,* pp. 134–35.
[72] *Ibid.,* (Dec 45), pp. 70–71, 151–54.
[73] Drake Rpt, pp. 69–70.

the use of ordinary commercial packing containers incapable of withstanding rough handling and numerous transfers. But for a few days Australian canned meat did give the troops on Bataan a little more than their usual meager fare.

The Japanese invasion of the Netherlands Indies and the accompanying increase of hostile air and naval strength in that area served to make blockade-running from the south even more hazardous. Recognizing the difficulties under which the Army in Australia labored in its efforts to help him, MacArthur suggested on 22 February that the Philippines be supplied direct from Honolulu. He pointed out that the forces in the antipodes had many other responsibilities and could not concentrate on Philippine supply, to them merely "a subsidiary effort." [74] Shortly afterwards, Brig. Gen. Patrick J. Hurley, Minister to New Zealand and former Secretary of War, who was serving temporarily in USAFIA as Gen. George C. Marshall's personal representative in organizing blockade-running, radioed his chief that risking ships from Australia was "no longer justified." Routes that might be followed to avoid enemy-controlled areas were, he pointed out, as long as those from Hawaii to the Philippines, and not as safe. General Brett as well as Hurley concurred in MacArthur's recommendation that supplies be sent from Honolulu.[75]

The War Department informed Brett that an effort to supply the Philippines from Honolulu was already under way. A converted 1,000-ton destroyer had left New Orleans for Hawaii and plans for using six other converted destroyers had been developed. In accordance with MacArthur's request the destroyers would carry 2,375 tons of rations, 369 tons of ammunition and other ordnance supplies, 55 tons of medical supplies, and 61 tons of signal supplies. Unhappily for the men now starving on Bataan, there was not enough time to execute these plans, for within one month the peninsula fell. In any event prospects for success were dubious because of Japanese control of western Pacific waters.[76]

The institution of this new phase of the effort to supply Bataan did not relieve USAFIA of its role in the relief program, and late in March Marshall was still urging MacArthur, who had been ordered to Australia as commander of the U.S. Forces in the Far East, to intensify his efforts to relieve the Philippines by all available means—planes, submarines, or surface ships.[77] Submarines, in fact, had been used since mid-January to run the blockade from Australian or Netherlands Indies ports. All together, five reached the Philippines. One, carrying ammunition, arrived at Corregidor early in February. Later in the same month another, also loaded with ammunition, reached Parang in Mindanao. Two others, carrying rations and medicines, arrived at Cebu City; one of them delivered a fifth of its cargo, about twenty tons of rations, at Corregidor on the day Bataan surrendered, but the other, arriving the following day, jettisoned its cargo. A fifth submarine reached the island fortress with mail on 3 May, just before it fell. The carrying capacity of all these vessels was limited, for they were ordinary torpedo-carrying submarines, not cargo carriers.[78]

[74] Quoted in Masterson, Transportation in SWPA, pp. 28–31.

[75] Rad, GS-588, Hurley-Brett to AGWAR (Marshall), 4 Mar 42. DRB AGO Opns Rpts, History of Effort to Sup P.I.

[76] Rad, TAG to CG USAFIA, 8 Mar 42. In same.

[77] Rad, XR 75, AGWAR (Marshall) to CG USAFIA, 28 Mar 42. In same.

[78] (1) Masterson, Transportation in SWPA, pp. 27–28. (2) Wainwright, *Story*, pp. 72–73.

The question naturally arises whether food shipments from Australia had been worth the risks involved. About 1,100 tons of balanced rations in poor condition did reach Bataan after transshipment from Mindanao, but in all probability the Luzon Force would have received an equal amount of food from the central and southern Philippines had these supplies from Australia been unavailable. One advantage of using rations from Australia was that they contained the elements prescribed by the Army and hence were better balanced and more acceptable to American troops than food from the Visayas and Mindanao would have been. But to the Filipinos, who composed the bulk of the Luzon Force, Philippine food would have been as acceptable as U.S. rations, and to American troops on the verge of starvation it surely made little difference from what country their subsistence came. Another reason for transporting food from Australia was uncertainty concerning the ability of the Cebu Depot to provide enough rations from local sources for both the Luzon Force and the Visayan-Mindanao Force. Yet experience demonstrated that this installation could furnish sizable stocks of food, although probably not enough to have provisioned Bataan indefinitely. But the main justification for the decision to send rations from Australia is that strategists planning a protracted defense of Bataan could not be sure in January or even early February that the Japanese blockade would prove all but unbreakable. They had to assume that opportunities might develop to furnish the peninsula food in more substantial quantities than the Cebu Depot could conceivably supply, and they had to be ready, if possible, to benefit from such opportunities.

As the situation in the western Pacific actually developed, the crux of the whole problem of food relief lay not in the inability of more ships to make the long voyage from Australia but in the inability of any ships after the end of February to proceed from Mindanao and the Visayas to Corregidor. As long as this part of the blockade could not be run, it made no difference how many tons of rations Australia—or even the United States and Hawaii—shipped or the Cebu Depot accumulated.

Bataan: Last Phase

Throughout January and February the men on Bataan subsisted on the meager half rations meted out at morning and late afternoon meals. The amount of food furnished at even these scanty meals gradually declined. When the half ration was inaugurated on 6 January, it theoretically supplied each U.S. Army soldier with 6 ounces of flour a day, but the stock was so restricted that the allowance had to be cut, first, to 4 ounces, then to 2 ounces, and, finally, late in March, eliminated altogether. At the start of half rationing daily issues of 6 ounces of canned or fresh meat were prescribed. But by 23 March diminishing stocks had forced reduction of the allowance of canned meat, usually corned beef, to 1.22 ounces. Strenuous efforts were made all along to provide 6 ounces of fresh carabao or other meat every third day. Like other stocks of food, canned vegetables, limited from the beginning in variety and quantity, shrank as the weeks passed and afforded only an increasingly monotonous diet. Within a month after the withdrawal to Bataan, butter, coffee, and tea had vanished from the menu. Stocks of sugar and evaporated milk had been almost exhausted and were issued only in inconsequential amounts. Little tobacco

was available in any form. On 22 March the ration had fallen to 17 ounces, or only about a third of the 46.2 ounces provided in a full ration, and it was recommended that the issue be further reduced to 12.67 ounces.[79]

The Philippine ration underwent a similar reduction. Daily issues of rice, which served the purpose of flour in the American ration, gradually dwindled from 10 ounces at the start of rationing to 3 ounces in mid-March. Stipulated issues of meat or of fish, which, under this ration, was frequently substituted for meat, declined in January to 4 ounces, 2 ounces less than were prescribed under the U.S. ration. By 23 March Philippine, like U.S., troops were getting only 1.22 ounces of meat or fish. Except for flour, which was not issued to Filipinos, other foods were prescribed in the same quantities under the two rations.

Normal wartime obstacles to equitable distribution of subsistence were intensified by the extraordinary conditions on Bataan. Front-line troops indeed received even less than the prescribed fare.[80] Transportation difficulties retarded deliveries and made it almost impossible to carry supplies in the stipulated quantities. After January the only passable road was the coastal route running from Orion on the Manila Bay side of the peninsula to Mariveles on the southern tip and then up the west coast on the China Sea side to Bagac. The jungles covering most of the peninsula were virtually impenetrable; and the few foot and pack trails were rank with tropical vegetation. From early February most of the defense line could be reached only by the arduous process "of clambering in and out" of densely overgrown ravines that "radiated like the ribs of a fan from the summit of Mariveles Mountain," six miles south of the front.[81]

Limitations on the use of vehicles, caused by the shortage of gasoline, added to the difficulty of delivering supplies on schedule. Equally serious was the highjacking of food, especially by Filipinos, most of whom had little training or discipline in supply matters. Even Philippine Army military police, who had been placed along the roads and trails to guard against such practices, occasionally helped themselves to food from vehicles they had halted, ostensibly to inspect the cargo. Food was always mysteriously vanishing from supply dumps and organization kitchens. Pilferage of this sort normally would have passed unnoticed, but rations were so small that soldiers at once detected the slightest diminution and freely accused rear echelons of "living on the fat of the land" and division quartermasters of inequitable distribution.

The provision of fresh meat illustrates how hard it was to furnish front-line troops with the prescribed ration.[82] Fresh meat was scheduled to be issued every third day, yet men at the front seldom received any more often than once every week or ten days. Even when they received supposedly fresh meat, it was as frequently as not maggoty or otherwise spoiled. Such deterioration was

[79] (1) Wainwright Rpt, Annex VI (Rpt of Opns of Luzon Force), Annex 5 (G–4 Rpt), p. 3. (2) Drake Rpt, App. A, Col Charles S. Lawrence, Tarlac QM Depot, p. 10. (3) Ltr, CofS Luzon Force to CG USAFFE, 22 Mar 42. Phil Records AG 430 (8 Dec 41).

[80] (1) Memo, Asst G–4 for CG Bataan Force, 12 Mar 42. Phil Records AG 430.2 (11 Sep 41). (2) Memo, CofS for CG USAFFE, 22 Mar 42, sub: Ration and Motor Fuel Status. Phil Records AG 430 (8 Dec 41).

[81] Wainwright Rpt, Annex XIV (Med Rpt), pp. 24–26.

[82] (1) Memo, Asst G–4 for CG Bataan Force, 12 Mar 42. Phil Records AG 430.2 (11 Sep 41). (2) Memo, CQM for G–4 USFIP, 23 Mar 42. Phil Records AG 430 (8 Dec 41).

inescapable, for the meat had to be transported in unrefrigerated open trucks on hauls that lasted ten or twelve hours during the heat of the tropical day. The long trip, moreover, afforded highjackers many opportunities for plunder.[83]

By late March, with the blockade completely shutting off all outside shipments, the subsistence stocks on Corregidor offered the only real hope of an increase in the Bataan ration. In the last half of December the Manila Quartermaster Depot had built up on the island fortress a defense reserve of Quartermaster supplies sufficient to last 10,000 men for 180 days. Though there were then actually only about 9,000 men in the harbor forts, MacArthur on 24 January had directed that subsistence reserves be further increased to provide for 20,000 men until 1 July 1942. This meant that food had to be shifted from Bataan to Corregidor. Of the substantial surplus thus created on the island, only a small part was ever returned to the peninsula. For a few days at the very end of the campaign some rations were belatedly shipped to the starving men on Bataan.[84]

Throughout the Bataan campaign the Harbor Defenses forces enjoyed more food and better balanced rations than did those on the peninsula. Rations at the harbor forts, it is true, were cut, nominally in half, early in January, when those on Bataan were reduced, and only two meals a day were served thereafter. Various factors, however, combined to give troops on Corregidor and at the other forts more and better food than those on the peninsula. There were virtually no transportation difficulties, little pilferage, and practically no hoarding. These factors, together with the availability of comparatively abundant food stores, rendered it inevitable that the Corregidor garrison often actually received better meals than quartermasters on Bataan could possibly give its hungry defenders.

A comparison of the rations in effect on Corregidor and Bataan reveals the inequality. About the middle of March the Harbor Defenses ration was well-balanced and provided about 48 ounces for Filipinos, who were normally lighter eaters than U.S. troops. At that time rations on Bataan usually totaled only 14 to 17 ounces. Even after the Corregidor rations were reduced on 1 April, they still greatly exceeded those on Bataan, Americans receiving 30.49 ounces and Filipinos 25.85 ounces. These reduced rations provided vegetables, fruits, and cereals, 8 ounces of fresh or canned meat, and, for Americans, 7 ounces of flour. In contrast to this not insubstantial fare the Bataan rations for weeks had provided no vegetables, fruits, or cereals, only 1.22 ounces of canned meat or, every third day, 6 ounces of fresh meat, and for Americans, 1.44 ounces of flour.[85] Rice was used largely as a substitute for flour, 8 ounces being issued to Americans and 10 ounces to Filipinos. Aside from these items, the Bataan rations provided only about 1½ ounces of canned milk, 1½ ounces of salt, and ½ ounce of sugar. In the closing weeks of the peninsula campaign, as supplies were depleted, even these meager issues were cut or eliminated.

The striking disparity between the Bataan and the Corregidor ration was plainly

[83] (1) Drake Rpt, pp. 67–68. (2) Lecture, Col Thomas W. Doyle, 25 Jul 42, sub: Recent Combat Conditions in Bataan and Matters of Interest to QMC. OQMG 319.25.

[84] Drake Rpt, pp. 33–34; App. F, Rpt, Col Chester H. Elmes, QM Opns, Ft Mills, pp. 2–3.

[85] (1) Memo, 13 Mar 42, and attachments. (2) Ltr, CofS to CG USFIP, 25 Mar 42, sub: Rations of Luzon Force. (3) Memo, CQM for CofS USFIP, 1 Apr 42, sub: Reduced Ration, HD M&S Bays. All in Phil Records AG 430.2 (3 Jan 42).

demonstrated to the defenders of the peninsula by incidents like that of 18 March, when military police halted a truck laden with rations for a few Harbor Defenses antiaircraft batteries, which drew their supplies direct from Corregidor, and discovered that it contained ham, bacon, sausage, raisins, canned peas, corn, tomatoes, potatoes, and peaches, none of which were available to the other troops defending Bataan, as well as large quantities of cigarettes.[86] Such incidents could not be kept secret, and in exaggerated form they were reported throughout the peninsula to the detriment of an already sagging morale.

The disparity between the issues of tobacco on Bataan and Corregidor particularly stirred the resentment of the Luzon Force. In general only one cigarette a day was issued to soldiers on the peninsula. Occasional efforts were made to issue five to men in the front lines.[87] Corregidor, on the other hand, had a relatively large supply of tobacco, and officers going from Bataan to that island often purchased cigarettes and pipe tobacco in substantial quantities.[88] The shortage of cigarettes on Bataan was relieved temporarily early in March by the arrival of a million and a half cigarettes that had been run through the blockade, but this relief lasted for only a few days.

Another cause for dissatisfaction was the fact that the 1,500 marines on Corregidor drew their rations from the Harbor Defenses Quartermaster, although they had brought their own food supplies. On arriving at the fortress the marines had offered their dry provisions to the Subsistence Officer, but since these supplies did not constitute a balanced ration, they had been told to retain their stores intact. On 3 April General Drake called attention to this situation and suggested that the time had come for the marines to consume their own supplies.[89]

As the food situation on Bataan rapidly deteriorated during March, increasing consideration was given to the possibility of tapping the Corregidor reserves. But these reserves were based on plans to defend the island until 1 July. Unless this date was altered to at least 1 June, no relief could be sent to the peninsula.[90] The date was so altered, effective on 1 April, when the Harbor Defenses ration was reduced to 30 ounces and the daily shipment of small quantities of food from the Bataan reserve was started. These measures came too late to benefit the Bataan forces.

By late March these forces, even under the prescribed ration that could not always be supplied, were receiving only about 1,000 calories a day. Yet men fighting under highly adverse conditions in terrain as formidable as that of Bataan required a minimum of 3,500 calories, and medical authorities generally agreed that 1,500 calories were necessary to perform the barest functions of life. The ration, furthermore, was deficient in vitamins A, B, and C, with the result that beriberi affected virtually all troops. As early as 16 February, there had been "many indications of accumulative malnutrition." In the morning men's legs felt "watery" and at intervals pumped "with

[86] Memo, PM for G-4, 19 Mar 42. Phil Records AG 430.2 (11 Sep 42).

[87] Ltr, AG to CG I Corps, 3 Mar 42, sub: Issue of Cigarettes. Phil Records AG 435.8 (3 Mar 42).

[88] Ltr, CO Phil QM Depot to CQM, 17 Mar 42. In same.

[89] (1) Memo, CQM for G-4, 3 Apr 44. (2) Memo, S-4 HD M&S Bays for CG USFIP, 4 Apr 42. Both in Phil Records AG 430 (8 Dec 41).

[90] (1) Memo, CG USAFFE for CG HD M&S Bays, 13 Mar 42, sub: Field Rations. Phil Records AG 430.2 (3 Jan 42). (2) Memo, CQM for G-4 USFIP, 27 Mar 42, sub: Surplus Subs, Ft Mills. Phil Records AG 430 (8 Dec 41).

pains that swell and go away again." Breakfast restored a normal feeling for an hour or so, but lassitude then followed.[91] Between mid-February and mid-March a tremendous increase occurred in the number of soldiers rendered ineffective because of malaria, malnutrition, and dysentery.

The commander of the I Corps attributed these alarming developments to the steady reduction in the quantity and quality of rations, to lack of quinine and other medicines, and to inadequate clothing and shelter. In some degree, he added, 75 percent of his command was incapacitated. Since rear establishments lacked rations to rehabilitate those suffering from malnutrition, he set up stations where food issued to his command was utilized to give patients slightly more than regular fare. But his efforts bore little fruit, and by mid-March large-scale offensive action by the I Corps had become impossible.[92] Physicians estimated its combat efficiency to be less than 45 percent. At the same time the commander of the II Corps asserted that the combat efficiency of that organization had fallen to about 20 percent.[93]

The last days of March saw further deterioration of the ration situation, and on the 28th Wainwright warned General Marshall that food stocks would last only until 15 April. Unless they were replenished, he declared, Bataan would be starved into surrender. Late in March MacArthur and Wainwright had agreed that a desperate attempt must be made to run supplies tied up at Cebu and Iloilo through the blockade to Corregidor. According to their tentative plan, motor ships, lying idle in the central islands since late February, would again become blockade-runners.[94] As this daring venture would be foolhardy unless a convoy of planes was provided, MacArthur agreed to send aircraft from Australia. Wainwright also planned to use the few remaining motor torpedo boats as a naval convoy. The Cebu Quartermaster Depot understood that American bombers would arrive about the night of 1–2 April, attack Japanese airfields along the route to Corregidor, and then, basing themselves on American-held airfields in Mindanao, patrol the sea during the perilous northward movement of the blockade-runners. On 1 April eight ships, fully loaded with rations, medicines, ammunition, gasoline, and oil, waited at Cebu and Iloilo, ready to start for Corregidor when the planes should appear. Days passed, but no planes came because plans for the special air mission could not be completed until 7 April at a conference in Melbourne after which several more days were needed to prepare for the flight from Darwin in northern Australia.[95] On the morning of 10 April the enemy landed and captured Cebu, but not before the waiting ships and their cargoes had been destroyed to avoid capture.

On 11 April ten B-25's and three B-17's left Darwin and arrived safely at the Del Monte airfield on Mindanao. During the next two days attacks were made against

[91] (1) Allison Ind, *Bataan, the Judgment Seat* (New York: The Macmillan Company, 1944), p. 296. (2) Memo, Adv Ech for Surg USAFFE, 27 Feb 42, sub: Diet of American Soldiers. Phil Records AG 430.2 (11 Sep 41).

[92] (1) Wainwright Rpt, Annex IV (Rpt of Opns of North Luzon Force), pp. 28–29. (2) Louis Morton, ed., "Bataan Diary of Major Achille C. Tisdelle," *Military Affairs*, XI (Fall 1947), 141.

[93] Wainwright Rpt, Annex V (Rpt of Opns of South Luzon Force), p. 56.

[94] (1) Drake Rpt, pp. 43, 50, 54; App. A, Rpt, Col John D. Cook, Cebu QM Depot, p. 3. (2) Wainwright, *Story*, p. 72.

[95] (1) Wainright, *Story*, p. 88. (2) Wesley Frank Craven and James Lea Cate, eds., *Plans and Early Operations, January 1939 to August 1942, The Army Air Forces in World War II* (Chicago: University of Chicago Press, 1948), I, 417–18.

shipping and docks at Cebu, against enemy facilities at Davao, and against Nichols Field at Manila. While these attacks were fairly successful, the small number of bombers and the meager protection afforded by the six battered pursuit planes available on Mindanao make it fairly obvious that, if the blockade-running enterprise had been undertaken, it would have ended in disaster.[96]

Rations during the final two weeks on the peninsula provided less than 1,000 calories a day. Rice, more plentiful than other foods, was now issued to all troops at a daily rate of about ten ounces and became the main food of Americans as well as Filipinos. It was indeed relatively so abundant that other available foods were rationed to last as long as it did. The extreme scarcity of other items at this time is illustrated by the headquarters mess of the 45th Infantry Regiment, Philippine Scouts. Besides rice, it received one can of salmon a day for fourteen officers and, occasionally, a small quantity of sugar, but never enough to be of real significance. Everywhere malnutrition, malaria, and dysentery demoralized the defenders. They were no longer capable of offensive action or even sustained resistance. The 31st Division, Philippine Army, which in early February had driven the Japanese from its immediate front, had "by lack of clothing, equipment, food, and medicine been reduced to a demoralized and uncontrollable mob." [97] The surgeon of the Luzon Force reported that men were "becoming so weak from starvation that they could hardly carry" their packs. At the end of March, he noted, examination of the 45th Infantry Regiment, Philippine Scouts, revealed that 65 percent of the troops exhibited signs of malnutrition. More than half the troops were afflicted with edema, night blindness, or other symptoms of dietary deficiency. The "well men," the surgeon continued, were "thin and weak from starvation." [98]

Ill and undernourished, the Bataan forces could not effectively resist the final Japanese offensive, which was launched against the southern part of the American front on 3 April. Units gradually disintegrated and by the 7th were abandoning arms and running away. Still hoping against hope for some kind of relief, General Drake radioed The Quartermaster General, Maj. Gen. Edmund B. Gregory, describing the critical food shortage and urging that air shipments of food concentrates be forwarded immediately from Cebu, Australia, and China.[99] The following day General Marshall radioed General Wainwright that the Chinese Government had volunteered to supply planes for such shipments. But it was too late to relieve the desperate situation, for on this same day attacking forces outflanked their opponents' lines and rendered further resistance impossible. On the southern front Americans and Filipinos fled, pursued by enemy infantry, bombers, and tanks. Surrender was imperative to avert wholesale massacre. On 9 April Maj. Gen. Edward P. King, Jr., commanding the Luzon Force, took this inevitable step, and the valiant resistance of the men of Bataan passed into history.[100]

[96] Craven and Cate, *The Army Air Forces*, I, 417–18.

[97] (1) Wainwright Rpt, Annex VI (Rpt of Opns of Luzon Force), Annex V (G–4 Rpt), p. 1. (2) Annex XIV (Med Rpt), p. 4. (3) Annex V (Rpt of Opns of South Luzon Force), p. 56.

[98] *Ibid.*, Annex XIV (Med Rpt), pp. 44–45.

[99] (1) Rad, Drake to TQMG, 7 Apr 42. DRB AGO OPD Incoming and Outgoing Msgs. (2) Drake, "No Uncle Sam," pp. 23–24.

[100] (1) *Ibid.*, p. 10. (2) Morton, *Military Affairs*, XI (Fall 1947), 133–35, 144–48. (3) Rad, Wainwright to CG USAFFE, 9 Apr 42. ORB SWPA AG 319.1 (Opns).

"The capitulation of Luzon Force," its surgeon declared, "represents in many respects a defeat due to disease and starvation rather than to military conditions." Physical deterioration, he continued, had progressed so far that it "became a determining factor in tactical operations." Even if the Japanese had not launched their final attack, surrender in all probability could have been postponed only a few days. So bad had health conditions become that during the three days preceding capitulation the last rations were used to feed the troops better than they had been fed for weeks. Flour, which had not been issued for some time, was dealt out at the rate of 2.88 ounces a day. The allotment of 1.22 ounces of canned meat, in effect since 23 March, was doubled. So was the rice ration, 17 ounces being given to Americans and 20 ounces to Filipinos. When King surrendered, all subsistence on Bataan, including 45,000 C rations, held to the end for emergency use, had been exhausted except for a single issue of a half ration.[101]

On the day of the capitulation, no other essential supply was as scarce as rations. It is true that there never had been sufficient mortars or .50-caliber machine guns and that heavy loss of firearms during the campaign had seriously reduced the number of automatic weapons, but these scarcities were not so severe as to demand capitulation. Ammunition stocks, too, though lacking antiaircraft shells and short of artillery shells, were still plentiful enough to last for another month at the existing rate of consumption. Supplies of engineer equipment and motor vehicles, while not large enough for the most efficient operations, were still adequate to meet minimum requirements. The shortage of gasoline was more serious, for it increasingly hampered all activities involving motor transportation. But on the night of 8 April, 50,000 gallons, sufficient to last twenty days, remained in Quartermaster dumps. In preparation for surrender on the following morning all this stock was destroyed except for 10,000 gallons which, the Americans hoped, the enemy would utilize to transport their weary, starving prisoners of war.[102]

Quartermaster Operations on Corregidor

After the capitulation the Japanese set up their artillery on the southern shores of Bataan, two miles from Corregidor, and began intensive shelling of that small but powerful fortress commanding the entrance to Manila Bay. The three harbor forts—Drum, Hughes, and Frank—were also subjected to bombardment. During this period Corregidor became the center of American efforts in the Philippines. Though a protracted defense appeared hopeless, General Wainwright determined, if possible, to hold the island until at least the beginning of June.

Even in the final weeks on Corregidor food never became as scarce as it had on Bataan at the end, in spite of the fact that soldiers and civilians evacuated from the peninsula immediately before and after the surrender of the Luzon Force had swelled the number of individuals to be fed to about 11,000. Meals, though unbalanced in their constituents, were served at a half-ration rate. This comparatively high rate was possible because Quartermaster supplies had sustained no significant damage. Since December they had been stored in Malinta Tunnel, where they were safe from hostile

[101] (1) Wainwright Rpt, Annex XIV (Med Rpt), pp. 34–37, 44–45. (2) Annex VI (Rpt of Opns of Luzon Force); Annex V (G–4 Rpt), p. 3.

[102] (1) *Ibid.*, p. 2. (2) Drake Rpt, p. 54; App. A, Col Charles S. Lawrence, Tarlac QM Depot, p. 11.



SURRENDER TO THE JAPANESE. *American prisoners sort supplies under the supervision of Japanese soldiers, Bataan, 11 April 1942.*

bombing and shelling. This huge excavation ran from east to west for about 800 feet beneath 500-foot-high Malinta Hill; it was approximately 25 feet wide and 15 feet high and had lateral branches 150 feet deep, 15 feet wide, and 15 feet high. When Corregidor surrendered on 6 May, this tunnel contained enough food to have provided half rations until about 20 June. In view of this relatively favorable situation, illness was much less common than it had been on Bataan. While diarrhea and minor respiratory diseases afflicted many soldiers, the more serious maladies, such as dysentery and beriberi, rarely appeared. Most of the garrison, however, showed signs of exhaustion, and as enemy activity was intensified, these symptoms multiplied. But it was not physical exhaustion that brought about the surrender as much as it was overwhelming Japanese superiority in planes and equipment.[103]

Of the bitter disappointments associated with the fall of the Philippines the QMC had a full share. In no other campaign in the Pacific were men so ill fed and so ill clad, and in no other campaign was such bitter criticism directed at the Corps. Lack of food elicited the most vigorous denunciation. During the siege of Bataan, according to Col. Irvin Alexander, an infantry officer

[103] (1) Drake Rpt, pp. 53–54; App. F, Col C. H. Elmes, QM Opns, Ft Mills, pp. 2, 4. (2) Wainwright Rpt, Annex VIII (Harbor Defenses Rpt), Exhibit H, p. 1. (3) *Ibid.*, Annex XIV (Med Rpt), p. 83.

detailed to the QMC, "the Filipinos were uncomplaining, but as the American soldiers grew hungrier the more vocal they became. Looking for someone to blame and not knowing where to place the blame they picked on the QMC." According to Colonel Alexander, "this bitterness continued on into prison camp and no doubt many survivors believed they were starved on Bataan because of the failure of the QMC to perform its duties properly." [104]

This criticism was unjustified, for the failure of the QMC sprang largely from conditions beyond its control, not from any neglect of duty. It had, in fact, taken every step demanded by long-laid plans for meeting a war emergency. In the summer of 1941 it had submitted requisitions to the War Department for defense reserve stocks large enough to last 50,000 men for six months. At the same time it had sent in requisitions covering the initial supply and equipment of the Philippine Army. Surely, it was not a Quartermaster fault that hostilities started before any of these supplies, except 1,000,000 gallons of gasoline and 500,000 C rations, arrived in Manila. Nor was it the fault of the QMC that it was suddenly forced to share nonperishable rations, clothing, and equipment, which had been accumulated for 20,000 Regular Army troops and Philippine Scouts, with the 60,000 men of the woefully undersupplied Philippine Army.

Neither was the QMC responsible for the failure to store rations on Bataan immediately after hostilities started, as had been directed by WPO-3. This failure was attributable rather to the decision of higher military authority to discard WPO-3 and "fight it out on the beaches," a change of plan that compelled the QMC to disperse food stocks among all the supply depots in Luzon. Higher authority perhaps also contributed to the shortage of rations on Bataan by its prohibition, in the opening days of the war, of the procurement of rice that the Philippine Government thought might be required by Filipino citizens. Finally, the collapse of the defense against the invaders within two weeks and the consequent withdrawal to the fastnesses of Bataan within a single week placed an impossible task on the QMC. The retreat was hurried; railroad transportation was no longer available; and a substantial number of trucks had been commandeered by combat organizations. These chaotic conditions forced the QMC to abandon or destroy an appreciable part of its subsistence stocks.

Since the food stores of 8 December had not sufficed to furnish full rations for the contemplated six-month stand on Bataan, even before suffering heavy withdrawals prior to hasty retirement to the peninsula, nothing that the QMC could have done would have squeezed full rations out of the scanty supplies. Once on Bataan, the QMC had exploited to the maximum the limited local food sources. Moreover, in Mindanao and the Visayas it had conducted a heartbreaking attempt to send surface ships loaded with food through the ever tightening blockade.

The failure of outside efforts to replenish essential supplies raises the question whether this was an unavoidable consequence of the weakness of American military, naval, and air forces in the western Pacific. To a very great extent, of course, it was. Yet the successful runs made by the few available torpedo-carrying submarines—all of limited capacity—suggests that the best chance of bringing in supplies may have lain in cargo-carrying submarines built to handle at least

[104] Drake Rpt, App. A, Col Alexander, Sup Problems of USFIP, p. 8.

500 tons as compared with the 150 or so tons transportable by the ordinary torpedo-carrying type. Unfortunately, no cargo-carrying submarines could be obtained either in the Pacific or elsewhere. Finally, American weakness in the air rendered supply by plane impracticable. But had more airfields, bombers, fighters, and, above all, more transport planes been available, Bataan, as subsequent experience in Burma demonstrated, could have been provisioned at least in part by air.

Generally speaking, supply operations on Luzon suggest that in making plans and in executing them too little attention was devoted to the potential significance of rations in a position as exposed as the Philippines. Though the archipelago lay thousands of miles from its major base, the United States, and at the very end of a supply line that was highly vulnerable to attack, the War Department assigned it low shipping priorities until the summer of 1941. Even then rations still had low priorities, and essential provisions never arrived. In retrospect, planning may also be criticized for not recognizing all the logistical implications of the protracted defense of such easily isolated positions as Bataan and Corregidor. Though it was anticipated that both positions would probably come under siege, in which event they were to be defended as long as was humanly possible, planners did not provide for unusually large supply reserves. Nor did they foresee that thousands of civilian refugees would have to be fed on both Bataan and Corregidor. In executing the plans for defending Luzon after hostilities had started, higher military authorities appear not to have fully realized at first the pressing importance of assuring rations for beleaguered forces in a blockaded Philippines. Habits of thought, produced by the almost universal peacetime abundance of food and the ordinarily routine character of its procurement, doubtless account for this lack of vision. Few survivors of Bataan today would deny that generous subsistence reserves, high shipping priorities for food, and provision for unforeseen emergencies are imperative safeguards for positions that may be isolated under comparable circumstances in the future.

CHAPTER II

Problems in Hawaii, Australia, and New Zealand

In an industrial age an army operating far from its homeland is benefited greatly if it can tap the material resources of thickly populated and economically well-developed countries. It can then utilize already existing docks, warehouses, offices, and even residences and employ thousands of civilians in rear areas as clerks, stevedores, and warehouse workers. Above all, it can procure a substantial part of its supplies and equipment from nearby industrial sources. Through the use of all these material and human resources an army can free its troops from building and supply tasks and make its own manpower more fully available for combat activities. But the vast Pacific contained few populous and industrialized areas. At the outset it indeed contained only three areas—Hawaii, Australia, and New Zealand—that could serve as great supply bases for defensive and offensive operations. While these areas could furnish much food, their industrial development was too rudimentary to permit extensive local procurement of manufactured articles. Nevertheless they constituted indispensable assets to the forces arrayed against Japan.

Hawaii, Mid-Pacific Supply Base

Of the three areas Hawaii since the turn of the century had been the major U.S. outpost in the central Pacific. With only about 420,000 inhabitants, few industries, and a highly specialized agricultural system, it was the least serviceable of the areas as a source of supply. But it was advantageously located for use as a base for offensive operations and as a distribution center for forward areas, and this was the role prewar strategists had assigned to the archipelago in case of a war with Japan. On the eve of the attack on Pearl Harbor, U.S. Army activities in the islands were still conducted generally in peacetime fashion. Consequently, troop strength and supply and service resources were far from sufficient to meet the requirements of a major wartime base for operations utilizing hundreds of thousands of men.[1]

To help the QMC in Hawaii in its task of supporting possible combat activities, plans had been formulated in 1940 and 1941 for the enlargement of its two main operating centers—the Hawaiian Quartermaster Depot, located at Fort Armstrong near the

[1] History of Quartermaster Operations, U.S. Army Forces Middle Pacific, During the War with Japan (QM Appendix to Historical Subsection, G–2 HUSAFMIDPAC, History of United States Army Forces Middle Pacific and Predecessor Commands), pp. 1–2, 9–27. OCMH. Hereafter these works will be cited respectively as QM Mid-Pac Hist and Mid-Pac Hist. (See Bibliographical Note.)

entrance of Honolulu Harbor, and the Quartermaster warehouses at Schofield Barracks, the Army's largest garrison post, 20 miles northwest of Honolulu.[2] But lack of funds and higher priorities given to building activities more directly related to combat operations prevented the execution of these plans, and no substantial additions had been made to Quartermaster installations by the time hostilities began. Even the construction of underground storage tanks for gasoline was delayed until the War Department after considerable delay approved the project.

On 7 December 1941 Quartermaster covered storage space totaled only 200,000 square feet and open storage space only 8,000 square feet, mere fractions of the square footage needed in the coming Pacific war. Modern mechanical aids in quick handling of supplies—fork-lift trucks, conveyors, stackers, pallets, and cranes—were completely lacking.[3] Since peacetime requisitions had been submitted to the San Francisco General Depot sixty days before anticipated need and had been promptly filled, military stocks of food, clothing, and other Quartermaster supplies were large enough to meet the immediate needs of the 42,000 soldiers then in the islands. But they were much too small to support the vastly increased number that was soon to be stationed there or even to make possible a protracted resistance if the enemy should blockade or invade the archipelago.[4]

In the early months of 1942, when a large part of the U.S. Pacific Fleet lay sunk or disabled in Pearl Harbor, a Japanese attack in force on Hawaii was considered altogether likely. A cardinal objective of the Army was to make the islands a mighty bastion capable of withstanding a powerful attack. With the disastrous naval losses sustained by the foe in the decisive Battle of Midway early in June 1942 making a Japanese assault improbable, the Army's objective in the following year became the speedy transformation of the archipelago into a vast training, rehabilitation, and supply area. The year and a half following Pearl Harbor was, then, a period of intensive preparations, defensive at first but offensive later, for the QMC as well as for other Army components.

At the outset the basic peacetime organization of the Office of the Department Quartermaster (ODQM) remained substantially unaltered. The Hawaiian Department Quartermaster, Col. William R. White, continued to exercise personal supervision over the formulation of long-range plans and the establishment of policy, the Supply Division to handle day-by-day routine matters, and the Hawaiian Quartermaster Depot to serve as the main operating agency of the ODQM. As in peacetime, post quartermasters consolidated the requisitions of units on their reservations and transmitted them to the Hawaiian Depot to be filled from its stocks. If requisitioned items were unavailable at the depot, it, in turn, sent requisitions for them to the San Francisco Port of Embarkation.[5]

Distribution Problems

On 7 December 1941 the requisitioning basis was a 60-day supply for 42,000 men. In the following months this basis steadily rose and by July became a 90-day

[2] Lt Col Franz J. Jonitz, "Quartermaster Corps Activities in the Hawaiian Department," *QMR*, XX (May–June 1941), 19–20.

[3] Mid-Pac Hist, p. 1291.

[4] Joint Committee on the Investigation of the Pearl Harbor Attack, 79th Cong., 2d Sess., *Hearings*, Pt. 28, p. 1041. These hearings will hereafter be cited as JC Pearl Harbor *Hearings*.

[5] QM Mid-Pac Hist, pp. 9–32.

supply for 139,000 men. Comparable increases in other overseas areas forced the War Department late in January 1942 to promulgate a modified system of supply for all theaters of operations. Food, gasoline, and oil would be shipped automatically without requisition by the ports of embarkation; clothing, equipage, and general supplies would, as in the past, be shipped only on requisition, but the requisitioning agency was now to recommend shipping priorities. During the greater part of 1942 the automatic supply of food, gasoline, and oil worked rather satisfactorily in the Hawaiian Department although shortages developed in some items and excesses in others.[6]

The sharp rise in the number of troops in the islands and the prospect of continuing increases for the next two or three years required the abandonment of manual methods of warehousing at the Hawaiian Depot, the procurement of the latest materials-handling equipment, and the acquisition of additional storage space. Since materials-handling equipment was scarce in the United States, it was well into 1943 before depot requisitions could be filled. Meanwhile additional storage space was obtained by leasing commercial warehouses in the Honolulu area and, as first-priority defense installations were completed, by erection of temporary structures. These structures were about 100 feet wide and up to 550 feet long, considerably smaller than those in the zone of interior, that is, the United States, where standard warehouses averaged about 180 feet in width and from 1,000 to 1,200 feet in length. Months elapsed before all the needed space was procured, and in the meantime open storage was employed for a good deal of the incoming flood of supplies. Despite the hazards to food and textiles from drenching rains, even the docks and paved streets of Honolulu were of necessity occasionally utilized as storage areas.[7] By the end of June 1943 covered storage space at the Hawaiian Depot had risen from 200,000 to 500,000 square feet, or 150 percent, and open storage space from 8,000 to 395,000 square feet, or 4,800 percent. Total space for all supplies except fresh food had leaped from 208,000 to 895,000 square feet, or 330 percent. Extensive though this increase was, it still did not equal the demand, for the QMC was then stocking a 105-day supply for 204,000 men, or an 8.5-fold increase over that on 7 December 1941.

Storage at the Hawaiian Depot never became as efficient an operation as it did on the mainland. Not only were warehouses proportionately fewer in number; they were also widely scattered—partly because leased buildings were dispersed throughout the Honolulu area rather than concentrated in one place and partly because the danger of losing all supply of the same kind by bombing required storage of the same item in many different locations. This decentralization of depot stocks inevitably caused longer hauls and more crosshauls. Though the relative closeness of Oahu to the mainland enabled the depot to obtain more materials-handling equipment than did installations at a greater distance, mechanical aids even here were never as numerous as in the zone of interior. But in spite of its deficiencies the installation probably had better equipment and warehouses than did com-

[6] (1) Ltr, AG 400 (1-17-42) MSC-D-M, 22 Jan 42, sub: Sup of Overseas Theaters. (2) Ltr, CG HD to WD, 27 Jul 42, sub: Sup of Overseas Bases. ORB AFPAC AG 400.22.

[7] (1) QM Mid-Pac Hist, pp. 56–61. (2) Memo, QM for CofS HHD, 7 Jan 42. ORB AGF PAC AG 463.7 (Jun 29–Apr 42) (Gasoline).

parable Quartermaster establishments elsewhere in the Pacific.[8]

The Hawaiian Depot at first sent items requisitioned by field units to a few posts that distributed them to the proper units. Since these posts were concentrated about Honolulu, there was danger that a large part of the supplies directly earmarked for field organizations might be destroyed in air raids. Further complicating the distribution problem was the necessity of supplying troops at many small and scattered defensive works hastily built at a considerable distance from distributing agencies. Obviously, war conditions demanded greater dispersion of field stocks.[9] A zonal system of distribution was the answer to this problem. Ten Quartermaster supply areas were established on Oahu, and within these areas centrally located supply points, each with its own zone of distribution, were set up. These points consolidated and submitted to the Hawaiian Depot requisitions of units within their boundaries and received and distributed the requisitioned supplies. The larger points served also as subdepots, which maintained reserve stocks of specifically assigned items indispensable to field troops. In Area 9, for example, Schofield Barracks specialized in the reserve stockage of food, and Camp Malakole in that of clothing and general supplies. Points serving as subdepots for food stocks kept a 30-day store of nonperishable subsistence; those stocking clothing and general supplies kept a 90-day store. There were also emergency distribution points. They differed from regular supply points in that they stocked reserves that could be issued only if the normal distribution system broke down. Such reserves usually consisted of a 5-day supply of combat rations and a 5-day supply of gasoline.[10]

As troop strength outside Oahu rose in the late spring and early summer of 1942, the Hilo, Kauai, and Maui Depots were established. They served, respectively, the Hawaii, Kauai, and Maui Districts, which consisted mainly of the islands bearing these names.[11] The new installations furnished supplies within the limitations imposed by sharply curtailed interisland transportation service. Some ships had been withdrawn from this service because of possible hostile attacks, and the remaining ships sailed only at irregular and unannounced dates. Lack of a fixed schedule caused an uneven flow of military supplies into the outlying islands, and the shortage of refrigerated vessels, or "reefers," made the supply of fresh food a particularly hard task so that rations were monotonous. Eventually, more frequent sailings, made possible by the lessening of serious danger from the Japanese, alleviated this problem.[12]

The Food Problem

Since Hawaii was no more self-sustaining than England, the maintenance of an ample and varied food supply for both the military and the civilian population was the

[8] (1) QM Mid-Pac Hist, pp. 57–60. (2) Ltr, CG USAFICPA to CO Army Port and SvC, 25 Oct 43, sub: Construction Policy. ORG AGF PAC AG 600.1 (Projects, Jun 17–Feb 44). (3) Memo, TQMG for CG ASF, 14 Mar 45, sub: Tour of POA and SWPA. OQMG POA 319.25.

[9] (1) HD Fwd Ech AdmO 1, 3 Jan 42, sub: Storage of Rations and Gasoline. (2) HD Fwd Ech AdmO 19, 19 Mar 42, sub: QM Sup Areas. ORB AGF PAC AG 400 (1942).

[10] (1) AdmO 19, cited n. 9(2). (2) Memo, QM for CofS HHD, 7 Jan 42. ORB AGF PAC AG 463.7 (Jun 29–Apr 42) (Gasoline).

[11] (1) HHD GO 92, 26 May 42, sub: Establishment of Kauai and Maui QM Depots. (2) HHD GO 129, Sec. II, 3 Aug 42, sub: Establishment of Hilo QM Depot. ORB AG GO.

[12] Rpt, IG Hq HSAC, 24 Sep 42, sub: The Ration. ORB AGF AG 430.2.

most important matter handled by the ODQM during the first six months of the war. For decades the Territory had pursued a specialized tropical economy that restricted agricultural production almost entirely to sugar and pineapples, the commodities with highest cash returns. Temperate-zone products, the chief elements in the diet of the European and American segment of population; rice, the staple food of the Orientals; and feeds and forage for poultry and livestock—these were all grown in small quantities that failed by a wide margin to meet Hawaiian needs.

The islands, as a whole, imported more than half their fresh fruits and vegetables, poultry, feeds, and cereals, a quarter of their meat, and a third of their dairy products. More than 90 percent of the rice, white potatoes, and canned vegetables, and 100 percent of the flour consumed in the islands came from the United States and other outside sources. Oahu, location of 60 percent of the Hawaiian population, heart of the powerful system of naval and military bases maintained by the United States, and the prime target of any foe attacking the islands, produced only about 20 percent of its food and depended more on imports than did the other islands.[13] Sugar and pineapples were the only commodities the peacetime Army obtained wholly from local production. Hawaii also furnished fairly large quantites of coffee and fish and small quantities of fresh fruits and vegetables, milk, and meat. But the total value of imports from the United States was usually about six times that of food obtained from Hawaii.[14]

[13] (1) DSCS Information Summary 1, 20 Mar 36, sub: Source of Food, HD. ORB AGF PAC AG 381. (2) *Agricultural Outlook*, VI (July 1941), 3–11.

[14] (1) Joint Defense Plan, HT, Estimate of the Situation, HD, 1937, pp. 27–33. (2) Hawaiian Defense Project, Revision 1939, QM Annex, p. 2. ORB AGF PAC AG Defense Plans.

The development of diversified agriculture was handicapped in many ways. Since the turn of the century production of temperate-zone fruits and vegetables had been declining. Farmers were unable to make a profit commensurate with the time and labor expended, for cultivation of these commodities required costly fertilizers and yielded smaller harvests than on the mainland. As large-scale, industrialized farming became more prevalent on the U.S. West Coast, Hawaiian producers were less and less able to compete successfully. The average grower of fruits and vegetables, usually Japanese, owned only about four acres and had an annual income of only about $500. Unable to afford machinery, he was forced to use uneconomic hand methods. He was further hampered by the fact that the lands most suited to vegetables had passed into the possession of the large sugar and pineapple plantations, so that he was confined in the main to poor soil in regions of excessive rainfall, where his crops were highly susceptible to insect infestation, plant diseases, and vagaries of the weather.[15]

The lopsided nature of Hawaiian agriculture was a condition that the Army could not ignore, for it meant that the entire population, military and civilian, might be starved by a complete or even partial blockade. Though the armed forces under these circumstances for a time might be fed satisfactorily from their reserves, they could not maintain a protracted defense with a starving people at their backs. Humanitarianism, if nothing else, would oblige them to share their stocks with the 420,000 civilians. Com-

[15] (1) Rpt, Ross H. Gast, A Suggested Plan for Sup Prod in Hawaii, 21 Nov 36, incl to ltr, Stanley C. Kennedy, Interisland Steam Navigation Co, to Maj Gen Hugh A. Drum, 27 Nov 36. (2) Ltr, Gen Drum to Stanley C. Kennedy, 1 Dec 36. Both in ORB AGF PAC AG 403.

manding generals of the Hawaiian Department had therefore increasingly stressed the development of an emergency food program for application in a military crisis involving Hawaii.

When the Department Service Command Section was established at Headquarters, Hawaiian Department (HHD), in August 1935, with the responsibility of planning for civil mobilization in time of war, it was especially charged with the study of the food problem in the islands as a whole and on Oahu in particular.[16] The Service Command collected facts pertinent to the production, conservation, and storage of food and conducted experiments showing that sweet potatoes, string beans, lima beans, Chinese cabbage, and peanuts could be grown satisfactorily. It determined that in a war crisis 25,000 acres constituted the minimum amount of land needed to make Oahu self-sufficient in food.[17] Even the availability of this acreage for cultivation, it warned, would not insure an adequate supply of provisions, for the islands ordinarily had on hand only small food stocks and several months would elapse before the emergency crops matured. This phase of the problem, the Service Command concluded, could best be handled by the creation of a large subsistence reserve. But this solution required more storage space than was possessed by either the armed forces or the civilian economy. Cold-storage warehouses were particularly scarce, for the peacetime practice of sending perishable commodities direct from incoming ships to retail shops largely eliminated the need for such structures. Even the Army had no space of its own, relying almost wholly on the limited amount available commercially.[18]

As relations with Japan deteriorated in 1940 and 1941, the Service Command focused increasing attention on acquiring land and storage space in the event of war. Since land and the labor to till it would have to come from the domain of King Cane and Queen Pineapple, the Service Command encouraged planters to develop emergency programs based on its conception of future needs. Late in 1940 the Hawaiian Sugar Planters' Association, which often exercised a decisive voice in Territorial affairs, started intensive work on such a program. It enlisted the co-operation of the pineapple growers as well as the Army and in October 1941 completed a plan that provided for the restriction of emergency crops in Oahu to four specified plantations, which, since the coastal areas might well be in a combat zone, were all located in the middle of the island. The plan also indicated the tentative acreage and the crops allotted to each plantation.[19]

To speed creation of food reserves was another matter of immediate interest to the Service Command. Speaking at an Army Day celebration on 6 April 1941, Lt. Gen. Walter C. Short, Commanding General, Hawaiian Department, warned the Hawaiian people of the dangerous status of their food supply and recommended that women buy canned products for storage in their pantries. The press publicized this suggestion, the public responded, and retail sales of food rose about 20 percent during the following month. Notwithstanding that buying subsequently declined, the possible necessity of large-scale home storage had

[16] (1) HHD GO 9, 13 Jul 35, sub: HD SvC. (2) Supp to HHD GO 2, 1935, 2 Mar 36. ORB AGF PAC AG GO.

[17] JC Pearl Harbor *Hearings*, Pt. 19, pp. 3107, 3363.

[18] Ltr, CG HD to Oahu Ice and Cold Storage Co, 31 Jul 41. ORB AGF PAC 430.

[19] JC Pearl Harbor *Hearings*, Pt. 18, Exhibit 153.

been firmly implanted in the public mind.[20]

General Short gave strong support to the Territorial Committee on Food Storage, which was trying to create a central reserve for the civilian population.[21] In the spring of 1941 this committee asked the Office for Emergency Management in Washington to buy two million dollars' worth of rice, flour, canned milk, fats, and oil, the essential commodities imported in the largest volume, but its request was rejected because there were not enough warehouses in Oahu to store such sizable purchases. In September the Bureau of the Budget disapproved a proposed federal appropriation that provided for the construction or lease of warehouses and the stocking of feed for poultry and livestock and of food for human beings.[22] Efforts to secure funds for the purchase and storage of seeds likewise failed. Despite the fact the U.S. Senate in May 1940 passed a bill providing for such purchases and for the construction of warehouses to store them, Congress never took any further action.[23]

During 1941 the Hawaiian Department utilized its procuring authority to give "infant industry protection" to the cultivation of potatoes. Hawaiian potatoes cost almost 40 percent more than the mainland variety but on General Short's request The Quartermaster General approved their purchase. Short justified the payment of the higher price as a defense measure that would help make Hawaii self-sufficient. Even this price, he claimed, barely enabled the sugar planters, who raised most of the potatoes, to avoid monetary loss.[24]

The Office of Food Control

Despite extensive planning, civilian food reserves on the day of Pearl Harbor were little larger than if there had been no plans at all. Limited production of a few vegetables had been stimulated, and some subsistence had been stored in housewives' pantries. But on Oahu an island-wide inventory on 9 December showed only a meager 37-day food supply for the 255,000 civilians. Stocks of rice and potatoes would last for only fifteen days. There were, it is true, approximately 113,000 cattle, equivalent to a 152-day supply, but wholesale slaughter was undesirable because it would leave the island without means of replenishing the herds.[25] The expansion of civilian reserves was complicated by the priority given the accumulation of a 70-day supply for 150,000 soldiers and by the withdrawal of the largest freighters from the Hawaiian run to supply the forces in Australia and the South Pacific.[26] Since civilian food would be scarce for at least some months, General Short, as Military Governor of the Territory, a position that he assumed on the proclamation of martial law on 7 December, created the Office of Food Control (OFC) to supervise the production, storage, price, and distribution of foods, feeds, forage, and seeds. Only naval stocks were exempt from OFC supervision.[27]

Just before he was relieved from the command of the Hawaiian Department in mid-December, Short also appointed an Ad-

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[20] *Ibid,* Exhibit 133.

[21] (1) JC Pearl Harbor *Hearings,* p. 3366. (2) Mid-Pac Hist, Pt. VII, p. 1264.

[22] JC Pearl Harbor *Hearings,* Exhibit 133.

[23] (1) S. Rpt 1694, 76th Cong., 3d Sess., *Seed Supply for Production of Food for Hawaii.* (2) *Congressional Record,* Vol. 86, Pt. 7, pp. 7099–7100.

[24] Ltr, CG HD to TAG, 4 Apr 41, sub: Authority to Buy Irish Potatoes. ORB AGF PAC AG 430.

[25] JC Pearl Harbor *Hearings,* Pt. 18, p. 3115.

[26] Mid-Pac Hist, pp. 1336, 1358.

[27] QM Mid-Pac Hist, pp. 33–38.

ministrator of Crop Production, who named four co-ordinators, one for each of the main islands—Oahu, Hawaii, Kauai, and Maui.[28] These appointments were all made with a view to the possible implementation of the plan for emergency vegetable production. When Lt. Gen. Delos C. Emmons succeeded Short, he decided that sugar and pineapple land would not be used for the cultivation of vegetables. He based his decision mainly upon faith in the continued even if limited availability of shipping and upon the build-up, already under way, of civilian reserves. He was influenced, too, by the possibility of converting sugar into motor fuel in Hawaii in case of need.[29]

The burden of insuring an adequate food supply for civilians thus fell upon the newly established OFC. During December and January Colonel White acted as chief technical adviser to this office. In addition he was charged specifically with the determination of civilian requirements and the preparation of a civilian rationing program.[30] Though under martial law the OFC had unlimited authority over the distribution of food, it at first used this power sparingly. But it was deeply interested in the creation of an ample reserve. A few days after Pearl Harbor President Roosevelt allocated $10,000,000 from his emergency funds for such a reserve, and late in the month Congress approved the establishment of a $35,000,000 revolving fund. The reserve was to consist of a six-month supply of nonperishables and a thirty-day supply of perishables. The Federal Surplus Commodities Corporation (FSCC) acted as buying agent and, by mid-December, had already begun to assemble stocks for movement to Hawaii. The OFC advised the FSCC concerning shipping priorities and arranged for storage of the reserve.[31]

On 26 January 1942 Colonel White became Director of OFC with full responsibility for the procurement and distribution of both Army and civilian subsistence stocks. Up to this time the OFC had set up neither a rationing nor a price control system. But the steadily growing cost of food confronted White with a thorny problem that could no longer be ignored. Prices had begun to rise with the buying panic of 9 December and in Honolulu by late January had increased by 10 to 40 percent. Rice was one of several staples that showed disturbingly large advances. Early efforts to check profiteering had stipulated simply that retailers publicly display lists of their prices. The day after White became Director, OFC termed this system a failure and fixed top retail charges for rice, potatoes, fish, and cheese sold on Oahu. Shortly afterwards it began to publish in the Honolulu newspapers notices of permissible prices for a steadily lengthening list of foods. As OFC had no police staff, enforcement of the published charges hinged almost entirely upon the voluntary co-operation of merchants and the willingness of buyers to report violations.[32]

Meanwhile inflationary forces were daily becoming more powerful on Oahu. As reefers departed from the West Coast of the United States only at irregular intervals, perishable commodities were alternately

[28] *Honolulu Advertiser,* December 17, 1941, p. 1.
[29] *Ibid.*, January 9, 1942, p. 7; March 19, 1942, p. 2.
[30] *Ibid.*, January 28, 1942, p. 6; January 29, 1942, p. 3.
[31] (1) Office of Price Administration in Region IX, Activities of the U.S. Office of Price Administration in the Territory of Hawaii (Honolulu, 1944). In Library of Congress. (2) *Honolulu Advertiser,* January 29, 1942, pp. 2, 9; February 18, 1942, p. 10.
[32] *Honolulu Advertiser,* January 28, 1942, p. 1.

plentiful and scarce. To eliminate these oscillations, Colonel White set up shipping priorities, but shortages and surpluses continued to prevail. Actually, Oahu suffered less from such fluctuations than did the outlying islands that relied on very infrequent sailings from Honolulu for the bulk of their fresh food. Apart from the recurrent shortages of fruit and vegetables, forces pushing prices upward were strongest on Oahu. Labor had been scarce in the Honolulu area, and the influx of highly paid workers that started a year before Pearl Harbor was now accelerated by the vastly expanded Army and Navy building program. Moreover, since wages were not frozen, they rose constantly as the armed forces used every feasible incentive to obtain more and more workers from the other islands and from the mainland. The bulging bankrolls of these workers plus those of the tens of thousands of soldiers and sailors swarming into the island exerted a powerful inflationary pressure that made impossible the strict enforcement of maximum retail prices.[33]

By mid-February some retailers were already asking more than permitted maxima. In justification of their action they pointed out that, though they were forbidden to ask more than ceiling prices, wholesalers were not regulated at all and increased their charges at will regardless of the effect on retail costs.[34] To curb continued profiteering, the OFC promulgated a new regulation on 21 February that for the first time put teeth into its orders by making violators liable to suspension or revocation of their licenses, a $1,000 fine or one year in prison.[35] In mid-March, the soaring prices of fresh fruits and vegetables, currently in short supply, caused Colonel White to establish wholesale as well as retail ceilings for many perishable commodities. To some extent at least he thus met retailers' demands for the control of wholesale charges.[36]

Price regulation alone, no matter how fair, was a mere expedient. The best method of dealing with the recurrent scarcities was to increase the supply. Of this fact Colonel White was well aware. Insofar as the problem resulted from the shortage of reefers, he could do little except point out the deficiency. But insofar as it sprang from restricted cold-storage space on Oahu, he could take action since he was Co-ordinator of Cold Storage as well as Director of Food Control.[37] As co-ordinator, he took over commercial ice plants and refrigerated warehouses and administered them, along with Army space, as a unit. He regulated the importation of perishables in line with the availability of refrigerated space, and classified and stored fresh foods according to priorities that gave the highest ratings to meat and other products that spoil easily, and the lowest rating to potatoes, onions, and other commodities less subject to rapid deterioration. In order to end nonessential use of space, he stopped completely the storage of beer, syrup, and dried fish and forbade all speculative and long-term storage. Since the enforcement of these regulations freed more and more space for essential items, importation of fresh food was increased.[38]

While perishable commodities became available in increasing quantities, the civilian supply fluctuated considerably and never quite equaled the prewar average. This development was attributable to sev-

[33] OPA, OPA in Hawaii, pp. 3, 6–7, 14–17.
[34] *Honolulu Advertiser,* January 30, 1942, p. 1; February 8, 1942, p. 1; February 16, 1942, p. 1.
[35] *Ibid.,* February 21, 1942, p. 2; February 22, 1942, p. 17.
[36] *Ibid.,* March 20, 1942, p. 1.
[37] *Ibid.,* December 28, 1941, p. 10.
[38] QM Mid-Pac Hist, pp. 35–36.

eral factors. One, as already pointed out, was the absence of a large cold-storage building program. Another was the higher priority given to the stockage and withdrawal of Army supplies. A third, and the most important of all, was the steady growth of military cold-storage requirements as the number of troops in the archipelago and other mid-Pacific islands multiplied. The shortage of perishables in Hawaii would have been alleviated had it been possible to increase interisland shipping and make public announcement of anticipated arrivals at and departures from the ports of outlying islands that at certain seasons had a surplus of some meats and vegetables. But the prior claims of other Pacific areas and the shortage of reefers made the allocation of enough vessels impossible, and sailing schedules could not be publicized because this information might be conveyed to the enemy.[39] Because adequate cold-storage resources were lacking on the islands, the limited number of ships meant that substantial quantities of exportable surplus spoiled; the unavailability of sailing schedules meant that insufficient time was afforded farmers to prepare commodities for shipment after a Honolulu-bound vessel was known to be in port.[40]

Despite sporadic shortages of meat, butter, and fresh fruits and vegetables, Hawaii did not suffer from lack of food, for nonperishable provisions were always supplied in ample quantities. By mid-February 1942, in fact, a six-month supply of many commodities was already on hand.[41] Reserves continued to grow, and by the end of the year danger of a grave scarcity had passed. As the stock of a food item approached or exceeded a six-month supply, part of it was distributed through wholesalers and replaced by purchases from the mainland. A six-month supply was thus constantly in storage.[42]

After fear of a critical food shortage began to wane in the spring of 1942, the OFC became more and more an agency whose main function was price regulation, a responsibility that involved the enforcement, by military officers, of military regulations applicable to civilians. General Emmons felt that such authority was contrary to democratic concepts of the proper relationship between the Army and the civil population. It should, he thought, be reduced to a minimum, particularly since the Territorial press and Hawaiian merchants were already asking for less military control. Quite apart from these considerations, the Governor believed that sound administration demanded that officers devote their attention to military rather than civil affairs. Aware that more rather than less price regulation was probably inescapable under existing conditions, the Governor nonetheless hoped that it could be carried out under civilian supervision.[43]

His first step toward achieving this objective was taken in late May, when, at his request, the Office of Price Administration (OPA) sent several representatives from the United States to set up an essentially civilian Price Control Section in the Office of the Military Governor. For the time being, however, the regulation of food prices remained a function of the OFC.[44] In October this responsibility was shifted to the

[39] Routing Slip, CG HSOS to P&TD HD, 25 Nov 42, sub: Freight Trans from Outer Islands. ORB AGF PAC AG 080 (Hawaiian Shipping Co).

[40] *Honolulu Advertiser*, January 20, 1942, p. 1; January 22, 1942, p. 1; March 20, 1942, p. 12.

[41] *Ibid.*, February 18, 1942, p. 10.

[42] Ltr, CofT to CG SFPE, 14 Aug 43, sub: Hawaiian Foodstuff Sup Level. ASF File, AGO.

[43] OPA, OPA in Hawaii, pp. 21–22.

[44] (1) Rad, CG HD to CG SOS, 16 May 42. (2) Memo, MG TH for all Secs, 2 Jun 42. ORB AGF PAC AG 104.12.

Price Control Section. When this action was followed in March 1943 by the transfer of control over foods, feeds, and agricultural seeds to the Director of Civilian Defense, the role of the Hawaiian Department Quartermaster in civilian food supply was terminated.[45]

The OFC never attained the importance it would have had if Hawaii had been blockaded by sea, but it nonetheless performed an essential task. Its operations, involving a far-reaching responsibility for the food supply of a friendly population that was virtually without precedent in Army history, showed that under comparable circumstances in the future it would be necessary to anticipate such problems as rationing and price control. Prewar planners had been so absorbed with schemes for shifting the basis of agricultural production from sugar and pineapples to fruits and vegetables that these matters had received little attention. In view of the difficulty of interisland communication, strategic planners should perhaps also have given more study to the food problems of the outlying islands.

Reaction to Japanese Victories, December 1941–May 1942

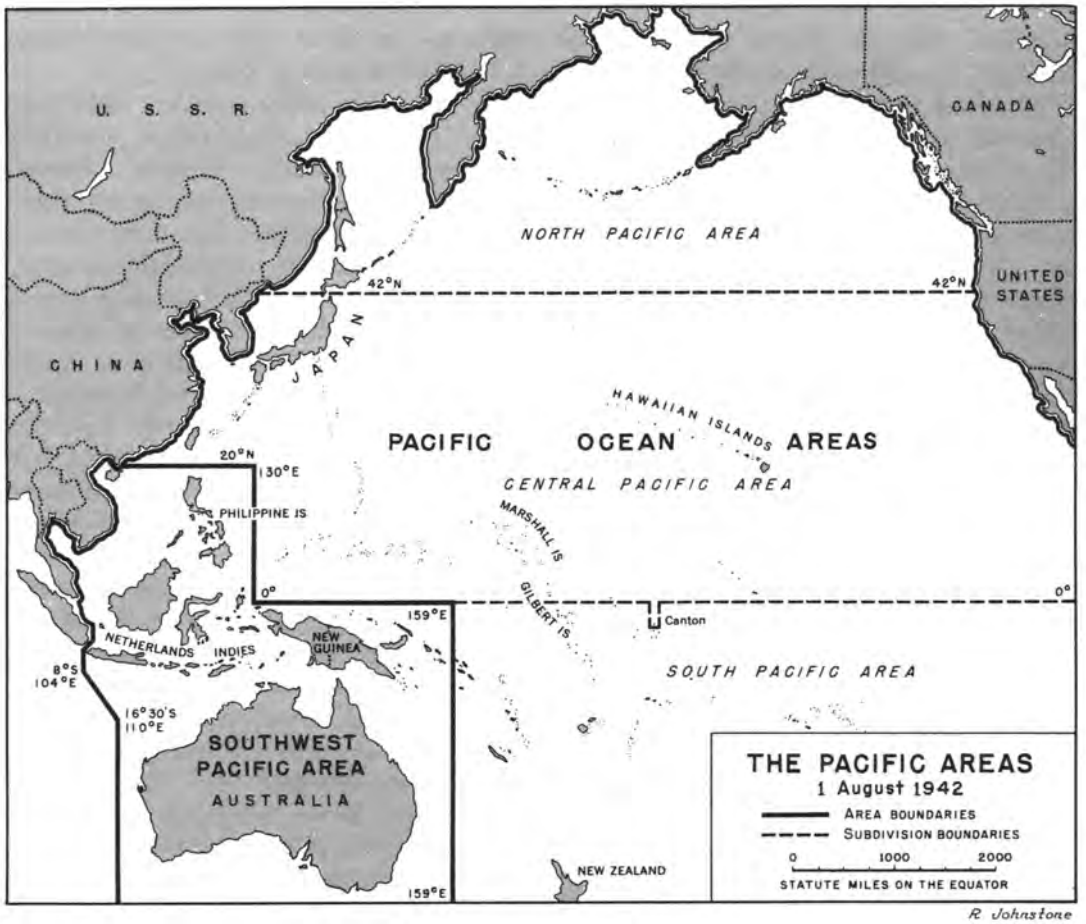
While the U.S. Army was strengthening its position in the great mid-Pacific outpost of Hawaii and making its brave but futile stand in the Philippines, the Japanese were fast transforming their grandiose scheme for a Nipponese-dominated "Greater East Asia" into a reality. At the time of Pearl Harbor they held in China the rich northeastern provinces, the large coastal cities, and the fertile Yangtse Valley. In the next six months they added to these conquests southeast Asia, Java, Sumatra, the American bases at Wake Island and Guam, the strategically located Australian outpost of Rabaul in New Britain, and numerous small islands in the south and central Pacific that could serve as bases for the defense of their acquisitions and as springboards for further advances.

To halt the southward thrust of the Japanese the Allies had to create a safe supply line from the United States to Australia and New Zealand, the only important sources of supply below the equator. Such a line, in turn, required the establishment of bases on the larger and more strategically located island groups that studded the central Pacific from Hawaii south to the British dominions. In the opening months of 1942, therefore, American ground and air forces, often in conjunction with Allied troops, occupied and transformed New Caledonia, the Fijis, Samoa, and other islands into air and supply bases. In Australia and New Zealand they formed the nuclei of organizations intended to develop these countries into major centers of logistical support for offensive operations aimed at driving the Nipponese from their recent conquests.

Organization of Areas in the Pacific Theater

The wide geographical sweep of the war against Japan created so many tactical, administrative, and logistical problems that two major territorial commands, the Southwest Pacific Area and the Pacific Ocean Areas, were established to handle them. The Southwest Pacific Area (SWPA) embraced Australia, New Guinea, the Philippines, the Netherlands Indies except Sumatra, the South China Sea, and the Gulf of Siam, all of which were essential steppingstones on the southern road to Tokyo and all of which, except Australia and southern New

[45] *Honolulu Advertiser,* March 10, 1943, p. 5.



MAP 1

Guinea, early fell into Japanese hands. The post of Supreme Commander, Southwest Pacific Area (CINCSWPA), was given to General MacArthur. The geographically vaster Pacific Ocean Areas (POA) included most of the Pacific. (*Map 1*) It embraced three subordinate areas—the South, Central, and North Pacific Areas. The South Pacific Area (SPA) extended below the equator, east of the Southwest Pacific Area and west of longitude 110° west, and comprised New Zealand, New Caledonia, and the Samoa, Fiji, Tonga, and New Hebrides Islands—roughly Polynesia with the important exception of Hawaii. The Central Pacific Area (CPA), stretching from the equator to latitude 42° north, included the Gilberts, Marshalls, Carolines, and Marianas in addition to Hawaii and most of the Japanese home islands. The North Pacific Area (NPA) covered the whole Pacific above latitude 42° north. Admiral Chester W. Nimitz, Commander in Chief, U.S. Pacific Fleet (CINCPAC), served as Commander in Chief of the Allied Forces in the Pacific Ocean Areas (CINCPOA). He commanded the Central and North Pacific Areas directly from his Pearl Harbor head-

quarters and the South Pacific Area through a subordinate. Both Admiral Nimitz and General MacArthur were responsible to the Joint Chiefs of Staff in Washington.[46]

Similar defensive and offensive missions were assigned to the Southwest Pacific Area and the Pacific Ocean Areas. Both commands were to hold those islands that were essential to sea and air communication with the United States, to the defense of North America, and to the launching of operations against the Japanese by sea, air, and land. They were both to prepare and conduct amphibious offensives. In these areas, as in all overseas theaters, the primary mission of the QMC was to support combat operations by furnishing the supplies and services for which it was responsible.

Quartermaster Problems in Australia and New Zealand

In carrying out its mission in the Southwest Pacific Area, the QMC, like other technical services, used Australia as its first great supply base. On that continent from the beginning of 1942 to the close of 1943 were concentrated a major part of the supply activities of the command. Though New Guinea became the chief base in 1944 and was replaced in turn by the Philippines at the beginning of 1945, the southern continent remained to the very end a substantial supplier and distributor of essential military items. To the QMC in particular Australia was important, for the Corps procured a larger proportion of its supplies in that country than did any other technical service. It indeed used that dominion as a zone of interior for the Southwest Pacific in much the same fashion as it did the United States for overseas theaters in general.[47]

At the outset many problems had to be solved before Australian supply potentialities could be utilized effectively. Internal distribution was impeded by long distances, inadequate railways and highways, and the shortage of coasters. Australian industry, moreover, was not highly developed. Many manufactured items were either not procurable at all or procurable only after industrial plants had been converted to the production of new articles. Primarily, Australia was an agricultural and a grazing land, but even in the procurement of food there were bothersome problems. Meat and grain products, and fruits and vegetables, while obtainable in considerable quantities, were not always obtainable in the quantity and the variety needed by the U.S. Army.[48] Vegetable production was conducted almost entirely on small, insufficiently mechanized truck farms and was concentrated near the populous southeastern cities, far from the areas where many American troops were first stationed and even farther from New Guinea. Fruit and vegetable canning and dehydration, essential to the feeding of large field forces, were both in a rudimentary stage of development.

The widespread shortage of manpower hampered efforts to increase production. Of the 7,000,000 people living in Australia, approximately 2,300,000 were in civilian occupations and 1,000,000 were in the armed services. The extent of the shortage of labor

[46] John Miller, jr., *Guadalcanal: The First Offensive,* UNITED STATES ARMY IN WORLD WAR II (Washington, 1949), pp. 2–3.

[47] Rpt, Brig Gen Hugh B. Hester, 20 Jul 45, sub: Proc in Australia (hereafter cited as the Hester Report), 1942–30 Jun 45, Apps. OQMG SWPA 319.1.

[48] (1) Rpt, Lt Col Lea B. Reed, IGD, 19 Jul 42, sub: Fresh Fruits and Vegetables in Base Secs 1, 2, and 3. ORB AFWESPAC QM 333.1. (2) E. Ronald Walker, *The Australian Economy in War and Reconstruction* (New York: Oxford University Press, 1947), pp. 209–10.

for new or expanding war industries is indicated by the fact that at the close of 1942, roughly 85 percent of the men, 26 percent of the women, and 30 percent of the farm population were either enlisted in the armed services or already engaged in war industries. Available labor consisted almost wholly of men over military age, of the physically handicapped, and of women. Farmers and manufacturers alike had trouble in securing workers. As industry and agriculture expanded, some labor was redistributed in line with shifting wartime needs, and certain types of artisans were released from the Australian armed services. But labor nonetheless remained scarce.[49]

Transportation, which also presented knotty problems, continued during the first four months of the war to be a responsibility of the QMC. That service alone was charged with the movement of troops, supplies, and equipment by land and by sea. In early March the War Department transferred this responsibility to a Transportation Division in Headquarters, Services of Supply, in Washington, and in mid-April USAFIA General Order No. 40 implemented this decision in the Southwest Pacific Area by shifting transportation functions in that command to a new agency, the Transportation Service.[50] But until this directive was issued, and at a few bases and in some military organizations for weeks and even months afterwards, Quartermaster officers carried out regular transportation functions.[51]

During its period of exclusive responsibility for transportation activities, the QMC busied itself with plans for the military utilization of the Australian railway system. That system was in general incapable of swift distribution of supplies. It had originally been built and developed by the six Australian states to serve state rather than national needs. This fact accounted for the system's most serious shortcoming—five different gauges. These varying gauges made long-distance shipments impossible without unloading and reloading, occasionally three or four times. Traffic repeatedly became congested; in one instance nearly 20,000 tons of freight were stalled on sidings between Newcastle and Brisbane. Delays were caused also by the lack of motor vehicles for moving accumulated traffic, by the shortage of cranes and other materials-handling equipment, and by the difficulty of obtaining workers for prompt handling of freight by manual means. The delivery of fresh provisions in good condition was particularly difficult, for Australia had developed no national system of distributing perishables and had few refrigerator cars. Fresh produce in consequence deteriorated rapidly.[52]

[49] (1) Walker, *Australian Economy,* pp. 68–70, 74–77, 114, 283–320. (2) Mtg, Allied Sup Council, 15 Jun 43. ORB AFPAC Allied Sup Council.

[50] (1) WD Cir 59, 2 Mar 42, sub: WD Reorganizations. (2) USAFIA GO 40, 15 Apr 42, sub: Trans Svc USAFIA. (3) USASOS Regulation 20-60, 14 Sep 42, sub: Trans of Sups. The QMC retained responsibility for the organization and training of military truck drivers until after the close of the war. There were many Quartermaster truck companies, but whether these units operated under the direction of the QMC or of the Transportation Corps, which emerged in July 1942, was in practice a matter for theater and even organization decision.

[51] The Quartermaster, Sixth Army, handled all transportation activities except shipping movements until 1 August 1944, when the Transportation Section, Sixth Army, was activated. He co-ordinated loading and discharging operations involving Sixth Army shipping and supervised all motor transport activities. The G–3 Section worked out shipping requirements for each operation and requested the needed ships from General Headquarters, Southwest Pacific Area. Brig Gen Charles R. Lehner, History of the Quartermaster Section, Sixth Army, p. 9.

[52] (1) Rpt, Capt Frank A. Vanderlip, Jr., n. d., sub: Trip to Darwin, 28 Mar–8 Apr 42. ORB AFWESPAC QM 333.1. (2) Ltr, Dir of Proc to CG USASOS, 30 Sep 44, sub: Proc of Subs. ORB AFWESPAC QM 430.

Apart from the absence of a single country-wide gauge, the railway system had other weaknesses. Grading was poor; there were not enough sidings, yards, workshops, or water supply points; and signaling was done mostly by hand. Rolling stock was designed to carry loads far below the American standard. Boxcars carried only from about 8 to 15 tons. Australian trains hauled only about 500 tons, as compared with the 4,000 or more tons sometimes handled in the United States, and had an average speed of 15 to 18 miles an hour. The lack of a reserve pool of serviceable locomotives and freight cars further retarded movements.[53] Finally, there were not enough lines to serve all militarily important areas. Northern Australia, strategically significant early in 1942 as the probable initial objective of any attempted invasion, had but a single railroad, running south 300 miles from Darwin to Birdum, with a gap of 650 miles between it and the terminus of the central system starting at Port Augusta on the south coast. Darwin was thus almost isolated from the rest of the country.[54]

So limited was the carrying capacity of the rail system that it could not deliver promptly all the supplies required by military installations. In April 1942 the main line of the Queensland system, running along the east coast from Brisbane to Cairns, had a daily capacity of only 1,000 tons and required twenty days to move a single division of 15,000 men and their supplies. The maximum capacity of the Trans-Australian Railway, connecting Melbourne and Perth, was a mere 400 tons a day. Only in Victoria and New South Wales, the heart of industrial Australia, did freight-hauling capacity approach military requirements. Here two lines, capable of carrying 5,200 tons a day, ran north to Brisbane, but they could not be devoted exclusively to military transportation for more than a few days at a time without crippling the economic life of this rich region upon which the armed services depended for coal, steel, munitions, textiles, and food.[55]

Motor roads, though compensating in part for railway shortcomings, were neither good enough nor well enough distributed to handle military traffic satisfactorily. Only in heavily populated southern and southeastern Australia, where railways were most efficient and improved highways least needed, could roads carry a dense traffic. Elsewhere they were mostly of a dirt type that swiftly disintegrated under the heavy loads that had to be hauled to American troops stationed at long distances—often several hundred miles—from railways.[56] The shortage of suitable trucks further hampered motor transport.

In line with its original mission, the QMC at the outset had responsibility for the procurement, distribution, and maintenance of motor vehicles and their parts and retained these functions until 1 August 1942, when they were shifted to the Chief Ordnance Officer.[57] At first the Corps could obtain few vehicles from the United States and could not use many Australian trucks, for they were in general small, few in number,

[53] Rpt, Vanderlip, cited n. 52 (1).

[54] Mtg, Allied Sup Council, 13 Jul 42. ORB AFPAC Allied Sup Council.

[55] Rpt, n. s., 17 Jul 42, sub: Australian Reserves, App. to Mtg, Allied Sup Council, 13 Jul 42. ORB AFPAC Sup Council.

[56] Lecture, Lt Col George Sutton, Australian Mil Mission, 23 Aug 42, sub: Australian Conditions. OQMG SWPA 319.25 (Misc Data).

[57] (1) WD Cir 245, 24 Jul 42, sub: Transfer of MT Activities. (2) Erna Risch, *The Quartermaster Corps: Organization, Supply, and Services*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1953), Vol. I, pp. 19–22.

and usually more than five years old. Most of these trucks, moreover, had power on only one axle, making it impossible to use them in rough country where American two- and three-axle-drive trucks could move easily. Throughout 1942, however, the U.S. forces were obliged to depend to a considerable extent on locally produced vehicles.[58]

During this period the Corps had practically no means of storing motor vehicles and their parts or of assembling the vehicles that arrived from the United States unassembled or only partly assembled. Nor did it have more than a few trained men capable of repairing trucks. It therefore negotiated contracts with the Australian branches of the American automobile companies for the performance of these essential tasks in the main cities of that country. An interesting feature of these arrangements was the handling of the problem of motor parts. Since these items were then very scarce, the QMC set up parts depots in conjunction with General Motors at Melbourne, Chrysler at Sydney, and Ford at Brisbane. Before these depots were established, it had often been necessary to dump parts in vacant lots at the port cities where, obviously, they could not be properly handled. Once the parts were concentrated in the new depots, they were classified and stored by item and forwarded to requisitioning units. In an effort to provide the means of quickly repairing broken-down vehicles at remote points, even commercial airlines were utilized to speed the delivery of the necessary spare parts. Generally speaking, the three parts depots pointed the way to a solution of the spare parts problem—a problem that throughout the war plagued all technical services issuing mechanical equipment.[59]

Because of the inadequacies of rail and highway transportation, the Army resorted to water transportation as much as possible. Only at the very outset, when sea lanes were still unsafe, did it ship most of its supplies by land.[60] Generally speaking, the eastern ports, despite the shortage of coasters, formed the main supply centers until the northward drive of the Allied forces gave them fairly satisfactory bases in New Guinea and the Philippines. The loading, discharge, and storage of cargoes at Australian ports became a hectic process early in the war because of the shortage of cranes, tractors, trailers, fork-lift trucks, and other materials-handling equipment, and the reluctance of the Commonwealth to relax long-established regulations governing the hours, wages, and employment of port laborers who clung to peacetime practices that slowed supply operations. Many of these laborers refused to work in the rain or handle refrigerated food and many other types of cargo. They objected, with some success, to the utilization of mechanical equipment. At times strikes obliged the Army to use service and even combat troops for discharging ships, a measure that stirred the resentment of the stevedoring companies and the longshoremen. Even if troops were not so employed, they sometimes had to be held in reserve for use if it rained during the loading or discharge of badly needed cargo.

The speed and efficiency of handling operations also suffered from the large pro-

[58] Masterson, Transportation in SWPA, pp. 688, 691.

[59] (1) QM SWPA History, I, 18–21. (2) USAFIA Memo 160, 14 Jul 42, sub: Distr of Motor Vehicles.

[60] Personal Ltr, Col Ross G. Hoyt, to Maj George M. Dietz, 7 Jan 42. DRB AGO Opns Rpts, Material Relating to USAFIA History.



STORAGE FACILITIES IN AUSTRALIA *were at a premium, and buildings such as the small warehouse (shown above) were utilized until temporary "igloo" type warehouses (below) could be constructed.*



portion of old and physically unfit men among port laborers and from the high rate of absenteeism, which averaged as much as 18 percent at Townsville. Since double and triple rates of pay were given for week-end work, some longshoremen put in an appearance only on Saturdays and Sundays. So common did this practice become that the Commonwealth, with the concurrence of the U.S. Army, finally stopped all week-end dock operations. Longshoremen, as a group, it was estimated, handled only 6 to 10 tons per gang per hour in early 1943 in contrast to the 18 to 25 tons handled by gangs of American soldiers. In the following two years the dock workers' average declined by about a third.[61] The Quartermaster Corps was concerned with these unfavorable port conditions not only because it had for a time direct responsibility for water transportation but also because its ability to maintain adequate stocks and to distribute supplies and equipment promptly and equitably, like that of other technical services, depended to a considerable degree upon speedy handling of cargoes.

Like transportation operations, storage operations had many adverse conditions to contend with. When U.S. forces first arrived, private storage space was almost completely filled. Wool warehouses were almost the only type of commercial storage available for lease, and they were available only until the new wool season opened in August and September. In the port cities the Australian Army had taken over most of the storage places not needed for mercantile purposes. In the interior, especially at change-of-gauge points, space was even scarcer. From the outset, therefore, the problem of future storage for ever increasing military stocks had to be faced. Finally, in 1943 an extensive building program was undertaken to meet American storage requirements, and a substantial number of temporary structures were built.[62] Storage operations were much less mechanized than those in the United States, and modern materials-handling equipment was slow in arriving from the zone of interior. Quartermaster warehousing, though better than elsewhere in the Southwest Pacific Area, never attained as high a degree of efficiency as it did at home.[63]

In Australia the U.S. Army had to adjust its operations to a new political as well as a new economic scene. While the Commonwealth Government was eager to help supply the American forces, it quite naturally gave prior consideration to its own armed services and its own citizens. As a member state of the British Commonwealth of Nations, it exported substantial quantities of supplies to the United Kingdom. It of course hoped to continue as extensive an export trade as possible. Since all local procurement and much distribution of American supplies had to be carried out through Australian agencies and in conformance with Australian policies, the U.S. Army set up special bodies and procedures to co-ordinate the relations between its own

[61] (1) Masterson, Transportation in SWPA, pp. 497–504. (2) Rpt, Deputy Dir Storage Div ASF, 29 Oct 44, sub: Sup Opns in SWPA. ORB ABCOM AG Supplies.

[62] (1) Memo, CQM for EngrO USASOS, 17 Apr 42. ORB AFWESPAC QM 633. (2) Ltr, CG USASOS to CG Base Sec 3, 19 Jun 43, sub: Warehouse Construction. ORB ABCOM P&C 633.

[63] (1) Memo, Gen Svc Div (Warehousing Br) for Chief Gen Svc Br OCQM, 28 Sep 42, sub: Materials-Handling Equip. (2) Ltr, QM USASOS to QM Base Sec 3, 12 Jan 43, sub: Stacking Machines. Both in ORB AFWESPAC QM 451.93.

supply organizations and those of the federal and state governments of Australia.[64]

In spite of the unprecedented problems that it posed, Australia was an invaluable asset to the QMC. For more than two years it furnished well over half the food consumed in the Southwest Pacific Area and a substantial part of that consumed in the South Pacific Area. Until the termination of hostilities it poured out rations for American use and supplied clothing, equipage, and general supplies in liberal quantities. Without Australia, the shortage of ocean-going ships would almost certainly have prolonged the war against Japan.

New Zealand, while a less valuable base than Australia, had a higher proportion of arable land, and relative to area and population, provided more food for the armed services. In New Zealand, as in Australia, there were shortages of labor, warehouses, and agricultural and industrial equipment.[65] Since the smaller dominion consists almost wholly of two long narrow islands, North Island and South Island, each about 500 miles long and seldom more than 120 miles wide, the chief means of assembling local products was by coasters. These vessels were at first scarce, but enough of them eventually were obtained to meet essential military demands. Like Australia, New Zealand proved of inestimable value to the U.S. Army.

Australia and New Zealand not only provided indispensable supplies and equipment. Under the principle of reverse lend-lease they also paid for them. The detailed application of this principle was first worked out in an informal agreement with the American forces in the spring of 1942. At London, several months later, the United States made a formal arrangement covering all British dominions and colonies in the Pacific. Under this arrangement Australia and New Zealand paid not only for locally procured supplies but also for such local services as the repair of shoes and typewriters, the dry cleaning and laundering of clothing, and the provision of water, gas, and electricity. In addition these countries bore the cost of building warehouses and other structures for the U.S. forces and paid the wages of civilians employed by American installations. Eventually, reverse lend-lease was applied also in the French possession of New Caledonia, but, owing to local opposition, not until early 1944. Through the application of this system of local procurement the United States received partial compensation for the millions of dollars that it expended for American products needed by its Pacific allies.[66]

[64] (1) Memo, CG USAFIA for Heads of Gen and Special Staff Secs, 21 Feb 42, sub: Centralized Proc. ORB AFPAC GPA 400.1201. (2) USASOS Regs 25-5, 16 Dec 42, sub: GPA. ORB NUGSEC USASOS Regs.

[65] (1) Rpt, U.S. Sup Mission, 12 May 42, sub: Conf with Controllers. (2) Rpt 165, Mil Attaché, Wellington, 12 Apr 43, sub: Manpower, N. Z. Both in ORB USAFINC AG 319.1.

[66] (1) Report to Congress on Lend-Lease Operations for the Period Ended April 30, 1943, pp. 42–43. (2) Ltr, SPBC to CG USAFPOA, 25 Aug 44. USAFINC AG 334.

CHAPTER III

Mission and Organization in the Pacific

The Quartermaster mission embraced so varied an assortment of supply and service functions that an extensive organization was required to carry it out. In the three principal territorial commands in the Pacific the organization of Quartermaster activities, though it did differ slightly from command to command, everywhere retained a basic similarity. In all these areas there was a central office that supervised the activities of the Corps outside the combat zone. There were also storage and distribution centers and corps, army, and division quartermasters who supervised the operations of their service in these organizations. Everywhere, moreover, specialized Quartermaster troop units helped carry out Quartermaster functions.

Quartermaster Mission

In general the mission of the Corps was to provide the supplies and services required by all troops, regardless of the branch of the Army to which they belonged. In World War II this meant that the Corps fed and clothed the Army; provided items of equipment and general utility, whether for personal or organizational use, which were not so specialized as to lie within the province of another technical service; and carried out the final stage in the distribution of gasoline and other petroleum products—issuance to the ultimate consumers, the troops in the field.

The feeding of troops involved the provision to every soldier of a "ration," defined as the allowance of food for one day for one man. Rations were of two general types: field rations, which were issued to units in contact with normal sources of supply, and emergency rations, specially developed packaged rations for combat units cut off from their usual means of supply. There were two field rations, designated as A and B. The A type, corresponding as nearly as practicable to the regular peacetime ration of soldiers in the United States, contained a wide variety of both perishable and nonperishable foods. In the Pacific, outside heavily populated areas, storage and transportation conditions seldom permitted the use of the fresh fruits, vegetables, and meats that constituted the very heart of the A ration. The B ration, which utilized canned or dehydrated foodstuffs in place of perishables, was of necessity frequently substituted. Front-line fighting troops customarily ate emergency rations, such as C, D, or K, each of which had been

developed for consumption during a particular phase of combat.[1]

The provision of clothing for the Army meant supply not only of the regular service uniform of coat, jacket, trousers, shirt, necktie, cap, and shoes, but also of variations of these garments intended to meet the special conditions of climate and terrain encountered in the Pacific. It meant, too, supply of scores of other articles, such as head nets, gloves, work suits, jungle suits, raincoats, and ponchos, which filled unusual needs. Personal equipment, other than clothing, supplied by the Corps embraced such essential items as field packs, sleeping bags, and intrenching shovels. Organizational equipment included tents, stoves, field bakery equipment, refrigerators, salvage, laundry, and bath equipment, and hundreds of lesser items.[2] The numerous general-utility articles, known collectively as "general supplies," were employed mostly for the Army's housekeeping. They included common yet essential items like stationery, typewriters, furniture and other office equipment, soap, sanitary goods, chinaware, glassware, and mess equipment in general. The Corps also furnished cigarettes, toilet articles, candy, and scores of other things sold in post exchanges (PX's).[3] Quartermaster responsibility for the distribution of petroleum products began at the pipeline termini or other bulk facilities constructed by the Engineers for the reception of these products. At these facilities—sometimes even at shipside—the QMC received gasoline and other fuels and transported them, often in 55-gallon drums or 5-gallon cans, to distributing points for issue by Quartermaster gasoline supply units.[4]

Quartermaster items were divided into four classes. Class I comprised those that were consumed at an approximately equal daily rate. Food and forage were the principal supplies in this category. In ordinary overseas language "Class I" was the term applied to rations. Class II included clothing, equipment, and other items for which the precise quantity of initial issue was set in Tables of Organization and Equipment or other War Department authorizations. Class III comprised coal and petroleum products; and Class IV, articles—chiefly general supplies—for which the quantity of initial issue was not prescribed. In theaters of operations Class I and III items were the ones whose prompt distribution was most essential; without food troops could not live and without gasoline a modern army was stopped dead in its tracks. These were in consequence the items upon which quartermasters focused their main attention.[5]

The procurement of supplies required much more than the mere filling of requisitions. It demanded accurate information regarding available stocks, anticipated deliveries, normal replacement needs, tactical requirements, and expected changes in troop strength. Without this information requirements could not be determined nor adequate stocks maintained. Local procurement demanded in addition knowledge of what farm and industrial products were available commercially, how production might be increased, and how local goods compared in quality with those obtained in the United States.

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[1] Risch, *The Quartermaster Corps: Organization, Supply, and Services,* Vol. I, p. 192.

[2] *Ibid.*, pp. 123, 138–39.

[3] (1) FM 10-10, 2 Mar 42, sub: QM Svc in TOPNS. (2) FM 10-5, 29 Apr 43, sub: QM Opns

[4] *Quartermaster Handbook: Gasoline Supply Company,* pp. 31–48.

[5] FM 10-10, 2 Mar 42, sub: QM Svc in TOPNS, Sec. II, par. 6.

The QMC stored and distributed as well as procured supplies. When supplies reached their destination, whether it was a modern base in Australia or a forlorn distributing point in a New Guinea jungle with vines and trees for cover and damp soil for flooring, quartermasters stored them and, when the stocks were wanted elsewhere, arranged for their distribution. Storage and distribution, like procurement, demanded a mass of detailed information. The QMC had to know what, if any, commercial warehouses were available for lease; how far these warehouses conformed to military specifications; and how much square footage and materials-handling equipment were needed to meet the fluctuating storage requirements of different distribution areas. Finally, the Corps had to maintain close liaison with Army shipping agencies to insure prompt delivery of Quartermaster cargoes.

Besides procuring, storing, and distributing thousands of items the Corps performed many services essential to troop health and morale. It baked bread and operated laundries and showers for men in the fighting line as well as in camps to the rear. It collected discarded clothing, shoes, personal equipment, drums, cans, and ordnance supplies—in fact, all discarded government property—classified these salvaged articles, and distributed them to the repair shops of the appropriate technical services. It cleaned, renovated, and reissued Quartermaster supplies and so made a substantial quantity of needed articles quickly available. In addition to caring for the living, it identified the dead, buried them in Army cemeteries, and saved their personal possessions. Quartermaster activities were, indeed, so varied that twenty types of Quartermaster units were employed in the war against Japan to carry them out.

In overseas areas all Quartermaster activities were carried out under authority of theater commanders. Though the Army Service Forces (ASF) in the zone of interior was responsible for the support of combat forces, its jurisdiction extended no farther than the ports of embarkation. Outside the United States every theater commander planned his logistical system in the manner he considered best, and all theaters in consequence had slightly different supply organizations. While Headquarters, ASF, and the technical services in the zone of interior could submit technical advice to overseas supply agencies, theaters were free to accept or reject their recommendations.[6] In the QMC, particularly toward the end of the war, there was a good deal of direct interchange of technical data between the Office of The Quartermaster General (OQMG) and the central Quartermaster offices in the Pacific. The OQMG provided these offices with copies of procurement regulations, training manuals, OQMG circulars, and specifications of standard supply items, notified them of projects for new items, and provided them with samples of recently designed articles. The Pacific areas in turn submitted to the OQMG copies of their important directives. But OQMG observers' reports, describing the actual utility of Quartermaster items in tropical, island-hopping warfare and suggesting how unusual overseas needs might be met by betterment of old items and development of new ones, constituted perhaps the best source of information available in Washington concerning Quartermaster problems in the Pacific. Incomplete though these reports often were, they nevertheless provided a more comprehensive picture of Pacific sup-

[6] FM 100-10, 15 Nov 43, sub: Field Svc Regulations Adm, Sec. II, par. 11.

ply operations than the OQMG could find elsewhere. While all this exchange of technical information helped that office furnish more serviceable supplies and better trained units, it did not give the OQMG any control over the operations of the Corps in the Pacific. Each area continued to have a Quartermaster organization independent of the Corps in the United States.

Supply Organization in the Southwest Pacific

Four major commands of the Southwest Pacific Area performed supply functions—General Headquarters (GHQ), the United States Army Services of Supply (USASOS), the Sixth Army, and the Fifth Air Force. The highest of these commands, GHQ, in line with its judgment of the urgency of requirements, assigned varying priorities to requisitions for supplies and to requests for technical service units from the United States. Occasionally, it even altered the number of units requested. On the basis of strategic plans and scheduled distribution of troops it issued logistical instructions and in general terms prescribed the quantity of stock to be held in different parts of the Southwest Pacific. Though all these responsibilities of GHQ were highly important to the Quartermaster Corps, GHQ, alone of the four commands, had no Quartermaster section. United States Army Services of Supply, the command most concerned with the details of getting supplies into the hands of troops, was responsible for items needed by ground troops and for commonly used supplies needed by the Fifth Air Force except technical air items. Headquarters, USASOS, planned and supervised procurement, storage, and distribution of all these supplies, and base sections and other USASOS field agencies actually carried out these functions. The Sixth Army and the Fifth Air Force, the major commands supported by USASOS, picked up and issued to their troops the supplies that USASOS brought to distributing points. Both commands established sizable organizations to administer Quartermaster matters and employed Quartermaster troop units to carry out the supply and service functions of the Corps.[7]

Headquarters, USASOS

The development of USASOS started in Australia in late December 1941, when Task Force, South Pacific, landed at Brisbane and set up Headquarters, United States Forces in Australia (USFIA), redesignated on 8 January 1942 as United States Army Forces in Australia (USAFIA). As the agency charged with administrative and logistical support of ground and air forces, it had responsibility for all activities of the technical services. At the outset it was regarded chiefly as a rear area command that would build up a base for the support of operations in the Netherlands Indies and the Philippines. The fall of Java in early March caused a drastic revision of this conception.[8] Only with that momentous event did the Army fully realize that a huge supply organization would have to be created in Australia for the exploitation of local resources and the reception and distribution of supplies to the large land and air forces that of necessity would use the Commonwealth as their main base.

Territorially, the authority of USAFIA—or USASOS, as it became in July 1942—

[7] Ltr, Hq USAFFE to CG Sixth Army, 26 Feb 43, sub: Allocation of Adm Functions. ORB AFPAC AG 322.01.

[8] Plng Div, Office of Director of Plans and Opns ASF, Hist of Plng Div ASF, I, 132–34.

covered the "communications zone," which embraced the entire Southwest Pacific Area outside combat zones.[9] Within the communications zone, which was divided for administrative and operating purposes into base sections, USASOS controlled all supply establishments, lines of communication, and other agencies needed for satisfactory support of troops. To carry out its mission, Headquarters, USASOS, established general and special staffs charged with the formulation of supply policies and the direction of their execution. In the Office of the Chief Quartermaster, often called the Quartermaster Section, was lodged responsibility for supervision of Quartermaster installations and units controlled by USASOS, for the procurement and storage of Quartermaster supplies, and for distribution of these supplies to troops within the communications zone. It was also charged with distribution of items to the supply points of organizations in combat zones. These points might be warehouses, open-storage centers, truckheads, or navigation heads set up to receive shipments from USASOS. At the supply points Quartermaster units, operating under the direction of tactical commanders, handled and stored the items of their service and issued them to using units or else transported them to distributing points deeper in the combat area where using units received them.[10]

Office of the Chief Quartermaster

The first task of the OCQM in Australia was the creation of an organization capable of performing under the unfamiliar conditions of an alien land in a command twice the size of the United States functions similar to those that long-established Quartermaster agencies carried out in the United States. There the Office of The Quartermaster General and the Quartermaster depots had developed over the years agencies capable of dealing with highly specialized problems. The Philadelphia Depot had long concentrated on the development and procurement of clothing, the Boston Depot on footwear, and other depots on food and general supplies. All these installations as well as the OQMG could call upon marketing and technical experts in industry, commerce, agriculture, and the universities for advice, and even before Pearl Harbor they had achieved a high degree of co-ordination between Army requirements and American industrial and agricultural capabilities that materially facilitated their supply activities when war came.

The OCQM in Australia started with none of the operational advantages possessed by the Quartermaster Corps in the United States. Yet it occupied in theory a position not unlike that of the OQMG in Washington. Though circumstances at first obliged it actually to carry out some Quartermaster operations, it was not set up to procure, store, distribute, or reclaim supplies and equipment but rather, like the OQMG, to plan, co-ordinate, and control these activities in accordance with supply programs approved by higher echelons.[11]

As a planning agency in the procurement field, the Australian OCQM first of all determined theater requirements for Quartermaster items and ascertained what proportion of these requirements could be obtained

[9] *Quartermaster Emergency Handbook* (Washington: *QMR*, 1941), p. 265.

[10] FM 10-10, 2 Mar 42, sub: QM Svc in TOPNS.

[11] Rpt, Maj Gen Julian F. Barnes, former CG USAFIA, 6 Nov 42, sub: Organization and Activities, USAFIA, 7 Dec 41–30 Jun 42. OCMH. This report will be cited hereafter as the Barnes Rpt.

in Australia and what proportion would have to come from the United States; finally, it arranged for procurement from the indicated source. The OCQM also determined how many Quartermaster officers and men were needed and, subject to the approval of GHQ SWPA, requested them from the zone of interior. In addition it provided for the establishment of bakeries, laundries, training schools, and storage and reclamation depots.[12] As a co-ordinating agency, it designated particular installations as storers of specific items. In line with logistical instructions issued to it by higher echelons it determined the size of stocks in different base sections and transferred supplies from one installation to another in order to maintain prescribed levels. To meet varying manpower requirements, it assigned and shifted men and units within the communications zone.[13] As a supervising agency the OCQM issued operating procedures, technical manuals, and special directives as guides for installations and units and through frequent inspections checked on the execution of its instructions.[14]

The establishment of the OCQM, like that of other technical service headquarters, was hampered for months by a far-reaching shortage of officers and by the confusion that accompanied hasty efforts to create almost overnight sections for which no plans had been formulated. When U.S. Forces in Australia set up its headquarters in Lennon's Hotel in Brisbane on 24 December 1941, the Quartermaster Section consisted of only the Quartermaster, Maj. Abraham G. Silverman, three other officers, and two enlisted men. Shortly afterwards Major Silverman hired six Australian clerks and obtained several additional officers on detached service from the Air Corps and the Chemical Warfare Service to help supervise the loading and discharge of ships. For some weeks transportation matters indeed demanded as much or more attention from the newly formed section as did any other activity. Silverman had no assistant until 9 January when Capt. Andy E. Toney arrived and became Assistant Quartermaster. With so few helpers, the Quartermaster could do little except care for immediate operating problems.[15] He centered his efforts mainly upon the discharge of incoming ships carrying Air Corps equipment and upon the storage of supplies in temporary warehouses near the Ascot racecourse.

The arrival in Melbourne on 2 February of the RPH ("Remember Pearl Harbor") group of officers signalized the beginning of a new phase in OCQM development. Though the contingent included only eight quartermasters, they represented an important accession of strength. Among them was Col. Douglas C. Cordiner, who served as Chief Quartermaster until 15 May 1944, when Col. (later Brig. Gen.) William F. Campbell succeeded him. Another prominent officer in the RPH group was Lt. Col. Herbert A. Gardner, who, later, on 15 June 1942, became General Purchasing Agent in Headquarters, USASOS. The OCQM was now moved to Melbourne, but the cramped quarters it occupied gave no room for expansion. As few of the clerical employees accompanied the office in the move from Brisbane, operations were for a time further handicapped by the necessity of hiring

[12] (1) Lecture, Col Hugh B. Hester, 16 Nov 42, sub: Organization of OCQM. ORB Base A QM 400.291. (2) OCQM OO 116, 5 Dec 42, sub: Organization OCQM USASOS. ORB AFWESPAC QM 400.1924.

[13] Lecture, Lt Col W. H. Hamrick, 7 Dec 42, sub: Proc Control. ORB Base A QM 400.291.

[14] Lecture, Lt Col Edward F. Shepherd, 18 Nov 42, sub: Sup System. ORB Base A QM 400.291.

[15] QM SWPA Hist, I, 2.

and training a new civilian staff. Because of the shortage of officers and space a full-fledged organization with divisions and branches operating in much the same manner as the OQMG did in Washington could not be established. It was nevertheless possible to designate a supply officer, a transport officer, and a purchasing and contracting officer. Not until 17 February could the OCQM submit to the zone of interior its first requisition—one requesting the clothing needed to make initial issues and provide maintenance supplies for troops in northern Australia.[16]

In early March the OCQM moved to more commodious quarters in the Melbourne Grammar School where space sufficed to permit the establishment of a larger but still relatively small organization. Four divisions were set up—an Administrative, a Transportation, a Supply, and a Purchasing and Contracting Division. The Administrative Division performed the routine services needed by the whole OCQM for the conduct of business. It distributed mail, messages, and directives; maintained the general files of the entire office; and provided and repaired typewriters, telephones, and other necessary business equipment. All these services were normal functions of an administrative unit, but in the OCQM the Administrative Division had in addition several responsibilities that in a more highly developed organization would have been vested in separate divisions. It formulated procedures for the care of military dead and for the handling of budget and fiscal affairs. Particularly important were its manpower and training functions. It estimated how many and what kind of Quartermaster units were needed to carry out the Quartermaster mission and upon these figures based its requests for units from the zone of interior and its assignments of units to USAFIA installations. In addition it established schools for QMC officers, planned their courses of study, and developed standards for training units and casuals.[17]

The Transportation Division dealt with military movements of men and supplies. It aimed at the fullest utilization of both military and commercial shipping, but its staff was too small to permit much more than a survey of Australian conditions before 15 April, when the OCQM was relieved of most of its transportation responsibilities and an independent Transportation Service was set up in USAFIA. During its short existence the division created the nuclei of several small sections. One of these sections dealt with the movement of cargo and troops by Australian railroads and airlines. Another, the Motor Supply Section, procured trucks and arranged for the assembly, testing, and distribution of vehicles. Late in March a Water Section began operations with a staff of about ten veteran shipping men headed by Col. Thomas G. Plant, who for many years had served as an executive of Pacific steamship lines. This section, as its name implied, provided for the handling of seaborne movements. In order to do this, it chartered coasters, lighters, cranes, and docks, and compiled information about the handling capacity of Australian ports.[18]

In April, when the Chief Quartermaster was relieved of all transportation functions but those relating to trucks, the Motor Transport Section became the Motor Transport Division until it in turn was shifted at the end of August to the Chief Ordnance

[16] *Ibid.*, pp. 4–5.

[17] *Ibid.*, p. 6.

[18] Memo, Chief Trans Div for CQM, 11 Apr 42, sub: Organization and Status of Trans Div. ORB AFWESPAC QM 320.

Officer. Before its transfer the division entered into agreements with local automobile firms for the assembly of imported American trucks at cost-plus-fixed-fee of 5 percent. The division made comparable contracts for the repair and maintenance of these vehicles, but on the basis of a flat fee per man per hour for work actually performed.[19]

More important in the development of the OCQM was the Supply Division, which laid down the policies and procedures governing the supply of Quartermaster items. It was organized on a commodity basis. That meant that it was split into sections, each of which handled but one general class of supply or a few closely related classes and decided upon the procedures to be followed in handling all the major supply functions—procurement, storage, and distribution—for the particular commodities it dealt with. In the Supply Division there were three commodity branches—the Subsistence Branch, the Clothing, Equipage, and General Supplies Branch, and the Gasoline and Oil Branch. There was also a Planning Branch which collected statistics fundamental to the operations of the commodity units. From the recently established base sections it received rough estimates of the size of Quartermaster stocks within their distribution zones, lists of scarce items, the amount of orders outstanding, and statements of future supply requirements. Unfortunately, these figures were often wide of the mark, for throughout 1942 it was usually impossible to obtain trustworthy inventories or other stock records from base sections, which were all in the confused state common to rapidly growing organizations. The figures, though unsatisfactory, of necessity served as the basis on which the commodity branches determined theater supply requirements and the quantities to be bought locally and in the United States. The branches submitted requisitions for supplies from the United States to the San Francisco Port of Embarkation and forwarded local purchase requests to the Purchasing and Contracting Division of OCQM.[20] The commodity branches were the agencies that actually controlled the stockage of Quartermaster items. They determined what base sections received incoming shipments, and it was they who shifted stocks from one base to another to meet fluctuating demands that rose in one place and fell in another. It was the commodity branches, too, that developed stock-accounting methods intended to keep depots constantly informed of the quantity of individual items on hand, due in, and due out.[21]

The Purchasing and Contracting Division was engaged chiefly in matters relating to the local buying of clothing, equipment, and general supplies. Since during most of 1942 U.S. military organizations obtained their food, gasoline, and oil through the Australian Army, the division had little to do directly with the purchase of these supplies. In performing its functions it was guided by the local purchase requests submitted by the commodity branches of the Supply Division. To care for the special problems involved in use of different methods of buying, it set up three sections to handle, respectively, open market transactions, formal contracts, and "contract demands." These "demands," covering eventually by far the greater part of local purchases, were simply requests that Commonwealth agencies in accordance with the reverse lend-lease arrangements negotiate contracts with Australian nationals for

[19] (1) OCQM OO 27, 14 Apr 42, sub: Motor Transport Div. (2) USAFIA Memo 160, 14 Jul 42, sub: Distr of Motor Vehicles.

[20] QM SWPA Hist, I, 5.

[21] Lecture, Col Hester, 16 Nov 42, sub: Organization of OCQM. ORB Base A QM 400.291.

specified quantities of needed items. Until these arrangements were made late in March 1942, most of the supplies for the U.S. Army were obtained locally through formal contracts with producers or by purchases on the open market. As contract demands gradually became the ordinary means of local procurement, these two methods of buying fell into disuse and the sections handling them ultimately disappeared. Another section, however, grew more important as local buying rose in volume. This was the Inspection Bureau, which accepted or rejected products offered in fulfillment of contract demands.[22]

The Purchasing and Contracting Division had close relations with the office of the General Purchasing Agent (GPA), a component of USAFIA that co-ordinated local procurement by the Army, the Navy, and the Air Forces, reviewing their contract demands and sending them in approved form to the appropriate Australian organizations.[23] If Commonwealth authorities in turn approved these demands, they made the necessary contracts with Australian producers. Generally speaking, U.S. agencies actually conducted necessary negotiations with the appropriate departments of the Commonwealth. In OCQM the Purchasing and Contracting Division formed a Liaison Section to work out terms mutually satisfactory to the Corps and to the Australians. With the help of other Quartermaster agencies this section located producers, ascertained their productive capacity, laid down specifications, and cared for contractual details.

Of all the Australian procuring agencies the Food Council affected the operations of the Corps most deeply as it was given the task of increasing food production on both the agricultural and the industrial front.[24] Another agency important to the Corps was the Allied Supply Council, composed of several Australian cabinet officers and a U.S. representative. It developed plans for stimulating the Australian economy as a whole. The OCQM also had extensive dealings with the Department of Supply and Shipping, which handled contract demands for nonmechanical items, and with the Department of Commerce, which handled contract demands for mechanical equipment.[25] Ordinarily, it had only unimportant relations with the Department of War Organization of Industry, which had responsibility for making ample labor available to the most essential plants, but if this department directed that workers be shifted from industries making Quartermaster supplies, the OCQM made known its concern and was sometimes able to stop the proposed action.[26]

In June the widening scope of U.S. Army activities required the establishment of two additional OCQM divisions. One of these was the Memorial Division, which took over the mortuary functions of the Administrative Division. This step was clearly advisable since these activities certainly would grow in magnitude as offensive operations were undertaken and casualties mounted.[27] The

[22] QM SWPA Hist, II, 4–5.

[23] (1) Historical Record, General Purchasing Agent for Australia, 1942. ORB SWPA AG 400.13. (2) USASOS Regulations 25-5, 16 Dec 42, sub: GPA. ORB NUGSEC Regulations.

[24] Ltr, J. F. Murphy, Controller General of Food, Commonwealth of Australia, to Allied Sup Council, 12 May 42. ORB AFWESPAC QM 430.

[25] (1) Lecture, Lt Col R. C. Kramer, 14 Dec 42, sub: Allied Sup Council. ORB Base A QM 400.291. (2) Rpt, Allied Sup Council, 15 Sep 43, sub: First Annual Rpt for Period Ending 30 Jun 43. ORB AFPAC Rear Ech Annual Rpt.

[26] Lecture, Col Herbert A. Gardner, 18 Nov 42, sub: Relationship of QMC with Other Agencies. ORB Base A QM 400.291.

[27] OCQM OO 60, 11 June 42, sub: Memorial Div.

other new division, the General Service Division, constituted a rudimentary control agency, whose establishment was brought about by the desirability of reviewing and co-ordinating basic functions scattered through the commodity branches of the Supply Division.[28] Its establishment reflected, too, the wartime trend toward a functional rather than a commodity organization of the sort characteristic of the peacetime War Department. In a full-fledged functional organization the commodity branches were abolished, and administrative units were set up to handle the major responsibilities of procurement, storage, and distribution. In this type of establishment a procurement division would be concerned with supervising the buying of all classes of supplies assigned to a technical service. In the QMC this meant that such a division would deal with all matters relating to food, clothing, general supplies, gasoline, oil, and other Quartermaster items.

The functional concept was embodied to a considerable extent in the General Service Division since this unit was given a large measure of authority over storage and distribution activities and lesser authority over procurement matters. It was particularly concerned with operations at USAFIA field installations. Its Warehousing Branch was charged among other things with the modernization of depot operations. To achieve this objective, it made frequent inspections of handling and storage methods and suggested how they might be bettered to enhance the safety of supplies and to conserve time and manpower. The Warehousing Branch had as another objective the equitable division of warehouse equipment. In carrying out this function it planned the distribution of equipment in line with the varying volume of supplies handled by the base sections. Another branch of the General Service Division, the Inspection Branch, performed practically all OCQM inspections except those relating to storage and the acceptability of goods offered under local procurement contracts. It investigated such routine but important matters in the base sections as requisitioning procedures, inventory practices, compilation of lists of scarce items, and maintenance of employees' time records as well as special problems like pilferage of supplies on docks and in warehouses. A third branch, the Planning and Statistical Branch, was the former Planning Branch of the Supply Division. It had been transferred because the statistical information it gathered came mostly from the field installations with which the new division was chiefly concerned.[29]

Since no suitable method of reviewing the purchase authorizations of the commodity branches in the Supply Division had been developed, that task, too, was assigned in August to the General Service Division, which set up a Procurement Control Branch to accomplish it. This branch analyzed the authority for proposed purchases to make sure that procurement regulations were being observed; determined whether prospective costs had been calculated properly; and checked the desirability of local procurement as opposed to procurement in the United States. Thus responsibility for some procurement as well as storage and distribution problems was lodged in the General Services Division.[30]

Although the activities of the OCQM increased rapidly during the first half of 1942, that office was "comparatively much shorter of operating personnel than any

[28] OCQM OO 59, 11 Jun 42, sub: Gen Svc Div.

[29] (1) *Ibid.* (2) QM SWPA Hist, II, 6–8.

[30] P. 9 of n. 29 (2).

other section." [31] In June it was functioning with only 33 officers as compared with an authorized 107. This substantial discrepancy stemmed in part from the establishment of the independent Transportation Service and the consequent loss of about half the Quartermaster officers and in part from the fact that the War Department for a time made no distinction between the old and the new service and often filled Quartermaster requests for officers with men suited for Transportation rather than Quartermaster work.[32]

During the summer QMC operations, like those of other technical services, also suffered, briefly, from the transfer of OCQM, along with the rest of the former USAFIA, from Melbourne to the headquarters of the newly established United States Army Services of Supply in Sydney. This move, another of a series that eventually brought the OCQM to Manila, temporarily interfered with OCQM activities but did not halt them.[33]

In late 1942 the widening scope of military activities brought about an almost complete reorganization of the OCQM. As that office had become in some respects a counterpart on a small scale of the OQMG, the administrative changes were modeled upon those made in the Washington office during the previous spring. These changes wiped out the predominantly commodity organization of the OCQM and substituted one based to a substantial degree upon function. The reorganization, begun in December 1942 and completed in March 1943, eliminated the Supply Division, the heart of the old office, and created several functional divisions.

In the reorganization the desirability of co-ordinating and controlling basic operating functions, an objective that had already won recognition in the establishment of the General Service Division, received still more recognition in the creation of a new staff agency, the Planning and Control Division, which exercised general supervision over all operations both in the OCQM and in the base sections. This division absorbed the storage and procurement control functions of the General Service Division and in addition gained the right to review and make recommendations about all Quartermaster operations. OCQM "operating" divisions, which meant all divisions except the Administrative Division and the newly established Inspection Division and Food Production Advisory and Liaison Division—all three regarded as staff agencies—were now required to co-ordinate their activities with the policies of the Planning and Control Division. Besides carrying out its control functions that unit served as a statistical clearing house for the whole Corps in the Southwest Pacific. Its statistical information was employed to set up replacement supply factors on the basis of area experience and to compute total area requirements for Quartermaster items. With its far-ranging functions the new division encroached extensively upon responsibilities traditionally in the province of commodity branches.[34]

Inspection activities, though essential to control operations, were not assigned to the Planning and Control Division. They were performed by the Budget, Accounting, and Inspection Division, commonly called the

[31] Barnes Rpt, p. 36.

[32] (1) *Ibid.*, p. 19. (2) QM SWPA Hist, II, 91. (3) Personal Ltr, Col Douglas C. Cordiner to Gen Gregory, 16 Sep 42. ORB AFWESPAC QM 400.

[33] USASOS GO 1, 20 Jul 42, sub: Establishment of USASOS.

[34] OCQM OO 116, 5 Dec 42, sub: Organization OCQM USASOS. ORB AFWESPAC QM 400.1924.

Inspection Division. This new division was formed by the consolidation of the Fiscal Branch of the Administrative Division and the Inspection Branch and the Field Service Branch of the discarded General Service Division. As a fiscal agency, it prepared estimates of future expenditures for OCQM and Quartermaster base section activities; allocated funds; and maintained records of lend-lease transactions involving the Corps. As an inspection agency, it shouldered the tasks that had been performed in this field by the old General Service Division, analyzed inspection reports made by OCQM representatives, and tried to see that action was taken on recommendations made in these reports. In the final analysis it was responsible for all inspection activities of the Corps except those relating to procurement.[35]

In the reorganization the Supply Division became the Storage and Distribution Division. Though that division still had commodity branches, they were shorn of most procurement functions. The preservation of these branches, even with narrowed responsibilities, represented a compromise between the functional and commodity principles, but there was no serious breach of functionalism since the commodity branches were concerned almost exclusively with the technical direction of storage and distribution operations. The only significant procurement activity remaining in these branches—and it was one that stemmed directly from the distribution responsibility—was the requisitioning of supplies needed to maintain prescribed stock levels.[36]

In the Procurement Division were vested virtually all procurement responsibilities, including those of the former Purchasing and Contracting Division, except ones relating to subsistence. These were handled by another new division, the Food Production Advisory and Liaison Division. The Procurement Division established policies and procedures to govern the local purchase of the supplies for which it was responsible, followed up contract demands, and inspected articles before they were accepted. In close co-operation with Commonwealth agencies it conducted a fairly extensive research and development program, which was directed at the development of specifications suitable to Australian industries rather than at the design of new items, the usual goal of this work.[37]

The Food Production and Advisory and Liaison Division was set up primarily to prepare for the end of the rationing of American troops by the Australian Army and for the beginning of large-scale reverse lend-lease procurement of food. The division was headed by the Deputy Chief Quartermaster, Col. (later Brig. Gen.) Hugh B. Hester. It had as one of its principal functions rendering technical advice to the Australian Food Council.[38] This advice was aimed chiefly at the inauguration of a large-scale canning and dehydration program and the increase of farm production. The division represented a reversion to the commodity type of organization, for it was charged with the storage and distribution as well as the procurement of all subsistence except fresh provisions, which were to be bought by the base sections. With this important exception it was re-

[35] QM SWPA Hist, II, 80–85.
[36] *Ibid.*
[37] OCQM OO 112, 18 Nov 42, sub: Advisory and Liaison Staff.
[38] OCQM OO 116, 5 Dec 42, sub: OCQM Organization.

sponsible for the entire U.S. Army food program in the Southwest Pacific.[39]

The Food Production Division did not remain long in the OCQM. On 27 February 1943 its staff and functions were taken over by the newly created Subsistence Depot, headed by Colonel Hester. This installation, located at Sydney, operated under the direct supervision of the Chief Quartermaster and served as the central buying, storing, and distributing agency for all food except perishables, which continued to be procured by the base sections. To increase farm production, the Subsistence Depot set up an elaborate organization to offer technical help to Australian agriculturists and food processors and through the American Lend-Lease Administration to import seeds, farm machinery, and processing equipment. Besides carrying out many of the details of local procurement, it requisitioned food from the United States in amounts adequate to make up any deficiencies in Australian production.[40] The depot stored huge quantities of rations in branches at Melbourne, Sydney, and Brisbane. These stocks, normally totaling about a ninety-day supply, formed a reserve constantly available to base sections for maintaining their food supplies.[41]

In addition to the divisions charged with the major responsibilities of control, procurement, storage, and distribution, two others were set up to supervise reclamation and training functions. These activities had grown so much in magnitude and importance that they could no longer be managed properly by small branches of divisions interested primarily in other matters. Garments, shoes, tents, and other commonly used items in need of repair were accumulating in larger and larger quantities, and more and more Quartermaster units and casuals requiring additional training were arriving in the area. To cope with these problems, the Salvage and Reclamation Branch of the Supply Division and the Training Branch of the Administrative Division were materially enlarged and made divisions.[42]

The major reorganization of the OCQM in the winter of 1942–43 had hardly been completed before the reconstitution of USAFFE occasioned another reshuffle of OCQM functions. USAFFE had become inactive after the fall of the Philippines, but in February it was revived and made responsible for the formulation of supply policy. The Chief Quartermaster and the heads of other technical services were transferred to the restored command, and USASOS became in theory merely an agency for the execution of policies made by USAFFE. For several months the Office of the Chief Quartermaster was located in the revived command. At the same time there was also an Office of the Quartermaster, USASOS, headed by Col. Lewis Landes. Since Colonel Cordiner took his key planning assistants with him to USAFFE, the number of officers available to Quartermaster staff divisions in USASOS was greatly reduced, and it became necessary to consolidate these divisions into a single organization, the Administrative and Planning Division. Other-

[39] OCQM OO 122, 19 Dec 42, sub: Subs Program.

[40] (1) USASOS GO 12, 27 Feb 43, sub: Establishment of QM Subs Depot. ORB AFPAC Gen Purchg. (2) Hq USASOS Memo 37, 15 Mar 43, sub: Mission of QM Subs Depot. ORB AFWESPAC QM 430. (3) Rpt, n. s., 5 May 43, sub: Organization of QM Subs Depot. ORB AFWESPAC QM 320.

[41] (1) Rpt, Col Cordiner, n. d., sub: Trip to Sydney, *et al.*, 7–26 Sep 43. OQMG SWPA 319.25. (2) Personal Ltr, Col Hester to Col Cordiner, 15 Nov 43. ORB AFWESPAC QM 312.

[42] (1) OCQM OO 116, 5 Dec 42, sub: OCQM Orgn. (2) QM SWPA Hist, II, 85–100.



SALVAGE AND RECLAMATION ACTIVITIES *in Australia involved sorting, classifying, and repairing vast quantities of clothing and equipment.*



wise, the pattern set by the basic changes of the previous winter remained unaltered. In October, only six months after Colonel Cordiner left USASOS, he, along with the other technical service chiefs, was sent back there and given the same responsibilities he had formerly been charged with. Colonel Landes' office passed out of existence, the divisions eliminated in the spring were revived, and USAFFE became in the main an administrative agency, which affected Quartermaster supply chiefly through the assignment of priorities to cargo movements. This difficult task, involving various shipping agencies and several armed services and territorial commands, was accomplished by a central priorities office in Headquarters, USAFFE, and by branch offices in Headquarters, USASOS, and each USASOS port.[43]

There can be little doubt that the numerous and sometimes bewildering changes in OCQM organization exerted in general an unfavorable influence on Quartermaster activities. Hardly a division or branch remained unaltered long enough for its staffs, military and civilian, to become proficient in the duties given them. Almost constantly functions were being modified or shifted from one administrative unit to another. Similarly, officers were transferred from assignment to assignment.

To a considerable degree this state of flux was unavoidable. At the outset the few available officers of necessity shouldered a variety of tasks, often unrelated. Later, the partial shift from a commodity to a functional organization demanded a period of adjustment to unfamiliar procedures. This had barely begun when it was interrupted by the administrative modifications accompanying the revival of USAFFE. After a few months these modifications were in turn rescinded, and the organization of the previous spring restored. But the shuffling and reshuffling of functions had not yet come to a conclusion.

Centralization of Procurement Activities

The most important administrative changes that subsequently affected the OCQM were those which removed most local procurement activities from the technical services and centralized them in a single field agency. These changes originated in the main as a result of the northward movement of combat activities. That movement obliged Headquarters, USASOS, with its technical service sections, to move north also in order to keep in close touch with the forces they supported. Yet since Australia carried on procurement activities of the highest importance to the area as a whole, it was almost mandatory to establish in that country organizations capable of making immediate on-the-spot decisions about the problems that arose there. A buying agency was particularly necessary in Sydney to continue close business relations with Commonwealth officials and local contractors after Headquarters, USASOS, departed from that city and finally from Australia itself. That requirement in turn demanded the concentration of technical service procurement activities in new agencies which would remain in Sydney or at least in Australia after the offices of the technical service chiefs had moved elsewhere. A second and less urgent reason for greater centralization of procurement ac-

[43] (1) Memo, QM USASOS for CQM USAFFE, 19 Jul 43. (2) Memo, "F. W. G." for CQM USAFFE, 26 Sep 43. Both in ORB AFWESPAC QM 323.7. (3) Memo, TQMG for CG ASF, 14 Mar 45, sub: Tour of POA and SWPA. OQMG POA 319.25.

tivities was the growing belief in the desirability of consolidating these activities so as to help eliminate the confusion and the duplication of effort inherent in imperfect co-ordination of USASOS purchasing units.[44]

The transfer of Headquarters, USASOS, to Brisbane in August 1943 started the process of consolidating procurement operations. That event at once raised the question of whether the military buying agencies should participate in the move. It was answered by the establishment at Sydney of rear-echelon procurement units representing the technical service staff sections. The Quartermaster unit was the Purchasing and Contracting Branch of the OCQM Procurement Division, which was still charged with local procurement of clothing, equipment, and general supplies. Within a few weeks all the rear-echelon units were combined with the Subsistence Depot and the Engineer Depot to form the USASOS General Depot, a field agency of G–4. The new installation, modeled on the Subsistence Depot and headed by Colonel Hester, was to procure all military supplies obtained in Australia except fresh provisions and other items bought by base sections. Like the Subsistence Depot, the General Depot was to receive and store supplies and deal directly with Commonwealth agencies.[45]

The establishment of the USASOS General Depot meant that the OCQM, having lost most of its authority over subsistence, now lost effective participation in the buying of clothing, equipment, and general supplies. It retained only the responsibility of computing requirements and informing the General Depot through procurement and distribution directives how much of an item was wanted, when it was wanted, and where it was wanted. The OCQM and other technical services objected to the new arrangement as it deprived them of important functions traditionally theirs. Chiefly because of their opposition the General Depot was abolished, even before centralized procurement actually became effective, and purchasing was decentralized once more to the individual services working through the rear-echelon units.[46]

The revival of something like the earlier procurement organization lasted only until late January 1944, when all U.S. Army procurement was again centralized—this time in a Procurement Division, which operated at Sydney, like the General Depot, as a field agency of G–4, USASOS. This division, which Colonel Hester served as Director of Procurement, had not only a mission comparable to that of the former General Depot but also shared with the new Distribution Division, another G–4 field agency in Sydney, the functions of computing supply requirements and issuing procurement directives. Whereas the Quartermaster Branch of the Distribution Division determined SWPA requirements for Quartermaster supplies, submitted the directives for local purchases of all Quartermaster supplies except food to the Quartermaster Branch, Procurement Division, and informed Headquarters, USASOS, of the quantities needed from the zone of interior, the Procurement Division itself initiated the contract demands for subsistence on the basis of area requirements as determined by its sister division and on the basis of quantities procurable in Australia

[44] G–4 Periodic Rpt USAFFE for Quarter Ending 30 Sep 43.

[45] Rpt, Staff Conf, USASOS, 8 Oct 43. ORB ABSEC AG 337.

[46] Ltr, Col Hester to Col Cordiner, 2 Oct 43. ORB AFWESPAC QM 323.71.

as determined by its own staff. Finally, the Procurement Division had the important task of obtaining from local sources, not only nonperishable foods but also fresh fruits, vegetables, meat, fish, milk, bread, ice cream, and other perishables, a function previously performed by the base sections. For the first time all major aspects of the buying of food were thus concentrated in a single organization.[47]

In March 1944, the Procurement Division ceased to be an agency of G–4, USASOS, and came directly under the Commanding General, USASOS. It retained this status until August, when it became part of Headquarters, Base Section, USASOS, recently set up to control the only remaining active base sections in Australia—those at Sydney and Brisbane. Local buying indeed became the most important activity of this subordinate USASOS command. The Procurement Division was now given the new tasks of maintaining prescribed stock levels and supervising the distribution of supplies in the Commonwealth, tasks that the Distribution Division, just transferred to New Guinea, had formerly carried out. The Procurement Division thus became a distribution as well as a purchasing agency, but it retained its enlarged responsibilities only until February 1945, when, owing to the comparative decline of local procurement as a factor in area supply, the division was discontinued. Its distributing functions were then returned to OCQM in the Philippines, and its local purchasing activities were taken over by the Sydney base. This situation was still in effect when the war against Japan ended.[48]

Looking back upon the emergence of procurement organization in USASOS, Colonel Hester later maintained that the numerous administrative changes had increased the difficulty of maintaining consistent policies and caused so rapid a turnover of officers that operations could not always be accomplished effectively. In his opinion these changes had impaired relations with both government and business agencies, for they were often accompanied by cancellations of contracts and soon afterwards by their reinstatement. The Commonwealth Government, according to Hester, became convinced that "we did not know our requirements." [49] Industry, he added, was obliged to make so many alterations in its work schedules that production occasionally fell substantially below capacity. In his judgment all local procurement functions, including those of the General Purchasing Agent, should have been consolidated from the very outset in one office, as was done in the South Pacific, where the Joint Purchasing Board negotiated with the New Zealand Government, formulated procurement policies, and received, stored, and shipped supplies—functions that in Australia were carried out by the General Purchasing Agent, the Procurement Division, and the technical services.

Centralization of Distribution and Miscellaneous Activities

At the same time that the procurement activities of the OCQM were being whittled down in order to concentrate control of these

[47] (1) QM SWPA Hist, V, 15–24, 29. (2) Ltr, Dir of Proc to CG USASOS, 11 Mar 44, sub: Proc of Perishables. ORB AFWESPAC AG 430.2. (3) Conf, 25 Mar 44, sub: Off Min, Base Comdrs Conf, 24–26 Mar 44, pp. 57–60. DRB AGO PHILRYCOM.

[48] QM SWPA Hist, V, 22–24; VI, 24–25; VII, 3, 6.

[49] Hester Rpt, pp. 63–64.

activities, distribution activities were undergoing a comparable attrition for much the same reason. Early in 1944, when stocks in New Guinea had sunk to precariously low levels, the Distribution Division was established under G–4, USASOS, to attain a better balanced division of all military supplies throughout the Southwest Pacific. As an agency untied to any technical service, it would, presumably, be uninfluenced by the special interests of these services and hence would be better able to control distribution in line with the actual needs of the combat forces. As the agency charged with over-all control of distribution, the new division took over from the technical services the keeping of consolidated stock records for the entire area and the maintenance of all base section stores at prescribed quantities. In order to facilitate the prompt movement of supplies to the installations needing them most, the new division in accordance with priorities set by higher echelons co-ordinated and scheduled shipments between Australian bases, and shipments from Australia and the United States to advance bases or forward areas. Through a Distribution Branch at Milne Bay in New Guinea it also controlled shipments north of Australia.[50]

In March, only a few weeks after its establishment, the Distribution Division was separated from G–4 and the Distribution Branch from the Distribution Division. Both organizations were put directly under the Commanding General, USASOS. The independent status given the Distribution Branch was the first step toward moving the center of the distribution system north from Australia and placing it nearer to the combat areas. This action originated in the need for an agency free to decide on the spot what to do about the increasingly complex distribution problems of the advanced areas. These problems were becoming both numerous and difficult. Adequate stocks were ever harder to obtain as cargo movements were slowed by lengthening distances between bases and by the shortage of interisland shipping. Food stocks in New Guinea had indeed become so low that equitable division of rations became a major task of the new branch.[51]

The second step in the northward shift of the distribution system came in June, when the Distribution Branch was moved to Oro Bay and made part of the Intermediate Section (INTERSEC), USASOS, which controlled all USASOS units and activities in the areas supported by the bases at Port Moresby, Milne Bay, and Oro Bay. The third step came two and a half months later when the Distribution Division itself was transferred from Australia, made part of INTERSEC, and given the functions of the formerly independent Distribution Branch. It was at this time that the division lost control over stock distribution in Australia to the Procurement Division.[52]

The same process that had taken procurement and distribution functions out of the OCQM affected its graves registration, central baggage, and reclamation and salvage activities, which demanded hundreds of civilian manual and clerical workers as well as fairly elaborate commercial repair shops. Such shops did not exist in New Guinea; nor would civilian employees accompany

[50] (1) QM SWPA Hist, V, 16–18; VI, 19–22. (2) Personal Ltr, Lt Col Walter R. Ridlehuber, DISTDIV, to Lt Col Robert W. May DISTBRA, 25 Feb 44. ORB NUGSEC QM 400.

[51] (1) USASOS GO 43, 23 Mar 44, sub: Distr of Sups. (2) Rpt, Lt Col Charles A. Ritchie, QM INTERSEC, 13 Apr 44, sub: Base QM Conf at Distr Br, 10 Apr 44. ORB NUGSEC QM 400.

[52] Rpt, Brig Gen William F. Campbell, CQM, 10 Dec 44, sub: Activities of OCQM, Oct–Nov 44. DRB AGO TOPNS Folder 211.

the OCQM when it was moved to Hollandia. For these reasons the sections handling these activities remained in Australia until April 1945, when the removal of Headquarters, USASOS, to Manila made available both Filipino clerks and repair shops and made possible the return of the sections to the OCQM. At the same time Quartermaster distribution functions were again turned over to that office. Since Australia was fast declining as a supply source because of the thousands of miles that now separated it from the bulk of Southwest Pacific troops, the OCQM two months later also recovered most of its original procurement responsibilities. The lengthy process of turning over Quartermaster activities to field agencies and rear areas thus came to an end.[53]

Organization of Quartermaster Operations in the South Pacific

The Army in the South Pacific at first had no central supply organization. Such an agency could not be set up till the full scope of Army air and ground operations became known and an agreement was reached with the Navy on the precise delimitation between the supply functions of the two services. In the absence of a central supply agency the forces that occupied the main South Pacific islands operated as independent supply commands responsible only to the War Department. Task force G–4's exercised staff control over supply operations, and the senior officer of each technical service acted as special staff officer as well as commander of all elements of his service. On New Caledonia, for example, within a few hours after the first American troops landed in March 1942, a Quartermaster office was established to carry out these functions.[54]

Each task force quartermaster submitted requisitions on the zone of interior for items not furnished automatically. As no means of co-ordinating these requisitions existed, they were sent in without reference to the needs or the stocks of other forces. Despite the fact that the U.S. organizations were located only 1,000 miles or so from agriculturally rich New Zealand, that country at first provided them comparatively little food. The task forces secured most of their rations as well as most of their other supplies from the West Coast, 4,000 miles or so away. To conserve shipping on this long run, USAFIA supplied the troops in the South Pacific to the extent of its capacity, and many Quartermaster articles were procured in this manner.[55]

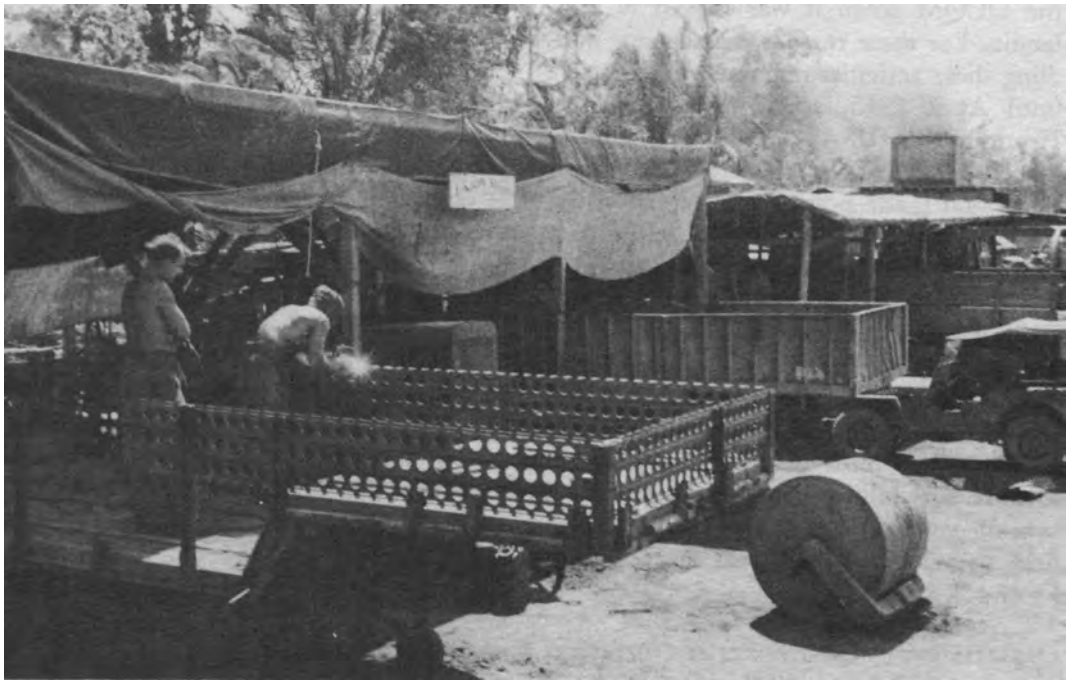
Shortages of men and units severely handicapped task force quartermasters in their efforts to carry out both their regular organizational responsibilities and those of a theater SOS. Quartermaster troops constituted less than 2 percent of task force strength and had little knowledge of the more specialized duties of the Corps.[56] That service nevertheless employed its scanty manpower in every kind of Quartermaster operation. At Nouméa the 130th QM Battalion, a truck organization, for five months ran the food dumps, the gasoline

[53] (1) Mil Hist of Base Sec, USASOS, Jun–Dec 44. (2) Hq Base Sec, USASOS, Hist of OQM, Jun 44. DRB AGO Opns Rpts (QM Sec USASOS).

[54] Personal Ltr, Col Joseph H. Burgheim to Gen Gregory, 24 Feb 43. OQMG POA 319.25.

[55] (1) G–2 Hist Secs USAFISPA & SOPACBACOM, History of the United States Army Forces in the South Pacific During World War II, 30 March 1942–1 August 1944 (4 parts), I, 62–67. Hereafter this work will be cited as Hist USAFISPA. (2) Historical Record of Headquarters Service Command APO 502, 10 November 1942 to 30 September 1943. ORB USAFINC AG 314.7.

[56] Ltr, CG USAFISPA to CofS, 27 Feb 43. ORB USAFINC AG 400.



QUARTERMASTER TRUCK COMPANY MOTOR POOL. *Note the use of landing mat in the conversion of the semitrailer in the foreground.*

dumps, and the clothing warehouses and transported supplies to the limit of its capacity. It was directed to haul materials, regardless of size, for all technical services, but its standard 2½-ton trucks were much too small to carry rails, lumber, landing mats, and other bulky materials. It solved this dilemma by trading small vehicles to the Navy for large ones and ingeniously converting trucks into tractors capable of pulling semitrailers constructed from salvaged 6-ton vehicles. The Corps attempted to make up for the scarcity of men by extensive utilization of both combat organizations and native workers, but tactical troops were reluctant workers and native laborers were unaccustomed to steady application and had little mechanical skill.[57]

The acute shortage of junior officers presented a perplexing problem that was finally solved by the establishment of an officer candidate school in New Caledonia and by direct commissioning from the ranks. Officers thus acquired helped fill the needs of undermanned forces. On New Caledonia these officers staffed the clothing and equipment repair shops, the salvage collection service, and the graves registration service. They also assisted in procurement activities, which for several months included procurement for other technical services since the QMC alone among the technical services in the South Pacific had a fairly large body of officers experienced in such activities.[58]

All these makeshifts relieved personnel shortages somewhat, but the situation de-

[57] Personal Ltr cited n. 54.

[58] *Ibid.*

manded more fundamental action. By July 1942 there were about 60,000 Army ground and air troops in the South Pacific, and substantial reinforcements were on their way. The Americal Division was then in New Caledonia, the 37th Division was in the Fijis, and smaller forces were in New Zealand, Efate, Espíritu Santo, Tongatabu, Bora Bora, Wallis, Upolo, and Tutuila. An Army territorial command was obviously required to supervise and co-ordinate the supply of these scattered garrisons. This need was accentuated by the preparations for the Guadalcanal campaign. On 7 July Maj. Gen. Millard F. Harmon, Chief of the Air Staff in the War Department, was therefore appointed commanding general (COMGENSOPAC) of the newly created U.S. Army Forces in the South Pacific Area (USAFISPA). He served under Vice Adm. Robert L. Ghormley, commander of the South Pacific Area and South Pacific Force (COMSOPAC), and his responsibilities were limited to administration, supply, and training of Army ground and air troops.[59] General Harmon's mission included the determination of Army logistical needs, the supply of Army bases, the procurement, through the Joint Purchasing Board (JPB), set up by Admiral Ghormley in June, of materials obtainable in New Zealand, and the requisitioning of other materials from the San Francisco Port of Embarkation.[60]

At the time it was difficult for General Harmon to develop a centralized supply system. Though he exercised no control over operational plans, Admiral Ghormley and his successor, Admiral William F. Halsey, Jr., constantly consulted him on tactical matters and the disposition of Army forces, and for some weeks following the establishment of USAFISPA headquarters at Nouméa in late July, Harmon's still incomplete staff was immersed in these problems to the exclusion of almost everything else. In any event it was too limited in numbers and logistical experience to control supply effectively. The main body of Harmon's projected staff was indeed still in California and arrived in New Caledonia only in late September.[61]

A plan for centralized supply control, prepared by Brig. Gen. Robert G. Breene, Assistant Chief of Staff, G–4, was then put into force. General Breene had soon concluded that the ordinary G–4 section lacked sufficient power to handle the complex logistics of island warfare and to integrate Army supply operations with those of the Navy, Marine Corps, and Allied forces. His plan called for a central command with more authority than a G–4 section normally possessed. This headquarters, commanded by Breene, was set up at Auckland in mid-October as the Service Command. Early in the following month it was redesignated the Services of Supply (SOS SPA) and moved to Nouméa in order to be closer to the center of operations.

The mission of SOS SPA was the logistical support of Army and other forces that might be assigned to it. This meant in general the supply of the island garrisons guarding the lines of communications between the United States and the Southwest Pacific and the support of tactical forces. These forces, under the direction of Admiral Halsey, advanced up the Solomons ladder in a series of amphibious operations that began on Guadalcanal in August 1942 and ended in

[59] Hist USAFISPA, 30–36.

[60] Ltr, CofS USAFISPA, 7 Jul 42, sub: Instructions to CG USAFISPA. ORB USAFINC AG 384.

[61] (1) Personal Ltr, n. s. to Brig Gen Frederick Gilbreath, 19 Aug 42. ORB USAFINC AG 319.1. (2) Hist USAFISPA, 505–23.

March 1944 with the occupation of Emirau, ninety miles north of New Ireland. The latter operation, in conjunction with that carried out at the same time by MacArthur in the Admiralties, gave the Allied forces control of the approaches to the Bismarck Sea and enabled them to flank the Japanese stronghold at Rabaul and protect their advance into the waters leading to the Philippines. This operation marked the successful termination of the South Pacific Area tactical mission. Most of the ground and air forces in the area, totaling about 150,000 men, were then transferred to General MacArthur's command, and the South Pacific became essentially a communications zone, supplying and mounting out Army and Marine Corps forces sent there from the Central Pacific Area for rehabilitation, training, and re-equipment preparatory to the Marianas and Carolines operations. So extensive were these tasks that until late 1944 there was little diminution in the magnitude of SPA supply activities.[62]

As long as the South Pacific was an active operational command, it constituted an expanding area in which new SOS operating agencies were constantly being set up and old ones enlarged. The most important of these agencies were the service commands established on strategically located islands to support offensive operations and supply all troops in their areas. These agencies, like USASOS base sections, operated through technical service sections and controlled the organizations, men, and depots concerned with SOS tasks. Quartermaster activities at Headquarters, SOS SPA, were conducted through the Quartermaster Section of the Supply and Salvage Division. This section, headed by Lt. Col. Carmon A. Rogers, was the largest agency under SOS, and like the OCQM in USASOS, exercised centralized control over Quartermaster operations.[63]

The joint operations of the Army, Navy, and Marine Corps in the South Pacific called for close co-operation in order to reduce confusing duplication of logistical efforts. The form of this co-operation was laid down in the Basic Logistical Plan for Command Areas Involving Joint Operations. Approved by the War and Navy Departments in March 1943, it directed the organization of joint Army-Navy staffs in the Pacific Ocean Areas to co-ordinate the activities of all supply and service agencies. In the South Pacific Admiral Halsey set up a Joint Logistical Board (JLB) to fashion co-operative supply policies and a Joint Working Board (JWB) to carry out these policies. The decisions of these two boards determined the precise scope of Army responsibility for supplying other services.[64]

The QMC was assigned a broader mission than it had in Army-controlled areas. This was particularly true of the procurement and distribution of food. Before June 1943 representatives of the Army, Navy, and Marine Corps had met at irregular intervals and made informal agreements roughly defining their respective missions in this field. After that date the JWB assigned definite functions to each service. It made the QMC responsible for the procurement, storage, and distribution of nonperishable subsistence and combat rations for Army, Navy, and Marine Corps units, whether ashore or afloat, and of perishable food for units ashore. The Navy procured perishables for units afloat and furnished ocean transportation for all such provisions,

[62] Miller, *Guadalcanal*, pp. 1–3, 10–12, 14–19.

[63] (1) Hist Record, cited n. 55(2). (2) Organizational Hist, SOS SPA, from Activation to 30 June 1943, pp. 1–4. ORB USAFINC AG 314.7.

[64] Ltr, CNO to CINCPAC, 8 Mar 43, sub: Basic Logistical Plan. ORB USAFINC AG 400.

whether for use at sea or on land. Only in the Samoan Islands and Funafuti Island was the Army excluded from any responsibility for food.[65]

The broad functions given to Quartermaster agencies for provisioning Navy and Marine Corps as well as Army units sharply increased the dimensions of the Quartermaster subsistence program. Though Army troop strength alone was usually smaller than in the Southwest Pacific, the QMC, owing to the large number of Navy and Marine Corps units, at times procured and distributed rations for as many or more men than it did in the neighboring area.

Whereas the Corps was charged in general with procurement of subsistence in the South Pacific, the Joint Purchasing Board, a body composed mostly of Navy representatives, remained responsible for the centralized procurement of food as well as other supplies obtained locally in New Zealand. The Corps, believing it should control all local procurement of subsistence, was never wholly satisfied with this allocation of responsibility. Increasingly, however, the naval representatives on the board devoted their major attention to negotiations with New Zealand government agencies, while the Quartermaster representatives more and more cared for the details arising in the purchase of the items with which they were charged. These officers functioned much like their counterparts in the Subsistence Depot in Australia, determining how production could be increased and what equipment and materials were needed to raise agricultural output.[66] The Quartermaster, SOS, provided the Joint Purchasing Board with estimates of future requirements on an area basis, and the board then determined the amount of each item procurable locally. On receipt of these figures the Quartermaster, SOS, could readily ascertain the quantity of supplies that he must requisition from the United States to meet area needs.[67]

The South Pacific Area obtained food not only from New Zealand and the United States but also from Southwest Pacific stocks of subsistence produced in Australia. During the early months supply from this source was conducted in a somewhat haphazard fashion satisfactory to neither command.[68] In January 1943 this situation was materially improved by a comprehensive agreement between the two areas, which accepted 400,000 men as the number to be supplied in the combined commands during 1943 and which provided that each area would estimate its requirements on the basis of half that number and inform the other area of its deficiencies. These, if obtainable locally, would be added to that area's procurement schedule and submitted as separate contract demands on the Australian or the New Zealand Government. Practically speaking, the burden of making up deficiencies fell almost entirely on the Southwest Pacific.[69]

Toward the end of 1943, the OCQM, USASOS, finding it increasingly difficult to send all needed food to the New Guinea bases and at the same time fill South Pacific demands, objected to the practice of requi-

[65] Ltr, COMSOPAC to SOPAC, 18 Jun 43, sub: Proc of Provisions, SPA. ORB USAFINC AG 400.

[66] (1) Hist USAFISPA, 376–95. (2) Rpt, TQMG, 14 Mar 45, sub: Tour of POA & SWPA. OQMG POA 319.25.

[67] Ltr, CG SOS to TQMG, 13 Aug 43, sub: Rpt of QM SOS SPA. OQMG POA 319.25.

[68] (1) Memo, QM USAFIA for Sup Div OQM, 5 Apr 42. (2) Memo, Plng Br for Subs Br OQM USAFIA, 28 Apr 42. Both in ORB AFWESPAC QM 430. (3) Memo, Col Lacey Murrow for CG SOS SPA, 14 Jan 43, sub: SPA Liaison Activities in Australia. ORB USAFINC AG 320.

[69] Rpt, Maj Gen Richard J. Marshall, 28 Jan 43. ORB USAFINC G–4 Subs Gen File.

sitioning and holding rations specifically for the neighboring command. It recommended that Southwest Pacific requirements be filled before any shipments were made elsewhere and that no stocks be earmarked for other areas. In a conference between the two areas in late 1943 these recommendations were substantially accepted.[70]

Quartermaster procurement for all three armed services in the South Pacific was not confined to food. It was applied also to the procurement and distribution of insecticides for the extermination of the anopheles mosquito and other insect bearers of malaria, dengue fever, filariasis, and scrub typhus, diseases that caused more casualties than did the Japanese.[71] Post exchange items constituted another group of supplies common to the three services that the JLB recommended be procured and distributed solely by the QMC. As in other overseas areas, each service in the beginning had procured its own sales items and sold them in its own stores. Every Army PX obtained its stock from the United States through individual purchase orders on the Army Exchange Service rather than from area warehouses. This method obliged each store to bear losses in transit. As a result exchanges sometimes had few items to sell. From the close of 1942, therefore, the QMC in the South Pacific, as in other operational areas, had gradually been charged with the procurement of more and more articles for PX's. It tried to maintain large stocks of candy, soap, toothpaste, and other common items in South Pacific warehouses, but there were almost chronic shortages of cigarettes, beer, and soft drinks. Since articles unavailable in post exchanges were repeatedly found in the ship's service stores maintained by the Navy, soldiers became increasingly dissatisfied with the Army stores.

This disparity in the variety and quantity of articles for sale to the different services engendered a sense of discrimination among the men and hurt their morale. Toward the end of 1943 the JLB accordingly proposed that the Quartermaster Section, SOS, buy all post exchange supplies for all the services. This plan was approved by both the War and the Navy Departments early in 1944, but Admiral Halsey never carried it out because he was uncertain concerning the future strength of his area.[72]

The principle of unification was applied also to the collection and repair of salvaged materials, matters of considerable importance in the South Pacific owing to the rapid deterioration of footwear and textile items, replacement of which was difficult. Though the QMC never actually had enough salvage personnel, it had more than any other organization and therefore was charged with the collection, classification, and repair of typewriters, cots, tents, shoes, clothing, and other salvageable articles common to the three services.[73]

On 1 August 1944, after conclusion of offensive operations in the South Pacific, the SOS SPA became the South Pacific Base Command (SPBC). As such, it was primarily responsible for the staging and rehabilitation of Central Pacific divisions in the South Pacific Area, the support of combat activities in the Central Pacific, and the

[70] (1) Ltr, CG USASOS to Liaison Office, SPA, 11 Dec 43, sub: Subs Rqmts. ORB USAFINC Subs Gen File. (2) Ltr, CG USASOS to Dir of Proc USASOS, 18 Jan 44, sub: Proc of Sups Purchased in SWPA. DRB AGO QM USASOS.

[71] Ltr, COMSOPAC to SOPAC, 19 Sep 43, sub: Basic Logistical Plan for SPA. ORB USAFINC AG 400.

[72] Hist USAFISPA, 351–52, 514–15, 565–75.

[73] (1) Ltr cited n. 71. (2) SPBC Memo 195, 14 Nov 44, sub: Repairable Property. OQMG POA 400.4.



SECTION OF THE QUARTERMASTER SALVAGE DEPOT *at Milne Bay, New Guinea.*

supply of three Southwest Pacific infantry divisions in the northern Solomons. When at the end of the year offensive operations spread to the Philippines, which lay too far west to be readily supported by the SPBC, its major functions became the "roll-up" of the area and the transfer of its excess supplies to other commands.[74]

Quartermaster problems in the two areas below the equator were for the most part not dissimilar. In neither area were there at the outset any Quartermaster agencies; from top to bottom such organizations had to be established in a few short months. The chief differences between Quartermaster operations in the two areas sprang almost entirely from the broader responsibilities placed upon SOS SPA for the supply of rations and certain other items to Navy and Marine Corps organizations.

The Central Pacific Quartermaster Organization

Unlike the South and the Southwest Pacific Areas, the Central Pacific Area started with an established peacetime organization in the Hawaiian Department. Within that department there were already a Quartermaster Section at Department Headquarters and Quartermaster depots on Oahu. During the first eighteen months after the outbreak of hostilities, when the main functions of the Hawaiian Department were the training and staging of troops for amphibious operations in other areas

[74] (1) Hist USAFISPA, 270–79. (2) Rpt, Maj. Harold A. Naisbitt, 1 Feb 45, sub: Info Obtained from QM SPBC. OQMG POA 319.25.

rather than for offensive activities of its own, Quartermaster problems were less complex than those of the southern commands. No extensive organization was required for distribution operations or local procurement as few indigenous items were obtained and there were no sizable bases outside Hawaii.

The Quartermaster Section functioned much like similar sections elsewhere, advising the commanding general of the area on policy matters and preparing estimates of the men and supplies required to carry out the Quartermaster mission. It also dealt with day-to-day operations, translating area requirements into requisitions, supervising unit training, and controlling the activities of subordinate organizations, such as the Quartermaster Depots at Fort Armstrong and Schofield Barracks, the School for Cooks and Bakers, the Quartermaster Supply Areas on Oahu, the service units operating these and similar installations, and the Quartermaster units sent to Hawaii for training. The only units of this type not controlled by it were those which furnished Quartermaster services in the outer islands under the supervision of the Hawaiian Department Service Forces and those which were assigned or attached to ground or air forces. Until late 1943, Quartermaster operations were, then, in general of a routine nature.[75]

As in the South Pacific, a Joint Logistics Board and a Joint Working Board developed plans for joint supply. Each service in Hawaii filled most of its own requirements, but the principle of joint supply was applied to the small advance bases. On Johnston and Palmyra Islands, where the Navy controlled all but a few facilities and had the larger forces, that service furnished all classes of supply. On Fanning and Christmas Islands, where the Army had the larger interest, it provided Class I, II, and IV items.

After large-scale offensive operations began with the attack on the Gilberts, Quartermaster responsibilities were substantially increased, for it was then agreed that during such operations the Army would furnish rations to Navy and Marine forces and provision these elements at the advance bases established as a result of combat activities. From this time onward, the QMC fed a steadily rising number of men, including eventually more than 100,000 marines. The principal effort of the Corps came, therefore, during the last two years of the war, when it handled four to six times as many supplies as it did in the preceding period.[76]

Since the support of combat troops was taking up more and more of the time of technical service chiefs and since base operations were becoming daily more important, the Central Pacific Area was reorganized in June 1944 to relieve these officers of routine duties. The functions of Headquarters, U.S. Army Forces, Central Pacific Area (USAFICPA), as the Hawaiian Department had been redesignated in August 1943, were divided between two new agencies—Headquarters, U.S. Army Forces, Pacific Ocean Areas (HUSAFPOA), and the Central Pacific Base Command (CPBC). This reorganization divided the functions of the former Quartermaster Office, Central Pacific Area, between the two new establishments, both of which had their headquarters on Oahu.[77]

[75] QM Mid-Pac Hist, pp. 9–31.

[76] (1) Mid-Pac Hist, VI, 1038–44. (2) Msg W-6510, CG CPA to WD, 17 Oct 43. (3) Memo, Dir of Plng for Dir Stock Control ASF, 27 Oct 43, sub: Logistic Support of Naval and Marine Corps Pers in CPA. OQMG POA 400.302.

[77] (1) Mid-Pac Hist, III, 479–484. (2) QM Mid-Pac Hist, pp. 85–94, 166–206.

The Office of the Quartermaster, HUSAFPOA, headed by Brig. Gen. George E. Hartman, inherited the planning, policy-making, and supervisory responsibilities of the Office of the Quartermaster, Central Pacific Area. It determined area and base stock levels as well as unit and supply requirements for combat organizations, supervised the building up of stockpiles by the base commands, and planned the logistical support of tactical forces and the development of Quartermaster base facilities on newly won islands.[78] As the CPBC was in essence a communications zone, the Office of the Quartermaster in that command looked after the countless details involved in the support of operational forces and in the development and supply of bases, old and new. Its responsibilities included the collection of statistics of stocks on hand and on order; the correlation of these figures with theater requirements as estimated by HUSAFPOA so as to ascertain what additional supplies were needed; the storage and distribution of stocks in accordance with directives from HUSAFPOA; and the establishment and supervision of Quartermaster base installations and services.[79]

The Quartermaster mission of the CPBC was of signal importance from July to November 1944. During that period the Marianas campaign was triumphantly terminated, and a substantial part of the forces that conquered Leyte was mounted. As the American forces moved toward Japan it became more difficult to control the supply of Pacific Ocean Areas troops from now distant Oahu. When the Okinawa campaign started, Saipan was therefore made the headquarters of the new Western Pacific Base Command, set up to assume in its territory tasks similar to those of the Central Pacific Base Command. The new command operated under the general supervision of the Quartermaster, HUSAFPOA. It participated in the logistical support of the tactical forces operating in the western Pacific and supplied garrisons totaling about 130,000 troops on Saipan, Guam, Iwo Jima, Angaur, and Ulithi.[80]

Meanwhile General MacArthur on 6 April 1945 had been given command over all Army troops in the Pacific. This event had little influence on Pacific Ocean Areas supply activities. It merely meant that in the future HUSAFPOA would submit its reports to MacArthur as Commander in Chief, Army Forces, Pacific (CINCAFPAC), rather than to the War Department. In July HUSAFPOA was redesignated as Headquarters, U.S. Army Forces, Middle Pacific (HUSAFMIDPAC), and Brig. Gen. Henry R. McKenzie succeeded General Hartman as Quartermaster.[81]

Though Quartermaster functions in the Central and the Western Pacific eventually embraced the logistical support of formidable task forces and the maintenance of large stocks at a long chain of growing bases, Quartermaster distribution operations were never as difficult as they had been earlier in these areas. This favorable situation was partly a result of the fact that supplies during the first two years had come to Honolulu almost wholly from San Francisco, only 2,000 miles away, and had been distributed over relatively short distances within the Hawaiian group; partly of the fact that shipping in the last two years, when distances became much greater, was never as scarce as elsewhere; and partly of the fact

[78] QM Mid-Pac Hist, pp. 324–36.
[79] QM Mid-Pac Hist, pp. 338–42.
[80] Mid-Pac Hist, VI, 1148–50.
[81] QM Mid-Pac Hist, pp. 324–26, 335.

that a full-scale Quartermaster organization existed in the mid-Pacific from the outset.

The central Quartermaster organizations in the two areas below the equator probably never attained as high a degree of efficiency as those to the north. When American troops first came to the south, there was in all that enormous territory no central Quartermaster organization to supervise the activities of the Corps and to inaugurate large-scale operations in support of combat troops. Such organizations had to be improvised without the benefit of carefully developed prewar plans and in the midst of uncertainty as to the precise role the U.S. Army would play in that part of the world. The confusion and doubts of the early months were quite naturally reflected in a dangerously undermanned Quartermaster organization. Frequent shifts in the location of SOS headquarters, particularly in Australia, made it almost impossible to retain a fully trained civilian staff drawn from local inhabitants and thus intensified the difficulty of building up an effective central office. Even more important hampering factors were the repeated changes in the internal organization of central Quartermaster offices—again, most notably in Southwest Pacific Area. No one principle of administration was long followed in USASOS; changes were almost constantly being made, often accompanied by shifts of supervisory officers and a general shuffling of activities within divisions. Apparently, this unsettled state of affairs often lowered efficiency. It might have been better if a definite administrative principle had been early adopted and then consistently adhered to.

CHAPTER IV

Pacific Bases

The OCQM in the Southwest Pacific and corresponding offices in the other areas planned, co-ordinated, and supervised Quartermaster activities, but base sections set up throughout the Pacific as need developed actually carried out most of these activities. They were the agencies that received, stored, and distributed supplies, reclaimed discarded and worn-out articles, and cleaned and laundered clothing.

Ordinarily, base sections covered specific geographical areas. According to their location in the communications zone, they were classified as rear, intermediate, and advance installations. Generally speaking, rear bases obtained their stocks direct from local industry and agriculture or from the United States. Since they supplied intermediate and sometimes advance bases as well, they normally maintained larger stores than the other bases. Intermediate bases, located nearer the combat zone, served in the main as suppliers for advance bases. The latter installations kept only limited stocks, which they employed to provide needed items to the truckheads and navigation heads of combat zones. All bases, regardless of classification, supplied the military units within their own geographical areas.

The mission of the bases varied in detail with shifting strategic requirements, availability of shipping, and changing locations of troops concentrations and combat zones. Until late 1943, for instance, each base in Australia was charged with buying perishable foods and furnishing these items to the base in New Guinea for whose supply it was responsible, but the insufficiency of reefer shipping and the increased number of troops in New Guinea made it difficult for the mainland installations to carry out their assigned responsibilities. This system was accordingly modified so as to permit shipments from any base that had reefers.[1] As fighting spread northwest along the New Guinea coast and finally reached the Philippines, more fundamental changes occurred. Rear bases in Australia were either abandoned or operated on a much smaller scale, and advance bases in New Guinea became intermediate or even rear bases. A similar evolution occurred in the South and Central Pacific.

Bases conducted their activities through technical service sections that handled the supplies and equipment furnished by their particular service. Quartermaster Sections operated mainly through storage and distribution depots located at strategic points within the base area. Administratively, these installations might be either general depots handling supplies of all services or

[1] USASOS Logistic Instructions 38, 1 Nov 43, sub: Distr of Perishables. ORB AFWESPAC AG 400.

technical service depots handling the supplies of a single service. Functionally, they might be in-transit depots, receiving and classifying inbound and outbound shipments; issue depots, storing stocks for units within the base area; or reserve depots, serving as sources of replacement supply for issue depots, other bases, and operational forces.

Southwest Pacific

During most of the war the Australian bases functioned as semipermanent rear installations supporting the New Guinea forces. They were indispensable to Quartermaster supply, for they handled not only the vast quantities of food, clothing, footwear, and general supplies procured in Australia but also all shipments made from the United States before August 1943. Despite the shortage of labor and materials-handling equipment the Australian bases were the most efficient ones in the Southwest Pacific, for they had the best ports and most warehouses.[2]

Since Australia at the start of hostilities had become the communications zone of the Southwest Pacific, the first bases in that area had been set up there. By April 1942 seven were in operation, five of which approximately followed state boundaries. The leading commercial center in each base area was designated as headquarters. Base Section 1 (Darwin) comprised the Northern Territory; Base Section 2 (Townsville), northern Queensland; Base Section 3 (Brisbane), southern Queensland; Base Section 4 (Melbourne), Victoria; Base Section 5 (Adelaide), South Australia; Base Section 6, (Perth), Western Australia; and Base Section 7 (Sydney), New South Wales.[3]

Until late 1942 the danger of Japanese invasion was the major factor in determining the location and mission of these bases. It forced the wide dispersion of supplies, which in turn for some months necessitated the continued operation of the seven original bases, even after available facilities in some of them proved unsatisfactory. Defense against possible attack from New Guinea and the Netherlands Indies largely motivated the establishment of bases at Darwin and Perth, and as that danger receded, these installations became less significant. Adelaide was set up chiefly because its location on the south-central coast presumably rendered it safe from attack. Its principal task was the supply of the 32d Division, staged from May to July 1942 at camps about 120 miles from Adelaide. After this mission had been completed, its importance rapidly diminished. Since Melbourne and Sydney were the leading industrial and commercial centers and were remote from probable enemy landing points, they became the largest receivers and forwarders of military shipments. In the early months Melbourne served as the main supplier of other base areas. Intermediate depots, stocking advance installations to the north and northeast, where danger of hostile landings was greatest, were established in the Sydney and Brisbane base areas, at relatively safe sites, 100 to 150 miles from the coast. Advance depots were located mostly in the Townsville base section along highways running west from Rockhampton, Townsville, and Cairns and at change-of-gauge points in this region. The principal depots were set up at Chart-

[2] Hq USASOS, Min of Gen and Special Staff Conf, 19 Jan 44. DRB AGO PHILRYCOM.

[3] (1) USAFIA GO 1, 5 Jan 42, sub: Establishment of Base Secs. (2) USAFIA GO 38, 15 Apr 42, sub: Mission, Organization, and Opn of Base Secs. Both in ORB AFWESPAC AGO GO.

ers Towers, Cloncurry, Mount Isa, and Tennant Creek between Townsville and the Darwin–Alice Springs railway.[4]

As danger of invasion waned and New Guinea emerged as the center of Allied offensive operations, base activities underwent substantial modification. Those bases which had satisfactory ports and lay comparatively close both to New Guinea and to industrial and agricultural centers handled more and more supplies while other bases dwindled in importance. Perth and Adelaide were discontinued in January 1943, and though Darwin functioned until July 1944, its activities were increasingly confined to supply of the Air Forces. Despite excellent port and warehouse facilities at Melbourne, the distance of that base from the center of combat operations caused gradual curtailment of its activities, and it was finally abandoned in June 1944. As Melbourne declined, Brisbane and Townsville, 1,100 and 1,875 miles nearer New Guinea, expanded and, together with Sydney, emerged as the principal bases. From September 1943 to February 1944 Cairns in northeast Queensland, 225 miles nearer New Guinea than Townsville, served as headquarters of the temporarily reconstituted Base Section 5, formerly at Adelaide, but owing to its inferior docks and warehouses, it handled comparatively few New Guinea-bound supplies.[5]

Quartermaster sections of Southwest Pacific bases were organized in various ways, the particular form being determined by their missions, but there was always a base quartermaster who exercised technical supervision over all the base activities of the Corps. He usually had certain assistants, of whom the Quartermaster depot officer was possibly the most important. This officer stored and distributed reserve stocks earmarked for other bases and for advance areas. His work was supplemented by that of the base supply officer who issued items destined for military units stationed in the base area. There were also purchasing and contracting officers, whose primary function was the procurement of the few supplies that bases were allowed to buy locally for these units, and subsistence officers—actually, perishable subsistence officers—who stored and issued fresh provisions and controlled the refrigeration cars and trucks used for delivery of perishables to units in outlying areas. Finally, there were service center officers, who looked after the miscellaneous activities of the Corps.[6]

All Quartermaster operations were carried out under the general direction of the base commander. The OCQM could issue technical instructions and its representatives could discuss technical problems with base quartermasters, but neither the OCQM nor the base quartermasters could determine exactly where supplies for troops within a base would be stored or how they would be distributed. These questions involved command functions, for which base commanders alone were responsible. To give them authority in these matters was a necessity if limited labor, transportation, and storage

[4] (1) Rpt, Lt Roy P. Smith, 28 May 42, sub: Sup System at Base Sec 1. ORB AFWESPAC AG 371.43. (2) Ltr, ACofS G–4 to CofS USAFIA, 4 Jul 42, sub: Sup Depot Installations. ORB AFWESPAC QM 633. (3) Masterson, Transportation in SWPA, pp. 57–59, 77–80.

[5] (1) Masterson, Transportation in SWPA, App. 56. (2) Hq USASOS, Min of Gen and Special Staff Conf, 19 Jan 44, pp. 4–5. DRB AGO PHILRYCOM.

[6] (1) Hq Base Sec 4, OQM, Methods and Procedures of QM Activities, 31 Dec 42. AFWESPAC QM 400.24. (2) Memo, Base Sec 3 for CQM USASOS, 17 Nov 43, sub: Base QM Organization Chart. AFWESPAC QM 319.1.

resources were to be pooled in the common interests of all services and all military units operating within the base area.[7] But base commanders had no power to determine just where, within their territorial jurisdiction, supplies reserved for other bases or for operational forces in other base areas would be stored or how they would be distributed. These operations were controlled by distribution instructions from the OCQM which, in turn, was governed by logistical instructions from higher authority.

The question of ultimate control over supplies held for distribution to other bases and operational forces was solved only after prolonged discussion between the base commanders and the OCQM. Throughout 1942 that office fought for Quartermaster reserve depots under its control rather than under that of the base commanders. Only by gaining this authority, the OCQM believed, could it really control Quartermaster reserve stocks. Early experience supported its position, for, in the rush to supply troops from the scanty stores, materials that theoretically constituted reserve stocks for other bases were not segregated from those held to fill the needs of the particular base in which they were located. Hence they could not be controlled effectively. To correct this situation, Headquarters, USASOS, ordered the establishment of Quartermaster reserve depots in the Sydney, Melbourne, and Brisbane base sections. These installations would be under the direction of the Chief Quartermaster, who would recommend the officers to be assigned by the Commanding General, USASOS, as depot commanders and who would determine where and in what quantities reserve stocks would be held and when and where they would be delivered to other installations.[8]

In compliance with the directions of Headquarters, USASOS, Quartermaster reserve depots were established at Brisbane and Melbourne, but the Sydney base commander, maintaining that he should control reserve installations within his territory, delayed setting up the prescribed depot. This situation caused Headquarters, USASOS, to reconsider its policy. In November it adopted a compromise solution whereby base commanders were empowered to set up general rather than technical service depots for reserve stocks and to appoint the commanding officers of these installations. The OCQM, however, was to issue distribution instructions indicating how Quartermaster reserve stocks would be distributed.[9]

Storage facilities at the Australian bases varied appreciably in serviceability. During 1942 commercial space of all sorts was employed. Quartermaster requirements for storage space were then much smaller than they later became, but at this time suitable warehouses were so scarce that supplies were even kept in empty shops, garages, social centers—in fact, in almost any available space. During 1943 an extensive leasing and construction program provided substantial quantities of Quartermaster covered space in the Melbourne, Sydney, and Brisbane base areas. In January 1944, when storage operations in Australia were at their peak, the Corps utilized more warehouse space than any other branch of the Army, occupying 3,175,000 square feet, or 43.7 percent of the 8,506,000 square feet employed by the Air Forces and the technical services.[10]

[7] Lecture, Col Fred L. Hamilton, ACofS G-4 USASOS, 14 Dec 42, sub: Base Secs, Relationships and Problems. ORB Base A QM 400.291.

[8] QM SWPA Hist, II, 34–41.

[9] *Ibid.*

[10] *Engineers in the Southwest Pacific, 1941–1945,* Vol. VII, *Engineer Supply,* p. 90.

In mid-1944 the growing practice of shipping direct from San Francisco to advance installations brought about a rapid shrinkage in activities at all Australian bases, and the bases in the huge undeveloped island of New Guinea became increasingly important. In 1942 this island had not a single mile of railroad and only a few small stretches of surfaced roads. There were but three ports with any modern means for handling shipments. These ports were Milne Bay, at the eastern tip of the island, with a daily handling capacity of 2,500 tons; Port Moresby, on the south side of the narrow Papuan peninsula, with 1,500 tons; and Buna, on the north side, with 1,000 tons. Minor ports at Morobe, Salamaua, and Madang handled together only 450 tons. At most coastal points lighters provided the sole means of bringing supplies ashore. In the interior high mountains, steaming jungles, impassable swamps, and kunai grass growing to a height of 6 or 7 feet covered the island and made transportation difficult except by native porters.

Because the means of moving materials on land were so inadequate, 95 percent of Army supply movements in New Guinea were made by ship. This dependence on water transportation brought about an extensive development of ports and bases.[11] Since construction of storage facilities could not start until the dense jungle had been cleared and airstrips, docks, and roads built, bases were seldom able to handle Quartermaster supplies efficiently in their early months. With suitable means of storage thus at a minimum, stocks were often held in the open or in tents, shacks, and other improvised structures. During this period logistical support of tactical forces of necessity came principally from the older and more distant bases, although these installations could not satisfactorily support large bodies of advance troops.[12]

The first base in New Guinea was started at Port Moresby in April 1942 during the desperate Allied attempt to hold eastern New Guinea, the primary Japanese steppingstone to Australia, whose Cape York Peninsula lay less than 100 miles across the Torres Strait. (*Map 2—inside back cover*) In August the base was activated as U.S. Advance Base, New Guinea. At this time another advance station, supervised from Port Moresby, was set up at Milne Bay and designated Sub-Base A. On establishment both these bases already had several small wharves, but neither possessed warehouses, the matter of chief Quartermaster concern, and supplies were stored mostly in improvised shelters or open dumps. At Port Moresby, because of the danger of air raids and flooding waters, the dumps were dispersed for greater safety in the hills, three to twenty-five miles inland. In the Milne Bay area they were several miles from the main port at Ahioma and the sub-ports at Waga Waga and Gili Gili. Throughout most of 1943 the Milne Bay area served as the major receiving and transshipment center in New Guinea. In August, with Allied possession of Papua apparently secure, it replaced Port Moresby as Headquarters, U.S. Advance Base, New Guinea.[13]

In December 1942, meanwhile, Sub-Base B had been started along the still primitive shores of Oro Bay, about 18 miles south of

[11] Masterson, Transportation in SWPA, pp. 433–34.

[12] (1) USASOS Conf 23, 18 Jan 44, sub: Min of Conf of Gen and Special Staffs. (2) Rpt 6, Capt Robert D. Orr, 6 Jan 44, sub: Rpt on Large Advance Base (F). OQMG SWPA 319.25.

[13] For a complete description of the New Guinea bases, see Harold Larson and Joseph Bykofsky, The Transportation Corps: Operations Overseas, a volume under preparation in this series.

Buna Village and 225 miles northwest of Milne Bay. Its initial mission was better support for the troops fighting in this area than could be furnished by the fishing boats and other small craft that made the long trip from Milne Bay and discharged their cargo on unsheltered beaches. Following the successful termination of the Buna–Gona campaign, Oro Bay developed into a staging area and a supply base for advance forces and for the nearby airfields at Dobodura. As at Port Moresby, storage installations were dispersed at points five to twenty miles inland.

In April 1943 Sub-Base C was activated at Beli Beli Bay on Goodenough Island, off the north coast of southeastern New Guinea, midway between Milne Bay and Oro Bay, but it never attained much importance as a general distributing base. In May, Port Moresby, which had declined somewhat in relative importance, was redesignated Sub-Base D. Three months later all the sub-bases became full bases operating under the supervision of Advance Section (ADSEC), USASOS, as the U.S. Advance Base at Milne Bay was then designated. After the capture of Lae in September, this area, in spite of its small unsheltered harbor on Huon Gulf, was developed as Base E. Its major task was not the supply of forward forces but of the huge Army Air Forces installations thirty miles inland at Nadzab, the western terminus of the Air Transport Command flights across the Pacific.[14]

[14] (1) Masterson, Transportation in SWPA, 441–43. (2) Military History of United States Army Services of Supply, compiled by USASOS, SWPA, n. d., pp. 67–70. OCMH. (3) Ltr, Col. Charles R. Lehner, QM ALAMO Force, to Col Lewis Landes, QM USASOS, 22 Jul 43. ORB AFWESPAC QM 312. (4) Rpt, Maj Allan W. Johnson, 8 May 44, sub: Hist of Base E to 1 Mar 44. ORB Base E AG Mil Hist.

Base F, situated at Finschhafen on the eastern end of Huon Peninsula, was begun in November 1943, shortly after the Japanese had been driven out. With a fairly good natural harbor, Finschhafen was developed as the major base in New Guinea. It replaced Milne Bay as the largest handler of supplies in the Southwest Pacific just as shipments direct from the United States to New Guinea were beginning. From April 1944 to February 1945, the period of maximum activity at New Guinea bases, it loaded and discharged a third of the tonnage passing through these installations. Between June and January, months that included the logistical build-up for the Leyte and the Luzon Campaigns, Finschhafen handled 25 to 35 percent more tonnage than did all the Australian bases. Yet it never possessed buildings and equipment of the high quality demanded by the magnitude of its mission.[15]

The difficulties besetting the development of Base F typified those generally encountered at New Guinea supply centers. Near-impenetrable mountainous jungle rose abruptly only a short distance from shore, and buildings and roads were necessarily strung out along the coast for miles. Because of the unfavorable hydrographic conditions dumps could not be placed just behind the docks, a location that would have made possible the most economical handling of supplies. Instead these installations were usually situated at distances that required considerable hauling to and from the waterfront. Storage conditions were rendered still less satisfactory by the lack of men and equipment, shortages that delayed building activities and made it almost impossible to put up sturdy storage places.[16]

[15] (1) Masterson, Transportation in SWPA, Apps. 42–43. (2) Rpt cited n. 12(2).

[16] P. 9 of Rpt cited n. 12(2).



CLOTHING AND EQUIPAGE BUILDING *of Base H Quartermaster Depot at Biak.*

The victorious conclusion of the Hollandia campaign early in June 1944 opened the way for the establishment of Base G.[17] Originally designed to replace Finschhafen as the chief supply center in New Guinea, the new base had too shallow a harbor to permit realization of this plan. Nevertheless, it was developed on a large scale and late in the year shipped a vast volume of supplies to the forces liberating the Philippines. During this period it ranked second only to Finschhafen in tonnage handled. Base H, activated in August 1944 after the successsful Biak Island operation, was located partly on that island, off the northwest coast of New Guinea, and partly on adjacent islets. Biak had a flat terrain that better fitted it for development as a supply and staging area than any other New Guinea base. As the USASOS installation closest to the Philippines, Biak shared with Hollandia in the mounting and supply of the forces invading Leyte and Luzon, and until the spring of 1945 sent large quantities of replacement stocks to the Philippines. During March and April it handled more tonnage than any other New Guinea base since Finschhafen then lay too far to the rear to be utilized effectively.[18]

[17] For an account of the Hollandia Operation, see Robert Ross Smith, *The Approach to the Philippines*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1953).

[18] (1) Conf, Gen and Special Staff Secs Hq USASOS, 9 May 44, sub: Mins. DRB AGO. (2) Ltr, CG Sixth Army to CG USASOS, 21 Aug 44, sub: Construction Base G. ORB AFWESPAC AG 600.1. (3) Hist, Lt Col Melvin M. Vuksich, 1 Nov 44, sub: Hist Rpt Base H, 25 Sep–25 Oct 44. (4) Hist, WOJG Julian P. Barton, 2 June 43, sub: Hist Rpt, 25 Apr–25 May 45. Both in ORB Base H AG 314.7.

During the first three years of the war bases in New Guinea in general were begun only after operations undertaken in part for the purpose of winning desirable base sites had been substantially concluded. This procedure had retarded the development of forward installations and rendered the supply of tactical forces dependent on bases located several hundred miles away. But it was a procedure necessitated by the lack of ships for accumulating stocks at forward bases, by the scarcity of building materials, and by the existence of still formidable Japanese air and naval forces. After the reconquest of the Philippines got under way, greater resources were available. At the same time the employment of the largest U.S. forces yet seen in the Pacific demanded bases closer to the combat zones. The Army Service Command (ASCOM) was accordingly set up in July 1944 under the Commanding General, Sixth Army, to plan the logistical support of tactical forces and provide for the prompt construction of bases. Though chiefly Engineer in composition, it contained Quartermaster and other technical service sections. It pooled building materials, made plans for major bases to be started in the Philippines immediately after the landings scheduled for the fall and winter, and gathered men for the erection and operation of these bases. In the future, therefore, bases were started as soon as possible after the landings and used initially as supply installations for troops fighting in their vicinity.[19]

Since combat operations before late 1944 had been carried out almost entirely within distinct areas by troops of each area, Southwest, South, and Central Pacific Area bases up to that time had supplied mainly their own organizations. But the reconquest of the Philippines and the projected invasion of Japan called for the participation of Army, Marine Corps, and Navy forces from all areas and necessitated the development of bases capable of maintaining these forces. An interarea conference, assembled at Hollandia in November 1944 to discuss this problem, agreed that the Philippine bases planned by ASCOM would help support all troops who participated in future operations, regardless of the area from which they came.[20] As the Philippine bases would also have extensive responsibilities for the supply of offensive movements against nearby objectives, for the rehabilitation of the archipelago itself, and for the logistical support of the invasion of Japan, they would be set up by ASCOM as semipermanent installations. The establishment of such bases was now possible, for ships and building materials were at last available in fairly large quantities.

Base K, the first of the Philippine bases set up by ASCOM, was located on San Pedro Bay at Tacloban in northeastern Leyte, where its installations extended along the shore for some twenty-five miles. Established in October 1944, only two days after the first landings, it supported the Leyte campaign from the beginning. Until Base M was activated at San Fabian on Lingayen Gulf in January, it was the only sizable base in the Southwest Pacific Area north of Biak. Base M, whose activities were eventually scattered for fifty miles along the shore, constituted a highly important source of supplies in the early Luzon operations despite its shallow port, which compelled the discharge of cargoes direct into landing

[19] (1) *Engrs of SWPA*, I, 200, 205–07. (2) Ltr, CG USASOS to CG ASCOM, 25 Jul 44, sub: Basic Organization Directive. DRB AGO TOPNS.

[20] Plng Div, Office of Dir of Plans and Opns ASF, Hist of Plng Div ASF, pp. 11–14.

craft and lighters. As the Lingayen Gulf campaign progressed, sub-bases were set up. They supported operations until the region was cleared of hostile troops. San Fernando, La Union, 30 miles north of San Fabian, then became the permanent headquarters of Base M.[21]

Early in April 1945 another base, R, was established at Batangas, 60 miles south of Manila. A month later Base S was started at Cebu City, site of a Quartermaster depot in 1941–42, and became supply headquarters for the southern Philippines, where stubborn fighting was still in progress. Despite the fact that engineers were obliged to remove great piles of wreckage to clear the way for these two new bases, supplies in the thousands of tons were flowing in by June and continued to arrive until the termination of hostilities caused a sharp drop in receipts. In October, Batangas was redesignated Sub-Base R under Base X, the huge Manila installation. The following month Cebu became Sub-Base S.[22]

Base X, by far the largest supply installation in the SWPA, served as principal supporting point for operations in the Philippines, Borneo, and other East Indies islands and for the planned assault against the Japanese home island of Kyushu. It was not formally activated until early April 1945, but rehabilitation and construction of docks, warehouses, and open storage areas had started soon after the recapture of Manila in January. From April 1945 to January 1946 it handled more supplies than any other SWPA base ever had, receiving and discharging a monthly average of 380,000 long tons. Of this tremendous tonnage 25 to 30 percent was Quartermaster.[23]

During the Okinawa campaign the tasks of executing the base development plan and of supplying the Tenth Army were delegated to the Island Command, a joint organization, which operated under that Army. Late in July 1945, following the completion of mopping-up activities, the Island Command, now redesignated Army Service Command I, was placed directly under General MacArthur and charged with the further development of the base, whose major function was to be the logistical support of the assault on Kyushu. The heavy damage sustained by the harbor facilities at the island's only developed port, Naha, on the southwest coast, required considerable repair work, which was still incomplete when V-J Day rendered unnecessary the construction of a large base.[24]

South Pacific

While the continental dimensions of Australia and the long coast lines of New Guinea and the Philippines allowed a good deal of freedom in selecting sites for supply bases in the Southwest Pacific, the land masses of the South Pacific outside New Zealand were so few, so small, and so undeveloped that the choice of sites was confined to a handful of island groups for the most part without permanent structures of any sort. Supply bases had to be built hurriedly under adverse conditions not unlike those in New Guinea.

[21] (1) *Engrs of SWPA*, I, 309. (2) Hist, Maj John F. Shelton, 29 Aug 45, sub: Mil Hist, Base M QM Sec. ORB Base M 314.7.

[22] (1) Ltr, CO Base R to CG Phil Base Sec, 29 Apr 45, sub: Storage Construction. ORB Phil Base Sec 633. (2) *Engrs of SWPA*, I, 310.

[23] (1) *Engrs of SWPA*, I, 310–11. (2) Masterson, Transportation in SWPA, App. 44.

[24] (1) AFWESPAC, Semi-Annual Rpt, 1 Jun–31 Dec 45, pp. 5–6. (2) Rpt, Maj Gen Frank A. Heileman, ACofS G–4 AFWESPAC, 21 Jul 45, sub: Weekly Rpt of Activities, G–4 Sec. ORB PHILRYCOM AG 319.1.

During the first half of 1942, when it was feared that Japanese forces would seize New Caledonia, the Fijis, and Samoa, the Army envisaged Auckland and Wellington, the principal distribution centers of New Zealand, as major supply bases that would serve as rear depots in much the same way as the leading Australian ports did. But inability of the Japanese to carry offensive warfare into the South Pacific and the inauguration in August 1942 of the American attack on Guadalcanal, 2,000 miles from New Zealand, altered the original conception of that country's role and brought about the development of New Caledonia, 1,000 miles nearer the combat zone, as the chief South Pacific base. Yet as far as local procurement of Quartermaster supplies and the distribution of food were concerned, New Zealand became the principal rear base.

From the Quartermaster standpoint the ration storage centers, established in April 1943 at Auckland and Wellington, constituted the most important installations in New Zealand. Operating under the Joint Purchasing Board, they stored both locally procured foods and those received from Australia and San Francisco. They shipped perishable provisions to all South Pacific bases and nonperishables to all bases except Bora Bora, Aitutaki, and Tongareva.[25] Before the establishment of these centers the provision of balanced rations had been a difficult task. Since the zone of interior and the Southwest Pacific Area had furnished only ration components unprocurable elsewhere and their deliveries, made direct to the scattered bases, had seldom synchronized with those from New Zealand, it had rarely been possible to combine the components from the three supply sources into a varied menu. The absence of central food depots, furthermore, had caused an uneconomical utilization of limited shipping facilities, for vessels from both Australia and the West Coast were often obliged to stop at several bases in order to deliver their cargoes. Finally, the lack of such installations had at times forced the Southwest Pacific Area to hold food bought in Australia for the South Pacific Area in warehouses already strained to handle Southwest Pacific Area stocks. The ration depots furnished, at least in part, a solution to all these problems. They relieved the Southwest Pacific Area of storing most purchases made for the South Pacific Area and both the Southwest Pacific Area and the San Francisco Port of Embarkation of deliveries at widely scattered points. Above all, they facilitated the assembly of ration components in one place as well as their shipment to advance bases as fully balanced rations.

The choice of Auckland and Wellington as ration storage centers was almost inevitable, for, though these ports were not centrally situated with respect to other bases, they had modern means of handling sizable cargoes. With few exceptions specially built temporary structures were used to hold nonperishables. Cold-storage space for perishables was leased from commercial firms. At the peak of their activities the ration depots stocked approximately a ninety-day supply of provisions.[26]

In addition to distributing subsistence to other South Pacific islands, New Zealand served till the end of 1943 as a mounting out and rehabilitation area for thousands of soldiers and marines. The 1st Marine Di-

[25] Memo, CG SOS for CG SPA, 26 Apr 43, sub: Subs Depots. ORB USAFINC Subs.

[26] (1) Msg, QMSO SOS SPA to CofS, 5 May 43. (2) Ltr, Pres JPB to CG SOS SPA, 29 Apr 44, sub: Sup Level for Ration Depot. (3) Personal Ltr, Col Harry C. Snyder, JPB to "Dear General," 9 May 44. All in ORB USAFINC QM 430.

vision and part of the 37th Infantry Division stopped there in June and July 1942, and the 2d and 3d Marine Divisions were there for some months in the following year. On the termination of the New Georgia operation, the 25th and 43d Infantry Divisions came to New Zealand for rehabilitation. The New Zealand Service Command supplied all these forces.[27]

The French dependency of New Caledonia, rich in nickel mines, was developed as the main receiving, storage, and transshipment base in the South Pacific not only because it lay 1,000 miles nearer the combat zone in the Solomons than did New Zealand but also because, except for Auckland and for Suva and Lautoka in the Fijis, it had at the outset the only satisfactory docking facilities in the entire area. Even these facilities, located at the capital, Nouméa, were inadequate for wartime needs since they consisted of but two piers capable of handling together only four ocean-going vessels. Warehouses were similarly inadequate, and civilian labor was limited in quantity. An extensive construction program was undertaken to provide badly needed warehouses, but shortages of workers and building materials retarded its execution, and New Caledonia never acquired storage facilities commensurate with its extensive supply responsibilities.[28]

In the New Caledonia Service Command the South Pacific General Depot, organized in May 1943 under the supervision of the Quartermaster Section, was the installation that had the most to do with Quartermaster items. Set up as a major agency of the central supply system then being created to replace the chaotic system of autonomous bases, this depot maintained reserve stocks for the entire South Pacific Area as well as items for the current supply of troops in New Caledonia. Before its establishment few supplies had been readily available to fill operational needs or even for ordinary replenishment needs. During this period many items could be obtained only by requisitioning them from the United States, a time-consuming process that took three or four months. In emergencies bases and even combat units were combed for required articles. When located, these supplies often had to be shipped from several different points to meet requirements in full. After the *President Coolidge* sank off the New Hebrides in October 1942, leaving a regimental combat team and a Coast Artillery unit without equipment, it took four months of scouring base and unit stocks to reoutfit these organizations.[29]

The South Pacific General Depot at first tried to maintain a 30-day reserve of nonperishable food for 300,000 men, a 30-day reserve of other supplies for 150,000 men, and stocks sufficient for the complete reequipment of selected types of combat units. Once the ration depot in New Zealand came into full operation, the General Depot was relieved of responsibility for storing large food reserves, and in October 1943 its mission underwent further modification. Three categories of stocks were then established—stocks, both current and reserve, for troops in New Caledonia; reserve supplies for other bases; and special stockpiles of organizational equipment for the whole area. Stocks for other bases included a 30-day supply of clothing and equipage and stores of petroleum products and general supplies in

[27] USAFISPA Hist, IV, 734–36.

[28] Ltr, COMSOPAC to Comdr U.S. Naval Forces in Europe, 2 May 43, sub: Construction of Bldgs ir New Caledonia. ORB USAFINC AG 600.

[29] USAFISPA Hist, pp. 686–87.

quantities set from time to time by Headquarters, SOS SPA.[30] The General Depot also furnished a substantial part of the supplies and equipment for combat operations and for the rehabilitation of combat units.

Next to the base in New Caledonia, the one in Guadalcanal was the largest in the South Pacific. After the victorious termination of the protracted campaign for Guadalcanal in February 1943 that island was fashioned into a vast mounting out, training, and rest area and the major supply base in the Solomons. In October it became the headquarters of the newly established Forward Area, whose principal function was the logistical support of combat operations. Although the boundaries of the Forward Area varied with the shifting tactical situation, they always included the bases on Guadalcanal, Tulagi, the Russells, and, except at the very beginning, those in the New Georgia group. As the largest of these bases, Guadalcanal was the main supplier of the operations that won New Georgia, Vella Lavella, Arundel, Bougainville, the Green Islands, and Emirau. In January 1944 at the height of the Bougainville offensive the Forward Area was supporting nearly 200,000 Army, Navy, and Marine Corps troops in the northern Solomons.[31]

After the combat mission of the South Pacific Area had been completed, the Forward Area bases gave logistical support to the Central Pacific campaigns in the Marianas and the Palaus. These installations were assigned this role because Central Pacific Area bases were too few, too small, and too remote from the combat zones to shoulder the whole burden of supporting these offensives. In the operations against Saipan, Guam, and Tinian in the Marianas in the summer of 1944, the forward bases mounted approximately 40,000 marines, provided them on their departure with supplies for 30 days, and maintained a 30-day reserve supply for emergency shipment. In the Palaus operation the Guadalcanal base, besides supporting Army units, furnished the 1st Marine Division with gasoline and oil and maintained reserves of these products to meet any emergencies that might arise.[32]

Aside from New Caledonia, New Zealand, and the Forward Area bases, the most active bases in the South Pacific were those in the New Hebrides. This archipelago lay 550 to 750 miles southeast of Guadalcanal, directly astride the routes to Rabaul and Australia. For this reason Efate and Espíritu Santo, the southernmost and the northernmost of the larger islands, were fashioned into advance bases early in 1942. Both installations attained considerable importance as stations for air groups that provided land-based support during the Guadalcanal offensive. Efate remained primarily an air station. Quartermaster operations there were confined chiefly to the supply of gasoline and the reconditioning of 55-gallon drums. In the last half of 1943, Espíritu Santo developed into a major source of logistical sup-

[30] (1) *Ibid.*, 686–91. (2) Organizational Hist Svc of Sup South Pacific Area, 1 Apr–30 Jun 43, pp. 29–30.

[31] (1) Ltr, COMSOPAC to COMAMPHIBFORSOPAC, 18 Jul 43, sub: Control of Sup, Guadalcanal. (2) Personal Ltr, Brig Gen A. J. Barnett to Maj Gen Maxwell Murray, 30 Nov 42. Both in ORB USAFINC AG 319.1.

[32] (1) USAFISPA Hist, IV, 768–73. (2) Cpl Arthur P. Schulze, "Quartermaster Operations—Guadalcanal Style," *QMR*, XXIV (May–June 1945), 24–25, 106–07. (3) Hist of the South Pacific Base Command, II, 262–74.

port for operations to the north and northwest.[33]

The Fijis constituted a sizable supply base only in the first year of the war. Because of their strategical location on the air and shipping routes between the United States and Australia, American troops were sent there shortly after Pearl Harbor. Since the islands were too remote from the scene of fighting to become a transshipment point, the main function of the archipelago's Service Command became the supply of local forces. This task grew steadily less important as the number of troops dwindled from about 30,000 in 1942 to 7,000 in April 1944.[34]

Central Pacific

Except for Hawaii, land areas in the Central Pacific in general consisted of irregular formations of narrow coral reefs enclosing large lagoons. These formations, called atolls, were few in number, were separated from each other by formidable distances, and were too diminutive for development as large supply bases. At best most of them could support only a limited number of troops. Owing to these handicaps, few islands could be employed to supply forward forces.[35]

Even Hawaii was not truly well fitted to serve as a supporting base for combat troops. Between it and the nearest areas of possible American offensive operations in the Gilberts and Marshalls lay two thousand miles of ocean. It was not only remote from operational areas; it was also crowded with scores of thousands of troops in training for amphibious warfare, and its depots had little space for operational supplies. Its chief port, Honolulu, was nearly always congested. These unfavorable conditions did not materially hamper supply activities as long as the command was a staging and training rather than an operational area, and most Central Pacific troops were stationed in Hawaii. But the Gilberts offensive of the winter of 1943–44 disclosed the inadequacies of Hawaii as a supporting base. The strain placed upon its storage facilities at that time indeed forced the hurried completion of a program for building additional warehouses. Even then the long distances that separated Hawaii from the Marianas and the Philippines precluded its employment as the area's chief supporting installation for operations against these objectives. For this reason its main function gradually became the transshipment of cargoes to more advantageously located bases.[36]

When the southern Marianas were occupied in mid-1944, the Central Pacific Area came into possession of two islands, Saipan and Guam, well suited for development as major supply bases. Saipan, approximately 3,500 miles west of Honolulu and 1,400 miles east of Manila, measured only 12½ by 5½ miles, but about two thirds of its area could be utilized for supply or staging purposes. Lying within bomber range of Japan, it became both an air and supply base. By September 1945 nearly 1,800,000 square feet of warehouse space had been built, and Saipan had become one of the largest supporting bases in the western Pacific. From late 1944 until the Japanese sur-

[33] (1) USAFISPA Hist, IV, 74–75. (2) 1st Lt J. T. Holmes, "Quartermasters on Efate," *QMR*, XXV (July–August 1945), 30. (3) Rpt, Hq SvC APO 708, 7 Jan 44, sub: G–4 Periodic Rpt. ORB Espíritu Santo AG G–4 Pers Rpts.

[34] (1) USAFISPA Hist, IV, 736–41. (2) Rpt, CofS Fantan (Fijis), 1 Oct 42, sub: G–4 Pers Rpt. ORB USAFINC AG 319.1.

[35] (1) QM Mid-Pac Hist, App. I. (2) Mid-Pac Hist, VIII, 1684.

[36] Ltr, Maj Harold A. Naisbitt to TQMG, 20 Jan 45, sub: Info from QM CPBC. OQMG POA 319.1.

render it ranked not far behind Hawaii in the volume of Quartermaster tonnage. It stored a sizable proportion of the supplies for the Okinawa operation, and, after becoming the headquarters of the Western Pacific Base Command in April 1945, it maintained much of the reserve stockage built up for the OLYMPIC operation.[37] In the year following the seizure of Guam, airstrips were built there; Apra Harbor was developed for medium-sized cargo ships; and extensive storage facilities were constructed. By V-J Day Guam, too, had developed into a major base.

The development and operation of Southwest, South, and Central Pacific Area bases illustrate the differences between supply in the Pacific and in Europe. In the Pacific there was always the problem inherent in the vast distances that separated bases from one another—distances recorded not in scores or hundreds of miles, as in the European Theater of Operations, but in thousands of miles. In the Southwest Pacific Area 2,200 miles lay between Sydney and Finschhafen and 2,000 miles between Finschhafen and Manila. The two most distant bases in the South Pacific Area were separated by 3,000 miles, and 5,000 miles lay between Honolulu and Manila. Whereas New York, the chief port for the shipment of supplies to Europe, was only slightly more than 3,000 miles from the United Kingdom and France, San Francisco, occupying a similar position with reference to the Pacific areas, was 6,300 miles from Manila; 6,200 miles from Brisbane, main Australian port for the receipt and shipment of Quartermaster supplies; and 5,800 miles from Milne Bay, for many months the center of logistical operations in New Guinea. Goods moved from San Francisco to Australia and thence to bases in the north were carried 8,000 or more miles before they reached points of issue. In terms of shipping time a trip from San Francisco to Brisbane and return often required as much as four or five months. A trip from New York to Liverpool and return, on the other hand, took only about fifty-five or sixty days. The time required to deliver goods in Australia was thus two or three times that for delivering the same quantity to the United Kingdom.

Bases in a highly industrialized continental theater like the European Theater of Operations could from the outset utilize already developed port, storage, railroad, highway, river, and communication systems and tap local sources of building materials and technical equipment; Pacific bases on the other hand, if located outside Australia, New Zealand, and Hawaii, had at the start virtually no man-made facilities. After first hewing sites out of the jungle, these bases had to construct such facilities from whatever materials were at hand. All this meant protracted delays in the receipt, storage, and distribution of supplies and in the end facilities not fully adequate to the demands made upon them, inefficient handling of supplies, and excessive deterioration of insufficiently protected subsistence, textile, and leather items.

In France, once the landings had been consolidated and the port of Antwerp had been put into full operation—and to some extent even before—new advances required only the extension of already available supply lines. Across the relatively narrow expanse of the Atlantic, war materials were funneled onto the European mainland and

[37] (1) Lt Gen Ralph C. Richardson, Jr., Participation in Marianas Opn, Jun–Sep 44, I, 101–02, 112, 115–16, 120; II, 503–10, 537. (2) Rpt, Brig Gen Henry R. McKenzie, 20 Jul 45, sub: Visit to Forward Areas. OQMG POA 319.1.

moved forward over a pre-existing network of railroads, navigable rivers, and highways. Thus supply in Europe "was like a single rubber hose growing larger in diameter as the immensity of operations increased." But in the Pacific each major advance was an amphibious assault on a primitive shore and each fresh landing "a completely new supply operation." Pacific supply was "like a lawn sprayer with a new stream of supply for every new patch of land occupied." [38]

[38] Anon., "Ships Are the Workhorses of the Pacific," *Quartermaster Training Service Journal* (hereafter cited as QMTSJ), VII (22 June 1945), p. 4.

Logistical activities in the American drive across France to the Rhine were confined almost entirely to the maintenance of combat troops, but similar activities in the Pacific were only intermittently carried out for this purpose. More frequently, they aimed at building up the matériel for another amphibious landing. This meant that supplies were handled more frequently than in the European Theater of Operations, that their movement was less smooth, and that more man-hours were expended in getting them into the hands of fighting forces.[39]

[39] Ltr, Capt Orr to Capt Clinton Morrison, OQMG, 17 Oct 44. OQMG SWPA 319.25.

CHAPTER V

Local Procurement in the Pacific

In no other theater of operations did local procurement become quite as extensive as in the Southwest Pacific and South Pacific Areas. Even in Great Britain, local purchases did not compare in quantity with those in Australia and New Zealand. During 1943 and 1944, for example, these two countries together furnished the major part of the meat consumed by the U.S. armed services below the equator. Australia alone provided about fifteen times and New Zealand about nine times the amount procured in Great Britain. Acquisition of such locally produced meat represented a substantial saving in shipping space. Purchases made in Great Britain, on the contrary, had scant effect on the shipping shortage, for 80 percent of the meat obtained there in 1943 and 1944, the years of peak procurement, came from Argentina, 7,100 miles away.[1]

During the first year of procurement from Australian sources subsistence, on the one hand, and clothing, equipment, and general supplies, on the other, were handled somewhat differently. When the first U.S. troops arrived in the dominion, the QMC hoped that it could provide them with American rations. But there were neither sufficient Quartermaster officers nor service units to handle procurement, storage, and distribution operations and no immediate prospect of securing adequate reinforcements from the United States. There were no American depots or railheads for storing and distributing subsistence, no prior arrangement with the Commonwealth for American purchases of local products, and, because of the policy of relying as far as possible upon Australian resources, little importation of food from the United States except for the comparatively small amounts brought in by newly arrived units. Even these shipments could be employed only sparingly, for they were needed to build up the indispensable ninety-day reserve for emergency and tactical use. For the time being the QMC thus necessarily relied upon the Australian Army for the procurement, storage, and distribution of most of the food required by American troops. But with regard to clothing, equipment, and general supplies, the specifications for which were too highly specialized to permit procurement by any organization not familiar with their use in the U.S. Army, QMC assumed responsibility from the outset.

Although Australian agriculture and industry furnished the bulk of locally ac-

[1] (1) Karl R. Cramp, Historian, Base Sec 7, USASOS, Food Production in Australia and American Co-operation in Wartime, Ch. XX, pp. 29–32; Ch. XXII, Apps. A–C. (2) Ltr, TQMG to Dr. D. A. Fitzgerald, Special Adviser WFA, 2 Jun 45. DRB AGO 400.12 (Overseas).

quired supplies during 1942, "distress" or "refugee" cargoes also provided a not unimportant share. These cargoes, originally consigned to the Philippines, the Netherlands Indies, Malaya, and other Asiatic areas, had, because of the Japanese occupation of these regions, been diverted to Australia and seized by the Commonwealth Government. Some 195,000 tons of products of various sorts were obtained in this way. The United States was given first priority on American shipments and second priority on Dutch and British shipments. No complete figures are available on the tonnage or value of supplies received by the QMC, but there is no doubt that it secured substantial quantities of food and general supplies which proved valuable in the alleviation of shortages and the build-up of reserve stocks, particularly of general supplies.[2]

Rationing by the Australian Army

While true that distress cargoes provided an important amount of foodstuffs, most of the rations were furnished by the Australian Army. In carrying out this responsibility that army suffered from many handicaps. It lacked firsthand knowledge of American food standards and naturally thought in terms of its own rationing system. Moreover, since most of its units were overseas, it was not organized for the provisioning of more than small bodies of men, and, though much better situated than the QMC, it still lacked enough service troops and means of distribution to carry out its new task easily.

The regular Australian ration sporadically used by American troops in the opening days of the war elicited considerable criticism from them, and it became apparent that one of the perplexities to be considered in making formal arrangements for Australian subsistence of the U.S. forces would be whether to employ this ration. Containing only twenty-four basic items, it lacked the variety and the balance furnished by the thirty-nine items of the United States ration. Moreover, as it was on a money rather than a commodity basis, it varied in both quantity and quality with fluctuations in market prices. Some common American favorites, such as coffee, rice, spaghetti, fruit juices, and fresh and canned fruits and vegetables, were served only rarely while frequent servings of mutton as the main meat component proved monotonous. As long as U.S. military units remained near the ports of entry, they could occasionally supplement Australian fare with the food they had brought with them. But once they were dispersed to sections of the country remote from coastal storage points, this relief became impracticable.[3]

Early in February the U.S. Army entered into negotiations looking to formal Australian assumption of responsibility for the subsistence of American units. Both parties agreed that American food requirements would be submitted to the Quartermaster General of the Australian Army. That officer would deliver rations for current consumption direct to units having their own

[2] (1) Personal Ltr, Brig Gen Arthur R. Wilson to Gen Gregory, 2 Apr. 42. OQMG SWPA 319.1. (2) Memo, CQM for G–4 USASOS, 28 Jun 42, sub: Distress Cargo. ORB AFWESPAC QM 435. (3) Memo, GPA for CofS USAFIA, 7 Jul 42, same sub. ORB AFWESPAC QM 435, Distress Cargo. (4) Conf, Base Sec QMs, 7–8 Mar 43, p. 8. ORB AFWESPAC QM 337.

[3] (1) Ltr, Australian Minister, Washington D. C., to U.S. Dept of State, 11 Feb 42. ORB AFPAC Sup Council. (2) USAFIA Memo 17, 24 Feb 42, sub: Rationing Plan. (3) Memo, CG USAFIA for Gen Richardson, 5 Jul 42, sub: Rationing of U.S. Troops. ORB AFWESPAC QM 430.2.

messes, help build up, maintain, and store a ninety-day food reserve for the combined forces, and present to the proper Commonwealth authorities American suggestions for increasing local food production. The question of the composition of the ration was not so easily solved. USAFIA was prepared to accept a money basis but it sought an improved ration that would cost 6d. more than the Australian ration and that would permit the selection of the menu for U.S. organizations to be made from a wider range of foods than was provided for Australian soldiers. The Commonwealth immediately pointed out that this proposal envisioned a more generous fare than it furnished its own troops. Such a fare, it contended, would impair the morale of Australian soldiers, especially if they were stationed in the same camp with American units.

Both sides finally approved a U.S. ration that contained four more components than did the Australian—eggs, macaroni or spaghetti, rice, and coffee—and substituted beef, pork, and ham for most of the mutton. It was also agreed that American organizations might supplement this ration by the procurement of provisions either not furnished in the regular menu or furnished only in limited quantities. These purchases would be restricted to a daily expenditure of 6d. a ration. To prevent competitive bidding by U.S. Army quartermasters in commercial markets, it was stipulated that all supplementary provisions must be bought in Australian Army canteens, which would be stocked with the desired supplies. Among these supplies were fresh and canned fruits and vegetables, fruit juices, crackers, breakfast foods, cocoa, baking soda, cornstarch, and corn meal. To diminish the potential danger to Australian morale, it was agreed that U.S. troops attached to Commonwealth units would be fed the same ration the latter received and that Australian troops attached to American units would be served the U.S. ration. This compromise went into effect in most parts of the country in April 1942.[4]

The Australian-American ration was never truly popular among U.S. troops. Food issues occasionally fell below prescribed quantities, and substitute items were not always available. Frequently, there were shortages of milk, canned vegetables, and condiments. Too many pumpkins, onions, squashes, and turnips were offered, and too few greens, tomatoes, sweet potatoes, apples, pears, oranges, and grapefruits.[5] To meet American objections the unsupplemented ration was twice modified to furnish more beef, lamb, and pork in place of the less popular foods and those already furnished in more than sufficient quantity. The first revision, made in May, increased issues of fresh beef and bacon and cut those of dried peas, potatoes, and onions. In August the allotments of pork and lamb were enlarged at the expense of fish issues. Actually, these changes could be carried out only to a limited extent, for Australian Army stocks were seldom large enough to permit the stipulated substitutions.[6]

The American-Australian ration would have been better liked if it had been possi-

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[4] (1) USAFIA Memo 27, 31 Mar 42, sub: Rationing of U.S. Troops. (2) Proc Div USASOS, Procurement in Australia—Historical Record, Jan 42–45, II, Intro., Sec. 4.

[5] (1) Ltr, CO 147th FA to CG USAFIA, 1 May 42, sub: Rations in N.T. ORB AFWESPAC AG 430.2. (2) Rpt, Capt Harry Cullins, 1 Jul 42, sub: Investigation, Townsville. ORB AFWESPAC QM 333.1. (3) Rpt, CO Base Sec 4, 3 Jul 42, sub: Bimonthly Rpt of Rations. ORB AFWESPAC QM 430.2.

[6] (1) USAFIA Memo 55, 8 May 42, sub: Rationing Plan. (2) USASOS Memo 24, 17 Aug 42, sub: Daily Ration Issue.

ble to carry out in its entirety the arrangement respecting supplementary purchases. But there was protracted delay in the establishment of the canteens from which these purchases were to be made, and even after the canteens were opened they did not always carry sufficient stocks to meet American requirements. The partial failure of the attempt to obtain extra ration components was attributable to supply shortages and to the fact that Australians never regarded these items as an essential part of the daily ration and thus as something that had to be furnished. They treated the stocking of canteens rather as Americans did the stocking of post exchanges, that is, as something to be done if procurement and distribution resources were not needed to handle more important supplies.[7] Perhaps it was too much to expect that any army would try energetically to feed the soldiers of another army better than its own, even if that army was a close ally. Moreover, even had the Australians redoubled their efforts they could hardly have met U.S. requirements in full, for important categories of subsistence, such as fresh and canned vegetables, were not yet produced in sufficient volume.[8] To acquire supplementary foods, quartermasters in some localities entered the open market, but their un-co-ordinated purchases raised prices, hampered procurement by the Commonwealth, and did little to better the American ration.[9]

From time to time Colonel Cordiner, Chief Quartermaster in the Southwest Pacific Area, pointed out the need for expanded production of scarce foodstuffs and for better inspection of meat and dairy products. His suggestions could not be put quickly into effect, however; months must elapse before production could be increased and improved inspection methods applied.[10] The slow rate at which U.S. Army subsistence reserves were being accumulated also disturbed Colonel Cordiner. Some Quartermaster officers alleged that this condition resulted from the fact that the Commonwealth Army, fearing that it might be accused of hoarding food, deferred the placement of requisitions involving substantial expenditures of money until supplies were actually needed. Because of this timid approach, these officers claimed, the small food-processing industry could not operate at full capacity, and vegetables, fruits, and meats were going to waste when they might be canned for future consumption. The QMC, it was contended, should take a more aggressive role in matters that affected the procurement of food, particularly in the analysis of production potentialities and the determination of the quantity of tin, agricultural machinery, and other lend-lease materials needed from the United States to expand canning and vegetable production.[11]

Increasingly, the OCQM felt that American interests would be served best by the prompt establishment of depots for the storage and distribution of U.S. rations and by the submission of its food requirements direct to the purchasing agencies of the Commonwealth Government rather than to the

[7] Memo for Files, 9 Oct 42, sub: Statement by Lt Col R. C. Kramer. ORB AFWESPAC QM 430.

[8] (1) Memo, CQM for Lt Col Edward F. Shepherd, 20 Mar 42. (2) Rpt, Col Cordiner, 9 May 42, sub: Sup at Base Sec 2. Both in OQMG SWPA 319.25. (3) Ltr, QM Base Sec 4 to CQM, 3 Jul 43, sub: Rations. ORB AFWESPAC QM 430.2.

[9] Memo, CG USAFIA for Maj Gen Robert C. Richardson, 5 Jul 42, sub: Rationing of U.S. Troops. ORB AFWESPAC QM 430.2.

[10] Memo, GPA for CQM, 6 Oct 42. ORB AFWESPAC QM 430.2.

[11] Rpt, "R.G.J.," 30 Oct 42, sub: Proc of U.S. Reserve Rations. ORB AFWESPAC QM 430.2.

Quartermaster General of the Australian Army. This method of procurement would relieve the Chief Quartermaster of the necessity of acting through his Australian counterpart, himself an interested party, in presenting American claims for higher priorities, larger allocations, and increased production.[12]

The provision of food through Australian Army channels had never been more than a stopgap imposed by temporary conditions. OCQM was convinced that the sooner the U.S. Army set up its own rationing system the better, if for no other reason than the fact that, as American forces advanced northward toward Japan, they would no longer be in close proximity to Australian forces and would be entirely dependent upon their own resources. By early 1943 the time for the establishment of such a system was opportune since a considerable number of Quartermaster officers qualified to handle the varied operations connected with rationing had at last reached Australia. On 15 February, therefore, General MacArthur notified Prime Minister John Curtin that the U.S. Army would start the procurement, storage, and distribution of subsistence for its troops as soon as possible. By April the new system was in effect in most parts of the country.[13]

Procurement of Subsistence in Australia

Early Problems

The most noteworthy feature of the American rationing system was that, while storage and distribution of subsistence were functions carried out by U.S. Army quartermasters, most of the food, especially perishables, continued to be purchased locally through Commonwealth procuring agencies. Another striking feature was that all locally procured food was acquired under the reverse lend-lease agreement, and so cost the United States nothing. Though other supplies and many services obtained locally for the American forces were also paid for by the Australian Government, the procurement of food was the largest operation under reverse lend-lease and the most striking evidence that lend-lease brought financial benefits as well as financial loss to the United States.

Because of the active participation of the Commonwealth, procurement procedures in the Southwest Pacific differed somewhat from those in the United States. The General Purchasing Agent, acting as the official representative of all American procuring services in dealings with the Commonwealth, determined over-all policy and coordinated American supply requirements with Commonwealth and State purchasing bodies. The Quartermaster Corps actually conducted the "follow-up" of its contract demands. Only if its efforts were unavailing in hastening deliveries did it appeal to the General Purchasing Agent for official intervention with Australian procuring agencies. While as a general rule it carried out routine inspection of fruits and vegetables offered to the American forces, it might and often did call upon the Veterinary Corps to perform this service. That corps had complete responsibility for the inspection of meats, dairy products, and all other products of animal origin.

Of the procurement tasks performed by the QMC none was more important than

[12] Memo, CQM for G–4 USASOS, 3 Jan 43. ORB AFWESPAC QM 430.2.

[13] (1) Ltr, CG USASOS to CQM, 8 Feb 43, sub: Distr of Rations. (2) Memo, same for CINCSWPA, 12 Feb 43. (3) Ltr, CINCSWPA to PM of Australia, 15 Feb 43. All in ORB AFWESPAC QM 430.2.

the encouragement of a large agricultural production. As early as February and March 1942 Quartermaster officers had surveyed the producing potentialities of Australian farms and concluded that except for green coffee, cocoa, tobacco, and a few minor items, sufficient food could be obtained from Australian farms to meet the needs of 500,000 troops.[14] But it soon became apparent that, though Australia could produce virtually all types of foodstuffs, it could not immediately furnish all of them in the quantities desired by the QMC and still satisfy civilian requirements and those of the United Kingdom and other Allied countries. Present crops would first have to be expanded and new types introduced. As the required labor could not readily be diverted from war industry, the most promising solution was the greatly increased mechanization of agriculture. In addition, corrective steps had to be taken to end the shortage of fertilizers, fungicides, weedicides, insecticides, and seeds, most of which were imported, and to disseminate information regarding the cultivation of sweet corn and other crops little grown in Australia. Above all, failure to produce the varieties of vegetables best suited to canning had to be remedied. If these deficiencies were to be corrected, a drastic transformation of agriculture was inescapable.

Industrially, the principal obstacles to an increase in the food supply were the inadequate number of vegetable canning and dehydration plants and the lack of equipment needed to establish such plants. Yet canned and dehydrated vegetables were indispensable to troops in forward and combat areas since the shortage of refrigeration on ships, at New Guinea bases, and in the hands of units made the provision of fresh vegetables an almost impossible task. Even where canning plants were well established, as in the fruit, corned beef, jam, and jelly industries, they produced for small local rather than national markets. Moreover, they often employed faulty processing methods. Dehydration was confined to the drying of a few fruits, such as raisins, peaches, and apricots. To meet Quartermaster requirements, it had to be extended to vegetables containing high percentages of water. Though dehydration sometimes made it hard to cook foods in a palatable form, it reduced weight and volume and so conserved ship and storage space. The extent of this saving is indicated by the fact that vegetables had a shrinkage ratio of between 20 to 1 and 5 to 1 and fruits, of between 10 to 1 and 3 to 1. In addition to saving space, dehydrated products had the notable virtue of needing little if any refrigeration or canning.[15]

To help solve the problems of food production, the QMC in mid-1942 began the assembly of a staff of food technologists, headed by Maj. Maynard A. Joslyn, who was called from a teaching career at the University of California to shoulder this responsibility. At the outset the Commonwealth Government perhaps did not fully appreciate the value of the young science of food technology.[16] Late in the year, however, the appearance among American troops at Iron Range in Queensland of one or two cases of botulism traced to unsanitary canneries

[14] Rad, USAFIA to WD, 19 Mar 42.

[15] (1) Rpt, Capt Maynard A. Joslyn, 25 Oct 42, sub: Vegetable Dehydration Plants. ORB ABCOM GP&C 400.9. (2) *Ibid.*, 2 Nov 42, sub: Vegetable Dehydration. ORB AFWESPAC QM 432. (3) Rpt, Capt Theo J. Pozzy, 7 Nov 42, sub: Canning Conditions. ORB AFWESPAC QM 400.252.

[16] Rpt, Robert S. Scull, 23 Jun 43, sub: Canning Program. ORB AFWESPAC QM 400.252.

strikingly demonstrated the potential usefulness of the specialists.[17]

When the Subsistence Depot began operations in February 1943, these specialists were put in charge of the branches set up to handle production problems. The most important branches were those in the Food Production Division, whose functions included collaboration with Australian official bodies, technical advice to farmers, canners, and dehydrators, and inspection of locally purchased food.[18] These branches survived the subsequent administrative changes affecting the procurement of subsistence and co-operated effectively with the Commonwealth and the states in innovations that transformed Australian agriculture and food processing.

Vegetable Production

The Agricultural Branch, headed by Capt. (later Maj.) Milton D. Miller, an expert on soil cultivation and farm machinery and for some years a teacher at the University of California, had as its main task the better utilization of existing resources. At the very beginning it helped provide farmers with vegetable seeds, the major prerequisite for larger crops. As many normal sources of seed imports were cut off, Australia looked to the United States for the filling of its requirements, but Commonwealth authorities knew little of the American market and had scant experience in the growing of "mother seeds," upon which the development of an abundant local supply depended. In these matters the Agricultural Branch gave invaluable assistance. It helped the Commonwealth Vegetable Seeds Committee order the proper varieties from the best American suppliers; it produced a type of hybridized sweet-corn seed fitted to Australian conditions; and, when necessary, it intervened with American lend-lease authorities to establish the Commonwealth's needs. Its help was perhaps most useful in the inauguration of large-scale cultivation of "mother seeds." During 1942 and early 1943 the United States filled about half the Commonwealth's requirements, but by mid-1944 local production sufficed to meet most requirements.[19]

For proper protection of seeds after they had been planted, weedicides were essential, but Australian farmers, having little knowledge of these preparations, customarily weeded their fields by hand. Carrot and onion crops were among those most damaged by obnoxious plant growths. Their cultivation had indeed been materially reduced because sufficient labor could not be found to do the weeding manually. This situation was not improved until the Agricultural Branch, in co-operation with the Australian Council of Scientific and Industrial Research, developed special weed-killing sprays that substantially increased the yield of both carrots and onions. The United States also provided fungicides to prevent the rotting of seeds during the germination period, but farmers, unfamiliar with such

[17] (1) Memo, DCQM for CQM USASOS, 10 Jan 43, sub: Insp of Canned Food. (2) Ltr, CG USASOS to Controller Defence Foodstuffs, 12 Jan 43. (3) Ltr, Controller Defence Foodstuffs to CG USASOS, 18 Jan 43. All in ORB ABCOM P&C 400.252.

[18] (1) Subs Depot Memo 18, 13 Apr 43, sub: Organization of Hq Subs Depot. (2) Rpt, n. s., 5 May 43, sub: Organization of Subs Depot. ORB AFWESPAC QM 320.

[19] (1) Memo, Capt Milton D. Miller for Maj Theo J. Pozzy, Subs Depot, 21 May 43, sub: Green Pea Seeds. ORB AFWESPAC QM 464.8. (2) Ltr, Vegetable Seeds Com to Maj Cobb, Subs Depot, 2 Aug 43, sub: Vegetable Seeds. (3) Memo, Vegetable Seeds Com for Maj Belford L. Seabrook, Subs Depot, sub: Seed Rqmts. Both in ORB ABCOM P&C 464.8.

preparations, utilized them but slightly until a special effort was made in mid-1943 to call attention to their value.[20]

Another major achievement of the food production program was a protracted and finally successful drive for the expansion of vegetable acreage, an effort carried out in the main by the Agricultural Engineering Section of the Subsistence Depot. The favorable outcome of this drive was attributable almost wholly to mechanization, a process that, because of the greater stress at first placed by the Commonwealth on the procurement of canning and dehydrating equipment, did not start on a large scale until 1943. Early in that year it became obvious that, if more mechanical aids were not speedily obtained, the higher agricultural production planned for the 1943–44 season could not possibly be attained. Unfortunately, the United States could supply only a fraction of Australian needs, for it was confronted by enormous demands not only from its own farmers but also from other Allied countries.[21]

Faced with a breakdown in the vegetable production program, the Agricultural Engineering Section began a concerted drive for greater mechanization. Its chief, Maj. Belford L. Seabrook of the 20,000-acre Seabrook Farm in southwestern New Jersey, one of the most intensely mechanized vegetable-growing units in the United States, requested the immediate adoption by the Commonwealth of a program looking to increased manufacture of farm machines in Australia itself. Before 1939 the large agricultural machinery plants of that country had turned out a sizable quantity of equipment, but in 1940 and 1941 most of them had been converted to armament production. Major Seabrook visited the plants and concluded that, if they were promptly reconverted to the manufacture of farm implements and provided with models of the latest American equipment, they could furnish the bulk of Australian requirements. The chief stumbling block to higher local production, he believed, was the failure of the Commonwealth to recognize that food as well as guns, tanks, planes, and ships constituted a munition of war—according to Seabrook, "the primary munition of war." Because of this failure, top priorities for the acquisition of plants, manpower, and materials went to the supplies and equipment recognized as munitions, and food production received only odds and ends. Major Seabrook further claimed that "endless delays, extreme caution and miserly approach" marked the handling of the "mechanization, development and expansion of the vegetable industry." [22]

The Commonwealth Government delayed action on Seabrook's recommendations for some weeks, but meanwhile it took a census of the country's farm machines and ascertained the total manufacturing capacity of the factories which had formerly made agricultural equipment. Finally, in July it ordered the reconversion of these plants and declared food a munition of war.[23] Once these decisions were made, the Australians determined to start the production of more than thirty different types of equipment. The Agricultural Engineering Section gave technical advice on retooling and other man-

[20] Cramp, Food Production, Ch. XII.

[21] (1) Min, Australian Food Council, 31 Jul 42. (2) Rpt, Australian Food Council, n. d., sub: Natl Vegetable Production Plan. (3) Ltr, CQM to Base Sec QM's, 16 Mar 43, sub: Vegetable Crops. All in ORB AFPAC Sup Council.

[22] (1) Cramp, Food Production, Ch. XIII, pp. 12–15. (2) Memo, Maj Belford L. Seabrook for Col Hugh B. Hester, 20 May 43, sub: Farm Machinery. ORB AFWESPAC QM 403.3.

[23] Cramp, Food Production, Ch. XIII, pp. 22–31.

ufacturing problems that arose in duplicating machines sent as models from the United States.

Probably the most valuable machine was the Farmall H Tractor which, with its attachments, made possible the mechanization of practically every phase of vegetable cultivation from plowing to harvesting. With a single Farmall H Tractor, Seabrook estimated, only two men were required for every 75 or 100 acres. But extensive retooling was needed for its production, and plant managers hesitated to embark on so costly an enterprise. Eventually, Seabrook's persistent optimism induced them to undertake the difficult task. Whereas American firms in peacetime ordinarily took two to four years to begin production of an entirely new piece of equipment, the Australians, with some technical assistance from the Agricultural Engineering Section, started production within six months.[24] Local plants also turned out the Farmall A Tractor, which had fewer attachments. The Farmall H Tractor was employed most effectively on tracts of 500 or more acres, while the Farmall A was employed mainly on smaller tracts.[25]

In addition to tractors, Australian plants turned out harrows, mowers, cultivators, plows, pea and bean harvesters, weeders, dusters, sprayers, and highly specialized equipment for fruit and vine crops. But time was needed to adapt plants to the production of these machines. At best Australia could not fill all its needs, and the United States finally had to furnish a number of tractors, corn planters, and potato graders. Sufficient machines indeed did not become available until shortly before the termination of hostilities.[26] During 1943 and part of 1944 the lengthy delay in commencing the manufacture of farm equipment combined with the scarcity of farm labor to make greater vegetable production a formidable task. To some extent the shortage of tractors was relieved by pooling those available and allocating them to the production of the most essential crops. But this could not be done without causing a comparative decline in the harvest of such commodities as sugar, production of which had previously been well mechanized. For that reason this expedient was used sparingly.[27]

Important though modern equipment was, it alone could not bring about mechanized vegetable production. Its most efficient utilization required tracts of at least 75 acres, and preferably 500 acres, yet the average vegetable farm contained only about 5 acres. Before the novel machines could be employed most advantageously, tracts of suitable size had to be secured. To some extent this objective was accomplished by bringing large farms under the production program and combining groups of small farms into projects that carried out machine operations without respect to individual holdings.[28]

In order to teach farmers how to derive the maximum benefit from the new equipment, the Subsistence Depot conducted an extensive educational program that directly or indirectly reached most of the rural population. Although mechanization was stressed, such problems as irrigation, har-

[24] (1) *Ibid.*, Ch. XIII, pp. 31–33; Ch. XIV. (2) Rpt, Capt Louis E. Kahn, 28 Nov 43, sub: Weekly Rpt, Hq SvC Base Sec 7. ORB AFWESPAC QM 403.3.

[25] Rpt, Maj Belford L. Seabrook, 16 Dec 44, sub: Farm Machinery Fld Day. ORB AFWESPAC 413.18.

[26] Cramp, Food Production, Ch. XIII, pp. 33–37.

[27] (1) Min, Australian Food Council, 9 Feb 43. ORB AFPAC AG 334. (2) Walker, *Australian Economy*, p. 201.

[28] Cramp, Food Production, Ch. XIII, pp. 9–15.

vesting, and the use of fertilizers and insecticides were not neglected. Since the departments of agriculture in the Australian states had the closest contacts with farmers, the program aimed chiefly at the indoctrination of the key men in these agencies, but it also reached individual farmers through lectures, radio broadcasts, motion pictures, leaflets, and, above all, through field demonstrations carried out by American technicians in the main vegetable-growing districts. The high degree of success attained by the educational program is attested by the doubling of the cultivated area. From 1934 to 1939 an average of 254,000 acres was sown yearly in vegetables. By the 1943–44 season more than 520,000 acres were under cultivation. The number of acres devoted to green peas, for example, rose from 13,353 to 66,440, or almost 400 percent, and similar gains were made in the production of string beans, tomatoes, carrots, and beets.[29]

Remarkable though these increases were, they did not provide adequate quantities of some of the most acceptable vegetables. This shortcoming was attributable to increased civilian demands, to the delays in the inauguration of the mechanization program, and to the natural reluctance of farmers to substitute unfamiliar for familiar crops. Perhaps there was also at first failure on the part of Americans and Australians alike fully to realize that a rise in total vegetable production did not in itself suffice to meet U.S. requirements; such a rise, to be most beneficial, had to include adequate quantities of acceptable varieties. By October 1943 it had become obvious that vegetables lacking in popularity were being obtained in too large quantities; acceptable vegetables, in too small quantities. In spite of considerable gains in acreage sown in peas, string beans, and tomatoes, shortages of these popular vegetables were particularly conspicuous; much of the increased production apparently had been absorbed by housewives and other claimants. Yet the vastly increased availability of vegetables as a whole was a highly significant accomplishment brought about in the face of exasperating perplexities. American soldiers might not always have peas and potatoes, corn and lima beans, but they did not go hungry; normally, they were more than well fed.[30]

Canning

The canning program, obviously, was controlled to a considerable extent by the supply of vegetables, but at the outset the primary problem was an industrial one, how to get an adequate number of well-run canneries into operation. At first Commonwealth authorities were often obliged to utilize plants that not only were remote from vegetable-growing districts but also were managed by former fruit canners who had scant knowledge of vegetable canning and frequently applied to it the less exacting techniques of their old occupation.[31] These techniques were particularly faulty in failing to provide enough heat in the canning process. Since vegetables are nonacid foods and so less able than fruits to resist bacterial

[29] (1) *Ibid.*, Ch. X, pp. 18–27. (2) Hester Rpt, p. 8.

[30] (1) Memo, Capt Albert E. Bester, Jr., for CQM, 26 Sep 43, sub: Analysis of Class I Sups. (2) Memo, Maj Hubert W. Marlow for CO USASOS Gen Depot, 14 Oct 43, sub: Analysis of Advance Base Inventories. ORB ABCOM GP&C 400.291.

[31] (1) Rpt, J. F. Foote, n. d., sub: Function of Canning and Tinplate Board. ORB AFPAC Sup Council. (2) Rpt, Australian Food Council, n. d., sub: Equip for Canning. ORB AFWESPAC QM 400.252.

growths, more heat had to be applied to them in order to kill all harmful matter. The canning methods in use were further defective in that they did not insure the retention of vitamins and minerals indispensable to good health. Preservation of these essential substances depended upon an adequate supply of fresh vegetables of proper maturity, prompt canning after harvesting, and exclusion of oxygen during the heating process to prevent destruction of vitamins, but these requirements could seldom be fully complied with. Recently picked vegetables were rarely available in the desired quantities since growing areas were not close enough to processing plants, and vegetables were of necessity hauled over long distances with a rapid decline in nutritive value. Finally, processors' lack of familiarity with the seaming, soldering, and closing of cans resulted in the production of easily damaged containers.[32] Proper inspection might have corrected these weaknesses, but inspectors, like canners, were for the most part former fruit men ill informed about vegetable processing. Specifications based on the best canning practices might have been set up to serve as sound guides, but such specifications were not at first available.[33]

Early in 1943 these difficulties led the Commonwealth to request the assignment of experienced Quartermaster and Veterinary officers to the enforcement of better operating practices. The Subsistence Depot thereupon established the Laboratory and Inspection Branch in the Food Production Division with Maj. (later Lt. Col.) Carl R. Fellers, a prominent food technologist, as director. He set up a highly efficient organization that carried out its functions in canneries as well as laboratories, rejecting not only all food found unfit for consumption but also improperly seamed cans. The effectiveness of the unit was demonstrated by the absence of any serious cases of food poisoning after its creation.[34]

In the meantime ambitious expansion plans were formulated, but it soon developed that they could not be fully carried out as shortages of manpower and machinery delayed the completion of new plants and the re-equipment of old ones. Canneries, in fact, never became numerous enough to keep pace with fast rising military requirements although by the close of the war sixty were in operation, several times the peacetime figure.[35] The frequent inability to utilize existing plants to full capacity was as detrimental to production as was the lack of enough plants. Operations were repeatedly disrupted by shortages of cans, of machinery for closing containers, and of wood shipping cases. So acute was the world-wide scarcity of tinplate that Australia never had more than a few weeks' supply of cans, not enough to allow the uninterrupted flow of containers in a seasonal industry like vegetable canning.[36]

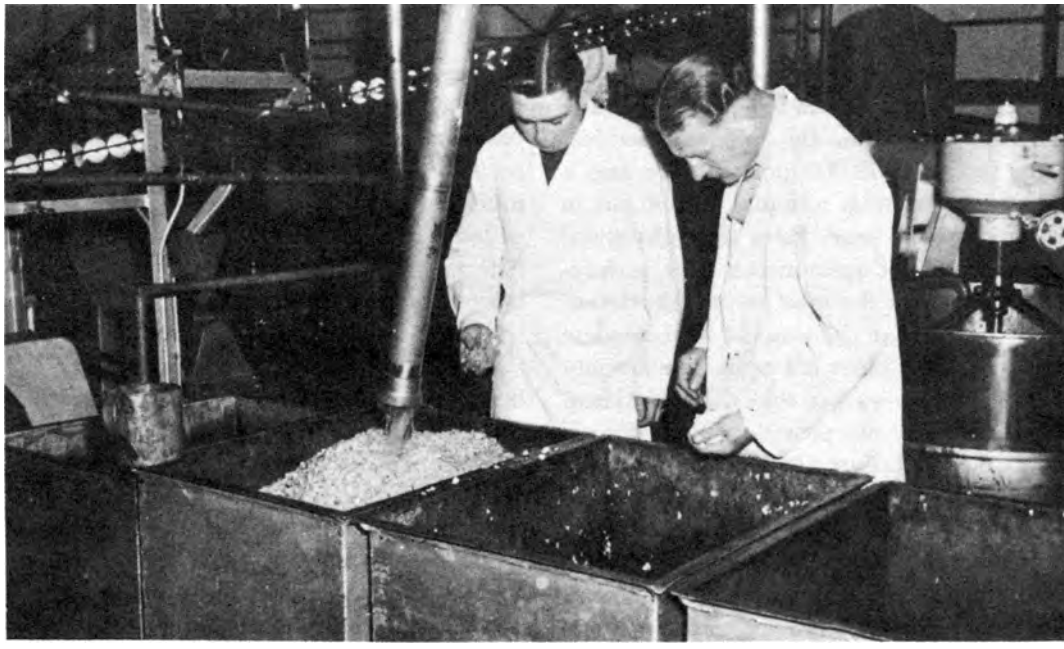
[32] Min, Australian Food Council, 11 Oct 42, pp. 4–8.

[33] (1) Rpt, R. S. Scull, 23 Jan 43, sub: Canning Program. (2) Memo, "H. B. H." for Maj R. W. Hughes, 4 Feb 43, sub: Laboratory. ORB ABCOM P&C 632.

[34] (1) Memo, DCQM for CQM, 10 Jan 43, sub: Insp of Canned Foods. ORB ABCOM P&C 400.252. (2) Memo, CQM for G–4 USASOS, 18 Feb 43. ORB AFWESPAC QM 323.71. (3) Subs Depot Memo, 8 Mar 42, sub: Insp of Canneries.

[35] (1) Cbl, U.S. Lend-Lease Mission to Secy of State, 13 Feb 43. ORB AFPAC Rear Ech Canning Equip. (2) Ltr, CQM USAFFE to QM USASOS, 11Mar 43, sub: Food Production. ORB AFWESPAC QM 400.252.

[36] (1) Memo, Food Mfg Unit for CO Subs Depot, 17 Sep 43, sub: Bottlenecks. ORB AFWESPAC QM 430. (2) Rpt, L. G. Roth, Controller of Vegetable Sups, 1 Jul 44, sub: Vegetable Canning Program. ORB ABCOM P&C 432.



CANNERY OPERATIONS IN AUSTRALIA *were performed under the supervision of Quartermaster inspectors.*



Nevertheless ever larger quantities of canned vegetables became available. Of the increased production the American services alone took 56,000,000 pounds, five and a half times the total amount turned out in the last prewar year. Even this substantial quantity did not quite match American requirements, but the most serious shortcoming was not that the amount furnished to the U.S. Army often fell below the amount ordered. It was rather that the varieties of vegetables were not provided in the desired proportions, a failure attributable not to the canning industry but, as noted above, to the fact that suitable varieties were not grown in the required quantities.[37]

To fill the gaps in its canned stocks, USASOS late in 1943 submitted several sizable requisitions on the zone of interior, but it still placed major reliance on reverse lend-lease procurement. In the following March it materially increased the quantities ordered from the United States and shortly afterwards completely revised its procurement schedule in line with ascertained American preferences. Of the procurement projected for 1944 from Australia and the United States together, 16 percent was allotted to tomatoes and lesser percentages, in descending scale, to peas, corn, string beans, asparagus, carrots, spinach, beets, sweet potatoes, cabbages, cauliflower, sauerkraut, parsnips, and pumpkins.[38] Actual procurement in Australia in that year reflected the inability of that country to make canned vegetables available in the contemplated proportions. Forty percent of the products obtained by the American services—double the planned amount—consisted of beets, cabbages, and carrots, none of which were truly acceptable as a steady diet. On the other hand, favored vegetables, such as tomatoes and corn, were procured only in much smaller percentages than the program called for.[39] As months necessarily elapsed before supplies arrived from the United States the vegetable components of the menu remained unbalanced throughout 1944.

The operations of the fruit-canning industry were also affected by shortages, but this well-established business nevertheless made a commendable record. In conformance with American desires it reduced the production of apricots, peaches, and pears, which had previously been turned out in fairly substantial quantities, in order to increase that of jams, jellies, applesauce, apple butter, and, particularly, fruit juices, which the QMC wished to obtain in large quantities. The disappointing fact that the industry never produced fruit juices in the desired volume was not attributable to any indifference on the part of the canners but rather to the unavailability of the necessary fruits.[40]

Meat Canning

Like fruit canning, meat canning was an old Australian industry, which concentrated on the production of corned beef, corned mutton, and minced beef loaf—all prepared according to British specifications. Packers were willing to prepare meats in the American manner, but their experimental efforts to do so failed because they lacked the proper equipment and were unacquainted with American processing methods. On its establishment the Subsistence

[37] (1) Ltr, INTERSEC to USASOS, 5 Nov 44, sub: Subs Sup. ORB AFWESPAC AG 430.2. (2) QM SWPA Hist, V, 34.

[38] OCQM Tech Memo 30, 16 Jun 44, sub: QM Class I, II, and IV Sups.

[39] Cramp, Food Production, Ch. XXII, App. B.

[40] (1) *Ibid.*, Ch. XVII, pp. 52, 66. (2) Ltr, CO Subs Depot to Rear Ech Div, 2 Apr 43, sub: Fruit Juices. ORB ABCOM P&C 435. (3) Ltr, CO Subs Depot to Dir Gen of Food Sup, 25 Aug 43. ORB AFWESPAC QM 433.

Depot therefore set up a Meat Section in its Food Production Division to help the packers. This section was headed by Maj. George V. Hallman, who for twenty years had worked in the packing industry in both North and South America. After surveying existing plants he concluded that with better equipment Australia could produce the canned meats known to Americans—chili con carne, corned beef hash, ham and eggs, luncheon meat, Vienna sausage, meat and beans, and vegetable stew and hash. The Commonwealth approved the production of these items and in 1944, at American request, added pork sausage, pork and beans, and roast beef with gravy to the list.[41]

In trying to meet U.S. Army requirements packers were handicapped by seasonal variations in the meat supply, which made it hard to maintain a smooth flow of canned products. Australia normally had an exportable surplus of beef, but there were times when for some weeks not enough beef could be obtained to fill Commonwealth commitments to Great Britain and the Australian Army and also provide for American troops. Hogs, moreover, were raised in such small numbers that only a scanty supply of pork ever reached the market.[42] In spite of these handicaps the meat-canning program achieved a remarkable production record. When it started in 1942, only two firms were under contract. In the following year most of the major packers participated, and production for the American forces soared from a mere 1,300,000 pounds to 43,800,000 pounds. Huge though this gain was, it still fell far short of the 77,400,000 pounds required. In 1944 the packers, with both more experience and more equipment, better than doubled their contribution, furnishing 90,000,000 pounds.[43]

Despite this decided spurt, the program, like that for canned vegetables, was unable to provide the variety desired by the QMC. Corned beef and corned beef hash, old Australian favorites, continued to be supplied in the largest quantities, in 1944 constituting over 36 percent of the canned meats turned over to the U.S. Army. This disappointing result stemmed in the main from the reluctance of packers to plunge into the large-scale production of unfamiliar items for which no substantial postwar demand was discernible. As in the case of canned vegetables, USASOS eventually obtained some relief through procurement in the United States.[44]

Vegetable Dehydration Industry

Apart from circumstances retarding the development of new industries in general, the lack of any foreseeable postwar need was the major factor that held up the development of a vegetable dehydration industry and kept production during the first two years of the conflict at low levels.[45]

[41] (1) Cramp, Food Production, Ch. XX, pp. 10–12. (2) Ltr, CQM USAFFE to QM USASOS, 4 Jul 43, sub: Canned Meat Products. ORB AFWESPAC QM 430.

[42] Rpt, Maj George V. Hallman, 10 Nov 43, sub: Meat Canning Program. ORB AFWESPAC QM 430.

[43] (1) Ltr, Controller Gen of Food to GPA, 18 May 44. ORB AFPAC GPA Subs. (2) Hester Rpt, pp. 10–12. (3) Cramp, Food Production, Ch. XX, pp. 29–32.

[44] (1) Cramp, Food Production, Ch. XX, pp. 29–32. (2) Memo cited n. 38. (3) QM SWPA Hist, V, 34–36.

[45] (1) Rpt, Commonwealth Dehydration Com, 5 Nov 42, sub: Vegetable Dehydration Program. ORB AFPAC Sup Council Vegetable. (2) Rpt, Capt Maynard A. Joslyn, 18 Dec 42, sub: Existing Dehydrators. ORB AFWESPAC QM 400.252. (3) Memo, Joslyn for Maj Theo J. Pozzy, 12 Apr 43, sub: Delay in Dehydration Program. ORB ABCOM P&C 400.254. (4) Ltr, Food Mfg Div to CO Subs Depot, 17 Sep 43, sub: Bottlenecks. ORB AFWESPAC AG 430.

In 1942 there were in use only a few hastily converted and unsuitably located fruit-drying plants, which turned out less than 2,000,000 pounds of dehydrated vegetables, and those of inferior quality. With the establishment in early 1943 of the Dehydration Branch at the Subsistence Depot, technical advice about the selection of vegetables and the improvement of processing methods became available for the first time. New plants were built largely in accordance with plans submitted by the Dehydration Branch, and in 1944 production was six times that of two years before. Dehydrated potatoes formed about 70 percent of the total output. Cabbages and carrots were the other vegetables dehydrated in the largest quantities.[46]

The American services received only a comparatively small percentage of all this production. Of the 1943 output of 5,000,000 pounds they secured a mere 620,185 pounds. The remainder went principally to the Australian Army, which had submitted its requisitions first. Believing its contribution to vegetable dehydration entitled it to an increased share, the Subsistence Depot requested that the system of giving the earliest requisitions preference be replaced by one giving the U.S. forces a definite percentage of each plant's production. The Commonwealth accepted this suggestion and at the beginning of 1945 allocated to the U.S. Army 25 percent of the dehydrated potato production for the coming year, 36 percent of the cabbage production, 26 percent of the onion production, and 50 percent of the beet production. Except for potatoes, allotment of which equaled American requirements, even these relatively generous allocations represented only about 43 percent of what the QMC had requested.[47]

Owing to the difficulty of supplying perishables in the Southwest Pacific, Australian canners and dehydrators were called upon to furnish meat, fruit, and vegetable components of the special rations prepared for advance, particularly combat, troops cut off from normal sources of supply. They even provided these components for standard field rations, especially those issued north of Australia where only small quantities of perishables could be handled. Rations of the C type, composed in the main of canned and dehydrated elements, were the only ones assembled entirely from Australian products.[48]

Fresh Meat

The quantity of fresh subsistence supplied to the U.S. services was even larger than that of canned subsistence, and among perishable foods none bulked larger than meat. Normally, about half the Australian production of fresh meat consisted of beef and about half of mutton and lamb. For many years large exports of these meats had figured conspicuously in the antipodean economy, but in 1940 the shortage of bottoms led to sharp curtailment of shipments

[46] (1) Cramp, Food Production, Ch. XVIII, p. 46. (2) Hester Rpt, p. 9. (3) Walker, *Australian Economy*, p. 210. (4) Rpt, Capt Joslyn, 2 Nov 42, sub: Vegetable Dehydration. ORB AFWESPAC QM 432. (5) Memo, Joslyn for Maj Pozzy, 10 Apr 43. (6) Ltr, Joslyn to CO Subs Depot, 21 Jul 43, sub: Dehydration Program. (7) Rpt, Joslyn, 29 Feb 44, sub: Future Dehydration Policy. (8) Memo, Joslyn for Col Hugh B. Hester, 10 Jul 44, sub: Major Joslyn's Accomplishments. All in ORB ABCOM P&C 400.254.

[47] (1) Cramp, Food Production, Ch. XVIII, pp. 36–37. (2) Rpt, 1st Lt Harold D. Van Wagenen, 13 Apr 43, sub: Dehydrated Vegetable Program. ABCOM P&C 400.254.

[48] (1) Ltr, CO Subs Depot to CG USASOS, 7 Jul 43, sub: Subs Reqmts. ORB AFWESPAC QM 333.1. (2) USASOS Regulations 30–16, 28 Feb 44, Sec. II, sub: Daily Ration Issues.

to the United Kingdom, making it impossible to dispose of surpluses. Prices slumped, and producers cut their stocks. American entrance into the war completely altered this situation, compelling the Commonwealth to stimulate meat production in order to fill heavy American demands. Because of the scarcity of pork, ham, and bacon and their popularity with American soldiers, the production of these meats was especially fostered. The Commonwealth furnished feeds to hog raisers at low prices and bought their animals at levels guaranteeing substantial profits.[49]

In spite of the fact that total meat production rose from 900,000 tons in 1941 to 1,030,000 tons in 1944 and shipments to the United Kingdom remained at relatively low levels, filling American requirements was not an easy assignment. One reason was that civilian consumption grew rapidly after 1940, yet, except for pork and a few other food products, remained unregulated until January 1944, when rationing was at last started on the basis of 2¼ pounds a week for each person over nine years of age and half as much for persons under nine. The shortage of freezer space also complicated the supply problem. In peacetime, heavy exports had kept refrigerated space clear of old meat and enabled a few plants to fill all demands for cold storage. But with the arrival of strong American forces large stocks had to be held for weeks at a time in order to assure adequate military supplies during the months when animals were being fattened for slaughter. To satisfy this need the Commonwealth imposed rigid limitations on civilian storage and built additional warehouses in Queensland, the main beef-producing state. The U.S. Army itself constructed freezer warehouses at Aitkenvale, near Townsville.[50]

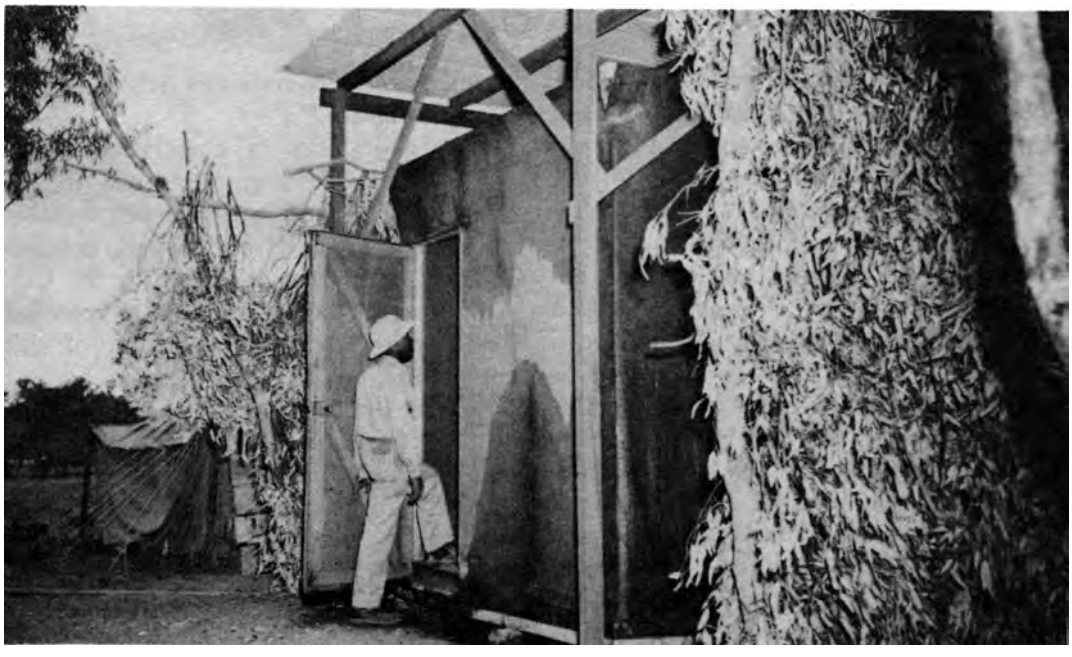
The desirability of conserving freezer space on board cargo ships and in the hands of units necessitated the procurement not merely of canned meat but also of boneless beef, a product developed by the U.S. Army for the express purpose of reducing cold-storage needs. Introduction of this commodity, unknown in Australia, became a primary responsibility of the Meat Section of the Subsistence Depot. Boneless beef eliminated not only bones but also fats and cuts of slight nutritive value. Whereas carcass beef in storage or shipment was hung on hooks with considerable room between each carcass, boneless beef was packed in 50-pound boxes, permitting compact utilization of space and reducing freezer-space requirements by about 60 percent and weight by about 25 percent.[51]

As in the United States, the principal stumbling block to the procurement of boneless beef was the reluctance of meat packers to incur the cost of the new equipment required to bring out a product for which there was no commercial demand. Boneless beef was at first so hard to procure that the Commonwealth had to prohibit its distribution to troops in Australia in order to make enough available for deliveries to advance bases. The supply problem was partly solved by Commonwealth guarantees of remunerative prices, but sufficient boning fa-

[49] Walker, *Australian Economy*, pp. 199–201.

[50] (1) Memo, 2d Lt Louis E. Kahn for Lt Col Edward F. Shepherd, USAFIA, 15 May 42, sub: Meat Packing Conditions. ORB AFWESPAC QM 333.1. (2) Memo, QMG Australian Army for Controller Defence Foodstuffs, 13 Jun 42, sub: Cold Storage Meat. (3) Ltr, Controller Defence Foodstuffs to CO Subs Depot, 5 Apr 43, sub: Meat Supplies. Both in ORB ABCOM P&C 341.

[51] (1) Ltr, TQMG to QM at X, 27 Dec 41, sub: Boneless Beef. (2) Ltr, CQM USASOS to Base Sec 3, 26 Jan 43, same sub. Both in ORB AFWESPAC QM 431.



STORAGE OF MEAT *forced the adoption of such expedients as the burlap cooler in which water dripping over burlap kept the temperature down (above) and the salting of fresh meat cuts (below).*



cilities never became available. This deficiency was worsened by the vast increase in demand during the last two years of hostilities, when the Australian Army, favorably impressed by the product, ordered sizable amounts.[52]

There was also difficulty in procuring pork carcasses cut, according to American custom, into hams, loins, shoulders, spareribs, and bacon ready for cooking by field organizations, and beef carcasses cut into steaks, roasts, and stews. Meat had never been prepared in this fashion in Australia. Wholesalers had always provided pork, for example, to retailers in the form of Wiltshire sides, that is, entire sides except for the heads, and they hesitated to make cuts in the American style because of the increased cost and the scarcity of qualified carvers. Yet mess butchers could not use Wiltshire sides economically, for they had few proper cutting implements and only limited training in carving carcasses. Because of their inexperience they discarded bones that still held a good deal of edible meat.[53]

In the Melbourne base section, as elsewhere, there was very much wastage of meat. To correct this defect, the Quartermaster and the Veterinarian set up a so-called "boning room," which was really a "cutting room," for little deboning was done there. Its operations, carried out mostly by Australian civilians recently trained as cutters, relieved mess cooks and attendants in the Melbourne area of tasks for which they were ill fitted and made possible the procurement of about 10 percent more meat from a carcass than had formerly been obtained.[54]

The Subsistence Depot hoped that similar cutting rooms could be established in all the Australian base sections, but the packers opposed such action. They claimed that the Melbourne experiment competed directly with their products, aggravating the shortage of skilled cutters and making it hard for them to turn out cuts in the American style. Their objections, together with the danger of contamination because of the lack of refrigeration in the Melbourne boning room, led to its abandonment early in 1944. At that time the packers agreed to make cuts of the types wanted by the U.S. Army, but the Australian Treasury disapproved as too high the prices set by the packers and so delayed the venture for several months.[55]

The American forces did not always obtain the cuts they preferred, it is true, but Australia did furnish a large amount of beef. During 1942 and 1943 it provided 16,700,000 pounds of the carcass variety and 7,440,000 pounds of the boneless variety. Whereas the supply of the latter product consistently fell below American needs, that of carcass beef approximated requirements until late 1943 when Australian production, though increased, did not suffice to fill demands treble those of 1942. Civilian rationing, put into effect in January 1944, helped tide over the shortage in military

[52] (1) Ltr, Lt Col John T. Taylor, IGD Base Sec 3, to Col C. H. Barnwell, Jr. Hq USASOS, 16 Jan 43, sub: Boneless Beef. (2) Memo, QM for Exec Off for Sup USASOS, 15 Mar 43. (3) Rpt, Col Cordiner, 26 Apr 44, sub: Rpt of Inspection. All in ORB AFWESPAC QM 431.

[53] Memo, CQM for Capt Norman H. Myers, 25 Aug 42. ORB AFWESPAC QM 430.

[54] (1) Ltr, 1st Lt Thomas J. Watson to Base Sec 4, 15 Apr 43, sub: Example of Waste. ORB AFWESPAC QM 430. (2) Rpt, QM Base Sec 4, 26 Apr 43, sub: QM Activities Base Sec 4. ORB AFWESPAC QM 370.43. (3) Ltr, Base Vet Base Sec 4 to CG USASOS, 23 Jun 43, sub: Boning Room. ORB ABCOM P&C 431.

[55] (1) Rpt, Maj George V. Hallman, 4 Jan 44, sub: Base Sec 4 Boning Room. (2) Personal Ltr, Col Hugh B. Hester to Dir Gen of Food Sup, 17 Apr 44. Both in ORB ABCOM P&C 431.

stocks. As the number of American troops in forward areas steadily grew throughout 1944, the acquisition of more freezer shipping space, rather than an inadequate supply of beef, became the primary problem. In June lack of such space forced the storage in Australia of about 30,000,000 pounds of carcass beef.[56]

Next to beef, pork products constituted the largest group of meats supplied to the U.S. services, amounting in the peak procurement year of 1944 to about half the beef procurement. During those twelve months 11,980,000 pounds of bacon, 11,790,000 pounds of ham and 9,460,000 pounds of pork were supplied. Sizable though these amounts were, they were still considerably less than the American forces wanted.[57]

Australia, as a major producer of lamb and mutton, could easily have supplied these products, but American preference for other meats kept procurement at a low level, less than a million pounds having been secured during the first two years of reverse lend-lease operations. Not until well into 1943, when hope of obtaining pork products in desired quantities had almost vanished, was much lamb and mutton taken. Yet even in the following years Americans got only slightly more than 10,000,000 pounds, or less than 9 percent of all local meat purchases.[58]

Generally speaking, the poultry industry could provide few chickens and turkeys, for they were Australian luxuries ordinarily available only in the better hotels and restaurants. Those sold commercially were unbled, incompletely plucked specimens most soldiers found distasteful. Many rejected the turkeys served at Thanksgiving and Christmas dinners in 1942. Later, the quality of poultry offered U.S. services gradually improved, and in 1944 purchases climbed from only 240,000 pounds in the previous two years to about 2,000,000 pounds.[59]

Flour, Sugar, and Rice

Flour was procured in greater volume than any other foodstuff. In 1944 alone the QMC obtained about 219,000,000 pounds. As one of the world's largest exporters of the commodity in prewar days Australia had no trouble in meeting even such huge demands. Yet U.S. Army bakers contended that the flour, because of its low gluten content, made smaller and less acceptable loaves than did the American variety. When the latter was available, they mixed it with equal quantities of local flour to obtain better bread. But this expedient was possible only to a limited degree, for until late 1944 about 90 percent of all flour used in the Southwest Pacific came from Australian mills.[60]

Sugar, too, was almost entirely Australian in origin. There were ample local supplies, and with the aid of civilian rationing at the restricted but still liberal scale of one pound per person a week, service requirements were met in full. Even the shortage of seasonal laborers for harvesting the crop in the principal growing areas in northern Queensland and of freight cars for transporting the raw sugar to the refineries in the south interfered but little with production for the military forces.[61]

[56] Cramp, Food Production, Ch. XXI, pp. 18–19, 27–33.

[57] *Ibid.*, pp. 21–23, 33.

[58] *Ibid.*, p. 33.

[59] *Ibid.*, Ch. XXII, pp. 21–23.

[60] (1) *Ibid.*, pp. 42–43. (2) Ltr, Base Surg to CO Base Sec 3, 29 Nov 43, sub: Bakeries. ORB AFWESPAC QM 633.

[61] Memo, Philip Grassick for Col Herbert A. Gardner, CQM USASOS, 8 May 42, sub: Sugar Rpt. ORB AFWESPAC QM 436.

Rice, grown in prewar days only in the publicly owned Murrumbidgee irrigation area of New South Wales, was not a major crop as were wheat and sugar. But shortages born of the war dictated that its cultivation be extended. India, Ceylon, and New Zealand could not raise all the rice they consumed and, when the Japanese occupied rice-exporting Burma and southeastern Asia, found themselves cut off from their customary sources of supply. As an emergency measure the Commonwealth Government, assisted by that of New South Wales, greatly expanded rice cultivation, increasing the number of acres from 25,000 in 1942–43 to 38,600 in 1943–44. The harvest of the latter season yielded 78,000 tons, 50 percent more than the record prewar crop of 1938–39. Despite the fact that Australian citizens were permitted to buy only limited quantities of the cereal, service demands and sizable exports to Ceylon and New Zealand absorbed most of the crop. American supply officers, looking forward to the liberation of the Philippines, expected that in the first year of reoccupation the Filipinos would require 200,000 tons of rice, an amount so large that, in view of the world-wide scarcity, it could probably be secured only by extreme effort. They suggested that the Australian Government stockpile the cereal for future use, but heavy current demands made such action impossible.[62]

Dairy Products

The Australian dairy industry produced milk primarily to make butter and cheese rather than to sell for liquid consumption. It was not a fully developed industry, and its operations were handicapped by the dissatisfaction of the labor force with the prevailing low wages and poor working conditions. During the first war years the industry steadily lost employees to the burgeoning suppliers of munitions. Because of these losses and the shortage of fertilizers for pasture lands, operations declined substantially. Even generous subsidies from the Commonwealth did not materially increase production.[63]

Despite rigid civilian rationing, fresh milk became very scarce, and only a small part of what was available met U.S. Army specifications. Cows were seldom tuberculin-tested, and 5 to 10 percent of dairy herds were estimated to be diseased. Milk was rarely pasteurized and bacterial counts were high. Since it, like other perishables, was at first procured mostly through the base sections, the quartermasters and veterinarians of these sections requested contracts calling for pasteurization and tuberculosis-free herds, but dairy farmers would not accept these provisions unless they received compensation for diseased animals and substantially higher prices to cover the expense of pasteurization. Local and state milk officials in the main supported the dairymen.[64]

The prolonged inability to iron out differences over tuberculin tests was the major obstacle to better sanitary conditions, but the suggested extension of pasteurization presented a scarcely less formidable barrier. Many farmers regarded pasteurization as merely a costly luxury to be used only in supplying American troops and discarded as soon as the war ended. Finding progress in

[62] (1) Rpt, Col R. C. Kramer, Jt Sup Bd GHQ SWPA, 7 Oct 44, sub: Rice. ORB AFPAC AG 430.2. (2) Walker, *Australian Economy*, p. 211.

[63] *Ibid.*, p. 199.

[64] (1) Memo, ACofS G–4 for CQM USAFIA, 12 May 42. ORB AFWESPAC QM 433. (2) Memo, Proc Div USASOS for GPA, 6 Apr 43, sub: Milk in Cairns. ORB AFWESPAC QM 434. (3) Rpt, L. T. MacInnes, Dept of Commerce and Agriculture, 2 Feb 44, sub: U.S. Milk Specifications. ORB ABCOM P&C 434.

ridding herds of tubercular animals slow, the QMC agreed to accept milk from approved pasteurization plants even if it came from uninspected cattle. Even then it was hard to secure an adequate supply. Not until September 1942 did Townsville become the first base section to obtain satisfactory deliveries, and not until some months later did similar deliveries become available in the Melbourne and Brisbane areas.[65]

Early in 1944 fresh efforts to institute tuberculin tests succeeded in every state except New South Wales. Both the lack of success in that populous state and the belated acceptance by the other states of the American request can probably be ascribed to the scarcity of fluid milk, the strong demand for which, as to be expected, afforded dairymen little incentive to furnish a special product for the U.S. armed services. Even if those services had accepted no milk, civilians would still have taken all that was offered. Only by putting up the funds for making the required tests and for indemnifying the owners of destroyed cows, could the Army have won its objective in New South Wales. This step it refused to take, and in November 1944 the Veterinary Corps began to reject all milk proffered in the Sydney area except about 75 gallons daily taken from excellent sources for hospital use.[66] Because of the unsatisfactory sanitary standards the U.S. forces in 1944, when the total production of fresh milk reached 200,000,000 gallons, took only 2,866,000 gallons. Approximately one and a half times this amount—4,270,000 gallons of dried milk, representing most of the Australian production—was obtained.[67]

Market Center Procurement of Perishables

Like milk and most other perishables, fresh fruits and vegetables were at first procured, not through the Subsistence Depot as were nonperishables, but by the Australian base sections and by units stationed in Australia. Generally speaking, base sections purchased the fresh produce required in advance areas, and units bought that required for their own use. This system, modeled upon Regular Army practices in times of peace, functioned unsatisfactorily when applied to fresh fruits and vegetables. Procurement of these perishables by every base section and every Army unit in Australia, by the Allied services, and by the U.S. Navy introduced severe competition for limited local supplies and often caused inequitable distribution among the armed forces. The system was also defective in that it provided no means of holding fresh fruits and vegetables in cold storage for more than a few days and established no regular schedules for the departure of refrigerated ships to advance areas. These weaknesses made it impossible for base sections to buy in anticipation of future requirements and when produce was most plentiful on the market. Supplies were of necessity bought hastily just before refrigerated ships arrived, and this, in turn, obliged the base sections to accept whatever fruits and vegetables then happened to be available commercially. Since these commodities were usually everywhere the same and were often obtainable only in

[65] (1) Ltr, Defence Foodstuffs Control to GPA, 11 Feb 44. ORB AFPAC GPA 434. (2) USASOS Regulations 50-100, 29 Mar 44, sub: Milk.

[66] (1) Ltr, Dir of Proc to CG USASOS, 24 Apr 44, sub: Pasteurized Milk. ORB ABCOM P&C 434. (2) Memo, Vet Sec for Subs Sec, 20 Oct 44, sub: Tuberculin Free Herds. Both in ORB ABCOM P&C 434.

[67] (1) Cramp, Food Production, Ch. XXII, pp. 25–27. (2) Ltr, Subs Depot to USASOS, 21 Aug 43, sub: Milk Ingredients. ORB AFWESPAC QM 434.



VEGETABLE MARKET CENTER *in Sydney, Australia.*

comparatively restricted quantities, small and monotonous issues of fresh vegetables were the frequent lot of troops in forward areas.[68]

A partial solution of the problem was found in the market center system, which started in the zone of interior in 1941. This system was set up in the Southwest Pacific in April 1944 and became the only market center system established in an overseas area. It introduced centralized procurement not only of fresh fruits and vegetables but also of the other perishables—meat, poultry, fish, butter, eggs, and other dairy products. Under this system the Procurement Division, USASOS, acting through market centers at Sydney, Brisbane, Melbourne, and Townsville, carried out procurement on the basis of requisitions submitted by the Distribution Division, USASOS, for supplies in forward areas and by the base sections for issues in Australia. Competition for produce among U.S. Army elements was thus terminated. On 1 July competition with the U.S. Navy came to an end, when the responsibility for obtaining perishables for the sister service also passed to the new buying system. Since the market centers acquired warehouses for long-term storage of perishables and established reasonably regular schedules of reefer sailings, hurried purchases were less often necessary. Advance procurement in bulk and in wider variety became the customary practice, making pos-

[68] (1) Memo, S&D Div for CQM USASOS, 10 Feb 43, sub: Mkt Cen. ORB AFWESPAC QM 414.1. (2) Ltr, CG USASOS to CQM, 14 Dec 43, sub: Proc of Perishable Subs. ORB AFWESPAC AG 430.

sible the creation of sizable reserve stockages.[69]

At times lack of refrigeration afloat and ashore made it impracticable to take all the fresh fruits and vegetables offered commercially. In the first quarter of 1945, General Hester estimated, these deficiencies prevented the procurement of 35,000,000 pounds of potatoes, 12,000,000 pounds of other vegetables, and 12,000,000 pounds of fruits.[70] Nevertheless during the nine months the market centers operated in 1944, they obtained all together 32,000,000 pounds of fresh fruits and 107,000,000 pounds of fresh vegetables. Apples and oranges were purchased in greater volume than were other fruits, followed in descending scale by pears, bananas, pineapples, and lemons. Potatoes alone accounted for more than 70 percent of the total procurement of fresh vegetables.[71]

Evaluation of Local Subsistence Procurement

The procurement of subsistence, both perishable and nonperishable, was of prime importance in the reverse lend-lease program. Of the estimated 3,617,000 measurement tons of supplies acquired for the U.S. Army from the beginning of 1942 to 30 June 1945, food accounted for 1,704,389 tons, or more than 47 percent. Indeed more shipping space was saved in procurement of subsistence than in procurement of any other group of supplies, Quartermaster or non-Quartermaster. Monetarily, too, it was of the highest significance, for the value of the food bought was estimated at $217,432,301, or 28.5 percent of the total purchases of $759,369,137 for the U.S. Army.[72]

Australia provided the Southwest Pacific Area with the bulk of its subsistence, furnishing 90 percent or more of some items. Its provision of fresh foods was particularly significant, for almost no perishables were received from the United States. Had not Australia filled this gap in military supplies, American soldiers would have been forced to live out of cans much more than they did. The most serious deficiency was the absence of a wider range of canned and fresh provisions. In a few instances, moreover, the food provided fell below desirable standards as considerable adjustment had to be made between the specifications worked out for purchases in the United States and the actualities of Australian productive conditions. Had more ocean tonnage been available, quartermasters probably would have preferred to import some items from the zone of interior in order to obtain ration components familiar to American soldiers. But this fact did not mean that the reverse lend-lease program failed. On the contrary, it constituted the major Quartermaster asset in the Southwest Pacific. Without it the QMC could not have carried out its mission of feeding the U.S. Army. However exasperating the recurrent shortages of individual items were, these were minor matters in comparison with the all-important fact that Australia furnished more than ample means of feeding troops well. The

[69] (1) Memo, Lt Col R. W. Hughes for Col Hugh B. Hester, SvC Base Sec 7, 16 Dec 43. ORB ABCOM P&C 432. (2) Ltr, CO SvC Base Sec 7 to CO Base Sec 4, 15 Jan 44, sub: Proc of Perishables. ORB ABCOM AG 400.12. (3) USASOS Memo 32, 10 Apr 44, Sec. II, sub: Mkt Cens. (4) Ltr, OIC USASOS Mkt Cen to U.S. Navy, 26 Jun 44, sub: Proc of Perishable Subs for U.S. Navy. Both in ORB ABCOM P&C 434.

[70] Ltr, Brig Gen Hugh B. Hester to CG ABSEC, 11 May 45, sub: Loss of Proc of Perishable Subs. ORB ABCOM GP&C 430.291.

[71] Proc Div USASOS, Proc in Australia, II, Mkt Cen Sec, pp. 4–8.

[72] Hester Rpt, pp. 4–5.

procurement of subsistence through the reverse lend-lease program was indeed perhaps the most arresting example of successful Australian-American co-operation. While true that the United States was the major beneficiary of this joint action, Australia also derived several lasting advantages. Within a few years it obtained new food-processing industries, a more highly mechanized agricultural system, and more modern farming methods. In the normal course of events a dozen years or more would probably have been necessary to bring these developments to the stage they had reached by V-J Day.

Procurement of Clothing and General Supplies in Australia

The procurement of clothing and general supplies, like that of subsistence, entailed a concerted Australian-American effort. As in the case of rations it necessitated a major transformation of some existing industries. In the 1920's and 1930's Australia had developed a number of new industries, but their production seldom met even domestic requirements in full. Many essential Quartermaster items were made only in small quantities, if at all. Australia manufactured, for example, less than 10 percent of its cotton goods requirements; hence the QMC had to import cotton clothing, the chief tropical garb of American troops, from the United States. The outbreak of war in September 1939 had caused the enlargement of manufacturing activities, and at the time of Pearl Harbor Australia was supplying most of its purely military requirements. "It appeared as though no more production could be obtained from an already over-extended economy." [73] Nevertheless, during the next few years many industries were expanded to fill American needs.

At the outset Quartermaster procurement of clothing and general supplies was undertaken in an atmosphere of confusion. One officer succinctly described this period in the following words:

> In February, March and April troops were pouring in, inventories were definitely incomplete, planning was in its infancy and requirements were somewhat confusing. Most troops were shipped expecting a tropical destination. Troops were also being evacuated from Java, nurses were arriving from the United States, Bataan and elsewhere without any uniforms. The situation was serious and winter was coming on.[74]

Further complications were injected by the continued lack of technicians capable of handling the matter of most immediate significance, the procurement of clothing for troops who had come clad in cotton and found that they needed wool. In these early days the QMC lacked even specifications for many important items; the few on hand for clothing and footwear were useless as they were based on patterns and lasts which did not arrive from the United States for several months.[75]

Meanwhile the Australian Army temporarily provided American troops with soap, toilet paper, chlorinated lime, kerosene, and a few other daily necessities, but the Corps rejected proposals looking to Australian procurement and distribution of most general supplies on the grounds that this solution would make it difficult to maintain American standards. From distress cargoes the Corps obtained typewriters, stationery, chinaware, glassware, cloth, canvas, shovels, electric fans, and hand

[73] Proc Div USASOS, Proc in Australia, I, Sec on Gen Sups, p. 1.

[74] Lecture, Lt E. W. Browne, 9 Dec 43, sub: Clo Proc. ORB Base A QM 400.291.

[75] (1) *Ibid.*, p. 2. (2) Conf, Base Sec QM's, 7–8 Mar 43, p. 7. ORB AFWESPAC QM 337.

tools, but this means of relief soon dried up. General supplies, obviously, had to come from the industrial plants of Sydney and Melbourne and from the United States.[76]

Late in March the OCQM Purchasing and Contracting Officer presented his first contract demand, one for nurses' clothing, to the Australian Government. Among other items needed at that time were 480,000 pairs of shoes, 740,000 pairs of woolen socks, 760,000 woolen garments, and 200,000 mess kits. Only the opportune arrival in April of a set of Munson lasts made possible the submission of a contract demand for shoes. Since few other lasts or patterns were available, the Purchasing and Contracting Officer relied upon Australian Army technicians to develop specifications for clothing similar in design and color to that provided for troops in the United States. Data required to make the thirty-five sizes of shirts and the various sizes of trousers, jackets, and overcoats had to be reconstructed from memory, for precise figures were not available and stock items were not manufactured with enough uniformity to furnish exact information.[77]

As the year progressed, this basic information finally arrived from the United States. In many instances, however, American specifications were modified to fit the distinctive characteristics of local industry and the available materials; in a few instances manufacturing methods were altered. The rapid progress made in the procurement of Class II and IV supplies is indicated by the fact that the end of 1942 saw purchase of over 2,000 items, from pins to tractors.[78]

Yet there were still annoying problems, of which shoe production was perhaps the most pressing. The shoe industry had ample manufacturing capacity, but its footwear came in full sizes only and in but two widths, whereas American shoes were manufactured in half sizes and multiple widths. In order to turn out American types the whole industry had to be re-equipped and reorganized. This feat was eventually accomplished with technical help from the General Supplies Branch of the OCQM Supply Division and with extensive importation of American machinery.[79] Another problem was the relatively low price level at first set for shoes by the Australian Contracts Board. Manufacturers considered the prices too low to compensate adequately for the heavier cost of producing American footwear; some even claimed that they were asked to operate at a loss. Not until prices satisfactory to the industry were finally established was full production attained.[80]

In addition to standard service shoes Australian plants provided hobnailed shoes and a special type distinguished by a rubber clump sole with a tread similar to that of an automobile tire. Production of Army footwear continued until late 1944, when large shipments of newly developed combat shoes arrived from the United States and made possible the release of the plants to the U.S. Navy. At that time about 60,000 pairs of shoes a month were being turned out for Army use. In the previous two and a half years approximately 1,500,000 pairs of

[76] (1) Memo, CQM for AcofS USAFIA, 25 Mar 42, sub: Refugee Cargo. OQMG SWPA 319.1. (2) Memo, GPA for CofS USAFIA, 7 Jul 42, sub: Distress Cargo. ORB AFWESPAC Distress Cargo.

[77] (1) Pp. 2–3 of Browne Lecture, cited n. 74. (2) Memo, CQM for Col Herbert A. Gardner, 18 Apr 42. ORB AFWESPAC QM 421.

[78] Hist Rpt of GPA, 11 Mar–14 Oct 42, pp. 25–44. OQMG SWPA 400.13.

[79] Proc in Australia, Sec on Gen Sups, pp. 17–19, 21.

[80] QM SWPA Hist, II, 111.

shoes had been produced, enough to fill a substantial part of military needs.[81]

The procurement of socks supplied another example of successful local procurement. Despite the fact that the Australian spinning capacity was limited, the mills produced a total of nearly 8,000,000 pairs of standard lightweight Army socks. At its peak in 1944 production ran at the rate of 350,000 pairs a month. This satisfactory figure was not attained without considerable reorganization of the hosiery industry, which had no previous experience in turning out a light wool sock that differed markedly from the Australian Army heavy-ribbed type designed to fill an oversized shoe. At first each manufacturer had different shaping, sizing, and pressing boards. This lack of standardization caused socks nominally of the same size to vary somewhat as to fit and obliged the General Supplies Branch to prescribe standard sizing boards. Persistent shortages also affected hosiery operations unfavorably, the scarcity of good dyes forcing mills to produce socks in natural colors of the yarn while the scarcity of chemicals to prevent shrinkage often kept hose from giving satisfactory service.[82]

When the procurement of woolen garments began, there was—paradoxically, in the world's chief wool-exporting country—a bottleneck in the supply of wool. This extraordinary situation originated in the fact that the United Kingdom throughout the war took the entire wool clip except for the amount needed to produce cloth in Australia itself. Since estimates of Australian requirements were deliberately kept as low as possible, wool cloth had became so scarce by early 1943 that manufacturers, after supplying the Australian services, had hardly enough material to make one suit a year for each male civilian. Severe restrictions on public buying, however, enabled the U.S. Army to obtain 420,000 pairs of trousers for enlisted men. This was not a large total, but it reflected not so much an unavailability of cloth for more trousers as the Southwest Pacific Area restriction which confined the wearing of woolen uniforms to the winter season in Australia. Before production began, a special cloth was developed to differentiate U.S. from other Allied soldiers, and tailors were taught to cut trousers in the American manner—not an easy task, for mass production of clothes was virtually unknown in Australia, where men usually wore custom-made suits. The task was, in fact, so hard that the fit of locally tailored trousers seldom complied with Army standards. In mid-1943, therefore, contract demands were canceled and never renewed.[83]

Slightly more than 1,100,000 wool knitted shirts, a type new to Australia, were produced for U.S. Army use. Considered excellent for the tropics because they enabled air to penetrate the garment, they were made along the lines of an ordinary cotton khaki shirt. But neither shirt nor outer knitwear firms could at first make the wool shirt to the satisfaction of American troops. Shirt manufacturers could not handle a knitted fabric properly as their operatives had no training in feeding a knitted fabric through an ordinary sewing machine, and knitwear firms, unused to making shirts, could not produce a well-fitting article. The problem was finally solved by the development of a new sort of knitted garment,

[81] (1) Ltr, 162d Inf to I Corps, 5 Feb 43, sub: Svc Shoes, Australian Manufacture. (2) Ltr, I Corps to USASOS, 25 Apr 43, sub: Rubber Clump Soles. (3) Ltr, I Corps to Hq SWPA. All in ORB I Corps AG 421. (4) Hester Rpt, p. 18.

[82] USAFFE Bd Tent Rpt 97, May 45. OQMG SWPA 333.1.

[83] QM SWPA Hist, III, pp. 103–04.

which could be worn either inside the trousers as a shirt or outside as a sweater and which could be made with comparatively little trouble.[84]

Blanket production involved only minor difficulties, and more than 1,000,000 were procured at a cost of only about $2.50 each, a price much below that in the United States. Longer and narrower than American-made blankets, they nonetheless were well liked.[85]

Both the shortages of materials needed to comply with U.S. specifications and the special requirements of American forces in the Southwest Pacific led to the introduction of several new items. One of these was a semi-British battle jacket developed as a substitute for the American field jacket. Some 270,000 of the new type were produced. A mess kit, using malleable steel hot-dipped with tin in place of aluminum, a very scarce metal in Australia, was also made.[86]

Besides the general supply items discussed above, many others were acquired in sizable quantities. Soap, production of which rose 400 percent during the war, was provided to the extent of 15,000,000 pounds. More than 33,000,000 feet of rope were also furnished. The production of so large a quantity demanded the complete reorganization of the cordage industry, which was suddenly called upon to increase its output several fold. Other products supplied in considerable quantities were: 7,000,000 pairs of leather gloves; 6,000,000 tins of canned heat; 3,200,000 pounds of candles; 2,000,000 knives, forks, and spoons; 1,100,000 brooms and brushes; 6,500,000 feet of steel strapping; and several hundred million printed forms. In addition to furnishing the U.S. armed services with these general supplies, the Commonwealth provided laundry and dry cleaning services to American troops stationed in Australia.[87] This procurement was not accomplished without frequent delays, stemming from the undeveloped state of Australian industries, nor without accentuating the already serious shortage of manpower. It involved, too, the shipment from the West Coast of materials, component parts, and machines and so diminished the saving of cargo space that was the justification of local procurement.

Despite these drawbacks general supplies were obtained from Australia in fairly large volume until the close of 1944. At that time the availability of these items in greater quantities from the United States, the continued shortage of interisland shipping, and, most of all, the lengthening distance between the northward-moving U.S. forces and Australia, caused Headquarters, USASOS, to forbid the procurement of items that required additional demands on Australian manpower, importation of unfinished materials, parts, or processing machinery, or construction of new plants.[88] The new limitations had little effect on the procurement of food, daily becoming scarcer in the United States. But at the end of 1944 contract demands for general supplies were canceled if manufacturing delays had repeatedly occurred. In the following June remaining orders for general supplies were nullified except those for burial boxes, a few constantly used housekeeping materials, and the printing, laundry, dry cleaning, and

[84] (1) Ltr, Col Herbert A. Gardner to Col Cordiner, 7 May 43. ORB AFWESPAC QM 421. (2) Ltr, USASOS to Base Secs 2 and 3, 25 Jun 43, sub: Woolen Clo. ORB AFWESPAC QM 420.

[85] USAFFE Bd Tent Rpt 97, May 45.

[86] QM SWPA Hist, III, 96.

[87] Proc Div USASOS, Proc in Australia, Sec on Gen Sups, pp. 39–40, 43–44, 45–47.

[88] USASOS Memo 100, 16 Oct 44, sub: Proc of Sups and Equip.

clothing repair needs of American troops in Australia itself.[89]

The statistics of reverse lend-lease procurement in Australia demonstrate the importance of Quartermaster general supplies in this program. By 30 June 1945 nearly 392,000 measurement tons of these items had been obtained. While this was only 23 percent of the subsistence tonnage, it exceeded the tonnage of all supplies acquired by either the Ordnance Department or the Transportation Corps and was more than seven times the combined tonnage of Signal, Chemical Warfare, Medical, and Special Services items. Quartermaster general supplies, moreover, were worth $154,774,635, or about 20 percent of the value placed on all locally procured Army supplies.[90]

Had the QMC been obliged to obtain all its general supplies from the zone of interior, it could scarcely have clothed and supplied the American forces in the Southwest Pacific as well as it did. The frequently low priorities assigned to the movement of these items—at times even to footwear and clothing—would in all probability have held area stocks at levels somewhat below those actually established through local procurement supplemented by importations from the United States. A few items obtained in Australia, it is true, were inferior in quality to those brought in from the United States. Others were objectionable simply because they departed slightly from familiar U.S. models. Most articles were at least equal to the corresponding American products. But whatever their quality, they provided U.S. forces with essential wares. Without them, it should be emphasized again, American troops would not have been as well supplied as they actually were.

[89] (1) USASOS Memo 116, 6 Dec 44, sub: Proc of Sups. (2) QM SWPA Hist, VI, 35–40.

[90] Hester Rpt, p. 3.

Procurement in New Zealand

Procurement of agricultural and industrial products in New Zealand was carried out under conditions not unlike those in Australia, but with one conspicuous difference: New Zealand had fewer surpluses after civilian requirements were met, particularly in its clothing, equipment, and general supplies industries, than did its neighbor. Even more than in Australia, reverse lend-lease procurement was primarily concerned with subsistence although some essential foods, such as sugar, flour, and fruits, were not produced on as large a scale as in the Southwest Pacific.[91]

From the beginning of 1943 the Joint Purchasing Board, as the body charged with the procurement of all supplies bought in New Zealand for U.S. forces, obtained Quartermaster items in considerable quantities.[92] The conditions surrounding procurement activities were not quite as favorable as in Australia. New Zealanders never felt as much menaced by the Japanese as Australians did in mid-1942, and purely domestic considerations therefore played a more prominent part in determining their attitude toward reverse lend-lease operations. Conscious that the further wartime economic dislocations went the harder would be the return to the pattern upon which peacetime prosperity had rested, they were reluctant to cut the traditionally large exports to Great Britain, for that commerce guaranteed an outlet for New Zealand cheese, butter, meats, hides, and wool. The determination to keep this market unimpaired was so strong that no major decision affecting these exports was taken without

[91] Notes on Conf of USA Sup Mission with Controllers of Food *et al.*, 12 May 42. ORB USAFINC AG 319.1.

[92] Ltr, CG SOS SPA to TQMG, 6 Aug 43, sub: Svs of Sup in SPA. OQMG POA 319.25.

British advice. The New Zealand Government also feared that a substantial increase of local food production might glut the postwar market and cause a disastrous slump in prices of exportable commodities.[93]

All these considerations were partly responsible for the almost constant insistence that no locally procured supplies were to be used outside the South Pacific Area and for failure to carry out the food program quite as aggressively as the Australians did. The program fell especially behind in canned and dehydrated vegetables and fruits.[94] Canned meats, on the other hand, were procured in fairly large volume, around 37,000,000 pounds having been acquired in 1943. Efforts to introduce American types achieved less success than in the Southwest Pacific. The comparatively small production of canned and dehydrated vegetables made a more abundant supply of fresh vegetables doubly necessary, and long-term contracts were entered into early in the war for the purchase of all surplus fresh vegetables. After a season or two farmers discovered that they received proportionately more for their efforts if they grew cabbages. The acreage sown in cabbages multiplied and their flow to South Pacific troops increased to so great an extent that eventually substantial quantities were dumped at sea because troops would no longer eat cabbages and these vegetables could not be stored satisfactorily in unrefrigerated warehouses. Though vegetable acreage eventually increased by about 42 percent above that of 1941, U.S. forces obtained no more than 60 percent of their potato requirements and lesser amounts of other vegetables. To the very end, therefore, the supply of these perishables remained inadequate in the South Pacific.[95] Among other perishables butter, cheese, and fresh meats were procured even in 1942, when few other foodstuffs were yet available. In the following year 95,000,000 pounds of fresh meats, constituting 30 percent of all local purchases, and 47,000,000 pounds of dairy products were obtained. These purchases, heavy though they were, still did not suffice to fill demands.[96]

Of all the food received by American troops in the South Pacific in 1944 about 36 percent came from New Zealand.[97] As the distance between that country and the operational centers lengthened toward the close of the latter year, less and less cargo space was saved by local procurement, and the Joint Purchasing Board ceased to ship all the flour, sugar, and canned goods it bought. By the beginning of 1945 these products filled its warehouses, and the board made heavy cuts in its purchases of all nonperishables. But it continued to obtain fresh foods.[98] Visiting Auckland in February, Quartermaster General Gregory found that about 60,000 tons of nonperishables as well as some fresh meat were then stored there. He urged that these stocks be forwarded to New Guinea and the Philippines or else sent to the United States. Either method of shipment, he pointed out,

[93] (1) Ltr, JPB to COMSOPAC, 21 Aug 43, sub: Food from N.Z. during 1944. ORB USAFINC AG 430. (2) Personal Ltr, A. H. Honeyfield, Manager, Internal Marketing Division, New Zealand Government, to Dr. Lawrence V. Burton, 30 Jun 44, sub: Vegetable Sups. ORB ABCOM P&C 432.

[94] Ltr, Maj Maynard A. Joslyn to CG Base Sec 7, 26 Feb 45, sub: Food Proc in N.Z. ORB ABCOM P&C 400.12.

[95] Hester Rpt, p. 8.

[96] Ltr, JPB to CG SOS SPA, 9 May 44. ORB USAFINC AG 334.

[97] Hist of USAFISPA, pp. 388–89.

[98] (1) Rpt, n. s., 5 Jan 45, sub: Redeployment in N. Z. ORB USAFINC AG 319.1. (2) Personal Ltr, Gen Gregory to Maj Gen Carl A. Hardigg, 4 Feb 45. DRB AGO ASF File 2A.

would relieve the shortage of fresh meat and canned vegetables that had developed in the United States because of heavy shipments to American troops overseas and to civilians in liberated territories.[99]

When Headquarters, ASF, transmitted these observations to the Assistant Chief of Transportation, that officer approved them because of the saving of shipping that would be accomplished.[100] But in practice it proved difficult to carry out the recommendations in their entirety since equitable allocation of vessels between the active western Pacific and the inactive South Pacific was impossible, and the New Zealand Government was reluctant to sanction large shipments to points outside the South Pacific Area. In spite of a few substantial movements to active operational centers in mid-1945, much food remained in Auckland storage when hostilities ended.[101]

In spite of the fact that the full utilization of New Zealand resources was impossible after the closing months of 1944, supply movements from that country in 1943 and most of 1944 prevented the shortage of bottoms from becoming worse. During the whole war the Joint Purchasing Board obtained food amounting to approximately 600,000 measurement tons, or slightly more than a third of that obtained by USASOS. In monetary terms subsistence accounted for about 55 percent of the total American procurement.[102] Practically all the fresh meats and vegetables consumed in the South Pacific came from New Zealand, even though that country furnished less than half of all the subsistence consumed in that command.[103]

Local Procurement Outside Australia and New Zealand

Nowhere else in the Pacific could Quartermaster supplies be procured in as wide a range as in Australia and New Zealand. The few items obtained locally outside these countries consisted almost entirely of foodstuffs. Only on Oahu was such procurement of any real significance; here sufficient fresh and canned pineapples, pineapple juice, granulated sugar, cane syrup, and other sugar products were obtained to fill mid-Pacific needs for these goods. When the local supply of meats and vegetables in Hawaii exceeded civilian requirements, as it did at certain seasons, those items were also acquired but never in quantities ample enough to form more than a small part of area requirements. More important was the procurement of coffee, which sufficed to supply the forces in the Hawaiian group.[104]

The abundant sugar resources of Hawaii led the QMC to encourage the local production of candy bars for sale in post exchanges. Such an enterprise was a new venture for the islands, but with help from American specialists it was successfully launched, and the Territory became the sole source of these confections in the mid-Pacific. It held this position until just before

[99] (1) Memo, ASF Hq for CofT, 22 Feb 45, sub: Cargoes for Returning Ships. DRB AGO ASF File 2A. (2) Memo, TQMG for CG ASF, 14 Mar 45, sub: Tour of POA. OQMG POA 319.25.

[100] Memo, Asst CofT for CofT, 23 Feb 45, sub: Cargoes for Returning Ships. DRB AGO ASF File 2A.

[101] (1) Memo, Dir of Plans and Opns ASF for TQMG, 3 Mar 45, sub: Proc of Subs in N. Z. OQMG POA 430. (2) Rpt, J. B. Harper, 13 May 45, sub: Activities of OCQM USASOS, Apr 45. DRB AGO Opns Rpts.

[102] FEA, Bureau of Areas, Reverse Lend-Lease Bull 9, 1 Aug 45.

[103] Hq USAFPOA, G–4 Pers Rpt, 1 Jan–31 Mar 45, pp. 10–11.

[104] Ltr, QM to CG CPBC, 24 Jul 45, sub: Rqmts Plng Data. OQMG POA 319.25.

V-J Day, when easier shipping conditions made possible the movement of candy from the West Coast. Since troops preferred the mainland product, local procurement was materially reduced until stabilized at 864,000 nickel bars a month.[105]

In the South Pacific Area, New Caledonia was the chief source of subsistence outside New Zealand. With only 60,000 inhabitants, most of whom were engaged in nickel mining, it normally had little surplus food. Coffee was abundant, however, and quartermasters set up a coffee-roasting plant that at times furnished as much as 75 percent of the daily issue. Since farmers had no modern means of cultivation, arrangements were made whereby the Foreign Economic Administration (FEA), the American civilian agency responsible for the procurement of supplies from foreign sources, provided technical advice, seeds, fertilizers, and insecticides and maintained pools of tractors, plows, and seeders. In return for these services approved farmers offered their surplus produce for sale to Quartermaster collection points.[106]

The Fijis were the third most important source of supply in the South Pacific, providing up to 30 June 1945 about $6,382,000 worth of food under reverse lend-lease agreements.[107] Procurement in other island groups was unimportant. In a few instances tropical products were obtained by barter with the local populations. Tobacco, pipes, twine, fishing equipment, pocket knives, soap, combs, mirrors, perfume, and bright-colored calicoes were exchanged for bananas, pineapples, coconuts, lemons, and limes. The limited resources of the islanders, however, left them little to spare after satisfying their own wants, and barter never attained much signifiance as a means of procurement.[108]

The recovery of the Philippines in 1944 and 1945 once more gave the United States possession of territory that in peacetime had helped supply the American forces stationed there. But the Philippines of the war's closing months were islands devastated by the contending armies. They were unable to provide for themselves adequately, let alone give the United States much economic assistance. During the reconquest factories, mills, warehouses, ports, even crops, suffered immense damage from bombing, shellfire, looting, and willful destruction by withdrawing Japanese. To restore production, seeds and agricultural plants as well as industrial equipment had to be imported, and mills and warehouses repaired and in some cases rebuilt.[109]

In spite of these hindrances to the quick acquisition of supplies, General MacArthur's headquarters in October 1944 authorized a procurement organization in the Philippines modeled on that in Australia. The General Purchasing Board operated pretty much as did the corresponding board in Brisbane and Sydney while the Philippine Commonwealth performed functions similar to those carried out by the Australian Government. The immediate task of the new organization was the purchase of commodities, not so much for American soldiers as for destitute civilians and Filipino em-

[105] *Ibid.*

[106] (1) Ltr, I Island Comd to BEW, 4 Jul 43, sub: Vegetable Growing. ORB USAFINC AG 432. (2) Ltr, SOS SPA to SvC Nouméa, 23 Jul 43, sub: Proc of Coffee. ORB USAFINC AG 435. (3) Rpt, n. s., Dec 43 (?), sub: Vegetable Growing in New Caledonia. ORB USAFINC AG 432.

[107] G–4 Sec, SPBC, XII Bimonthly Lend-Lease Rpt, 1 Jul–31 Aug 45, Sec. III. ORB USAFINC AG 319.1.

[108] (1) Ltr, QM USASOS to CQM USAFFE, 25 Mar 43, sub: Foraging Parties. ORB AFWESPAC QM 403.3. (2) QM USASOS Tech Memo 44, Jul 43, sub: Bartering in Pac Islands.

[109] Hist of Plng Div ASF, V, 73–104.

ployees of the Army. Procurement of Quartermaster supplies was rendered doubly difficult by the stipulation that buying should not cause hardship to the Philippine people, a requirement that automatically precluded the purchase of such scarce items as beef, pork, fish, chickens, eggs, and dairy products. Another hampering stipulation was the requirement that the Commonwealth schedule of permissible maximum prices be strictly adhered to. This policy effectively barred procurement of sugar, fruits, and vegetables, for these commodities were handled almost exclusively on the flourishing black market where they commanded exorbitant prices far exceeding those officially allowed. Yet enough food and cigarettes were obtained to supply the wants of Filipino guerrillas and civilian employees of the United States.[110]

By July 1945 economic conditions had begun to improve, and it became possible to buy a few supplies for American troops. Two large breweries, whose equipment and raw materials were provided by the QMC, furnished beer to post exchanges, while recently repaired Manila plants supplied soap and those traditional Philippine products, rope and cordage. At this time the Procurement Division, operating in the Philippine Base Section, reported that it had obtained avocados, papayas, camotes, and pineapples but that black market prices in general still prevented the acquisition of enough fresh vegetables to feed even the relatively few hospital patients. It was also able to buy some sweet corn, which was grown in scattered districts of the central islands. Unfortunately, only a few ounces could be procured for each American soldier.[111]

Army Farms

In addition to obtaining supplies in the commercial centers of the Pacific areas, the QMC attempted to increase the amount of local procurement by fostering wherever practicable the operation of Army vegetable farms. These projects would, it was hoped, furnish fresh provisions for local, particularly hospital, consumption. In the Central Pacific the coral soil did not lend itself to agricultural production, but below the equator more propitious conditions permitted the establishment of farms at some of the island bases. Smaller tracts, dubbed "gardens," were occasionally cultivated by Army units.

A host of troubles plagued both base and unit enterprises. Limited in size, most of them produced hardly enough vegetables to supply nearby hospitals.[112] In some areas satisfactory cultivation hinged upon irrigation, yet few of the smaller islands had a dependable water supply. The absence of approved tables of organization and equipment for agricultural projects further hampered cultivation by making it difficult to obtain agricultural machines and insecticides and by necessitating the employment of islanders having no knowledge of vegetable cultivation. Even managers of farms often lacked complete information about the production

[110] (1) Ltr, Hq SWPA to USAFFE, 28 Oct 44, sub: Proc in SWPA. ORB AFPAC GPA. (2) GPB Regulations 25–6, 10 Nov 44, sub: Proc in P. I. ORB ABCOM AG 400.12. (3) Rpt, J. B. Harper, 8 Aug 45, sub: OCQM Activities, Jul 45, pp. 5–10. DRB AGO Opns Rpts.

[111] (1) Rpt, J. B. Harper, 13 May 45, sub: OCQM Activities, Mar 45. ORB AFPAC GPA. (2) *Ibid.*, 8 Aug 45, sub: OCQM Activities, Jul 45. ORB AFPAC GPA. (3) Ltr, Proc Div to CG Phil Base Sec, 10 Aug 45, sub: Proc of Fresh Fruits and Vegetables. ORB Phil Base Sec AG 430.

[112] Ltr, Agricultural Off to CO Base D, 4 Aug 45, sub: Production Plans for New Guinea. ORB AFWESPAC QM 403.3.

of temperate-zone vegetables in the tropics; some of them did not even know what varieties of seed were best adapted to tropical environments.[113] Inexperienced natives prepared the soil poorly and planted seeds before the land was thoroughly weeded. Frequently, they could not operate the few available farm machines and knew so little about keeping records of vegetable production that these necessary guides to future plans were usually lacking.[114]

The South Pacific Area manifested more interest in agricultural projects than did either of the other areas.[115] The Quartermaster farm on Guadalcanal, the largest project of its kind in the South Pacific, typified many aspects of Army agriculture. The first plantings, begun on a small scale early in 1943, were designed to determine what fruits and vegetables grew best on the island. In February 1944, owing to the rapid rise in troop strength in the Solomons, the project was put on a mass-production basis. By September, 3 officers and about 75 enlisted men and 250 local laborers were cultivating 1,800 acres, approximately half the total area then tilled by the armed forces in the entire South Pacific. The next six months constituted the period of maximum production. Since a high yield in a short span of time was the main objective, no effort was made to preserve the fertility of the soil. Crops were planted in rapid succession. In a single year as many as four were raised. This excessive utilization of the land, unaccompanied by protective measures, caused rapid erosion and leaching, and by early 1945 the yield per acre had dwindled to about half that of two years before. In spite of shrinking productivity and the loss of some crops by floods, 11,000,000 pounds of fresh fruits and vegetables were raised between 1 May 1944 and 30 September 1945.[116] Included among the produce were cucumbers, corn, eggplants, watermelons, cantaloupes, peppers, radishes, Chinese cabbage, tomatoes, okra, and onions.[117] Hospitals had first priority on the production of the farm; troops on Guadalcanal, second; and those in the northern Solomons, third.

As the number of troops throughout the Solomons area declined steadily after February 1945, the number of acres under cultivation on Guadalcanal correspondingly fell. By June it had shrunk to about 425. Other South Pacific farms located on Espíritu Santo, Efate, Bougainville, New Georgia, and New Caledonia at their peak cultivated all together between 1,000 and 1,200 acres. Unit gardens added still another 400 or 500 acres.[118]

Before the recovery of the Philippines the Southwest Pacific Area conducted only a 110-acre farm at Port Moresby and small, ephemeral projects at Dobodura, Oro Bay, and other places in New Guinea. At the

[113] Rpt, 1st Lt Joseph F. Kusek, 9 Sep 43, sub: Agricultural Survey. ORB AFWESPAC QM 403.

[114] (1) 1st Lt Curtis H. Dearborn, History of Quartermaster Farm, San Miguel, Tarlac, P. I., 20 Apr 46. (2) Ltr, SvC Espíritu Santo to SOS SPA, 18 Nov 43, sub: Vegetable Project. ORB USAFINC 430. (3) Ltr, QM for Base Svc Comdr Base D, 9 Dec 43, sub: Native Labor. ORB Base D 291.2. (4) Ltr, QM INTERSEC for CQM USASOS, 14 Dec 43, sub: Farming at Base D. ORB AFWESPAC QM 403.

[115] (1) Ltr, CNO to BEW, 12 Sep 42. ORB USAFINC AG 334. (2) Ltr, JPB to COMSOPAC, 12 Jan 43, sub: Exploitation of SPA Bases. DRB AGO Drawer 374 (A46-305).

[116] (1) Hester Rpt, pp. 14–16. (2) Hq USAF Guadalcanal, Final Close-Out Rpt, pp. 16–17.

[117] Hq USAF Guadalcanal, Final Close-out Report, Exhibit 11. This exhibit lists the specific varieties of seeds used on the Guadalcanal farm and indicates the suitability of each type for use under climatic conditions similar to those on the island.

[118] (1) G–4 Periodic Rpt, 4 Nov 44, p. 7. ORB Espíritu Santo AG 319.1. (2) Hist of SOS SPA, 1 Apr–30 Jun 44, pp. 25–26.



QUARTERMASTER FARMS *on Guadalcanal (above) and Espíritu Santo (below) were among many such projects in the South Pacific furnishing fresh vegetables for the Army.*



height of its productivity in September and October 1944 the Port Moresby enterprise harvested in each month more than 100,000 pounds of vegetables, mostly of the varieties grown on Guadalcanal. During this period lettuce was grown in amounts that permitted the issuance of one pound a week to each man at the base. With the shift of operations to the Philippines the Port Moresby farm was abandoned, and most of its equipment transferred to the new and larger project at San Miguel in Luzon.[119]

Started in April 1945 and continued after V-J Day, the San Miguel farm occupied part of a large sugar plantation. According to its historian the project was the first large-scale venture in vegetable production "ever carried out to any degree of success" on Luzon.[120] Owing to the general absence of knowledge among Filipinos about the production of such vegetables, the farm was pretty much an experiment. From the outset it was hampered by heavy labor turnover and by slow delivery of equipment, seeds, fertilizers, and insecticides. But its worst handicaps were partial depletion of the soil from a century of intensive sugar and rice culture and lack of water for irrigating more than 500 acres, a deficiency that made impossible the realization of the original plan for a 2,000-acre farm. Only those vegetables were planted which deteriorated rapidly during shipment from the United States or which lost quality and palatability when canned. In the year ending on 31 March 1946 a total of 1,414,000 pounds of produce was gathered. Cultivation had just then reached a peak, 725,000 pounds having been harvested in the previous four weeks.[121]

The reasonably satisfactory results achieved by the San Miguel venture demonstrated that even under relatively unfavorable conditions vegetable farming in the tropics could be moderately productive. The comparative success of this project, like that on Guadalcanal, was attributable to expert supervision, use of a sizable tract of land, and the employment of a large body of civilian laborers. Had similar conditions prevailed generally on military farms, they might have become significant sources of fresh food. Actually, they never attained more than local importance because they were hastily embarked upon in answer to temporary exigencies rather than in response to plans carefully prepared in advance. What was probably needed most of all was area-wide programs, but the highest Quartermaster levels had few or no qualified officers who could be spared from more immediately pressing matters to formulate and supervise such programs. Agricultural projects thus became largely hit-and-miss affairs of individual bases and units and seldom produced worthwhile results.

Despite the comparative unproductiveness of its bartering activities, military farms, and other minor features, the Quartermaster procurement program emerged as a conspicuous success that contributed materially to effective support of combat forces. The supply of perishable foods was its most significant accomplishment, a fact that ought not to be obscured by the frequent lack of refrigeration for these items. Troops below the equator would indeed have had scarcely any fresh provisions had not Australia and New Zealand furnished

[119] Personal Ltr, 1st Lt Michael H. Reagan to Col Charles A. Ritchie, 12 Sep 44. ORB Base D QM 403.

[120] Dearborn, QM Farm, San Miguel, p. 16.

[121] *Ibid.*, Apps. 4–5.

them to the limit permitted by their agricultural capacity and internal necessities. By wise abandonment of traditional methods of buying perishables and by bold substitution of the market center system in the midst of war, the QMC in the Southwest Pacific contributed heavily to satisfactory procurement operations.

Though home sources provided the bulk of Quartermaster items issued in the Pacific, this circumstance should not detract from the major importance of local sources. At times in 1942 and 1943 they actually furnished more Quartermaster supplies in parts of that theater than did the United States. During the entire war local sources provided nearly 30 percent of Quartermaster items in the Southwest Pacific.[122] A procurement system that achieved so remarkable a result despite all the difficulties inseparable from dealing with suppliers unfamiliar with American requirements and ill equipped to meet vastly increased demands cannot but be considered of outstanding merit.

[122] (1) Masterson, Transportation in SWPA, App. 21. (2) Hester Rpt, p. 3.

CHAPTER VI

Supply From the United States

Despite the fact that the South Pacific and the Southwest Pacific Areas continued throughout the war to obtain as many Quartermaster supplies from local sources as military specifications and the number and distribution of troops permitted, both commands as time went by were obliged to obtain more and more supplies from the United States. In the South Pacific at the end of 1942 it was calculated that during the coming year New Zealand would furnish about 45 percent of nonperishable food requirements, Australia about 33 percent, and the United States only about 22 percent.[1] But the greatly increased number of soldiers in both areas prevented the degree of support anticipated from Australia, and at the close of 1943 it was estimated that in the following year the contribution of Australia would shrink to 10 percent while that of the United States would double and that of New Zealand remain unchanged. Actually, New Zealand did not provide more than slightly over 36 percent, and the United States made up the deficiency.[2] In the Southwest Pacific, too, the United States supplied a growing share of area needs. By the last half of 1944 it was probably the source of more than 75 percent of nonperishable foods eaten by soldiers at and west of Hollandia, who then constituted about 30 percent of the theater troop strength. For the remaining 70 percent of the troops who were stationed east of Hollandia, it provided about 30 percent of nonperishables.[3]

From the outset both theaters procured post exchange (PX) articles—cigarettes, cigars, matches, razors, shaving blades, shaving cream, toilet soap, tooth powder, toothbrushes, candy bars, and soft drinks—mainly from the United States, for that country alone could provide the familiar type of articles preferred by most soldiers.[4] As the war progressed, the percentage so obtained rose steadily. This was true, too, of clothing, equipage, general supplies, and petroleum products. The Central Pacific, unlike the other two areas, from the very beginning looked to outside sources for practically all its Quartermaster supplies.

Area Stock Levels and Requisitions

To prevent any one theater from securing a disproportionately large share of available supplies and at the same time give every

[1] Ltr, CG SvC and USAFISPA to JPB, 2 Nov 42, sub: Subs for SPA. ORB USAFINC AG Subs Gen File.

[2] Ltr, CG SOS SPA to JPB, 24 Dec 43, sub: Subs Rqmts. ORB USAFINC AG 334.

[3] (1) Ltr, CQM to QM Base Sec 3, 19 Dec 43, sub: Subs Shpmts from U.S. ORB AFWESPAC QM 400.226. (2) Ltr, QM DISTBRA to CQM, 27 Jun 44, sub: Block Shpmts from U.S. ORB NUGSEC QM 400.

[4] Ltr, CG USASOS to CG SFPOE, 11 Dec 43, sub: PX Consumption Factors. OQMG SWPA 381.4.

overseas area adequate stocks, the War Department determined for each theater the amount of reserve stores it needed to replace supplies that units brought overseas with them and to maintain a margin of safety. These reserves, varying from theater to theater with their diverse requirements, were expressed in terms of "days of supply," one day's supply being the amount needed to fill the replacement demands of a theater for one day.

War Department directives of early 1942 established a 90-day level for Quartermaster stocks in the Southwest Pacific. These instructions did not make it clear whether supplies on order or in the hands of troops were to be included in the authorized reserves. Headquarters, USAFIA, assuming that such supplies were to be included, found that under this interpretation the long delays in forwarding shipments of Quartermaster cargoes from the West Coast made Quartermaster supplies on order so large a part of the permissible stock level that stores actually in the Southwest Pacific were likely to be inadequate to furnish a suitable margin of safety. For that reason it recommended that the total of allowable Quartermaster levels be doubled to a 180-day supply. The War Department not only did this; it went further and definitely excluded from the reserves all supplies on order or in the hands of troops. It also divided the reserve into two parts: one, an "emergency or minimum reserve," and the other, an "operating reserve." The emergency reserve was composed mostly of supplies stored in ports and depots. In theory it was used to meet abnormally large replacement needs stemming from tactical operations, transportation breakdowns, or the depletion of the "operating reserve." The latter reserve, stored in all echelons of supply, contained the items needed to fill routine replacement demands.[5]

In the Southwest Pacific each of these reserves consisted of a 90-day supply, and both together constituted what was called the "maximum reserve." As the South Pacific Area's greater proximity to the West Coast enabled it to obtain quicker deliveries than the Southwest Pacific Area, its operating reserve was only a 60-day supply and its maximum reserve only a 150-day supply. In both areas the distinction between the emergency and the operating levels became blurred in practice. The tendency, particularly in regions with few well-established bases, was to treat all stores as available for either routine or emergency issue and to make the maximum reserve the actual operating reserve. Insofar as the concept of an emergency reserve had reality, it was increasingly as a stockage held for the use of task forces in combat operations.

Until the last year and a half of the war, both emergency and operating reserves of Quartermaster items in the Southwest Pacific continued to be based generally on a 90-day level. Lower levels were set for items that were not issued regularly but only under unusual conditions. Thus field rations, consumption of which depended upon the varying conditions that governed the supply of regular A rations in the field, particularly in combat operations, were stocked in accordance with rough estimates of probable consumption during a 180-day period. The maximum reserve for B rations was a 144-day supply; for C rations, a 24-day supply; and for D rations, a 12-day supply.[6] Some-

[5] (1) Ltr, AG 400 (1-31-42) MSC-D-M to CG USAFIA, 2 Feb 42, sub: Sup of USAFIA. (2) Ltr, AG 400 (4-27-42) MC-SP-M to CG AGF *et al.*, 26 Apr 42, sub: Sup of Overseas Depts, Theaters, and Separate Bases. (3) Ltr, AG 400 (7-11-42) MS-SPOPS, 20 Jul 42, sub: Overseas Sup Levels. All in ORB AFWESPAC AG 400.

[6] QM SWPA Hist, II, 19, 22–23.

times special circumstances required the establishment of levels higher than those normally authorized. The seasonal character of the canning industry and the impossibility of delivering canned foods at a uniform rate throughout the year, for example, made it necessary to permit stockage of more than formally authorized amounts of these foods at peak production periods.[7]

During 1944 two factors—the vastly increased requirements brought about by the invasion of the European Continent and the growing shortage of supplies of all sorts throughout the world—compelled the War Department to lower authorized operating reserves for Quartermaster items. In January the build-up for the Normandy landings forced a reduction in the Quartermaster operating reserves in all Pacific areas to a 30-day level. In the Southwest Pacific and South Pacific Areas emergency reserves, which were becoming comparatively more important as the scope of tactical operations widened, were reduced only to a 75-day level for food and petroleum products, or two and a half times the operating reserves for these supplies. Emergency reserves for clothing, equipage, and general supplies were actually lifted to a 120-day level, this high figure being set because deliveries from the West Coast were often held up by low shipping priorities. In Hawaii the level for food and petroleum products was a 30-day supply and for clothing, equipage, and general supplies, a 60-day supply. For forward areas in the Central Pacific, the corresponding figures were a 60-day and a 90-day supply.[8]

The War Department at the same time formally redefined the emergency level as a reserve specifically designated for combat forces. Stockage of this reserve "in echelon," it declared, envisioned "the assembly of adequate supplies immediately behind combat operations to insure a constant flow." [9] Under this definition the emergency reserve could no longer be considered available for any unforeseen needs that might arise except those connected with combat operations.[10]

As 1944 advanced, the procurement of supplies in the United States became more and more difficult, and in December the War Department again reduced Quartermaster stock levels. By this time Pacific quartermasters themselves considered a reduction of authorized stocks necessary, for materials consigned to advanced supply points could not always be stocked there and had to be diverted to rear bases where they were not needed and where storage space was already at a premium.[11] In any event increased shipments direct from the West Coast to the island bases made further reductions of permissible levels feasible as well as desirable. In the Southwest Pacific the total reserve, operating and emergency, for food, clothing, and general supplies was set at a 90-day supply. As compared with January figures, this represented a 15-day reduction for subsistence and a drastic 60-day cut for clothing, equipage, and general supplies. The reserve for petroleum products was placed at an 85-day level, a decrease of only 20 days.[12]

[7] Ltr, AG 400 (8 Jul 44) OB-S-SPOPI-M, 10 Jul 44, sub: Overseas Sup Levels. ORB AFWESPAC AG 400.23.

[8] Ltr, AG 400 (11 Jan 44) OB-S-E-M, 20 Jan 44, sub: Overseas Sup Levels. ORB AFWESPAC AG 400.23.

[9] *Ibid.*

[10] QM SWPA Hist, V, 9.

[11] Min, Conf of Gen and Sp Staff Sec USASOS, 22 Aug 44, pp. 1–2. ORB AFWESPAC AG 334.

[12] Ltr, AG 400 (12 Dec 44) OB-S-E-I, 29 Dec 44, sub: Overseas Sup Levels. ORB AFWESPAC AG 400.23.

Whether high or low, authorized area stock levels put a definite limit on the total quantity of supplies sought through local procurement and requisitions on the zone of interior. In establishing this quantity for a given period the initial step was to determine over-all area supply requirements. This was done by first multiplying the probable troop strength by the maintenance factor that represented the average daily or monthly depletion of an item and then multiplying the resultant figure by the authorized days of supply plus "order and delivery" time—the period between the consolidation of base inventories and the arrival of requisitioned materials. In the Southwest Pacific the order and delivery time was usually 120 days; in the South Pacific, 90 days. Once the figure for total area requirements had been calculated, the next step was to determine how much of the required items would be on hand at the end of the requisitioning period if no additional supplies were ordered from the zone of interior. These amounts were ascertained by first estimating how much would be available from local procurement, from base stocks, and from replacement supplies accompanying newly arrived units and by then adding these figures and subtracting the anticipated consumption and wastage during the order and delivery period. The difference between the total requirements and the quantity expected to be on hand in the area at the end of the requisitioning period represented the amounts that had to be ordered from the United States.[13]

[13] (1) Memo, S&D Div for CQM USASOS, 1 Apr 43, sub: Maint Factors. (2) Ltr, CQM to QM Br DISTDIV USASOS, 30 Sep 44, sub: Computing Rqmts. Both in ORB AFWESPAC QM 400.312. (3) Rpt, Maj Harold A. Naisbitt, OQMG Observer, 11 Feb 45, sub: Data Obtained from QM CPBC. OQMG POA 319.25.

The determination of requirements for Quartermaster items and the preparation of requisitions on the zone of interior were functions that, generally speaking, were carried out by the supply branches of the central Quartermaster organization in each theater. This arrangement was followed even in the Southwest Pacific during 1942 and 1943. All requisitions on the zone of interior were checked by higher echelons before they were submitted to the San Francisco Port of Embarkation for completion. In the Southwest Pacific in 1943 the Planning and Control Division of the OCQM checked all requisitions and then sent them for approval to the Supply and Transportation Section, USASOS, which in this respect acted essentially as a G–4 Section. Requisitions approved by that section were forwarded to GHQ SWPA, which in turn submitted them by air mail to San Francisco. When the Distribution Division was set up in the Southwest Pacific at the beginning of 1944, its Quartermaster Section took over the tasks of estimating requirements and preparing requisitions on the zone of interior. In the other Pacific areas these tasks remained functions of the central Quartermaster organization.[14]

The preparation of over-all area requisitions accurately mirroring Quartermaster needs required, above all, reasonably correct consolidated inventories of all stocks. Such inventories in turn depended on the availability of accurate consolidated inventories from the bases, which were supposed to take stock every month or two and submit the inventory figures to the requisition-

[14] (1) Ltr, Lt Col Roland G. Batchelder, OQMG Observer, to TQMG, 9 Aug 43, sub: Stock Levels and Maint Factor. OQMG SWPA 400. (2) Rpt, Maj Naisbitt, OQMG Observer, 8 Mar 45, sub: Info Obtained on QM Activities in SWPA. OQMG SWPA 319.25.

ing agency. Unfortunately, bases seldom had sufficient qualified technicians to furnish this fundamental information. In the Southwest Pacific such personnel were lacking not only in new advance bases but to a considerable extent even in older and better organized bases. Writing to Quartermaster General Gregory in mid-1943, Colonel Cordiner said that "Property officers too often place their weakest men on stock record accounts, personnel who know nothing of nomenclature and who often have no desire to know anything." [15] In the South Pacific lack of an effective system of keeping stock records at SOS bases prompted the Quartermaster Section of Headquarters, SOS SPA, in the spring of 1944 to revise the existing methods of stock control. At that time an inventory team visited all South Pacific bases and examined bookkeeping methods and depot operations that affected accurate reporting. On the basis of the information obtained, the team helped each base prepare better inventories and better stock records.[16] This development, though desirable, came at a time when the South Pacific was already rapidly declining as an active combat area. It was too late to be of much value.

Other computations used in estimating requirements were often as unreliable as inventory figures. Deliveries from Australian and New Zealand sources of supply could seldom be forecast correctly because droughts and other unpredictable natural hazards repeatedly lowered agricultural production and because labor and materials shortages in swiftly expanding industrial plants made adherence to production schedules almost impossible. Nor was it possible to do more than make a shrewd guess as to combat, shipping, and storage losses.[17]

In practice the requisitioning system provoked many differences of opinion between the Pacific areas and the zone of interior. The War Department, believing that units going overseas would be amply cared for by the replacement supplies that accompanied them and wanting the size of overseas reserves limited as much as possible, favored a troop basis for requisitioning purposes founded on the number of men actually in an area at the time requisitions were submitted. Since it often happened that freshly arrived troops were not actually accompanied by their replacement supplies and had to be provided for out of maintenance reserves already in the theater, Pacific quartermasters wanted projected strength as of the end of the requisitioning period to determine the troop basis.

G–4, USASOS, early in August 1942 directed that a troop basis of 100,000 men be used for requisitioning purposes. This figure represented approximately the number of troops then in the area, but new organizations were pouring into Australia, "sometimes without the knowledge of the supply branches," at a rate that would shortly bring the total strength to a substantially larger figure.[18] Because of the rapid rise in the number of soldiers Colonel Cordiner insisted that the authorized basis was too low to insure adequate reserves. Late in August, G–4 appeared to accept this contention when it authorized a troop basis of 125,000 men until 1 October and of 150,000 men from

[15] Ltr, 8 Jul 43. ORB AFWESPAC QM 370.43.

[16] SOS SPA Memo 173, 23 Oct 44, sub: Stock Control, QM Sup.

[17] (1) Memo, DCS GHQ SWPA for DCS USAFFE, 15 Jan 44, sub: Subs Demands on Australia. ORB AFPAC AG 430.2. (2) Ltr, Col R. C. Kramer, Jt Sup Survey Bd, to CINCSWPA. ORB AFPAC AG 400.

[18] (1) Barnes Rpt, p. 32. (2) Memo, CQM for G–4 USASOS, 2 Aug 43. ORB AFWESPAC AG 400.

that date to the end of the year. Scarcely had it taken this action when it lowered the basis to 110,000 men for requisitions on the zone of interior but, somewhat paradoxically, retained the 150,000-man basis for procurement operations in Australia and for determining theater supply levels. Since these levels were based on a larger number of troops than were used for requisitions on the zone of interior, Quartermaster stocks often could not be built up to the authorized level and therefore appeared in "a rather bad light." [19] For this reason Cordiner suggested that the basis for procurement from the United States again be lifted to 150,000 men, a figure that would soon represent the actual strength of the theater. This change was made, but at the same time the troop basis for theater supply levels was raised to 200,000 men. While more supplies could thus be obtained from home sources, it was still frequently impossible to bring Quartermaster stocks up to authorized levels.[20]

In December the War Department directed that the ports of embarkation edit overseas requisitions on the basis of the number of men actually in the theater. This development led USASOS to direct that the troop basis for requisitions be set at 135,000 men, approximately the number then in the command, but 15,000 less than the figure set just a month before. Until authority was finally granted in the summer of 1944 for the inclusion in the troop basis of units ordered to proceed to the area, requisitions were based roughly on actual strength, but not without considerable discussion between the Pacific areas and the port of embarkation concerning what constituted "actual strength." Whenever, as sometimes happened, the zone of interior and the Pacific areas used different troop figures, the editing and filling of requisitions became a longer process.[21]

Troop strength, whether current or projected, was only one element in the calculation of requirements. An equally important element was accurate replacement factors. These factors were simply numbers expressed in fractions or decimals, which represented the replacement need for a single issued article during a specific period of time. If it was desired to ascertain the replacements for the shirts of 100,000 troops, each of whom had been initially issued two shirts, and the replacement factor representing a month's requirement was .20, total requirements were calculated merely by multiplying the 200,000 shirts in the hands of the troops by .20. Accurate replacement factors were particularly needed for clothing and general supplies, which were not consumed with the regularity characteristic of rations and, to a lesser extent, of petroleum products. But factors that mirrored wartime replacement needs with reasonable accuracy could of course not be obtained before the theaters of operations had developed a body of issue experience. Until well into 1943 both the Pacific areas and the San Francisco Port of Embarkation utilized OQMG factors based mainly upon the peacetime issues of the Regular Army in the United States, which, obviously, did not reflect combat conditions in the tropics.[22]

Fully alive to the need for more accurate factors, the Pacific areas after mid-1943 used their accumulating issue experience as a check on published factors and as a basis

[19] Memo, CQM for G–4 USASOS, 2 Nov 42, sub: TRB for Rqmts. ORG AFWESPAC AG 400.

[20] Memo, G–4 USASOS for CQM, 30 Nov 42, same sub. ORB AFWESPAC AG 400.

[21] (1) Memo, CQM for G–4 USASOS, 22 Dec 42, sub: TRB. ORB AFWESPAC AG 400. (2) QM SWPA Hist, II, 28–30.

[22] Ltr, Rqmts Br Mil Plng Div OQMG to TQMG, 9 Aug 43. OQMG SWPA 400.

for the compilation of experience tables. If these tables were to be accurate, a sharp distinction had to be drawn between replacement and initial issues, but such a distinction was often impossible since initial issues frequently came from the same stocks as did replacement issues and supply installations seldom distinguished between the two types in their stock records. Yet if the War Department was to work out its supply plans intelligently, it had to differentiate between recurrent and nonrecurrent issues. It therefore insisted that theaters of operations exclude initial issues from replacement statistics. But its efforts to apply this principle had slight success in the Pacific because the haste accompanying initial issues and the scarcity of qualified accountants did not permit careful bookkeeping. For this reason Quartermaster experience figures were never very accurate.[23]

Because of the many uncertain elements that entered into the preparation of requisitions—incorrect inventories, doubt as to the basis of troop strength, doubt as to the precise quantities procurable from local sources, inability to forecast combat, shipping, and storage losses, and lack of wholly suitable replacement factors—requisitions mirrored Quartermaster requirements only approximately. Yet, usually, they were not too far from the mark. Of more importance was the prompt shipment of requisitioned items from the United States.

Port-Depot System

The San Francisco Port of Embarkation, the agency charged with the task of filling Pacific requisitions, was authorized to utilize not only its own resources but also those of its subports—Los Angeles, Portland, Seattle, Port Rupert (British Columbia), and New Orleans—and of its supporting depots, which stocked supplies for movement to the Pacific on its call.

In the Overseas Supply Division (OSD) at San Francisco, as at other ports of embarkation, there was a Quartermaster Branch, which dealt directly on technical matters with the OQMG in Washington. That branch had functions analogous to those of a zone of interior depot, being responsible for completing Quartermaster overseas requisitions and for storing and inspecting supplies handled in transit at the port. In addition to editing requisitions to see that the quantities ordered complied with prescribed stock levels and allowances of equipment and supplies and that they were not excessive in relation to the prospective troop strength of the requesting area, the Quartermaster Branch ordered the needed items from the port's "initial" or "primary" supply sources, which were ascertained from OQMG charts showing the particular installations that served as primary and secondary sources of supply for each major item required at San Francisco and its subports. These installations ordinarily were interior storage depots, but the port itself might be a supply source since it stocked limited quantities of Quartermaster items in constant demand. If an item was scarce, the source might even be a procuring agency, possibly the OQMG itself.[24]

For San Francisco and its Pacific coast subports the Utah General Depot at Ogden

[23] (1) Rpt, Lt Col Roland C. Batchelder, 9 Aug 43, sub: Stock Levels and Maint Factors. (2) Ltr, AG SPX (5 May 44) OB-P-SPDDX-MB-M to POE's, 9 May 44, sub: Editing Rqmts. Both in OQMG SWPA 400.

[24] (1) WDSB 10–12, 11 Feb 44, sub: Prep of Rqmts in Overseas Comds and Editing by POE's. (2) ASF Manual M-411, sub: Processing Overseas Rqmts.

or some other western installation usually served as the primary supply source. For New Orleans the sources were southern or middle western depots. The Quartermaster Branch instructed the supplying installation to forward the item to the port that it designated as shipper; it also indicated the date by which the item had to arrive in order to meet sailing schedules. If the primary source could not furnish the required item, it forwarded the order to a secondary source for completion.[25]

Throughout the war the Quartermaster Branch, like other technical service branches at the port, suffered from an organizational system that assigned to it not only too few officers in general but too few officers of field grade who could handle important problems with promptness and authority. In this respect the San Francisco branch was worse off than its sister branch at the New York Port of Embarkation. In June 1945, when the volume of supplies moving to the Pacific was fast nearing the peak levels earlier handled at New York, Quartermaster officers in the Overseas Supply Division at San Francisco consisted of only one major, three captains, and seven lieutenants. At a corresponding period in the activities of the New York Port the Quartermaster Branch, Overseas Supply Division, had one lieutenant colonel, three majors, six captains, and twelve lieutenants. Civilian employees at New York, too, were proportionately more numerous.[26] The branch at San Francisco also suffered from the fact that its functions were not confined, as were those of the branch at New York, to supply policy, editing requisitions, and coordinating overseas problems but included such purely local operations as storing Quartermaster stocks kept at the port for overseas shipment, compiling stock records, and following up orders on supporting installations to see that supplies were delivered as promptly as possible.[27] Owing to limited storage space, port stocks were confined to fast-moving items, of which a ninety-day working supply, based on both past and prospective shipments, was normally prescribed. The Quartermaster Branch submitted requisitions for the initial stocks of these items direct to the OQMG; once that office had filled these orders, it automatically replenished supplies on the basis of the port's periodical stock status reports.[28]

Hampered by its small staff and numerous functions and the complications introduced by the receipt of requisitions from three major areas, the Quartermaster Branch in San Francisco could not always edit overseas orders promptly nor maintain as complete records of actions taken on requisitions as were needed for effective control over the supplies flowing into the port. Its follow-up action was sporadic. Generally speaking, it took no immediate action when a supplying depot indicated its inability to deliver items within the stipulated time; instead, the branch waited for thirty days after the deadline. Had a more aggressive follow-up system been feasible, it might have substantially diminished the number of tardy deliveries.[29]

The inadequate organization of the Quartermaster Branch was only one of several causes for slow completion of requisitions.

[25] WDSB 10-182, Apr 45, sub: QM Sup Sources.
[26] Control Div OCT ASF, 15 Jun 45, Survey of Pac Sup, pp. 24–25. OCT HB POA.
[27] *Ibid.*, pp. 9–10.
[28] Ltr, CG ASF to TQMG *et al.*, 29 Nov 43, sub: Stockage at SFPE. OQMG 400.
[29] Survey of Pac Sup, pp. 24–25.

Railroad and storage deficiencies were also in part responsible. During 1942 most Quartermaster stocks for shipment through San Francisco were held in the Utah General Depot at Ogden, nearly 1,000 miles to the east. Because of the distance between the two installations and the fact that shipments to and from three other depots at Ogden congested the thin railway network leading to the West Coast, Quartermaster supplies could not always be delivered promptly. On several occasions this situation led to shortages in the food stocks at the port. When tardy deliveries continued into 1943, the newly built warehouses of the California Quartermaster Depot at its substation in Tracy, about 45 miles southeast of Oakland, were utilized for overseas stocks in order to bring them closer to the port, and the responsibilities of the Ogden installation for storing such stocks were substantially reduced.[30]

In the autumn of 1943 a special board of officers was appointed to study the problem of "delinquent" requisitions, defined as those which, after ninety days, were still not ready for shipment from San Francisco.[31] It found that, in October 1943, 5.1 percent of the Quartermaster requisitions submitted since the preceding March were delinquent—a much smaller percentage than was shown for requisitions of most other technical services but one that included several fairly sizable orders. The board attributed Quartermaster delinquencies to two causes. One was the fact that stocks at supporting depots, though generally meeting prescribed levels, were still too small to match demands, and the other was the slowness of the OQMG in handling requisitions that the port had forwarded for assignment to eastern and middle western supply points. That office took, on the average, twenty-two days to assign such requisitions; it sometimes distributed an order for a single item among several depots. The board found that the completion of a specially assigned requisition took, on the average, 116 days, or 26 days more than the theoretical limit.[32] Partly on the basis of the board's findings the OQMG established a special organization for handling overseas requisitions and restricted as far as possible the dispersion of orders for single items among depots.

The provision of more space for Quartermaster overseas supplies posed serious difficulties, for there was hardly any unallotted storage space in the western third of the country. Eventually, 900,000 square feet were assigned to the QMC in Umatilla Ordnance Depot at Hermiston, Oreg.; 250,000 square feet in Navajo Ordnance Depot at Flagstaff, Ariz.; and a like amount in Pueblo Ordnance Depot in Colorado. To obtain still more space the missions of the western depots were modified. The major functions of the Mira Loma and the California Quartermaster Depots and the Quartermaster Section of the Seattle General Depot had originally been the storage and distribution of supplies for troops being trained in the domestic distribution areas of these installations, but during 1944 most of these tasks were transferred to the Quartermaster Section of the Utah General De-

[30] (1) Rpt, Maj Louis C Webster, 20 Apr 42, sub: Inspection of QM Activities at UTGD. OQMG 319.1. (2) Memo for File, OQMG, n. d., sub: Functions of UTASFD—Filler or Non-Filler Depot. OQMG UTGD 323.7.

[31] Rpt, Bd of Officers, n. d., sub: Survey of Sup of Pac Theaters. OQMG SWPA 400.

[32] *Ibid.*, pp. 16–17.

pot, and the other depots increasingly became feeders for the port of embarkation.[33]

These changes, while they made for more efficient use of existing resources, left untouched several factors that delayed the filling of orders. Even after Quartermaster supplies arrived in port, thus theoretically completing a requisition, they, along with many other military items, were often held up by the need for special loadings for impending tactical operations and by the difficulty of equitably allotting the limited number of bottoms to fifty or more receiving points located thousands of miles from the West Coast and at considerable distances from each other. Low priorities, assigned to Quartermaster items by Pacific area commanders, constituted another important cause for delayed movements of supplies. This factor, Colonel Cordiner asserted, was responsible for the fact that Quartermaster supplies often could not be loaded even when they were on dock awaiting movement. "By the time the next sailing occurs," he added, "other high priority items roll in and Quartermaster supplies still remain [unloaded]."[34] These unfavorable conditions affected clothing and general supplies in particular, and in November 1942 large quantities of such supplies requisitioned in early May were undelivered though most of them had by then arrived in San Francisco. Colonel Cordiner estimated that four to six months were required for delivery. In August 1943 Lt. Col. Roland C. Batchelder, an OQMG observer then in the Southwest Pacific, estimated that it took "from 120 days to infinity" to get Quartermaster supplies to that area. He found that as a result some Quartermaster stocks had been depleted.[35] Deliveries to the South Pacific and Central Pacific Areas were slightly faster, taking on an average thirty to sixty days less than those to their sister area.

Early in 1944 several large Southwest Pacific Area requisitions were delinquent. In March only 5,000,000 of 12,000,000 rations ordered nine months before had been delivered. The delay was caused mostly by the high shipping priorities held by the European Theater of Operations, then busily preparing for the Normandy landings, and by the fact that the War Department, expecting Australia to fill most of the Southwest Pacific requirements for food, did not always have enough rations stored on the West Coast to meet large demands promptly. In May 1944 an order for 10,000,000 rations led the War Department to request that it be told informally well in advance if large orders were about to be submitted officially. Such prior information, it pointed out, would enable it to begin early planning for the shipment of the necessary supplies.[36]

It was not merely requisitions involving large quantities that remained uncompleted for fairly lengthy periods. Requisitions for small quantities, too, often remained unfilled. All these delays held up the supply of food from the United States. In December

[33] (1) OQMG S&D Order 51, 8 Jun 43, sub: Establishment at Umatilla Ord Depot of QMSS SEASFD. OQMG Seattle ASF Depot (SEASFD) 323.3. (2) Ltr, Brig Gen T. L. Holland, OQMG, to QMSO, UTASFD, 7 Aug 43, sub: Asgmt of Space at Pueblo Ord Depot. (3) Memo, TQMG for CG ASF, 18 Aug 44, sub: Pac Coast Missions. Both in OQMG 323.3.

[34] Memo, CQM for G-4 USASOS, 11 Nov 42, sub: Sup Levels. ORB AFWESPAC QM 400.291.

[35] (1) Ltr, Lt Col Roland C. Batchelder to TQMG, 9 Aug 43, sub: Stock Levels and Maint Factors. OQMG SWPA 400. (2) Memo, Dir of Opns ASF for TQMG, 5 Sep 43, sub: QM Sup Deficiencies. OQMG SWPA 400.

[36] (1) Ltr, CG USASOS to TQMG, 1 Nov 43. ORB AFWESPAC AG 430. (2) Ltr, CINCSWPA to CG USASOS, 21 May 44, sub: Rations from U.S. ORB AFWESPAC AG 430.2.

1943, for example, expected shipments of fruit and tomato juice, dehydrated potatoes and onions, peanut butter, dried eggs, and lard had not arrived. Similarly, requisitions sent in November to San Francisco for a wide range of canned meats and vegetables had still not been received by the end of March.[37]

At this time there was probably an even larger number of tardy requisitions for clothing than for food—chiefly because heavy shipments to the United Kingdom had almost exhausted some clothing stocks. Col. Fred L. Hamilton, director of the Distribution Division, USASOS, warned fellow officers on his return from the United States in March 1944 that they must rely to an unusual degree upon the reclamation of discarded clothing to eke out their stocks. Delays, even longer than in the case of clothing, were being encountered, he reported, on deliveries of general supplies. Though the War Department was procuring a substantial volume of such badly needed items as laundry soap, insecticides, and insect repellents, the shortage of labor and materials had obliged it to reduce or halt temporarily its purchases of less essential items. Colonel Hamilton indeed reported that few general supplies were being procured that theater commanders had not certified as urgently required.[38]

Of all the factors retarding the delivery of supplies—long lines of communications, shipping shortages, the time consumed in editing requisitions, an overworked Quartermaster Branch in the Overseas Supply Division at San Francisco, railroad and storage deficiencies, low shipping priorities, and stock shortages—none was more important than the slow turnabout of vessels. This particular problem, common to all theaters of operations, was made more acute in the Pacific by the inability of vessels to discharge cargoes quickly at island bases. At these installations it was the shortage of floating equipment, modern unloading equipment, warehouses, dumps, trucks, and labor that in the main accounted for the inability to keep ships constantly moving to and from the United States. By mid-1944 vessels detained at congested bases and beachheads had become so numerous that Quartermaster cargo awaiting movement from the United States to the Southwest Pacific Area began a disturbing rise. In October, 35 percent and, by March, 65 percent of such cargo could not be transported because of lack of bottoms. Large though these proportions seem, they were less startling than the 53 and 85 percent shown at the same dates for supplies of the technical services as a whole. On several occasions the San Francisco Port of Embarkation pointed out that it could utilize ships more efficiently if the technical services in the Southwest Pacific correlated their requisitions more closely with the discharging capabilities of the ports in that command, but these services, overly optimistic about future improvements of handling equipment, continued to submit requisitions for more supplies than the ports could readily receive.[39] The Pacific Ocean Areas balanced requisitions and shipping somewhat better than did the Southwest Pacific Area. During the period when half or more of the cargoes bound for

[37] (1) Ltr, CQM to QM Base Sec 3, 19 Dec 43, sub: Subs Shpmts from U.S. ORB AFWESPAC QM 400.226. (2) Conf, Base Comdrs USASOS, 24–26 Mar 44. DRB AGO.

[38] Conf, Staff Conf Hq USASOS, 15 Mar 44, pp. 9a–9c. ORB AFWESPAC QM 337.

[39] For a fuller treatment of the shipping situation in late 1944 and early 1945, see Chester Wardlow, *The Transportation Corps: Responsibilities, Organization, and Operations*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1951), pp. 291–98.

the Southwest Pacific Area were being held in interior depots for future movement, 80 percent or more of the Quartermaster supplies earmarked for the Pacific Ocean Areas were being loaded on schedule.[40]

On the whole, belated shipments resulted from causes beyond the control of either port or depots and often from causes originating in the Pacific commands themselves. Such shipments, it is true, contributed to the unbalanced stockages that characterized Quartermaster activities in the Pacific, but they constituted merely one of several factors that helped produce this troublesome unbalance. If food, clothing, equipment, and general supply stocks seldom attained more than a 120-day level and often fell below that figure, this state of affairs was attributable as much to failure of local procurement to reach anticipated figures, to unexpected issues of initial equipment to newly arrived units, and to the re-equipment of combat troops after an operation ended, as it was to tardy receipts of replacement supplies requisitioned from the United States. In most cases reserve stocks sufficed to meet urgent requirements before shortages reached a critical stage.[41]

Automatic Supply

In order not to oblige overseas areas to try to draw up accurate requisitions in the opening months of their activities—when they were undermanned and had few means of accurately estimating either stocks on hand or supplies necessary to maintain established levels—War Department procedures for replenishing stocks were at first grounded on automatic supply as well as area requisitions. Automatic supply meant, simply, that ports of embarkation at regular intervals shipped selected items in quantities derived from their own estimates of future overseas requirements. This system was confined in the main to articles consumed at a fairly constant rate. A reasonably accurate estimate of future needs for these articles could, it was thought, be prepared merely on the basis of overseas troop strength and the amounts already shipped.

Of all Quartermaster supplies food items were best fitted for automatic supply. Since menus were determined months in advance necessary shipments of subsistence could be easily ascertained by taking the components of the menus, calculating the amounts required to feed one soldier during the chosen period of time, and multiplying this figure by the estimated troop strength. Though other Quartermaster items were not well suited to this method of supply, all of them were at first provided automatically to the forces in Australia in order to help build up stocks as quickly as possible to the ninety-day level prescribed for replacement stocks. In February 1942, however, the War Department directed that after 1 March automatic supply of Quartermaster items would be confined to rations and petroleum products.[42]

Since the full directive did not reach Colonel Cordiner he was left in doubt whether clothing, equipment, and general supplies were to be shipped automatically. His efforts to clarify this question brought

[40] Survey of Pac Sup, pp. 3–5, 21.

[41] Memo, CQM for G–4 USASOS, 9 Feb 44, sub: Overseas Sup Levels. DRB AGO F224.

[42] (1) Ltr, AG 400 (1-31-42) MSC-D-M, to CG USAFIA, 2 Feb 42, sub: Sup of USAFIA. (2) Ltr, AG 400 (4-27-42) MC-SP-M, to AGF *et al.*, 28 Apr 42, sub: Sup of Overseas Depts, Theaters, and Separate Bases. Both in ORB AFWESPAC AG 400.

conflicting information from Washington.[43] A War Department radiogram of 28 April declared that automatic shipments of clothing, equipage, and general supplies were being made on the basis of 78,000 men in Australia and 17,000 men in New Caledonia. Finally, on 12 June, more than four months after the original directive had been issued, the War Department radioed that these supplies were being furnished only on requisition.[44] Meanwhile, to be certain of receiving such items, Colonel Cordiner early in May had submitted requisitions based on the requirements of 150,000 men. This confused situation contributed to a delay of some weeks in building up essential reserves.[45]

By the late spring of 1942 it was obvious that automatic supply was not working well in the Southwest Pacific. Excesses appeared in some stocks and shortages in others. In part these imbalances resulted from the difficulties encountered at the San Francisco Port of Embarkation in calculating replacement needs correctly. Marked variations in actual troop strength figures from those used by the port distorted its estimates, and further distortions were introduced by unpredictable day-by-day fluctuations in the consumption rate and by the impossibility of forecasting losses from ship sinkings, air attacks, inferior packing, unsuitable storage, and widespread pilferage. Most of all, stocks were unbalanced because of increased deliveries of supplies bought in Australia and New Zealand. As the port of embarkation lacked complete information regarding such procurement, it could not adjust its shipments to reflect these purchases.[46]

By June the availability of more and more Australian food rendered the automatic system almost unworkable for that class of supply. The only ration components then needed in quantity from San Francisco were coffee, tea, cocoa, canned fish, tobacco, and a few other nonperishable elements of the B ration.[47] The position of clothing and general supply stocks was less satisfactory because of the prolonged uncertainty as to whether these items were being furnished automatically and because shipments made in January and February were based on 78,000 men, whereas the area had actually supplied more than that number owing to its responsibility for furnishing many items to the South Pacific Area. For a time clothing and general supplies became so scarce that issues were adequate only because some units arrived with replacement stocks and distress cargo furnished substantial quantities of needed articles.[48]

In the South Pacific, as in the Southwest Pacific, automatic supply did not prove entirely satisfactory. The longer the system lasted the more unmanageable became the shortages and excesses. The fact that shortages were the same at most supply centers precluded the better balancing of stocks by using excess accumulations of one center for filling the shortages of another. In January 1943 the Quartermaster, SOS SPA, submitted special requisitions on San Francisco to bring all his stocks up to prescribed levels,

[43] (1) QM SWPA Hist, II, 18–19. (2) Control Div ASF, Development of the U.S. Supply Base in Australia, p. 44.

[44] Rad, AGWAR (Somervell) to USAFIA, 28 Apr 42. DRB AGO.

[45] Rad, AGWAR (Somervell) to USAFIA, 10 June 42. DRB AGO.

[46] (1) Min, Jt Adm Plng Com USAFIA, Mar 42, pp. 2–3. ORB AFWESPAC QM 430.2. (2) Memo, Maj R. W. Hughes for Lt Col Edward F. Shepherd, OCQM USASOS, 15 Jun 42. ORB AFWESPAC QM 400.

[47] Memo cited n. 46(2).

[48] (1) Questionnaire, HQ USASOS, 29 May 42, sub: Sup Spstem. ORB AFWESPAC QM 400. (2) QM SWPA Hist, II, 20.

but several badly needed shipments did not arrive until July.[49] Not until the following month did requisitioning wholly supplant the automatic system.[50]

Shipment of Organizational Equipment and Supplies

The movement of organizational items constituted a special form of automatic supply. According to established policy, units departing from the United States—or from Australia—were if possible to be accompanied by the items needed for initial issues and by a sixty-day replacement stock of Quartermaster items. This method of supply was considered an indispensable safeguard against the unbalancing of stocks that would result if areas submitted requisitions covering the requirements of units under orders to proceed overseas and these units arrived in greater or less strength or earlier or later than expected.

In practice this system did not always operate in the prescribed manner. Frequently, in the hectic months after Pearl Harbor, the shortage of ocean-going vessels and the numerically inadequate gangs of stevedores prevented the movement of organizational supplies in the same convoy with the outgoing troops and forced the dispersion of such cargo among other convoys, some of which did not leave the West Coast for days or even weeks after the troops had sailed. The port was also often obliged to resort to "commercial loading" of organizational supplies—that is, the cargo was solidly stowed in order to secure maximum carrying capacity. Since solid stowing was the primary aim, items for different destinations and items of the various technical services were unavoidably intermingled. To make matters worse, overworked stevedores sometimes had to move cargo directly from incoming freight cars and hurriedly dump it into the holds of waiting vessels.[51]

These practices made the delivery of the proper organizational supplies to the proper overseas ports a hard task. Lt. Col. Joseph H. Burgheim, Task Force Quartermaster at Nouméa, New Caledonia, reported in late April 1942 that shipments were so mixed that whole cargoes had to be discharged in order to locate the supplies consigned to New Caledonia. Supplies consigned to Australia and New Zealand of course had to be reloaded. Colonel Burgheim estimated that improper stowage of supplies had damaged about 25 percent of the total tonnage. Organizational equipment, he added, seldom accompanied the troops. Truck companies lacked motor vehicles, bakery companies lacked ovens, and laundry companies lacked cleaning equipment.[52] Continued inability to match equipment and units in Australia led General MacArthur late in May 1943 to inform the San Francisco Port of Embarkation that for the time being all unit-marked supplies would be stored and, like other supplies, be issued only on requisition.[53]

To Pacific quartermasters the ideal solution for this confused situation was "unit-loading," that is, the transportation of all organizational cargo on the ship that car-

[49] (1) Memo, TQMG for ACofS for Opns SOS, 27 Nov 42, sub: New Caledonia G–4 Rpt. OQMG POA 319.1. (2) Memo, QM SOS SPA for D/SS, 21 Jun 43. ORB USAFINC G–4 430.

[50] Ltr, AG 430 (4-23-43) OB-S-SPOPI to CG SPA, 2 May 43, sub: Subs Sup, SPA. ORB USAFINC AG 400.

[51] Masterson, Transportation in SWPA, pp. 270–75.

[52] (1) Personal Ltr, Lt Col Joseph H. Burgheim to Col Cordiner, 29 Apr 42. (2) Personal Ltr, Col Burgheim to Gen Gregory, 24 Feb 43. Both in OQMG POA 319.25.

[53] Rad, CG SWPA to CG SFPOE, 27 May 43. ORB AFWESPAC QM 400.

ried the troops, or at least in the same convoy, but this solution in general proved impracticable. The Transportation Corps directed the port of embarkation to apply this method of loading as far as possible, but variations in the carrying capacity of troop transports and in the amount of unit supplies and equipment were too great to permit it as a standard practice. Since relatively more troops than supplies could be carried in a convoy, complete unit-loading was usually feasible only if some organizations were left behind. Later in the war port conditions in San Francisco at times allowed "selective loading," that is, the segregation of shipments by technical service and by general class of supply. Under this system of stowage, space was left in holds of vessels so that items could be taken off without moving the whole cargo. But the system was so time-consuming, tied up so many vessels, and so aggravated the shortage of bottoms that it could be used only sparingly.[54]

In many instances the large number of Pacific ports receiving supplies continued to force the shipment of consignments for two or more ports on the same vessel but with the whole cargo to be discharged at a single port. The latter procedure was particularly likely to be adopted if there was a large quantity of high-priority supplies for one port and a small quantity of low-priority supplies for another port. In that event all the cargo was likely to be discharged wherever the high-priority supplies were consigned. Quartermaster items destined for the Milne Bay base were repeatedly landed at Finschhafen; in this event, distribution of Quartermaster items from Milne Bay might be materially delayed. "The distribution situation being what it is in this theater," declared Capt. Robert D. Orr, OQMG observer, "it is almost an impossibility that the men and the equipment would show up at the same port at the same time unless they are together." [55] This state of affairs, though exasperating to quartermasters whose stocks might be unbalanced, was under the circumstances unavoidable.

In the last two years of hostilities delays in the arrival of organizational cargo grew shorter, but some divisions and other organizations—from Australia as well as from the United States—continued to reach New Guinea without essential equipment.[56] Frequently, even tents and cots, indispensable to the proper housing of troops, were not available for three weeks or more after units had arrived. In such cases, quartermasters in the base sections where the affected units landed issued these items from area replacement reserves. At times when many organizations were arriving in New Guinea, these reserves were indeed used mainly not for the replacement purposes for which they had been established but for initial issue to incoming units.[57] Yet cots and tentage were always in heavy replacement demand because tropical mildewing hastened their deterioration. They were needed in the first place because of the absence of permanent structures and the necessity of protection from the torrid sun, torrential downpours, deep mud, and disease-bearing insects. When large initial issues were added to these normal replacement requirements, acute

[54] Masterson, Transportation in SWPA, pp. 274–75.

[55] Ltr 32, Capt Orr to Gen Doriot, 13 Nov 44. OQMG SWPA 319.25.

[56] QM SWPA Hist, V, 44.

[57] (1) Personal Ltr, Col Cordiner to Col D. H. Cowles, OQMG, 12 May 43. OQMG SWPA 319.1. (2) Ltr, Sup Officer Sig Aircraft Warning Co to QM 36th Sv Gp, 29 Aug 43, sub: Lack of Tentage. ORB AFWESPAC QM 422. (3) CG Fifth Air Force to CG USAFFE, 25 Sep 43, sub: Equipping Overseas Units. ORB USAFFE AG 475.

shortages occasionally appeared. These would not have been particularly troublesome if units had returned the tents and cots when their own equipment finally arrived, but they seldom made such returns.[58]

Late delivery of other types of organizational equipment also inconvenienced units. Shortages of mess equipment, for example, impaired the ability of units to feed themselves properly, but it did not make as deep inroads on area stocks as did belated receipt of textile materials. In June 1943 the Base Quartermaster at Port Moresby reported that his stocks were "being daily depleted by initial issues of cots, mosquito bars, and other critical items to troops arriving from the U.S. and the mainland." He added that "something drastic will have to be done to insure that troops either arrive here fully equipped or that our stocks be increased at once to meet their needs." [59]

Since ships could seldom be totally unit-loaded at San Francisco, General MacArthur in October 1943 suggested that at least tentage and cots accompany troops departing from the United States. Maj. Gen. Charles P. Gross, Chief of Transportation, replied that converted passenger liners, which normally served as troop carriers, did not have enough cargo space to accommodate these supplies but that small transports, which had served as freighters in peacetime, could often stow these items for discharge with organizations. MacArthur then requested that, if cots and tents could not accompany a unit, they be forwarded before the troops embarked. Owing to the diversion of most tents to the ETO for its pre-invasion supply build-up, even this arrangement could not always be followed.[60]

Throughout most of 1944 units in New Guinea were staged with inadequate tentage or with tentage that would normally have been discarded as worthless. In the spring the arrival of a whole division and smaller organizations with but limited quantities of clothing and equipment materially complicated supply conditions. At Finschhafen stocks of tents, cots, jungle clothing, trousers, jackets, and socks were wholly exhausted. In early April the Base Quartermaster reported that shortages of clothing, equipment, and general supplies had reached "alarming proportions." He added that it was "a physical impossibility to initially equip task forces or other units from maintenance stocks." [61]

From the standpoint of the QMC, the most unfortunate result of belated deliveries of organizational cargo was the arrival of Quartermaster units without their operating equipment. This deficiency was especially serious in late 1944, when the campaign for the recovery of the Philippines was beginning and the support of Quartermaster units was badly needed. In December, for example, the 156th, 157th, and 158th Bakery Companies landed at Hollandia, but their baking equipment had been "shipped to an island in the Pacific Ocean areas and no equipment was available within the Theater for issue . . . inasmuch as the activation of four Quartermaster bakery companies had depleted" all oven stocks.[62]

[58] (1) C. J. Magee *et al.*, Scientific Liaison Bureau, Australian Army, *Report on the Condition of Service Material Under Tropical Conditions in New Guinea* (Melbourne, 1943), pp. 62–66. (2) Memo, CG U.S. Advance Base for QM *et al.*, 27 Mar 43. ORB Base Sec 7 AG 424.

[59] Ltr to QM Base Sec 3, 26 Jun 43. ORB AFWESPAC QM 370.43.

[60] (1) Rad, CINCSWPA to CG SFPOE, 12 Oct 43. ORB AFWESPAC AG 400. (2) Masterson, Transportation in SWPA, pp. 280–82.

[61] (1) Ltr, Base QM to QM DISTBRA, 3 Apr 44, sub: Status of Sups. ORB AFWESPAC QM 424. (2) Rad, CINCSWPA to CG SFPOE, 26 Oct 44. ORB AFWESPAC AG 400.

[62] QM SWPA Hist, VI, 56–57.

The three newly arrived units had been designated for early participation in the Philippine operations, but inability to carry out their assigned task obliged them to stay in New Guinea for several months.[63] Another newly arrived bakery company proceeded to Leyte, but lack of standard ovens forced the employment of a discarded wood-burning type in use of which it had no training.[64]

Truck, like bakery, companies sometimes lacked essential organizational equipment. Only rarely could vehicleless units be equipped from area stocks, which were so small that few Quartermaster companies had even their full complement of 2½-ton trucks. The skilled services of these technically experienced units were thus often lost for weeks, and their members were in the main employed as laborers on port jobs. Despite their lack of training for such tasks, these troops carried out essential assignments that the Transportation Corps, suffering, like the Quartermaster Corps, from a shortage of manpower, could not always accomplish with its own personnel.[65]

With comparatively few Quartermaster units in the Southwest Pacific, most of those arriving in 1944 were assigned to direct support of combat forces rather than to rear-area activities. But when these units landed without the tools for carrying out their mission, it was taken over by organizations operating at busy supply bases. Quartermaster base functions were thus impaired just at the time rear installations were immersed in the important task of forwarding supplies to the troops fighting on Leyte and Luzon.[66]

Meanwhile, in March 1944, the War Department took drastic action to solve the problem of organizational supplies and equipment. It recommended the discontinuance of the shipment of a 60-day consignment of rations, clothing, equipment, and general supplies with troops going to the Southwest Pacific and the basing of area requisitions not only on actual troop strength, as was then the general practice, but also on the number of men under orders to proceed to the area. With these modifications of established procedures there would be, the War Department maintained, no need for supplies to accompany units. Insofar as the Quartermaster Corps was concerned, it concurred in these recommendations with reservations as to the movement of food. Because of internal distribution problems, springing from the shortage of intra-area shipping, it proposed that organizations continue to be accompanied by a 60-day supply of B rations, a 2-day supply of C rations, and a 1-day supply of D rations. The new system went into effect on 1 October. By making what were actually initial issue stocks of clothing, equipment, and general supplies part of the authorized replacement reserves, it appreciably eased the pressure on Pacific stocks.[67]

Block Ships

During the first half of the war, combat troops in operational areas received needed items, whether for initial or replenishment supply, chiefly from island bases. The Ad-

[63] (1) Rpt, Capt Philip F. Hurt, 22 Jan 45, sub: Hist Rpt, 156th QM Bakery Co. DRB AGO QMC-156-0.1. (2) Rpt, 1st Lt Mack Gilbert, 25 Apr 45, sub: Hist Summary, 26 Mar–25 Apr 45, 157th QM Bakery Co. DRB AGO QMC-157-0.2. (3) Rpt, 1st Lt Robert Summers, n. d., sub: Yearly Hist Summary for 1945, 158th QM Bakery Co. DRB AGO QMC-158-0.3.

[64] Ltr cited n. 55.

[65] (1) Ltr, G–4 SWPA to CG USAFFE, 17 Sep 44, sub: Svc Organizations. ORB USAFFE AG 321.2. (2) Rpt, CO 169th QM Bn, Mbl, 25 Nov 44, sub: Hist, 26 Oct–25 Nov 44. DRB AGO.

[66] Rpt, Brig Gen William F. Campbell, 10 Jan 45, sub: Activities of OCQM, Dec 44, p. 9. DRB AGO.

[67] QM SWPA Hist, V, 9–10.

miralties operation illustrated how costly in both time and labor this method of support could be. Supplies for that offensive were loaded in San Francisco, discharged and reloaded at Brisbane and again at Oro Bay. Part of the cargo even underwent this wasteful procedure a third time at Finschhafen. There were two major reasons for all this rehandling. For one thing, since regular cargoes from the United States and Australia usually contained items for base reserve stocks as well as for combat operations, the two groups had to be separated. For another, the incessant pressure for prompt turnabout of freighters made some rehandling inevitable. Unloading could be averted only by keeping fully laden vessels in port for weeks and utilizing them in effect as floating warehouses—an unsatisfactory practice that intensified the scarcity of bottoms on the West Coast.[68] In other respects, too, the system of supplying combat areas from Pacific bases was defective. Since bases did not have an adequate number of service troops, vessels departing for operational areas were seldom loaded in a fashion that facilitated rapid discharge. Classes of supply were mixed, and individual items were hard to locate because of the frequent inaccuracy of manifests and stowage plans. Among Quartermaster items such essential supplies as ration components and replacement parts for warehouse, bakery, and cooking equipment were often among those which could not be found readily. Worst of all, undermanned and overworked bases were often obliged to leave unloaded low-priority items, such as clothing.[69]

In an effort to correct some of these weaknesses in the logistical support of operational forces, the "block system of supply" was developed to simplify and standardize at least the provision of replenishment items needed by operational troops after the small stocks accompanying them on their first landings had been exhausted. This system was distinguished by use of West Coast ports, rather than inadequate Pacific bases, for shipments direct to combat areas without rehandling, and, above all, by the eventual development of various "blocks" of supplies. Each block consisted mainly or wholly of one general supply class, such as food or clothing. All types were based upon standardized lists of items prepared by the technical services, each service determining which of its items, if any, were to be included. The quantities of the individual items provided for each type were ordinarily expressed in terms of the requirements of 1,000 men for a given period of time and could thus be raised or lowered in line with the particular requirements of an operation. Once established, the types could be requisitioned from the zone of interior in support of one operation after another simply by submission of the numbers or code names assigned to the required types. The block system thus eliminated to a considerable extent the tedious process of determining precisely what items and how much of each was needed for the resupply of each new operation and of then requisitioning them from the San Francisco Port of Embarkation. In some respects the new system was indeed analogous to automatic supply. It had the further advantage of making possible the adoption of standard plans for the stowage of each type of block.

Block shipments enabled everyone "from the task force commander to the officer in charge of a warehouse or on duty at a dock"

[68] Min, Base Sec Comdrs Conf, 24–26 Mar 44, pp. 24–25. DRB AGO, ASF Files.
[69] *Ibid.*, pp. 26–30.

to ascertain readily from published lists and stowage plans "what was on each vessel and where it was loaded." This advantage, asserted Lt. Col. Fred W. Greene, whose activities in the Southwest Pacific were concerned largely with block movements, "is one which, notwithstanding repeated efforts, was not attained throughout the war by any other method of supply, and is of the utmost importance if efficient logistical support is to be provided." Block shipments, he added, "assured new equipment and supplies to the combat troops, took the burden of loading hundreds of ships under adverse conditions and placed this task on United States ports and depots operating with expert personnel and the finest of equipment and facilities." [70]

The block system was first employed in the Central Pacific during the Gilberts operation of November 1943 and in the Southwest Pacific during the Hollandia operation of April 1944. In the last year and a half of hostilities it served as a major means of replenishing combat supplies in the amphibious campaigns of both these areas. The old system of making shipments from Pacific bases was still utilized for provision of the initial stocks that task forces took with them and even for provision of some replacement supplies. For the latter purposes, block ships increasingly were employed. They were, indeed, often termed "resupply ships." Some of these vessels were loaded in Hawaii and Australia, but most were loaded on the West Coast where the required items were obtainable in greater quantity and diversity. In June 1944 it was estimated that the new system had reduced transshipments in the Southwest Pacific by 70 percent and tonnage handled at USASOS bases by 15 percent.[71]

By then block ships had become so important in the replenishment of Quartermaster items that they were described as "the backbone of Quartermaster supply of operations." They occasionally even supported troops at points remote from ordinary sources of replenishment.[72] Since the QMC carried more items consumed at a predictable rate than any other technical service, it was the service most affected by the new system, which by the time plans were drawn for the proposed OLYMPIC assault on Kyushu in November 1945 was expected to furnish about 90 percent of Quartermaster replacement stocks.[73]

In the Southwest Pacific similarly loaded "standard block ships," several of which were ordinarily utilized in an operation, constituted the major type of block ship. These vessels transported two "standard blocks," based at first on those which had been employed in the Gilberts and Marshalls operations but afterwards substantially modified in line with tactical experience. Each block, set up to meet the requirements of 10,000 troops, embraced most of the articles that combat soldiers needed during the thirty days normally required to consolidate their positions. Since Quartermaster items made up about 85 percent of the cargo, standard block vessels were often termed "Quartermaster resupply ships." Their food cargo was usually broken down into 500,000 B rations and 100,000 packaged combat rations, but exact quantities varied with time and place. The

[70] Greene, *QMR*, XXVI (January-February 1947), 36.

[71] Ltr, QM Sec Distr Br INTERSEC to CQM USASOS, 27 Jun 44, sub: Standard Block Ships. ORB NUGSEC QM 400.

[72] QM SWPA Hist, VI, 15.

[73] Sixth Army AdminO 18, 16 Jul 45, Annex I, QM Plan, p. 2. ORB Sixth Army G–4 560 (OLYMPIC).

petroleum cargo consisted principally of oils, greases, kerosene, and range fuel. At first motor and diesel fuel oil were included, but as considerable amounts of these items were shipped with the initial assault troops and dispensed in bulk by shore installations, they were eventually eliminated.

Sixth Army experience early revealed a need for larger quantities of some items than had been originally carried in standard blocks. At Leyte it was found that more petroleum products and more shoes and clothing should have been provided. There was even need for such prosaic articles as pencils, ink, typewriters, and writing paper. To meet these proven requirements, a thirty-day replacement stock of scarce items of clothing, footwear, and general supply items which helped promote individual morale or organizational efficiency was added to the cargo.[74]

In terms of bulk, petroleum products constituted from the outset more than half the standard block. Rations formed the next largest class of supply while clothing and general supply items made up a considerably smaller part. In June 1944 petroleum products totaled about 4,800 measurement tons; rations, about 2,500 tons; and clothing and general supplies, only about 250 tons. By the following February the need for larger loadings of the latter category was more fully recognized, and it in general constituted a substantially larger proportion of the cargo. Such variations were unavoidable in view of the experimental nature of block movements and the inability to develop immediately a wholly acceptable listing of the most essential supplies.[75]

The standard block vessels in any particular operation carried the same items, an arrangement known as "spread or balanced loading." This method of shipment had the virtue of distributing risks, for if one vessel was sunk, all supplies of the same type were not lost. For this reason standard block ships were utilized mainly for resupply movements during the opening stages of an operation, when danger from the enemy was greatest. Actually, they were "assault stage ships." Leaving the United States on a staggered schedule, they reached their destination at more or less regular intervals during the first month or two of a campaign. If conditions were favorable, they landed their cargoes at once; if unfavorable, they lay offshore until called forward for discharge.[76]

After standard block ships provided initial replacement stores of the most commonly used items, "solid block ships," so called because they usually carried only one class of supply, brought in most of the items needed for resupply. Twelve types of these vessels were developed for Southwest Pacific Area participation in the planned OLYMPIC operation. Type B, for example, was to carry B rations, combat rations, and PX articles; Type C, all kinds of petroleum products in drums, which would be landed early in the operation, when bulk-dispensing installations would not yet be functioning; Type D, discharging its cargo after the landing had been secured, was to carry petroleum items not handled by bulk installations; and Type E, clothing and general supplies. Altogether the Southwest Pacific Area developed more than 100 blocks,

[74] (1) *Ibid.* (2) Min, Base Sec Comdrs Conf, 3–5 Mar 44, pp. 57–59. ORB AFWESPAC AG 334. (3) Ltr, CG USASOS to CG INTERSEC, 6 Jul 44, sub: Sup of ALAMO Task Forces. ORD ABCOM AG 420.

[75] Memo, CO Base M for ACofS G–4 Sixth Army, 28 Feb 45. ORB Sixth Army Journal, Vol. III.

[76] Ltr cited n. 71.

which, if properly distributed among the various sorts of resupply ships, would give almost any desired loading.[77]

The Pacific Ocean Areas also developed a large number of blocks, but they did not employ a standard block vessel under that name. They did obtain, however, the equivalent of this vessel by carrying on identically loaded freighters all classes of supply except petroleum products, which were handled by the Navy. Blocks were based at first on the requirements of 1,000 men for 20 days, but as the magnitude of operations grew, a 30-day period was applied. In Pacific Ocean Areas operations from the Gilberts to Iwo Jima the principal Quartermaster blocks were those designated A, AA, A-1, A-2, A-3, A-4, B, and C-1. Block A consisted of individual and organizational equipment; block AA, of B rations, combat rations, and ration accessory packs; block A-1, of a wide selection of clothing and general utility articles; block A-2, of laundry supplies; block A–3, of shoe repair supplies; block A-4, of field range repair parts; block B, of B rations; and block C-1, of PX items.[78]

On the basis of combat experience the Tenth Army and the Central Pacific Base Command thoroughly revised Pacific Ocean Areas blocks for the impending Okinawa campaign, which was expected to be a more formidable undertaking than any previous offensive against Japanese forces. Old blocks were combined to form new ones, and the listings of items and quantities were drastically modified. The new blocks included four for subsistence—a Q-1 block, composed entirely of B rations, of which about 170,000 were carried; a Q-2 block, consisting of 90,000 rations of the 10-in-1 type, 54,000 C rations, and 36,000 K rations, or 180,000 combat rations in all, enough to fill the demands of 6,000 men for 30-days; a Q-3 block, made up of 100,000 special twenty-ounce rations, based on the customary Okinawan diet and intended for civilians made destitute by battle damage; and a Q-4 block, composed of emergency supplies, such as D rations, flight rations, hospital rations, and salt tablets, and of a few items always in heavy demand, such as bread and coffee. Four blocks were set aside for clothing, footwear, and general supplies of all sorts—a Q-5 block, providing clothing, tentage, laundry supplies, and shoe repair equipment, all of which had formerly been furnished by A-1, A-2, and A-3 blocks; a Q-6 block, devoted to field range repair parts; and two special blocks, consisting, respectively, of PX items and miscellaneous spare parts.[79] Enough supplies to last 30 days were to accompany the assault troops going to Okinawa, but in computing replenishment needs a 30-day safety factor, designed to compensate for combat and other unforseeable losses, was provided by assuming the total loss of initial supplies and calculating replacement requirements from L Day, the date of the first landings, rather than from L plus 29. Block ships would thus carry enough materials to take care of emergency as well as ordinary replacement requirements.[80]

In previous operations resupply ships, coming from the United States at intervals of five to ten days, had arrived offshore shortly after an operation started. In the

[77] (1) Min, Base Sec Comdrs Conf, 3–5 Mar 44, p. 56. ORB AFWESPAC AG 334. (2) Ltr, CG USAFFE to CG USASOS, 14 Dec 44, sub: Sup of U.S. Forces in SWPA. ORB AFPAC GPB. (3) Sixth Army AdminO 18, QM Plan, 16 Jul 45.

[78] The components of these blocks are given in that section of the Appendix of the QM Mid-Pac History pertaining to Chapter II, Section 3.

[79] (1) QM Mid-Pac Hist, pp. 253–54, 259. (2) Ltr, CG Tenth Army to CG Army Garrison Force Okinawa, 12 Jun 45, sub: Loading of Resup Ships. ORB Tenth Army AG 400.

[80] Tenth Army Action Rpt, 11-XVI-14.

Okinawan campaign it was planned to obtain greater flexibility of shipping movements by assembling the vessels at regulating stations on Ulithi in the Carolines and at Eniwetok in the Marshalls and calling them forward as supplies were needed on shore. Because provision of normal field rations was expected to be difficult during the first few weeks of the operation, twice as many combat as B rations were to be brought in by the first set of resupply vessels. Twenty-three Q-2 blocks of C, K, and 10-in-1 rations, representing a 20-day supply for 205,000 men, were to be shipped as compared with only twelve Q-1 blocks of B rations, representing a 10-day supply. Eleven Q-4 blocks of specialized types of emergency rations were also included in the early shipments. Since it was assumed that tactical conditions would allow the provision of more field rations after the lapse of 30 days, the second set of resupply shipments was to carry an equal number of Q-1 and Q-2 blocks, each containing a 10-day supply.[81]

Troublesome operational conditions during the opening days of the Okinawa campaign precluded the execution of this plan in its original form. Interruption of unloading activities by sharp air raids and heavy storms, the hurried opening of unscheduled supply centers for immediate support of the attack, and the cluttered state of the beaches caused shipping to pile up at discharge points and kept vessels from unloading according to schedule. Food dumps on shore contained only scanty stores, and rations could not always be issued in desired quantities. These unfavorable developments were not attributable to want of block ships but resulted from unforeseen obstacles to speedy discharge of cargoes and from poor transportation conditions on shore.[82]

The proper stowage of cargo, especially rations, was perhaps the most vexatious problem connected with the block system. The QMC was concerned primarily with easy accessibility of supplies for rapid discharge according to established unloading priorities. But the order of loading was not a mere matter of preference or convenience. An improperly loaded vessel might roll over or break in two in a storm, and the port of embarkation had to consider, first of all, the safety of the ship. Next it had to consider the maximum utilization of scarce cargo space by the stowage of supplies according to their intrinsic nature as bottom cargo, between-deck cargo, or top cargo. These considerations were often difficult to reconcile with the desire of the QMC for easy accessibility to its supplies. The Corps particularly objected to the stowage of low-priority items on top, for this arrangement made it necessary to discharge these items first in order to reach food and other supplies. From its standpoint the best method of loading rations was directly on top of vehicles and other heavy equipment in not more than two hatches, but such stowage was not consistent with quick loading or with the most efficient utilization of space, which demanded that rations be put on the bottom with heavy equipment on top in hatch squares directly under the ship's loading gear. Bottom loading of food was therefore adopted for most block movements. If care was exercised, this type of stowage could be used without injury to rations, which were, in fact, seldom damaged. The problem of prompt discharge of food in op-

[81] QM Mid-Pac Hist, App. to Ch. II, Sec. 3.

[82] Tenth Army Action Rpt, 11-IV-18, 20, 41, 55; 11-XVI-10.

erational areas remained, however, largely unsolved.[83]

In the Leyte operation standard block ships arrived with heavy deck cargoes and with miscellaneous equipment placed in the holds on top of Quartermaster supplies. This method of stowage, it was estimated, held up the discharge of rations by as much as five days.[84] Worse still, some of the ships arrived without the expected packaged rations. In large measure this omission was responsible for the shortage of emergency rations during the Leyte operation.

During the drive on Manila in January and February 1945 the base at Lingayen Gulf reported that although standard block ships, just in from the United States with 1,525 tons of rations, were "having deck loads and top loads discharged, they are not capable of producing any Class I supply while once solid rations are reached it is possible to discharge 500 tons of rations per day from a single ship." [85] Though an average of 795 tons of rations a day was unloaded from all vessels between 19 January and 24 February, or 95 tons more than the average daily requirements of 213,000 men, the rate of issue fluctuated because of the irregular rate of daily discharge, and occasionally fell a good deal below the desired amount. In both the Southwest Pacific and the Central Pacific wider utilization of block ships loaded solidly with rations was suggested as the proper solution.[86]

In addition to the difficulty of discharging specific kinds of supplies promptly, other problems were also involved in the use of block ships. Though helping to furnish items not obtainable from frequently unbalanced base stocks, they furthered the unbalancing of stocks in Pacific commands as a whole. Inclusion in the ration components loaded in block ships at San Francisco of those items obtainable in Australia and New Zealand created on the area level excess supplies of flour, sugar, and other foods heavily procured in these countries. For a time in the summer of 1944 standard block ships therefore ceased to carry these components and filled the space thus left vacant with several hundred tons of cargo so stowed as to be easily discharged at bases in New Guinea. On arriving at these installations the general cargo was taken off and the missing components added.[87]

Some officers charged with the distribution of food in the Southwest Pacific believed that this attempt to solve the problem of area stock levels did not go far enough. They even doubted the wisdom of block shipments direct to operational areas. Col. Fred L. Hamilton, director of the Distribution Division, contended that these shipments gave his agency too little latitude in controlling the supply of food. He recommended that all rations from the United States be sent to Australia and placed in subsistence depots, which would assume full responsibility for providing complete rations to all consuming centers. This would mean that block cargoes leaving the West Coast for combat zones would contain no food.

[83] (1) Ltr, Vet to Surg INTERSEC, 25 Mar 44, sub: Shpmt of Food to New Guinea. ORB ABCOM P&C 430. (2) Memo, CTO for G–4 USASOS, 26 Apr 44, same sub. ORB AFWESPAC AG 430.2.

[84] (1) Sixth Army Leyte Rpt, p. 243. OCMH. (2) Rpt, Maj Robert E. Graham, 1 Dec 44, sub: KING II Opn. ORB USAFINC AG 370.2.

[85] Memo cited n. 75.

[86] See, for example, Ltr, CG Tenth Army to CG Army Garrison Force Okinawa, 12 Jun 45, sub: Loading of Resup Ships. ORB Tenth Army AG 400.

[87] (1) Personal Ltr, Col Cary B. Hutchinson to Col Fred L. Hamilton, 14 Jul 44. (2) Ltr, CG USASOS to CG SFPOE, 5 Aug 44, sub: Class I Items for Resup Ships. Both in ORB AFWESPAC AG 430.2.

Maj. Gen. James L. Frink, Commanding General, USASOS, maintained that this plan would cause delay and unnecessary rehandling in getting food to consuming troops.[88] Accordingly, it was never put into effect. Partial loading in New Guinea was itself feasible only so long as that island was the center of combat activity in the Southwest Pacific. As operations shifted to the Philippines, where there were at first no fully functioning bases, it was abandoned and ships departed from the United States completely loaded.

There was still another objection to block movements. If used indefinitely for resupplying operational areas, they created shortages and excesses in these areas as well as in the theater as a whole. Colonel Greene estimated that three months—at the maximum, five months—constituted the longest period for which they could be profitably employed. By the end of that period unpredictable requirements and losses—the bane of all forms of automatic shipment—would throw stores out of balance. Normal requisitioning would then be necessary to adjust stock levels.[89]

Rations shipped direct to consuming centers were naturally fresher than food stocks built up at established bases by the slow processes of ordinary requisitioning and held in warehouses for many months. Block shipments in consequence often created a divergence in the age of food eaten in forward and rear areas. As early as August 1944, Captain Orr noted that stocks at and west of Finschhafen were fresher than those in areas east of that base. As operations moved northward, this contrast became more marked.[90]

Finally, block movements had the disadvantage of increasing the workload of the already heavily burdened San Francisco Port of Embarkation. That installation had to handle alterations made in block components by the ordering areas and assemble the blocks as the supplies came in from the depots. Resupply movements, in fact, transferred from Pacific bases to the West Coast ports much of the paper work required to get replenishment supplies into the hands of operational forces.[91]

Despite its disadvantages the block system materially alleviated the difficulties encountered in the supply of combat troops and in the handling and storage of materials at inadequately equipped bases. The value of block ships was attested by Col. James C. Longino, Deputy Quartermaster of the Sixth Army during its most active combat period. They were, he declared, far superior to the ordinary vessels from Australia that supplied operational forces before the advent of the block system. As many Quartermaster items, unavailable at Australian bases, were supposedly stocked in New Guinea, these vessels had often been routed to advance bases in order to complete their cargoes. But the bases, according to Longino, "either couldn't or didn't balance the cargo as contemplated." [92] Nor were materials always unloaded at the designated points; sometimes, because most of the supplies were consigned to one service at a single point, the entire cargo was discharged there. This practice added to shortages and

[88] (1) Memo, CQM for G-4 USASOS, 13 Jul 44, sub: Resup Ships. ORB AFWESPAC AG 430.2. (2) Personal Ltr cited n. 87(1).

[89] Greene, *QMR*, XXVI (January–February 1947), p. 70.

[90] Rpt 18, Capt Orr, 30 Aug 44, sub: Misc QM Matters, p. 3. ORB NUGSEC QM 319.

[91] Plng Div, Office of Dir of Plans and Opns, ASF, Hist of Plng Div, ASF, II, 197–98.

[92] Personal Ltr, Col Longino to Gen Doriot, 23 May 45. OQMG SWPA 319.25.

excesses existing at advance installations, and meals became unbalanced. "Protests from long suffering troops," declared Colonel Longino, "brought replies that the bases had been supposed to do thus and so." But there was "little or no improvement," he continued, "until we began to receive balance loaded resupply ships from the U.S. If credit can be given to any one individual for that, he should certainly have a DSM." [93]

Similar in some respects to automatic supply, block loading was superior to that system in that it "permitted theaters to control quantities and the rate of flow by ordering blocks forward as needed." [94] It thereby corrected in part the most flagrant weakness of the older system, the absence of overseas control over the incoming stream of materials. Though block loading unbalanced theater stocks, it did not do so quite as rapidly as automatic supply. For several months it was a reasonably efficient tool. This fact led some observers to believe that it might solve the problem of supplying newly established overseas areas during the period when they were still too unorganized to secure stocks by normal requisitioning. Colonel Greene suggested that block loading might also be employed to stock isolated army or division supply points far from distribution bases. "Unless," he added, "our concept of war is completely changed, supply by the block-ship system will be among the first of our new developments to be utilized in the event of another conflict." [95]

In evaluating the work of the zone of interior in supplying Quartermaster items to the Pacific areas, the most important fact is that despite the difficulties encountered in the movement of cargoes from the West Coast the Army in general had been satisfactorily supported. However exasperating the delays met in completing requisitions and in handling automatic supply, organizational shipments, and block movements, supply accomplishments compared favorably with those of the Civil War, the Spanish-American War, and World War I. This was especially true, once American industry had been fully geared to peak military production and more ships had become available. Logistical troubles in the Pacific resulted more from internal problems than they did from supply deficiencies at home. Insofar as weaknesses appeared in support from the zone of interior, they had been produced largely by incomplete preparedness for war waged simultaneously against two powerful and widely separated foes who had so strongly intrenched themselves in vast conquered territories that their home citadels, the main sources of their military strength, could not be reduced without first liberating distant lands in protracted and difficult campaigns. In part, too, supply failures resulted from planning and organizational defects inevitable in an untried army just learning in the hard school of experience what the problems of amphibious warfare were and how they ought to be dealt with.

The vast volume of supplies shipped to Pacific destinations attested to the vigorous support the zone of interior rendered the forces fighting Japan. From the beginning of 1942 to the close of that year, Quartermaster cargo shipped from the United States to the Southwest Pacific amounted to 353,023 measurement tons, or 47 percent of total Army movements of 767,589 measurement tons. Quartermaster shipments in 1943 came to 466,763 tons, representing only

[93] *Ibid.*

[94] Plng Div, Office of Dir of Plans and Opns, ASF, Hist of Plng Div, ASF, II, 200.

[95] Greene, *QMR,* XXVI (January–February 1947), 36, 70.

about 16 percent of the 2,802,877 tons of Army cargo—a marked decline in the Quartermaster proportion, probably caused by increased reliance upon Australian production. In the following months, as troop strength soared and local procurement fell in importance, Quartermaster cargo reached much higher levels. In 1944 it amounted to 1,863,654 tons and in 1945 to the end of June to 1,354,658 tons, representing nearly 30 percent of all Army cargo.[96] From the standpoint of the QMC the most serious drawback in the movement of its cargo was that a large part of it had low shipment priorities and was consequently often held in port for days. But the most important consideration was that, whether speedily or slowly, Quartermaster supplies and equipment were made available to the Pacific areas. Valuable though local procurement became in the Southwest Pacific, it furnished from the outset of hostilities to the end of June 1945 only 1,704,389 measurement tons of Quartermaster supplies as compared with the 4,038,098 tons shipped from American ports during the same period.[97] Quite obviously, Quartermaster support in the Pacific largely depended on supply from the United States. Without it, the Corps could not have carried out its mission.

[96] Masterson, Transportation in SWPA, App. 21.

[97] (1) *Ibid.* (2) Hester Rpt, p. 3.

CHAPTER VII

Storage, Transportation, and Packing Problems

The distribution of Quartermaster matériel to forward bases and supply points was marked by unusual difficulties stemming partly from the perishable nature of many items and partly from the unfavorable conditions under which distribution activities were conducted. Nowhere in the forward areas were truly appropriate storage facilities available. Outside Oahu, New Zealand, and Australia what passed as "covered" storage seldom furnished adequate protection. Actually, most supplies were kept more or less in the open, where they were exposed to the destructive effects of tropical heat, moisture, and insects. Poor packing, which did not adequately protect supplies from rough handling and the hazards of tropical storage, further intensified distribution difficulties.

Quartermaster Storage

Plans for Quartermaster storage in forward areas usually called for nothing more than insubstantial, quickly built structures, which were assigned the lowest building priorities. By the time the Corps of Engineers had completed airfields, docks, roads, hospitals, and higher headquarters, months had often elapsed, and construction materials and equipment were needed for similar tasks at new bases. Frequently, Engineers could do no more than put up the framework of Quartermaster buildings; sometimes they could not do even this. Quartermaster units themselves, with the help of native laborers, were often obliged to complete what Engineers had started; occasionally, they even had to erect the structures from start to finish. Such emergency operations seldom furnished storage suitable in either quality or quantity.

For six months or more after the establishment of a base, most Quartermaster supplies were placed in open dumps. The primary consideration in choosing the location of these dumps was that they be situated as near as possible to landing points in order to facilitate prompt discharge of vessels and insure maximum utilization of available trucks. As areas surfaced with concrete, asphalt, cinders, or crushed stones were seldom in existence during this period, supplies were simply dumped on the ground, where they were exposed to the full glare of the sun, soaked in the rain, and bogged down in the mud. Owing to the need for quick discharge of ships and the comparative scarcity of service troops, supplies were at times hurled into these dumps without seg-



THATCHED ROOF WAREHOUSES *provided some protection against the elements at Quartermaster depots.*

regation as to type.[1] In July 1943, the OCQM sent Maj. Carl R. Fellers, head of the laboratory in the Subsistence Depot, to New Guinea to observe supply conditions. He found large quantities of rations piled on low ground unsuitable for storage purposes. At Port Moresby rain from neighboring hills "flowed through the dump and actually covered several tiers of canned foods." At Milne Bay, too, open storage areas were "extremely muddy." Major Fellers concluded that up to then it had been "physically impossible to protect subsistence stocks from serious and rapid deterioration." [2] While the New Guinea bases at this time had just selected sites for new dumps on well-located land, most of the proposed facilities would not be completed before the beginning of 1944, a year or more after the installations had been established.

In the meantime rude shacks, thatched with nipa leaves and other native materials, were as far as possible substituted for unprotected open storage. At first few of these makeshift structures were built as service troops could not be spared from the more immediately pressing tasks of loading and discharging supplies. With the help of native laborers many thatched structures were eventually constructed.[3] Modeled upon native huts and known as "bures" warehouses, they varied in size, but all were

[1] (1) Rpt, 1st Lt Robert A. Moody, 23 Jun 43, sub: Canned Food. ORB AFWESPAC QM 430. (2) Rpt, Maj Carl R. Fellers, 7 Aug 43, sub: Subs Condition of Advance Bases. ORB AFWESPAC QM 333.1.

[2] Pp. 2–3 of Rpt cited n. 1(2).

[3] Memo, CQM for G–4 USASOS, 28 Jan 43, sub: Rations in New Guinea. ORB ABCOM GP&C 430.2.

based upon a framework of coconut or bamboo poles and cross bracings, with a gabled roof and with the sides and top covered with nipa strips. They had no floors and at best furnished imperfect shelter for food and clothing.[4]

When imported milled lumber became available, it was utilized instead of thatch and rude local poles to construct sturdier warehouses. The food warehouses, the best at Milne Bay, were somewhat larger than most of the other warehouses, measuring about 200 feet long and 30 feet wide. Unlike similar buildings elsewhere in the Pacific, they had concrete floors and corrugated roofs. They had, however, only the simplest wood frameworks. The middle sections of these narrow structures were sometimes utilized as runways, a practice that absorbed as much as 40 percent of the space. At Guadalcanal, Oro Bay, and Port Moresby the eaves were projected so as to render end and side walls unnecessary. This expedient enabled trucks to drive directly alongside stacked supplies and so eliminated wide central aisles.[5]

Some bases used quonset huts and prefabricated wood or steel warehouses, but these structures were never available in large numbers and on the whole were not very practicable. Generally measuring only about 20 by 120 feet, they provided little space. They had, moreover, no floors. As the tin roofs generated too much heat to permit the storage of canned foods, the huts were utilized chiefly for other Quartermaster items.[6]

Since even prefabricated warehouses and rude shacks could not be provided for more than a fraction of the incoming supplies, proper protection of materials stored in the open became a major Quartermaster task. Yet as late as August 1943 half the food stocks at Port Moresby and Milne Bay had not even the protection afforded by tarpaulins. When available, these canvas covers, usually, were simply flung over the stacks, but this practice prevented the free circulation of air and trapped heat and moisture under the canvas. Two expedients were adopted in trying to provide better protection for supplies in open storage. One was the "portable paulin warehouse," built of ordinary tarpaulins and tent poles. Though this so-called warehouse was, essentially, no more than a tent, if properly arranged it permitted air to circulate and dry out the stacks. The other expedient was the "paulin oasis," formed by placing a canvas-covered, rooflike frame directly on top of the stack. Two men could easily move this frame from a depleted pile to a new pile. If lack of tarpaulins forbade these expedients, salvaged matting might be laid horizontally on the stacks as makeshift protection.[7]

At most bases, particularly in the first half of the Pacific war, shortages of materials and manpower and widespread ignorance of the principles of tropical storage resulted in poor stacking and hastened the

[4] (1) Ltr, COMSOPAC to Comdr U.S. Naval Forces in Europe, 2 May 43, sub: Construction of Bldgs in New Caledonia. ORB USAFINC AG 600. (2) Hq SOS SPA, Storage in Tropics, *passim*, 1 Oct 43–31 Mar 44. DRB AGO Vault SPA (Organizational Hist, SOS SPA).

[5] (1) Ltr, QM Base A to CQM USASOS, 9 Oct 43. (2) Daily Diary, Capt Thomas J. Doyle, Field Inspection Team, 12 Jan 44. Both in ORB AFWESPAC QM 319.1. (3) Rpt, Lt Col D. B. Dill, n. d., sub: Observations in SWPA and POA, Oct–Dec 44. OQMG POA 319.25.

[6] (1) Anon., "Storage at Guadalcanal," *QMTSJ*, VI (22 December 1944), 12. (2) Pp. 13–17 of Rpt cited n. 4(2).

[7] (1) Rpt, Lt Col R. C. Kramer, 9 Sep 43, sub: Trip to New Guinea, 30 Aug–7 Sep 43. ORB AFWESPAC AG 430. (2) Anon., "Storage at Guadalcanal," *QMTSJ*, VI (22 December 1944), 12.



OPEN STORAGE OF QUARTERMASTER ITEMS *caused rapid deterioration of outer containers, (above) and lack of dunnage materials forced the use of coconut log ramps (below).*



deterioration of supplies. Food containers in boxes, improperly piled solidly together, sweated and rusted, disintegrating canned meats and vegetables by releasing acids; these acids ate into the tin, seeped out, and contaminated other cans. Damage from this cause was appreciably increased when tarpaulins were thrown over the stacks in such a way as to cover the sides and prevent the piles from drying out. Another hindrance to good stacking was the scarcity of dunnage, a scarcity so great that stocks were often put directly on the ground, thus increasing the spoilage of food in the lower layers. In the South Pacific Area, ramps of coconut logs placed about a foot apart were often substituted for ordinary dunnage.[8]

First priority on Quartermaster covered space was accorded to combat rations, sacked sugar, flour, salt, rice, condiments, and other foods especially liable to irreparable damage. If sacked flour, for example, was not well protected, it became moldy and insect-infested within a few weeks. Drummed and canned petroleum products were stored on high ground in the open, as were general supplies not liable to rusting. Until covered space became available in large quantities, even tinned foods were customarily piled in the open. During his trip to New Guinea Major Fellers found that 60 to 70 percent of the canned fruits, vegetables, juices, meats, and evaporated milk was still outdoors. Though the Army called canned foods "nonperishable," they were actually in varying degrees perishable. Huge losses of these products occurred because of corrosion and rusting, puncturing of containers during handling operations, and high temperatures, which accelerated food spoilage. Subsistence, it was estimated, deteriorated twice as fast at 90° F. as at 70°, and four times as fast as at 50° or 55°. For this reason it was sometimes recommended that shipments of rations to operational areas be limited to the smallest amounts consistent with the tactical situation.[9]

The disastrous effects of prolonged outdoor storage on poorly protected subsistence were vividly described by an OQMG observer on his return to the United States from New Caledonia late in 1943:

> I saw two huge dumps in the open with no protection from the weather except for some untreated tarps placed on the piles very carelessly. In many cases they had blown off. In others, they only partly covered the stacks; and in some instances they were open at the top. Most of them had been there for over a year, and some for eighteen months. I can't tell you how many cases, but for the sake of something to figure on as a basis, consider shiploads . . . .
>
> The condition of these stores is ten times worse than covered by any report we have seen. . . . In the center of some of the stacks solid fiber cases were just like mush. Wooden cases were so rotten the wood could be mashed between one's fingers. Many cans were completely covered by rust. The center of the stacks looked like a big mold culture. One can breaks and spreads its contents over surrounding cans; and mixed with water and mold it multiplies until a huge area is affected. . . . I saw one disposal dump that contained over 100,000 cans of spoiled product.[10]

Better means of storing nonperishable foods were provided toward the end of hostilities. In February 1945 General Gregory found such food supplies in New Guinea

[8] (1) Anon., "Storage at Guadalcanal," *QMTSJ*, VI (22 December 1944), 12. (2) Rpt, Capt Herman C. King, 4 Nov 43, sub: Packaging and Packing of Subs in New Caledonia, pp. 2, 4–5. OQMG POA 400.162.

[9] P. 7 of Rpt cited n. 1 (2).

[10] Rpt, Capt W. W. Bailey, n. d., sub: Containers in Open Storage, incl to Memo, Packaging and Crating Sec to Chief Storage Br OQMG, 3 Nov 43. OQMG 457 (Containers).

fairly well warehoused except at the Hollandia base, which had been set up only in the previous June.[11] Here, five months after General Gregory's visit, 75 percent of the ration stocks, mostly canned subsistence, still remained in open storage. They all had, however, tarpaulin protection, which, in a similar stage of development at the earlier New Guinea bases, had been provided for only about half the stocks. Of the rations at Hollandia 23 percent were stored in warehouses with corrugated roofing and 2 percent in structures with tarpaulin roofs.[12] At that time 90 percent of the subsistence area at Bougainville, which was fairly typical of storage conditions in the Solomons, consisted of wood ramps with tarpaulin-covered frames.[13]

As in the case of nonperishable food, inadequate storage caused heavy losses of clothing, equipage, general supplies, and petroleum products. At Guadalcanal bulldozers and other essential pieces of heavy equipment at first were not available for leveling the ground and installing drainage systems at the dumps set up for these supplies. By the time projects holding higher priorities were completed, many stores had become water-soaked and irretrievably damaged. To a lesser extent other bases experienced similar difficulties.[14]

Since textile and leather goods were particularly liable to mildewing and other forms of tropical deterioration, they were, if at all possible, placed under cover. If nothing better could be found while a base was first being set up, they were put in storage tents. Later, they were kept in thatched shacks or in warehouses. At Guadalcanal 40 shacks, about 85 feet long and 28 feet wide, were employed. To protect clothing from dampness, floors were provided in all these buildings. Ramps of coconut logs, on which incoming supplies were placed before being tallied in, connected the buildings.[15]

Refrigeration Ashore

The most persistent deficiency in Quartermaster storage was the lack of refrigeration ashore for eggs, butter, and milk and for fresh meat, fruits, and vegetables. At no time during the war did advance bases, let alone forward areas, possess sufficient refrigeration. Improvisation was virtually out of the question because of the highly mechanized nature of cold-storage equipment. Such elaborate equipment had to be procured from the United States, for, while Australia furnished some portable models, it never became a major source of supply. As the agency mainly interested in refrigeration, the QMC determined cold storage requirements and presented them to the Corps of Engineers for procurement. In the Southwest Pacific Area the QMC also allocated refrigeration among supply centers and Army units. In the Central and South Pacific Areas no agency was at first clearly responsible for this function, and distribution became badly unbalanced. This problem was finally solved by making the Island Commanders responsible for the allotment of available equipment.

The scarcity of cold-storage space continued throughout the war. In April 1944 the Southwest Pacific Area set the refrigeration needs of military organizations at

[11] Rpt, Gen Gregory, 14 Mar 45, sub: Trip to Pacific. OQMG POA 319.1.

[12] Ltr, Off of Surg to QM Base G, 13 Jul 45, sub: Temperature of Stored Subs. ORB Base G QM 430.

[13] Ltr, USAFNORSOLS to AFWESPAC, 15 Jul 45, same sub. OQMG POA 430.

[14] "Army Supply Problems in the Southwest Pacific," *QMR* XXII (May–June 1943), 35.

[15] Anon., "Storage at Guadalcanal," *QMTSJ*, VI (22 December 1944), 12.

250,000 cubic feet, to be furnished by units with a capacity of 220 cubic feet or less; of distribution centers at 1,000,000 cubic feet, to be provided mostly by 660-cubic-foot units; and of ports at 2,000,000 cubic feet, to be supplied by units with a capacity of more than 660 cubic feet. Actually, at this time military organizations had less than 50,000 cubic feet, or only a fifth of their estimated requirements; distribution centers had about 260,000 cubic feet, or a fourth of what they needed; and ports had approximately 764,000 cubic feet, or somewhat more than a third of their requirements.[16]

The shortage of refrigeration in military organizations stemmed in the main from belated inauguration of a large-scale manufacturing program in the United States. War Department figures of June 1945 illustrated how far deliveries fell below requirements even at that late date. These figures dealt with 26½- and 125-cubic-foot refrigerators, models utilized chiefly by small organizations and mess kitchens and hence of prime significance in maintaining a regular flow of fresh provisions to consuming troops. They showed that Southwest Pacific Area requirements for 3,000 units of 26½-cubic-foot capacity and for 1,600 units of 125-cubic-foot capacity had been approved months before, but that only 1,008 units of the smaller refrigerator and 365 units of the larger refrigerator had been delivered or were on the way to the area. The figures for the Central Pacific Area told a similar story insofar as the 26½-cubic-foot units were concerned. Requisitions for 1,835 refrigerators of this type had been approved, but only 345 had been delivered or were on their way. For the larger refrigerators Central Pacific Area demands for 863 units had been completely filled. South Pacific Area requisitions for 177 small refrigerators and 400 large refrigerators had been entirely met. The War Department promised that, starting in July, 700 units of 26½-cubic-foot capacity would be allocated from production every month to fill uncompleted requisitions. This meant that demands for these refrigerators could not be wholly met before 1 December. The War Department hoped to complete requisitions for 1,235 units of the larger refrigerators by 1 August, but actually it was not able to do so.[17]

Shortages of refrigeration equipment ashore were not attributable solely to incomplete requisitions but also resulted from the inability of the Pacific areas to transfer such equipment from old to new bases at a rate matching the growth of troop strength at the new bases. This fact is illustrated by the situation in New Guinea in March 1944. Port Moresby then had more refrigerated space and fewer troops than any other base in New Guinea. At the same time Milne Bay, possessor of the next largest amount of cold storage, was losing troops every day to the rapidly growing Base F at Finschhafen, which had 50,000 troops but only 5,000 cubic feet of refrigerated space—obviously, too small a quantity to provide fresh food for so large a body of men. Inasmuch as sufficient refrigerated vessels were also unavailable, the only way to obtain perishables at Finschhafen was to fly them in. The best means of increasing shore refrigeration at Base F would have been by the removal of unneeded equipment from the older bases to Finschhafen, but, as most of this equipment was of a semipermanent,

[16] Memo, G-4 for CQM, 4 Apr 44. ORB AFWESPAC QM 414.1.

[17] QM Mid-Pac Hist, pp. 233–35.



PREFABRICATED REFRIGERATED WAREHOUSES *are shown in process of assembly at Oro Bay, New Guinea.*

nonportable type, this solution proved impossible. Alleviation of the cold-storage situation at Finschhafen thus depended mostly on shipments of portable refrigerators from sources outside New Guinea.[18]

Permanent cold-storage warehouses of the standard 80-by-200-foot type, capable of holding 100,000 cubic feet of provisions, were not built at bases outside Oahu. Nor were smaller permanent types employed except at Port Moresby and Milne Bay. Because of their relatively large size these structures could be run economically, but it took months to build them. By the time they were in full operation, supply activities were being concentrated at more advanced installations.[19]

Prefabricated warehouses with a capacity of 600 and 1,800 cubic feet provided most of the refrigeration at many bases. These units could be readily disassembled and moved, and for this reason were especially desirable in the Pacific. The base at Finschhafen eventually employed about fifty 1,800-cubic-foot refrigerators and that at Oro Bay about thirty. At Saipan and Guam this type of refrigerator was also utilized but in lesser quantities. Though valuable because of their portability, knockdown refrigerators entailed the operation and maintenance of comparatively large numbers of engines for the limited amount of space they

[18] (1) Min, Conf on Refrigeration, 8 Mar 44. ORB AFWESPAC QM 337. (2) Rpt, Col Cordiner, 26 Apr 44, sub: Rpt of Inspection. OQMG SWPA 319.25.

[19] Rpt, Col R. C. Kramer, 10 Mar 44, sub: Trip to Advance Bases. ORB AFWESPAC AG 430.2.

furnished and so wasted manpower. In mid-1944 the Southwest Pacific Area therefore began to procure in Australia larger portable warehouses having a capacity of 4,300 cubic feet, but not many of these new units had been delivered before hostilities ended.[20]

The American-built, 10-ton refrigerated semitrailer with a capacity of 600 cubic feet, enough to store a day's supply of meat for one division, was employed but rarely. Designed primarily for extensive land areas supplied with modern highways, it could not be operated efficiently in the Pacific because combat operations were carried out so largely on territory lacking fully developed road systems. Even for the transportation of perishables from bases to supply points only ten to twenty-five miles away these vans seldom proved satisfactory. On such trips their large size and heavy weight made them hard to drive over the rough terrain ordinarily encountered. One Quartermaster observer suggested that for carrying fresh provisions portable equipment of a size fitted to 2½-ton trucks would be preferable.[21]

Quartermaster Refrigeration Companies, Mobile, which were established to operate the refrigerated semitrailers, were in fact utilized principally for storage of perishables received from shipside rather than for transportation of these products. In New Caledonia a refrigeration platoon, serving in this fashion, proved essential to the operations of hospitals and medical units. It also set up and repaired fixed refrigeration equipment at South Pacific bases. Refrigeration units were used sparingly in combat operations. The platoon assigned to the Sixth Army was broken up into sections, which were assigned to task forces. These sections were of considerable value during the early stages of operations before fixed refrigeration became available. Unfortunately, such units could not be made available for every operation.

Despite the fact that storage space of all kinds became larger in quantity and better in structure as the war continued, it never fully met Quartermaster demands. According to Southwest Pacific Area logistical standards Quartermaster Class I, II, and IV supplies required twenty square feet of covered space per ton, but island bases could never provide this much space. In May 1944 Lt. Col. Charles A. Ritchie, Quartermaster of the Intermediate Section, USASOS, which allocated physical facilities in New Guinea, studied covered space requirements and concluded that the Corps could get along with ten square feet per ton, or only half the prescribed amount. At this time Class I, II, and IV supplies at Milne Bay, "covered" in the flexible Southwest Pacific Area meaning of the word, were stored in 328,000 square feet of space, but 1,350,000 square feet were demanded on the basis of standard requirements and 675,000 square feet even under Colonel Ritchie's revised estimate.[22] Depending on which statement of requirements was taken, the QMC thus had only about one fourth or, at best, one half of the covered space it needed at Milne Bay. This condition typified those prevailing at other island bases.

The unavailability of sufficient service troops for manual operations necessitated fullest possible use of time- and labor-saving equipment. Unfortunately, the proper conditions for employing this equipment did

[20] (1) QM Mid-Pac Hist, pp. 271–72. (2) Rpt, Capt Orr, 25 Jun 44, sub: Answers to Questionnaire, 14 Jun 44. OQMG SWPA 319.25.

[21] (1) Rpt cited in n. 20(2). (2) Rpt, 1st Lt I. F. Legrand, 11 Jan 43, sub: Refrigeration Survey. ORB AFWESPAC QM 414.1.

[22] Weekly Opns Rpt, QM INTERSEC, 19 May 44. ORB NUGSEC QM 319.1.

not exist in the forward areas. Standard solid-rubber-tired fork-lift trucks, the most serviceable equipment at zone of interior depots, required for efficient operation roads and floors with concrete or wood surfaces. But as Quartermaster storage areas in the Pacific were seldom so surfaced, these trucks could not be used extensively. Pneumatic-tired fork-lifts, which operated fairly well in soft areas, were, indeed, the only type suitable for the island bases, and they did not arrive until well into 1944, and then only in numbers too small to help appreciably.[23] The employment of tractors and trailers also presented difficulties. Only trailers with dual wheels and oversize tires could operate in muddy dumps, but this type of carrier, like fork-lift trucks, was hard to procure. So were roller conveyors, use of which materially reduced the manpower required to handle supplies.

Because of the scarcity of satisfactory storage places and modern materials-handling equipment on the north shore of New Guinea the "standard operating procedures," which were designed to teach the principles of good warehousing, frequently meant little even to storage officers. Lacking the mechanical equipment for application of these principles, they lost interest in them. At Oro Bay and Finschhafen an observer found no evidence

> . . . of any conception of the SOP or its practical application as a stabilizing influence in such forward bases. There are no hard standings worthy of mention capable of supporting mechanical handling, no cement requisitioned, no program planned and no apparent knowledge of efficient materials handling. No pallets are available. Fork trucks and other equipment are mis-used in the mud and coral. . . .[24]

Once Southwest Pacific Area forces reached the Philippines, storage conditions rapidly improved. More building materials were procurable locally, and owing to the better shipping situation, more construction materials and warehouse equipment were obtained from the West Coast. Thousands of fairly skilled civilians, too, were available both for the construction of covered storage facilities and for routine depot operations. Even at the early bases, particularly at San Fernando, La Union, in Luzon, some warehouses were built from imported materials soon after these installations were opened. Usually, some hard-surfaced roads and storage areas were available, making possible more effective utilization of fork-lift trucks, tractors, and trailers. Commercial space was also obtainable in fairly substantial quantities for Quartermaster operations.[25]

Distribution Problems

The difficult conditions found in the Pacific areas created vexatious problems in the distribution as well as the storage of supplies. During most of the war a large part of Quartermaster items at advance bases was furnished under an automatic system of supply which employed base inventories, taken at regularly designated periods, to determine base needs. This inventory system generally applied to subsistence below the equator. The practice as to petroleum prod-

[23] (1) Memo, CQM for G-4, USASOS, 13 Oct 43, sub: Whse Equip. ORB NUGSEC QM 451.93. (2) Rpt 18, Capt Orr, 30 Aug 44, sub: Misc QM Matters. OQMG SWPA 319.25. (3) Rpt, Maj Harold A. Naisbitt, 1 Feb 45, sub: Info Obtained From QM SPBC. OQMG POA 319.25.

[24] Ltr, Capt George N. Shaeffer to CG USASOS, 12 May 44, sub: Mechanical Handling in Forward Bases. ORB Base B AG 633.

[25] (1) Ltr, Base M to USASOS, 6 May 45, sub: Covered Storage at San Fernando de La Union. (2) Ltr, Base K to PHJBSEC, 13 May 45, sub: Sup Installations. Both in ORB PHIBSEC 633.

ucts, clothing, and general supplies varied from place to place, but the trend was strongly toward replenishment on the basis of requisitions prepared by the bases themselves.[26]

Whether inventories or requisitions furnished the impetus for distribution, approximately correct stock records were essential to satisfactory supply. Yet, owing to the lack of qualified technicians this condition could not always be met. At Milne Bay in November 1943 no records of clothing and general supply stocks could be maintained, and "little was known as to the actual goods on hand." [27] So extreme a condition was unusual, but Colonel Cordiner believed that "inventories were generally never more than 50% correct." "How," he wrote, "anyone can expect to maintain a proper level without inventories is beyond me." [28] By March 1944 more accurate records were being kept everywhere and from that time incorrect inventories became less significant as a factor in unbalancing stocks.

In the Southwest Pacific the determination of distribution routes was a more complex matter than in either the Central Pacific, where the installations in the Honolulu area constituted the main transshipment centers, or in the South Pacific, where the ration depot in New Zealand and the general supply depot in New Caledonia served as the principal transshipment points. In Australia, Base Section 3 at Brisbane in the beginning supplied clothing and general supplies to all American forces in New Guinea, chiefly through Port Moresby.[29] In February 1943, following the establishment of bases at Milne Bay and Oro Bay, the support of troops in the huge island was divided between the Brisbane and Sydney base sections. While Brisbane supplied Port Moresby with all its Quartermaster needs, Sydney filled the comparable needs of the two new installations, which in turn supplied the north shore of New Guinea.[30] During the ensuing months insufficient stockages at Sydney and swift growth of troop strength in forward areas made it increasingly hard for that installation to support its large distribution area. For this reason its responsibilities were lessened by charging other base sections with direct support of the large supply points set up for ground and air troops near Oro Bay; Townsville provided rations while Brisbane provided clothing and general supplies.[31]

The principal weakness in this system of definitely charging designated Australian base sections with the supply of one or more advance base sections was the impossibility of keeping Australian installations constantly stocked with all the items needed by their distribution areas. When the arrangement was originally set up, USASOS realized that this problem might develop but felt that the shipping shortage necessitated such a method of supply. It had at least the

[26] (1) Ltr, Advance Base USASOS to CG ALAMO Force, 12 Jul 43, sub: Sup of Advance Bases. ORB PHIBSEC 400. (2) Ltr, CQM USAFFE to QM USASOS, 21 Aug 43, sub: Sup Levels. ORB PHIBSEC 400.23. (3) Rpt, Maj Hubert W. Marlow, 14 Oct 43, sub: Inventories at Advance Bases. ORB ABCOM GP&C 400.291.

[27] Ltr, QM ALAMO Force to CQM, 2 Nov 43. ORB AFWESPAC QM 312.

[28] Ltr, to QM Base Sec 7, 9 Nov 43. ORB AFWESPAC QM 400.

[29] (1) USASOS Memo 43, 14 Sep 42, sub: Rations for Port Moresby. (2) Memo, QM Advance Base for QM Base Sec 3, n. d. (3) Rpt, Maj Gordon Phelps, 12 Dec 42, sub: Shpmts to New Guinea. Both in ORB AFWESPAC QM 333.1.

[30] Ltr, USASOS to Advance Base *et al.*, 15 Feb 43, sub: Sup of New Guinea. ORB AFWESPAC QM 400.

[31] USASOS Logistic Instruction 33, 17 Jun 43, sub: Sup of Forward Areas. ORB AFWESPAC QM 400.

virtue of requiring vessels to call at only one port and of thus facilitating prompt and solid loading. The alternative method of making movements from whatever Australian bases had the largest stocks of needed items was rejected, for it required that supplies be picked up at several ports, with loss of valuable shipping time.[32]

The method actually adopted likewise proved wasteful. Food, for example, was generally procured in southeastern Australia, but most of it was not shipped from there to the advance bases. Instead, it was sent north by rail or water to Brisbane and Townsville, where it was discharged, stored, reloaded, and shipped to the New Guinea bases supplied by these installations. This system, wrote Col. John P. Welch, Quartermaster, ADSEC, added to the burdens of the already overloaded railroads and needlessly tied up water transportation.[33] In September 1943, the OCQM suggested that a more flexible method of distribution would be possible if it were given control over the movements of its supplies. Under this system the OCQM would direct that shipments be made from the Australian bases best equipped at the time to send supplies to New Guinea. In general, rations would be moved from Sydney, clothing and general supplies from Brisbane, and drummed petroleum products from both Brisbane and Sydney, but any of these supplies might be moved from any point chosen by the OCQM.[34]

This system was adopted in November 1943, when each technical service at Headquarters, USASOS, became for a short time responsible for co-ordinating the movements of its own supplies. The OCQM, for example, received requisitions or inventory figures from the New Guinea bases and issued directives to base quartermasters in Australia instructing them what to ship, when to ship, and where to ship. This system lasted only until the beginning of 1944, when the newly established Distribution Division undertook the task of controlling all supply movements from the United States and Australia to New Guinea, and the Distribution Branch, Milne Bay, that of controlling movements within New Guinea.[35] Centralized control, whether by the Distribution Division or the OCQM, proved to be a vast improvement over the rigid system of supplying designated areas only through specific bases.

The question of administrative control was only one of those which demanded solution. In all the Pacific areas problems stemming from the shipping situation also demanded solution. Generally speaking, the offices of base and service command quartermasters all had Quartermaster shipping sections to look after the movement of Quartermaster supplies to advance areas. Their major functions were to arrange for the scheduling of the necessary shipping, to assemble and deliver Quartermaster cargoes at the designated ports, and to maintain item-by-item records of all water movements, supplemental to those of the Transportation Corps, in order that lost cargoes might be quickly duplicated. In Australia in the early days, as in San Francisco during the same period, Quartermaster supplies with low shipping priorities, though on dock, could not always be booked for movement

[32] Ltr, Subs Depot to QM ADSEC, 1 Sep 43. ORB AFWESPAC QM 430.

[33] Personal Ltr to Col Hester, 8 Sep 43. ORB AFWESPAC QM 430.

[34] (1) Memo, CQM for G–4 USASOS, 10 Sep 43, sub: Distr Responsibilities. (2) Personal Ltr, Col Cordiner to Col George Grimes, 9 Nov 43. ORB AFWESPAC QM 400.

[35] (1) Ltr, USASOS to ADSEC *et al.*, 24 Jan 44, sub: Distr of Sups. (2) USASOS Memo 27, 31 Mar 44, same sub. Both in ORB AFWESPAC AG 400.

and even if booked, could not always be placed on board the available ships. For that reason alone the maintenance of adequate stocks at advance bases was occasionally very difficult. Quartermaster shipping sections nevertheless tried to place as many of their supplies as possible on the scheduled vessels.[36]

When enough ships were not on hand for the transportation of all supplies awaiting movement, the whole chain of distribution might be disrupted. In that event shipments could not be spaced at the intervals required for the regular flow of supplies, and materials piled up at bases. Cargoes were either not delivered in the expected quantities or were delivered only after protracted delays. Shortages then appeared in stocks at advance bases and were reflected in unbalanced issues to troops. These weaknesses in the distribution system could not easily be eliminated because of the world-wide shipping shortage. At no time did the Army in the Southwest Pacific Area control enough bottoms to meet its supply requirements without difficulty.[37] The situation was similar in the South and Central Pacific Areas. In March 1944, for example, the Army in the latter area required 93 vessels yet had only 63.[38]

The tying up of ships for days or even weeks by making them await discharge at poorly equipped bases often aggravated the scarcity of cargo space. At the still undeveloped port of Nouméa in late 1942 and early 1943 scores of idle vessels awaiting discharge filled the harbor.[39] Comparable conditions existed at Guadalcanal, Espíritu Santo, and the Russells in their early days and even later during periods of active combat. The naval convoy system as well as congestion at base ports lengthened turnabout time. In the Southwest Pacific, for example, vessels from Australian ports assembled at Townsville and awaited convoy to their destinations, a procedure that held up movements for several days or more. These delays were occasionally so prolonged that "entire shipments" of potatoes and onions carried as deck cargo deteriorated.[40] Frequently, from 1,000 to 5,000 sacks of these vegetables were lost. After leaving Australian waters ships bound for the north shore of New Guinea or for neighboring islands were collected at Milne Bay, the naval control center for these areas; their dispatch from this point hinged on the tactical situation and on the readiness of forward bases to handle their cargoes. Both these factors might force postponement of sailings. If, for example, there were two reefers bound for Lae, a port which could handle only a single reefer at a time, one vessel would be held until the other had proceeded to its destination and discharged its cargo. Between 24 May and 18 July 1943 hostile air and naval activities plus delays in completion of port facilities at Oro Bay prevented any vessels carrying Quartermaster supplies from leaving Milne Bay for that base. A huge backlog of all sorts of Quartermaster commodities accumulated at the

[36] (1) QM SWPA Hist, IV, 9–10. (2) Ltr, QM USASOS to Base Sec QM's, 30 Jun 43, sub: Handling Shpmts to Advance Bases. ORB AFWESPAC QM 400.2.

[37] Masterson, Transportation in SWPA, pp. 217–82.

[38] Weekly Min, Vessel Allocation and Cargo Subcom, 22 Mar 44. AG 304 (Jt Ship Opns).

[39] Duncan S. Ballentine, *U.S. Naval Logistics in the Second World War* (Princeton, N. J.: Princeton University Press, 1947), pp. 118, 123–24.

[40] Personal Ltr, Brig Gen Edward B. McKinley to Gen Gregory, 11 Nov 44. OQMG POA 319.25.

control center, and when ships bearing Quartermaster items were finally called forward, twenty sailed within three weeks.[41]

Refrigeration Afloat

Just as lack of refrigerated space ashore hampered Quartermaster supply on land, so did the shortage of refrigeration afloat hamper the distribution of perishables by water. In prewar days the military forces in Hawaii and the Philippines had secured most of their fresh food from local commercial sources. The Army in consequence had no fully refrigerated vessels. It had indeed only the limited cold-storage space needed to keep food for passengers and crews of the troop transports that sailed to Honolulu and Manila. Shortly before Pearl Harbor the Maritime Commisssion had contracted for the building of refrigerated vessels under the emergency defense program. Deliveries on these contracts started in May 1942, but, since perishables for the South and the Southwest Pacific Areas came almost wholly from Australia and New Zealand, most of the new ships were assigned to the Atlantic service.[42] This allocation of reefers made possible better utilization of available vessels because the short Atlantic runs permitted the delivery of fresh provisions to Great Britain and North Africa in larger quantities than could have been made to the southern Pacific areas within the same period of time. But it deprived troops below the equator of much needed vessels for supplying perishables to distant installations and combat forces.

The Central Pacific Area felt the reefer shortage less keenly. Its favorable position resulted principally from the relative proximity of Honolulu to the West Coast, a factor that allowed the shipment of substantial amounts of perishable subsistence from San Francisco. The Cold-Storage Co-ordinating Committee, composed of representatives of the Navy, Army, War Shipping Administration, and Hawaiian civilians, periodically determined what proportion of cargo space on reefers in the Hawaiian–San Francisco pool was allocated to Army, to Navy, and to civilian requirements. When distribution of perishables among these three consuming elements became maladjusted, the committee transferred space from one element to another in order to restore the proper balance.[43] During the first two years this system usually provided Army troops in Hawaii with about two cubic feet of food per man per month. After the drive across the Central Pacific started, reefers were diverted from the Hawaiian–San Francisco run in order to care for the needs of the fleet, advance bases, and combat forces, whose supply became the paramount consideration, and the allowance of perishables for soldiers and sailors in Hawaii was slashed by 50 percent to one cubic foot per man per month. In spite of these restrictive measures a shortage of about 550,000 cubic feet in Central Pacific Area reefer requirements had developed by March 1944. At this time top priority on deliveries of perishables was granted to hospitals, forward installations,

[41] (1) Pp. 1–2 of Rpt cited n. 1(1). (2) Rpt, Col Cordiner, 18 Aug 43, sub: Inspection Trip, 3–17 Aug 43. OQMG SWPA 319.25. (3) Ltr, Vet to Surg INTERSEC, 25 Mar 44, sub: Shpmt of Food to New Guinea. ORB ABCOM P&C 430.

[42] Lt John D. Keser, "Perishables to the Pacific," *Army Transportation Journal*, V (March–April 1949), pp. 17–18.

[43] CINCPOA Ser 03201, 20 Dec 43, sub: Cold Storage Co-ordinating Com. ORB AGFPAC AG 430.

combat vessels, and ships carrying amphibious forces.[44]

The South Pacific Area depended mostly on the Navy reefer fleet, which was too small to maintain regular distribution of perishables out of New Zealand. Small refrigerated vessels for transshipping fresh provisions to remote points in the northern Solomons were particularly scarce. Even the large and relatively accessible base in New Caledonia repeatedly went without fresh eggs and vegetables.[45] In January 1945 responsibility for deliveries of fresh provisions in the South Pacific Area and the Central Pacific Area was divided between the Army and the Navy. The Army was charged with delivery of fresh and frozen provisions to all U.S. servicemen, whether ashore or afloat, in the Gilberts and the Marshalls. The Navy was charged with deliveries elsewhere in the two areas outside Hawaii and the Line Islands, where each service supplied its own men.[46] At this time standard allowances governing the distribution of perishables among the forward installations were established in order to foster more equitable distribution. For soldiers and sailors ashore outside Hawaii 1.5 cubic feet per man per month were allowed; for those afloat, 1.75 cubic feet. In general these allowances were met.

The Southwest Pacific Area, as in many other matters, suffered more than the others from the shortage of reefers. Obliged to rely chiefly on its own efforts, the area during 1942 converted some barges and other small vessels into reefers, but they could not fill even the requirements of the small forces then in New Guinea. During the following two years the reefer fleet was gradually reinforced by about thirty small craft from the United States, mainly "lakers," which averaged about 12,000 cubic feet in capacity. Though these vessels, called "X-ships," were indispensable to distribution activities, they were slow, between twenty and thirty years old, and in poor condition. About a fifth of them were ordinarily laid up for repairs. The normal turnabout time between Australia and New Guinea early in 1943 amounted to thirty-eight days, a period so long that part of the cargo usually spoiled before reaching its destination.[47]

Late in 1943, two relatively fast ships, which had been used to carry troops on leave between New Guinea and Australia, became available for transportation of fresh subsistence. These leave vessels each had about 45,000 cubic feet of refrigerated space that could be spared for base supplies. Since their turnabout time was approximately 18 days, both ships together had a carrying capacity of about 160,000 cubic feet a month, only a little less than the 166,000 cubic feet of all X-ships.[48] Owing to quick turnabouts, leave vessels had the advantage of transporting perishables with little deterioration, but their rigid sailing schedule, permitting only three days for loading, did not allow enough time to fill all refrigerator space. This shortcoming was

[44] (1) Mid-Pac Hist, VI, 1095, 1099, 1103; VIII, 1738–39. (2) Weekly Min, Vessel Allocation and Cargo Subcom, SFPOE, 22 Mar 44. AG 334. (3) CINCPOA Ser 06818, 21 Nov 44, sub: Reefer Allocations. ORB AGFPAC AG 430.

[45] Rpt, Brig Gen Walter A. Wood, Jr., n. d., sub: Matériel and Equip Problems for Plng Div, ASF. DRB AGO Folder "Wood—Actions Resulting from Pacific Trip."

[46] CINCPOA Ser 081, 3 Jan 45, sub: Responsibility for Sup of Perishables in SPA and CPA. ORB AGFPAC 430.

[47] (1) Ltr, Chief Engr USASOS to CO's Base Secs, 18 Oct 43, sub: Reefers. ORB AFWESPAC AG 441.5. (2) Min, Base Sec Comds Conf, 3–5 Mar 44, pp. 74–76. ORB AFWESPAC AG 334.

[48] Ltr, CG USASOS to CG USAFFE, 20 Oct 43, sub: Perishables to Advance Areas. ORB AFWESPAC QM 312.

especially serious at Sydney because of poor stevedoring. In March 1944 it was reported that leave vessels had never once left Australian ports fully loaded; every month they had run with 35,000 to 40,000 cubic feet of cold-storage space, or approximately 25 percent, empty. Maj. Gen. James L. Frink, commander of USASOS, therefore ordered that loading time be extended to five days.[49]

A further measure of relief was obtained in August 1943, when the Navy made unused refrigeration on the USS *Mizar*, a former commercial reefer, available for transporting fresh provisions to Milne Bay. At the same time the Navy agreed to bring perishables to that base whenever its refrigerator vessels had vacant space. Advantageous though this arrangement was, its benefits could not be fully realized, for the Army did not have enough small reefers to transship all the fresh subsistence consigned to other New Guinea bases and Sixth Army supply points on Goodenough, Woodlark, and Kiriwina Islands. Navy reefers nevertheless furnished sizable quantities of food that otherwise would not have been secured. In March 1944 it was estimated that Quartermaster supplies occupied every month between 80,000 and 100,000 cubic feet. One particularly favorable aspect of the arrangement was the virtual absence of spoiled food, an advantage attributable to the fast speed of the ships as well as to refrigeration.[50]

During most of 1944 the two Army leave vessels continued to make regular runs from Australia to Milne Bay and Oro Bay and the X-ships to supply other bases. The point at which the leave ships were loaded was determined by the degree of congestion at Australian ports and by the cargo. Beef was taken on mainly at Townsville and Brisbane; and potatoes and onions at Sydney. Melbourne, though a good source of all kinds of fresh provisions, lay too far from New Guinea to be employed extensively save by fast naval vessels.[51]

Lakers and leave and naval craft together could not supply perishables in the required quantities. Because of incessant demands for fresh meats their distribution of this item constituted perhaps the most acute problem. Five meat issues a week, or twenty-one issues a month, were prescribed in the forward areas. But General Frink reported in February 1944 that, though every resource was being tapped to meet this standard, no more than six issues could be made. He calculated that the provision of twenty-one issues for the 355,000 troops then in the forward areas demanded at least 219,250 cubic feet of reefer space. Yet after allowing for ships under repair and for turnabout time, there were available for meat only 97,500 cubic feet, or about 120,000 cubic feet less than requirements based on twenty-one issues a month. Of the remaining reefer space, 12,400 cubic feet were used for fresh eggs; 11,100 for fresh fruits; 88,700 for potatoes and onions; and 11,800 for other vegetables.[52]

In New Guinea early in 1944 a special ADSOS (Advance Section, USASOS) fleet, composed of three small reefers, each with a capacity of about 5,000 cubic feet, was organized to transship fresh pro-

[49] Min, Base Sec Comds Conf, 3–5, Mar 44, pp. 74–75. ORB AFWESPAC AG 334.

[50] (1) *Ibid.* (2) Ltr, CO Subs Depot to CG USASOS, 17 Jul 43, sub: Subs to Forward Areas. ORB AFWESPAC QM 400.3. (3) Rpt, Col Hester, 30 Jul 43, sub: Army-Navy Conf. (4) Memo, Capt Louis E. Kahn for Col Hester, Subs Depot, 1 Sep 43, sub: Perishables on *Mizar*. Both in ORB AFWESPAC QM 400.22.

[51] Min, Base Comds Conf, 24–26 Mar 44, pp. 60–66. DRB AGO PHILRYCOM.

[52] Ltr, CG USASOS to CG USAFFE, 18 Feb 44, sub: Distr of Fresh Meat. ORB AFWESPAC QM 431.

visions from Port Moresby and Oro Bay to Finschhafen and Hollandia, neither of which then had sufficient shore refrigeration to receive large movements direct from Australia. But while the ADSOS fleet proved useful, it never became large enough for truly effective operations.[53] For general transportation of perishables two additional leave ships and a number of smaller vessels were acquired late in the year; yet the growth of cold-storage space afloat still did not keep pace with the rise in troop strength and the lengthening of communication lines. In April 1944 it had been estimated that from then until June 1945 about 807,000 cubic feet of fresh provisions would be moved north from Australia each month. Since part of the reefer fleet was normally under repair and turnabout time would be protracted to much more than a month after the Philippines were reached, the Southwest Pacific Area would actually have to control 1,452,000 cubic feet of space in order to transport the needed perishables. But in July available reefers could move food at a rate of only 280,000 cubic feet a month, or only slightly more than a third of current requirements and just enough to provide eight or nine issues of fresh subsistence a month. Late in the year the space problem was somewhat alleviated; nonetheless large-scale relief did not come until victory in Europe freed reefers for Pacific service.[54]

Air Transportation

The shortages created by shipping troubles occasionally forced the use of air transportation in order to build up fast vanishing stores of fresh provisions in forward areas. Plane shipments indeed normally included more perishables than they did other Quartermaster items.[55] Air transportation in the Southwest Pacific was used not only during periods of severe shipping shortages as a supplement to inadequate deliveries by water but also as an emergency means of establishing and replenishing stocks at times when consuming centers had no other means of communication with the outside world and when their undeveloped bases were still too poorly equipped to handle heavy demands.

Movements by air presented many difficulties. Cargo planes were controlled by the Army Air Forces and were limited in number. Moreover, they were designed primarily for the carriage of supplies belonging to the AAF; quite naturally, that organization furnished transports more freely for moving its own items than for carrying those of other armed services. Nevertheless it generally supplied planes for Quartermaster supplies in cases of urgent necessity.[56] Transport planes at best carried only a small cargo; 5,000 pounds constituted a sizable load for a C–47, the basic type. Air movements, furthermore, were often improperly co-ordinated. For example, on shipments of Quartermaster supplies from Brisbane and Townsville to Dobodura via Port Moresby in June and July 1943, USAFFE established shipping priorities, but since it did not offi-

[53] (1) Ltr, Surg to QM DISTBRA, 28 Apr 44, sub: Distr of Perishables. (2) Ltr, QM DISTBRA to CG INTERSEC, 5 May 44, same sub. Both in ORB NUGSEC QM 430.

[54] Masterson, Transportation in SWPA, pp. 397–99.

[55] (1) Ltr, QM Sub-Base D to QM Advance Base, 16 Jul 43, sub: Perishable Issues. (2) Memo, same for Col John P. Welch, 6 Sep 43, sub: Air Shpmts. Both in ORB NUGSEC QM 430. (3) Ltr, QM USASOS to CO Base Sec 2, 7 Sep 43, sub: Perishables Proc by AAF. ORB AFWESPAC AG 430.

[56] (1) Memo, CQM for CG USASOS, 9 Oct 43, Sup of Advance Bases. ORB AFWESPAC QM 312. (2) Ltr, USASOS to USAFFE, 18 Feb 44, sub: Air Shpmts of Meat. ORB AFWESPAC QM 431. (3) Rpt 9, Capt Orr, 4 Jul 44, sub: Special Type QM Orgns, p. 14. OQMG SWPA 319.25.

cially book these movements with the Fifth Air Force, which handled the transshipments at Port Moresby, the supplies were left in open storage until all formally booked cargoes had been cared for. On 6 August 1943 an observer at that base found 54,000 pounds of Quartermaster supplies awaiting shipment; some of this accumulation had been there since 12 July. When the supplies were finally started on their way to Dobodura, no tallies or other shipping documents accompanied them and no notification of their impending arrival was sent to the consignee. Accordingly, no trucks were on hand to receive them, and the items were simply unloaded and left unguarded on the field, where they became the easy prey of pilferers until trucks could be found to move them.[57]

In spite of such difficulties, which were probably unavoidable accompaniments of unstandardized methods of shipments, air transportation was frequently a vital means of Quartermaster supply. From the establishment of the airfield at Dobodura in January 1943 until the following June, troops there received practically all Quartermaster items by plane, an expedient required by the lack of roads between the air base and Oro Bay, twenty miles away.[58] For the same reason nearly all newly established airfields in New Guinea, most of which were situated inland at some distance from ports, and similarly located installations of the Sixth Army as well, were at first supported by planes.[59] Radar and other small outposts, in general placed at remote points almost inaccessible by either land or water, were supplied about twice a week by parachute packs containing rations and equipment. Many weeks would have been required to deliver these items over rough jungle trails, but one plane sometimes supplied as many as twenty outposts on a single trip lasting only a few hours.[60]

Packaging and Packing

The unusual danger of deterioration to which many supplies were exposed in the Pacific made proper packaging and packing of the utmost importance.[61] In some instances better packaging and packing constituted the most practicable method of coping with storage and distribution hazards. Since there were too few research and development technicians to permit designing of improved packs in the Pacific, this task was primarily one for the OQMG in the zone of interior. Through its efforts supplies from the United States were eventually shipped in better containers and the standards for packaging and packing materials bought below the equator were materially improved.

Subsistence

At the outset of hostilities neither American industry nor the OQMG fully realized that packaging and packing specifications for food sent abroad must be substantially higher than those for food distributed within the United States. Most shipments for overseas destinations were at first packaged

[57] Rpt, Base Sec 2 Liaison Office, Sub-Base D, 9 Aug 43, sub: Air Shpmts to Sub-Base B. ORB AFWESPAC QM 430.

[58] Memo, Capt R. T. Murphy for Col John P. Welch, Advance Base D, 6 Sep 43, sub: Air Shpmts. ORB AFWESPAC QM 430.

[59] P. 14 of Rpt cited n. 56(3).

[60] Weekly Rpt, 6 Sep 44, sub: Perishable Shpmts to Forward Bases. ORB AFWESPAC QM 430.2.

[61] By official definition "packaging" referred to the means by which the product itself was contained; "packing," to the exterior or shipping container. Harold W. Thatcher, *The Packaging and Packing of Subsistence for the Army* (QMC Historical Studies 10, April 1945), p. 14, n. 7.

in the paper, fiber, and cloth containers of retail trade and packed in fiber cartons, usually without overpacking. Corrugated fiber containers, which were used mostly for packing canned goods, were strong enough to insure safe delivery in the zone of interior, where there were few handlings and plenty of covered storage space, materials-handling equipment, and trained employees, but they lacked the strength to withstand the hard usage of overseas areas and deteriorated rapidly in hot, humid climates. In the beginning no substitutes for fiber containers were available in adequate quantities.

In March 1942 the OQMG authorized the use of a recently developed and supposedly weatherproof solid fiber container, which during the following summer provided the principal shipping carton for subsistence going overseas. The new container made possible substantial savings in space, weight, and scarce materials, but unfavorable reports from abroad soon belied its reputation for strength and resistance to moisture and caused a notable reduction in its use. In an effort to give more protection to fiber containers of all sorts, the OQMG late in July directed that as a temporary expedient depots overpack them in wood.[62] These installations opposed this innovation, claiming that it made heavy demands upon scarce labor and materials and required nearly 15 percent more warehouse and shipping space than was needed by supplies which were simply moved in fiber cartons. In defense of their position the depots pointed out that the overpacking of the 30,000,000 solid fiber containers then scheduled for movement overseas would increase the space occupied by each box to such an extent that an additional 225,000 displacement tons of shipping would be required. It was also pointed out that huge quantities of lumber, which was daily becoming more scarce, would be needed and that, in any event, neither canners nor depots had sufficient equipment for nailing wooden boxes. These cogent arguments compelled the OQMG to substitute metal-strapping for overpacking of fiber containers.[63]

Temperature changes during the long voyage from the West Coast caused cans containing fruits and vegetables to sweat and rust. Once these supplies had arrived at their destination and had been placed in open storage, they were subject to three additional weather hazards: excessive heat, torrential rains, and high humidity, which rusted metal cans, broke fiberboard boxes, rotted wooden containers, and fostered the rapid growth of mold cultures on food, textiles, and leather goods. The prolific insect life further endangered poorly packed supplies.[64]

Quartermaster supplies in the Pacific were handled at least three to five times if they were brought straight from the United States to a point of consumption; if transshipped from base to base, they might be handled ten or more times. Colonel Cordiner estimated that food was commonly handled eighteen to twenty-six times en route from Australia to a point of consumption in New Guinea. Combat rations might go through several tactical operations without being issued and in consequence be handled as many as forty times.[65] Poorly packed food

[62] Tel, TQMG to QM Depots, 28 Jul 42, sub: Overpacking. OQMG 457 (Containers).

[63] Thatcher, *Packaging*, pp. 61–62.

[64] *Ibid.*, pp. 5–6.

[65] (1) Rpt, Cordiner, 2 May 43, sub: Trip to New Guinea, 13–24 Apr 43. ORB AFWESPAC QM 463.7. (2) Rpt, Capt King, 24 Dec 43, sub: Packaging and Packing Subs in New Caledonia. OQMG SWPA 400.162.



DAMAGED SUBSISTENCE *in a storage shed at Milne Bay, New Guinea (above) and in the hold of a ship carrying rations (below).*



suffered heavy damage in being loaded and discharged by sling nets. This damage was particularly heavy if cargo vessels were discharged as swiftly as possible in order to reduce turnabout time. Containers were then tossed five or six feet from trucks into a net spread on the ground, often landing on corners or edges. When the net was lifted or dropped, it crushed and then pushed the boxes in all directions. Diagonal pressures threw the load on the weakest points of the cartons, frequently denting or puncturing inner containers.

Time and again available mechanical equipment and service troops did not suffice to handle peak loading and discharging demands, and untrained islanders, who could not be expected to exercise much care, were necessarily employed to do the job by hand. During the first two years, moreover, danger of bombing repeatedly forced the hasty discharge of vessels at night, with severe losses of supplies. In August 1943 one observer in New Guinea concluded that the greatest injury to poorly packed items occurred during operations of this sort.[66] The Guadalcanal offensive illustrated the rough usage to which Quartermaster items were subject under such circumstances. Owing to the presence of many enemy planes and ships, supply vessels might have to move at a moment's notice and consequently did not drop anchor. Lighters were brought alongside after nightfall, and cargo was simply flung overboard to waiting boats. In some instances makeshift piers were built to receive it, but usually only beaches were available.[67]

[66] Rpt, Maj Carl R. Fellers, 21 Aug 43, sub: Subs Spoilage in SWPA. ORB ABCOM GP&C 400.33 (Lend-Lease).

[67] Min, Subcom of Container Co-ordinating Com on Fiber Boxes, Drums, and Cans, pp. 3–5. OQMG R&D.

Throughout 1942 and most of 1943 Pacific quartermasters commonly described the outer packing of subsistence items as "completely worthless." [68] A survey of bases between Hawaii and New Caledonia in the spring of 1942 disclosed that corrugated fiber cartons in outdoor storage fell apart as soon as a heavy downpour hit them. In the humid Fijis they disintegrated even in warehouses.[69] On the docks at Wellington cartons, awaiting transshipment to Guadalcanal, became wet and broke open. Flour, sugar, rice, coffee, cereals, and baking powder, flimsily packaged for sale in grocery stores, fell out and covered the docks with a mushy deposit. Even wooden packing cases were not entirely adequate.[70] Tightly fastened with nails, they lacked resilience and broke up more quickly under rough handling than did less rigid boxes. Straps did not afford much protection; they were too light in weight and too few in number, only one ordinarily being placed around the short circumference of a container, whereas a minimum of two was needed.[71]

Pacific quartermasters regarded the inner packagings, with the exception of tin cans, as no better than the outer packs. Col. Joseph H. Burgheim, Task Force Quartermaster in New Caledonia, scathingly described them as "a complete waste" of funds.[72] Salt and sugar, shipped in cloth bags, were often already half dissolved by

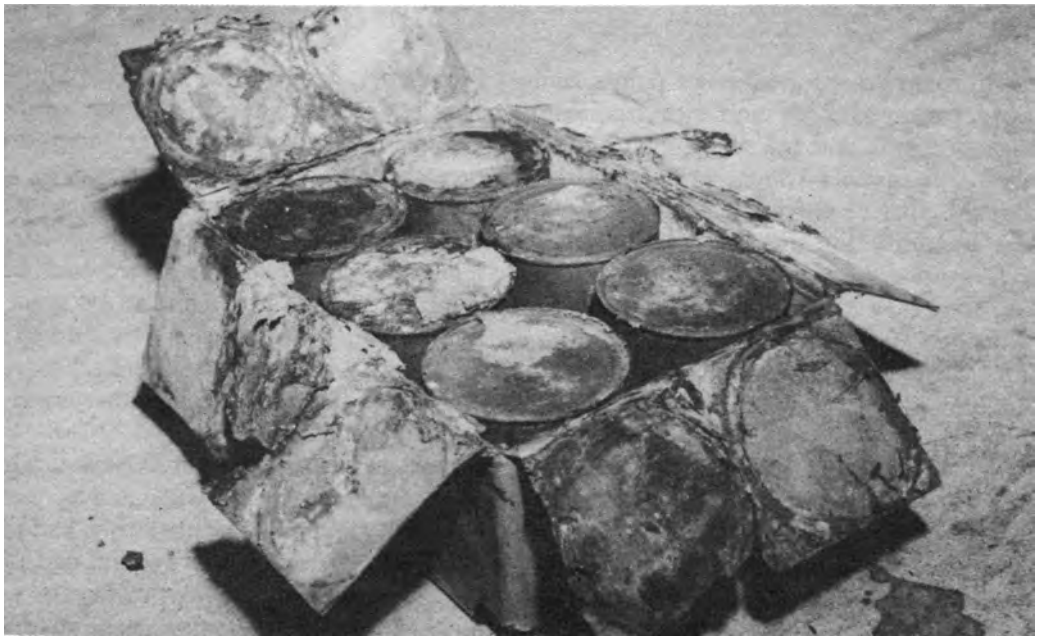
[68] Ltr, TFQM New Caledonia to CQM USAFIA, 29 Apr 42. OQMG SWPA 319.1.

[69] (1) Ltr, CG HHD to CG SFPOE, 2 May 42, sub: Shpmt of Subs in Pasteboard Containers. OQMG 430. (2) Ltr, CG USASOS to CG SOS, 23 Sep 42, sub: Packaging Subs for SWPA. ORB AFWESPAC QM 430.

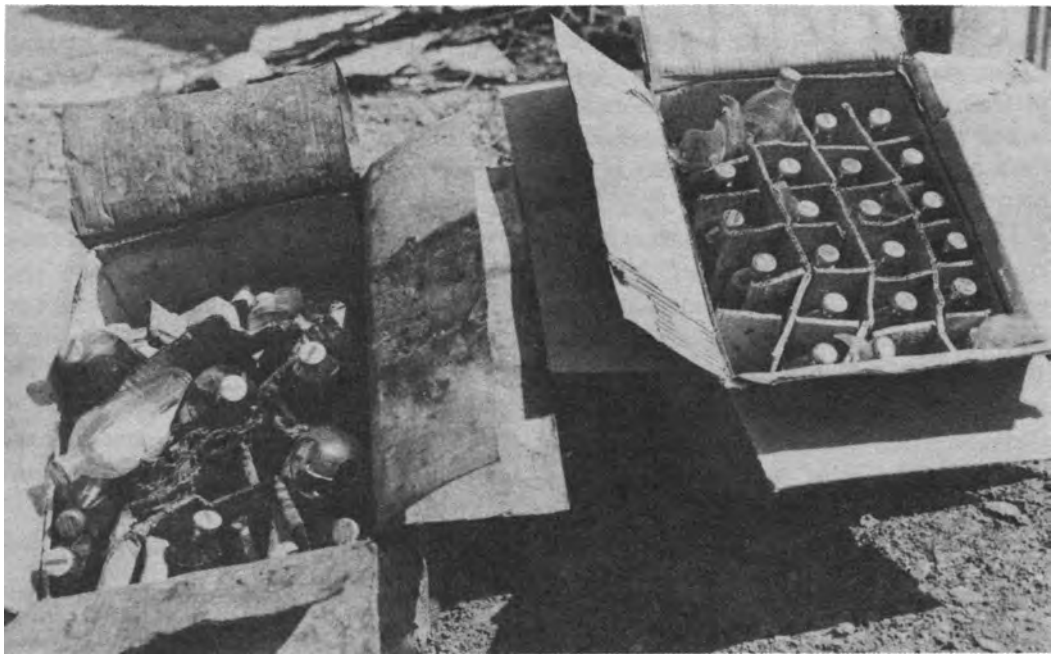
[70] Lecture, Col Robert C. Kilmartin, USMC, 19 Nov 42, sub: Solomon Islands. OQMG POA 319.1.

[71] Memo, Maj William B. Harmon for Col John T. Harris, New Cumberland QM Depot, 19 Oct 42, sub: Packaging for SWPA. OQMG 400.162.

[72] Ltr cited n. 68.



CORRUGATED FIBER CARTONS *used for packing soon disintegrated in the rains of the South Pacific Area, and afforded little protection for their contents.*



moisture on arrival at advance points. Similarly packaged flour and rice frequently became moldy and full of weevils. Though fiber cans furnished more protection, they did not provide safeguards against excessive humidity for the salt, sugar, baking soda, and corn starch they usually held. Nor were they structurally strong enough to withstand hard usage and were therefore often dented and pierced.[73]

Composite cans—fiber containers with metal ends—were employed for packaging cocoa, gelatin, spices, condiments, baking powder, tea, and hard candy. These containers, particularly the larger ones, proved unsatisfactory because of the weak joint between the fiber sides and the metal tops and bottoms. In some shipments of large five-pound cocoa cans the metal bottoms came off practically all the containers. A stronger joint could not be developed without use of a side wall disproportionately thick in relation to the size of the contents. Even glass containers, used for syrup, pickles, vinegar, jams, jellies, and concentrated butters, were not fully satisfactory, for a high percentage always broke in shipment. [74]

Despite the fact that tin cans were in general considered fairly reliable, they were easily punctured. As these containers were unlacquered, they were also liable to rust. If the labels, which covered the cans, became wet, rusting was accelerated. Furthermore, moist labels speedily disintegrated and once the label was gone, there remained no ready means of identifying the contents or learning the date of packing. Frequently, cans had to be issued with no certainty as to the age or even the contents.

Packing and packaging deficiencies, however caused, obliged Quartermaster and Veterinary personnel to devote countless hours to the separation of unspoiled from spoiled food. Once this chore had been completed, more hours had to be spent in the repacking of usable cans earmarked for shipment to advance bases or combat areas. Sometimes the shortage of lumber made repacking impossible.[75]

Because of the numerous hazards to which Quartermaster items were liable, better packaging and packing, obviously, had to be developed. Subsistence in general had to be packed to protect it an entire year or even longer, for reserve supplies accumulated at bases and, as operations advanced, were either left behind for protracted periods of time or else dragged through new campaigns. Combat rations in particular might be stored for many months; consequently, they needed protection for at least two years.[76]

In Washington the OQMG tried to develop more durable outer containers. It especially sought a fiber box equaling nailed wooden boxes in packing performance. Corrugated fiberboard manufacturers, eager to become once more competitive in the military container market, undertook the development of the desired products. They created two new types—one, a super-strength, all-kraft solid fiber container with a sisal outer layer, and the other, a corrugated container in which sisal was used in the construction of the kraft paper itself.

[73] Rpt, Lt Col John T. Taylor, IGD USAFFE, 14 Mar 43, sub: Packaging of Rations. ORB AFWESPAC QM 400.16.

[74] Rpt, 1st Lt Robert L. Woodbury, 28 May 43, sub: Observations in SWPA, 1 Feb–15 May 43. OQMG SWPA 400.162.

[75] (1) Memo, ACofS for Opns SOS for TQMG, 24 Nov 43, sub: Packaging. OQMG 430. (2) Ltr, Capt King to TQMG, 15 Jun 44, sub: Packing and Packaging of QM Sups in SPA. OQMG SWPA 400.162.

[76] P. 6 of Rpt cited n. 65 (2).

Both cartons, it was claimed, surpassed nailed wooden boxes in resisting rough usage. Dropped 50 times in a testing drum to simulate rough handling in a ship's hold, then immersed in water for twenty-four hours, and finally again tumbled in the drum until they broke, two all-kraft containers sustained 315 and 526 falls and a sisal-kraft container 569 falls before they failed. The weatherproof solid fiber container survived only 21 falls and the nailed wooden box 222 falls.

Using "V" for "Victory," the OQMG termed the new materials "V-board" and at the close of 1942 issued specifications for three grades. V1 grade, based on the super-strength, all-kraft, highly water-resistant fiber box used in the tests, furnished the best grade; it was made entirely of virgin fibers and had a bursting strength of 750 pounds per square inch when dry and 500 pounds when wet. The V2 grade, made from both virgin and used fibers, had a bursting strength of 500 pounds per square inch, either wet or dry. The V3 grade, with a strength of 400 pounds if dry but only 150 pounds if wet, made merely a superior weatherproof solid fiber container. Sleeves, fitted over the V-containers from end to end, appreciably increased resistance to hard usage. Further protection was given by two metal straps tightly drawn at right angles to each other. Later a third strap was added for still more protection.[77]

Production of V-containers was at first severely circumscribed by the limited capacity of box factories, the shortage of fiber pulp, labor troubles, and the inability of the OQMG to issue procurement directives in time to obtain delivery by the desired dates. For some months these handicapping factors forced the continued use of weather-proof solid fiber boxes. Not until the summer of 1943 were V-boxes made in substantial volume, and even then the output was not commensurate with requirements. The QMC, indeed, never obtained all the V-boxes it would have had if production had not been curtailed by continued manufacturing difficulties. V2- or V3-board often had to be used when the superior V1 grade was preferable.[78]

V-containers did not reach Pacific bases in significant numbers until the close of 1943. Employed principally for food items, they withstood handling hazards well, and most observers believed them superior in this respect to wooden boxes. If V2-boxes were provided with sleeves, they were suitable for packing canned goods, but the sturdier V1-boxes were preferred for emergency rations and other items stored over long periods of time. The less durable V3-containers proved most satisfactory for such fast-selling PX articles as beer, soft drinks, and fruit juices. Efforts were made to send V1- and V2-boxes as far as possible to forward areas and V3-boxes to rear areas; but the mixing of all three grades in shipment made this difficult. Since V-boxes lacked the rigidity of wooden cases, they did not stack as well and sometimes collapsed if they bore the weight of a superimposed load or if not fully packed. They were most suitable when used for foods packaged in tin cans or other strong inner containers capable of helping boxes withstand stacking pressures. V-containers were also inferior to wooden containers in that they were more easily damaged by moisture. The new boxes retained heat longer than did those made of wood, but excessive spoilage was seldom observed. In spite of the inferiority of V-containers in some respects, their superiority in space-

[77] Thatcher, *Packaging*, pp. 65–68, 82–83.

[78] *Ibid.*, pp. 70–73.

saving qualities, ease of handling, and, above all, resistance to hard usage, more and more won them acceptance.[79]

During 1943 the OQMG developed the conception of "amphibious packing" to indicate packing that could be easily carried and that could withstand exceedingly rough usage and about ninety days of exposure to the elements. In practice the term implied a relatively low poundage and the employment of superior outside packing materials. Amphibious packing, designed originally for tactical operations, was actually applied to most of the subsistence sent to the Pacific late in the war. As far as possible packers employed the freshest food. They preferred metal-strapped V1- or V2-containers with sleeves, but, if these cartons were unavailable, they substituted nailed or wire-bound wooden cases. Because of the repeated necessity for carrying combat rations by hand, packers restricted the weight of amphibious packs to about 40 pounds in contrast to the 50 to 60 pounds of other packs.[80]

While fiber and wooden boxes were the containers most commonly used for overpacking food items, the OQMG developed a special container for flour, salt, sugar, powdered milk, rice, and dry beans and peas—a multiwall paper sack lined with asphalt moisture barriers. Originally, these products had been shipped in burlap or osnaburg, that is, coarse cotton, bags, which furnished only slight protection against handling hazards, moisture, and insects. Tin containers would have been more satisfactory, but the growing shortage of tin plate prohibited their extensive use. After the spring of 1942, five-ply multiwall sacks with two asphalt barriers were prescribed as the outer containers. The plies from inside to outside consisted of one layer of natural kraft; one layer of duplex, waterproof, asphalt-laminated kraft; two layers identical with the first two; and, finally, a fifth layer of natural kraft. In February 1943 a second type of outer sack, the laminated paper-osnaburg-paper bag, which afforded more protection against moisture than the first, was authorized. It consisted of creped kraft paper laminated with asphalt to osnaburg cloth, which, in turn, was laminated with asphalt to creped, wet-strength-treated kraft paper. Both types of multiwall sack were sealed with wax and water-resistant adhesives.[81]

The contents of multiwall bags were packaged in sacks of cotton sheeting. In the 60-pound sack there were usually 12 inner bags containing 5 pounds each, or 6 bags containing 10 pounds each, or one bag containing 50 pounds, the precise size of the bag depending upon the standard unit employed in distribution of the product. Flour and sugar were shipped in 50-pound bags and salt, which was in less demand, in smaller bags.[82]

[79] (1) Ltr, CG USASOS to CG Base Sec 7, 4 Jan 44, sub: Subs Packed Amphibiously. ORB ABCOM AG 430. (2) Rpt, Capt Horace Richards, 26 May 44, sub: Trip to New Caledonia. ORB ABCOM P&C 457. (3) Ltr, Dir of Proc USASOS to CG USAFFE, 20 Jun 44, sub: Packaging of Australian-Procured Sups. ORB AFPAC GPA 400.161. (4) Ltr, CG USASOS to CG ASF, 1 Jul 44, sub: Packing of QM Sups. ORB ABCOM AFWESPAC QM 430.

[80] (1) Memo, S&D Div for DQMG for Sup Plng, 8 Jan 43, sub: Rpt on SPA. OQMG POA 319.1. (2) Ltr, TQMG to CG USASOS, 17 Jul 43, sub: Amphibiously Packed Rations. ORB AFWESPAC QM 430.2.

[81] OQMG Tentative Specification 103, 23 Feb 43.

[82] (1) Memo, Subs Br for S&D Div OQMG, 5 Nov 43, sub: Packaging QM Overseas Items. OQMG SWPA 400.162. (2) Rpt cited n. 79 (2).

Special Packaging Problems

While the OQMG in Washington grappled with packing difficulties, it also tried to solve packaging difficulties. The principal problem was the shortage of tin, which, though easily punctured and prone to rust, still provided the most generally satisfactory packaging material for subsistence. Even before Japanese conquests cut off the rich tin resources of southeastern Asia, the supply of this metal did not suffice to meet all essential military and civilian requirements. In view of the fact that a suitable substitute for tin cans could not be developed quickly, the OQMG focused its attention on conservation measures that would increase the supply of tin cans without use of additional tin. In the late spring of 1942 it substituted lightweight, electrolytic tin plate for the much heavier hot-dipped tin plate. Since even the latter type speedily rusted in the tropics, the lighter type manifestly would rust even faster. Originally, the OQMG had thought that the lacquering of cans was unnecessary, but it now recognized that protective coating or, as it was commonly known, "procoating," was almost mandatory. Such a program proved difficult to start, for manufacturers did not ordinarily lacquer cans and therefore kept no adequate equipment on hand for this purpose. Nor was it known what paints, enamels, and wax emulsions gave the maximum security against rust. Not until the late summer of 1943 was this information available and equipment ready for coating the outsides of cans at some thirty contracting plants, two of them pineapple canneries in Hawaii.[83]

In the spring of 1944 millions of containers, lacquered or enameled on the outside, began to arrive in the Pacific. In open storage they were generally unrusted, whereas unlacquered cans stacked at the same time were already corroding. One observer in the South Pacific declared that inside as well as outside surfaces of fruit juice cans should be lacquered. This precaution would, he believed, eliminate the pinholing of the can by acid juices.[84] Little was done, however, to implement this suggestion. Summing up the procoating program in the Pacific, Col. Rohland A. Isker, wartime chief of the Subsistence Research Laboratory in Chicago, declared that it had prolonged the life of treated cans by at least three or four months and so saved huge quantities of food.[85]

Marking

In the spring of 1943 the OQMG took steps to dispense with some of the paper labels on tin cans. It required that the full name of the product or a five-letter abbreviation be lithographed, stamped, or embossed on containers.[86] Labels were still employed to convey other information. A few months later the procoating program, which, for the best results, demanded the complete elimination of paper coverings, strengthened the argument for not applying any labels. Finally, in January 1944, the OQMG ordered their use discontinued and instructed the food-procuring depots to lithograph, stamp, or emboss on the can all the essential data still carried on labels, par-

[83] Thatcher, *Packaging*, pp. 41–45.

[84] (1) Ltr cited n. 75(2). (2) Ltr, Col Doriot to Dr. Karl T. Compton, OSRD, 22 Aug 44, sub: Soiled Cans. OQMG 457.

[85] Lecture, Col Isker, Army Food Conf, 2 Apr 46, sub: Field Svc is the Best Lab for Research and Dev. OQMG 334.

[86] Chicago QM Depot, QMC Tentative Specification 107, 20 Mar 43, sub: Marking Cans for Overseas Shpmt. OQMG 400.1141.

ticularly the year in which the pack was made.[87] Embossing of cans for citrus commodities created a fresh problem, for the embossing die occasionally fractured the container and permitted acid liquid to spread over and rust the can. A more serious fault was the repeated failure of contracting plants to indicate the name of the product and the date of packing, omissions that rendered identification of contents and the consistent provision of fresh foods almost impossible.[88]

Marking of outside containers for movement overseas, like that of tin cans, received considerable attention from the OQMG. Regulations governing this matter varied from time to time and from one class of supply to another, but from 1 March 1943 to the termination of hostilities the marking of outside containers was in general governed by the Schenectady Plan, so named because it was tested at the Schenectady General Depot. Under this system markings on containers were limited to those required in combat areas; data required in the zone of interior was placed by itself on a special label. Unfortunately, contracting firms remained lax in the execution of marking instructions, and the Quartermaster inspection staff was too small to rectify more than a few errors.[89]

Some months elapsed before supplies marked, at least in theory, in accordance with the improved method reached the Pacific. Even then quartermasters were not wholly satisfied. Col. James C. Longino probably expressed the prevailing opinion when he claimed that markings were too complicated and too small to be "readily detected and understood by relatively unintelligent labor." [90] Owing to the failure to indicate clearly the contents of boxes, the wrong item or incorrect quantities of the right item were often issued. Fewer markings—and these in larger letters—were what Pacific quartermasters wanted. They objected in particular to the small 1/4- to 1/2-inch lettering of the name of the product and to its appearance on only one side and one end of the container. They wanted this identification placed on both sides and both ends in 3- or 4-inch letters and the number and weight of units in the container and the date of packing similarly indicated in slightly smaller letters.[91] Facts not required overseas merely confused handlers. Yet cases arrived, covered, in violation of instructions, with such irrelevant data as the name of the contractor, the purchase and specification numbers, the name and location of the manufacturing plant, the names of the procuring and receiving depots, and other information valuable only in the zone of interior.[92]

Despite the fact that marking, packaging, and packing problems arising in the supply of subsistence from the United States were never wholly solved, better marking and sturdier packages and packings reduced losses materially. That more was not achieved is attributable to lack of materials, deficiencies in contractors' equipment, and inability to anticipate in prewar days all the packaging and packing problems that arose in areas so widely different from the United States in climate, terrain, and social and economic development as were those of the Pacific.

[87] OQMG Daily Activity Rpt, 11 Jan 44.
[88] *Ibid.*, 8 Dec 44; 20 Mar 45.
[89] Thatcher, *Packaging*, pp. 87–89.
[90] OQMG, Rpt of Food Conf, 1–30 Apr 46, Vol. I, "Proceedings 1 Apr 46," pp. 4–7.
[91] (1) OQMG Packing and Crating Bull 51, 10 Feb 43. (2) Personal Ltr, Capt Orr to Col Doriot, 22 Aug 44. OQMG SWPA 319.25.
[92] Pp. 1–5 of Rpt cited n. 23(2).

Packing of Clothing, Equipage, and General Supplies

The provision of packing protection for clothing, equipage, and general supplies was a simpler matter than in the case of food, for they were all much less liable to deterioration. In packing these supplies, bales, wooden boxes and crates, plywood cases, and wood-cleated fiberboard containers, all served as packing containers and except for plywood and wood-cleated fiber boxes, which were easily broken, gave moderately satisfactory results.

Baling was the common method of packing compressible clothing and equipage in the zone of interior. It withstood rough usage well and reduced space requirements by about 30 percent. Bales even afforded protection against water damage as the tight compression of the contents diminished seepage of dampness into interior layers. Wrapping of baled goods in water-resistant paper gave extra protection. In spite of these precautions, clothing was occasionally mildewed, but on the whole the amount damaged was small. The major criticism centered about the difficulty of moving uneared bales by hand because of their excessive weight—often several hundred pounds, a load much too heavy for easy manipulation in areas with limited mechanical equipment. The introduction of lighter, eared bales late in 1943 eliminated this cause of complaint. On the long trip from depots in the United States to Pacific bases some bales always disintegrated because of torn coverings, rusted metal straps, and crumbled waterproof paper. In spite of these mishaps advantages of baling far outbalanced disadvantages.[93]

[93] (1) Memo, CQM for CG USASOS, 1 Nov 43, ORB AFWESPAC AG 430. (2) Rpt, Capt King, 14 Nov 43, sub: Packing of QM Sups at Nouméa. OQMG SWPA 319.25.

The zone of interior never completely solved the problem of packing nonbalable clothing and equipage. These items were customarily placed in unwieldy plywood boxes or wood-cleated fiber cases, which carried loads too heavy for their frameworks and often fell apart, requiring many man-hours for recooperage.[94] In most instances packing of general supplies proved satisfactory, but experience revealed some deficiencies. Plywood boxes, used for field ranges and other bulky articles, frequently broke. The original method of shipping massive items composed of many parts also proved faulty. Stoves, for example, were shipped with six sets of bases, tops, and rings in one crate and all the other parts—shakers, pokers, grates, shovels, and pipe sections—in separate boxes, each of which contained scores of parts of the same type. If a box containing grates, pipe sections, or some other vital part did not come with the rest of the shipment or was misplaced on arrival, the stoves could not be used until the missing parts had been received or located. To insure the delivery of complete units a crate containing all the parts for five complete stoves was developed. This improved method was applied also to other pieces of equipment consisting of many parts. Another weakness in the shipment of general supplies was lack of precautions against rusting of fire-unit burners, pressing surfaces of ironers, and typewriter springs. Eventually, employment of rust preventatives solved this problem.

Many items of clothing and general utility were shipped in V-cases, usually of the V3 type. As some of these items could not be solidly packed, the comparatively weak containers often collapsed under pressure. Boxes containing shoes were especially sub-

[94] P. 10 of Rpt cited n. 65 (1).

ject to this mishap. So were those which held helmets, for these articles, because of their irregular shape, could not be fitted snugly into a case and were so heavy they gradually broke down their containers. If cartons holding soap became wet, they disintegrated because the soap dissolved and weakened the interior of the boxes. In the Philippines in 1944 and 1945 rain damaged socks, uniforms, stationery, and toilet paper, if they were not strongly packaged.[95] Such losses brought about various suggestions for dealing with the problem. One observer recommended that the sides of V3-boxes be strengthened sufficiently to prevent collapse under heavy loads. Another observer proposed that V-containers be utilized only for food and nailed or metal-strapped wooden cases for Class II and IV supplies. But the most common recommendation was that V3-boxes be utilized solely for articles so shaped as to strengthen resistance to stacking pressures.[96]

Packing and Packaging Locally Procured Supplies

The new packaging and packing methods were applied insofar as was feasible to commodities purchased in Australia and New Zealand. But technical inexperience and shortages of raw materials retarded the introduction of American innovations. At the start inner containers for subsistence were comparable to and as unsatisfactory as those employed in early shipments from the United States, but by the close of 1943 better ones had been introduced. Lacquered tin cans were extensively employed. Square, four-gallon cans, employed for flour and dry cereals and occasionally for dehydrated vegetables, frequently admitted moisture. Since package sizes and shapes were not rigidly standardized, it was hard to pack containers snugly, and considerable uncertainty often prevailed as to the number of packages in a container.[97]

Outer packs proved even less satisfactory than inner containers, being larger and more unwieldy than those from the United States. Steel drums, weighing 250 pounds, were occasionally used for flour. As late as May 1945 an observer from the Chicago Quartermaster Depot found many New Zealand products packed in unmanageable 150-pound containers or 100-pound wooden cases.[98] The wooden boxes, generally employed in the Southwest Pacific to pack supplies consigned to advance areas, proved unsuitable because the softwood required to make superior cases was unobtainable, and the brittle lumber employed as a substitute broke easily. Late in 1943 lumber for packing purposes became so scarce in Queensland that the crates necessary for the delivery of fresh vegetables in edible condition could not be provided. In contrast to Australia, New Zealand had a relatively plentiful supply of softwoods appropriate for the production of wood containers. That country indeed had a surplus for exportation to its large neighbor.[99] Both New Zealand and Australia suffered from recurrent shortages

[95] 7th Div Opns Rpt KING II, G-4 Sec, p. 48.

[96] (1) Rpt 3, Capt Orr, 20 May 44, sub: Rpt on the LETTERPRESS Opn. OQMG SWPA 319.25. (2) Ltr cited n. 79(3). (3) Rpt cited n. 23(2).

[97] Rpt, Capt King, 23 Dec 43, sub: Packaging and Packing of Sups from Australia and New Zealand. ORB NUGSEC QM 400.162.

[98] Rpt, Capt Lyle M. Richardson, Jr., Aug 45, sub: Class I Sup in the Pacific, p. 14. OQMG Mil Plng Div.

[99] (1) Ltr, CG USASOS Gen Depot to CG USASOS, 7 Oct 43, sub: Recasing of Subs. ORB NUGSEC QM 400.16. (2) Ltr, CG Base SvC Base Sec 7 to CQM USASOS, 2 Nov 43, sub: Amphibious Shpmts. (3) Memo, Lt Col T. J. Pozzy for Col Hester, Proc Div USASOS, 3 Jun 44, sub: Wooden Shooks. Both in ORB NUGSEC QM 457.

of wire, nails, and straps for bracing wooden boxes. USASOS and SOS SPA therefore imported these indispensable materials from the United States but never received all they wanted. From home sources, too, came "shooks," that is, sets of box parts, ready to be assembled, and small quantities of V-board.[100] The Southwest Pacific Area tried to interest Australian manufacturers in the production of V-containers; its efforts, however, came to naught.[101] Considerable quantities of burlap and other baling materials were procurable below the equator, but lack of compression machines prevented their extensive use, and balable supplies were necessarily packed in three-ply wooden boxes.[102]

Since the new and better packaging and packing methods developed in the zone of interior could not be widely applied to items obtained in Australia and New Zealand, supplies from these countries in general could not resist rough handling as well as those from the United States. Furthermore, since they were less compactly packed, they occupied more cargo space. Despite these drawbacks Quartermaster packaging and packing constituted one of the brighter aspects of QMC distribution activities. The improved methods appreciably alleviated handling problems, prolonged the storage life of most supplies, saved cargo space, and pointed the way for still further betterment.

[100] Memo, Capt Horace Richards for Lt Col R. W. Hughes, Proc Div USASOS, 12 Jul 44, sub: Packing. ORB NUGSEC QM 457.

[101] (1) Ltr, Capt Horace Harding to Dir of Proc USASOS, 26 May 44, sub: Trip to New Caledonia. ORB ABCOM P&C 457. (2) Ltr cited n. 79(3). (3) Ltr, CG USASOS to Dir of Proc, 21 Sep 44, sub: V-cases. ORB ABCOM P&C 457.

[102] (1) Memo, Lt Col W. R. Ridlehuber for P&C Office, QM Sec, USASOS Gen Depot, 29 Sep 43, sub: Packaging of Sups. QM 400.16. (2) Memo, n. s., for Col Cordiner, 5 Nov 43. Both in ORB AFWESPAC QM 400.16.

Some tentative conclusions can be drawn with regard to the problems treated in this chapter. Few of them were susceptible of ready solution; indeed, under the unfavorable conditions encountered in advance areas a large number were almost if not quite insoluble. Building materials and skilled labor for constructing storage facilities at island supply centers were almost totally absent, and Quartermaster construction at best had only low priorities. Had more ocean-going vessels been available, more building materials could have been imported, and had procurement of refrigerated facilities and small prefabricated warehouses been conducted with greater vigor, more of these desirable means of storage could have been obtained. But even if these conditions had all been met, they could have ended storage perplexities only in part. Manpower shortages and low priorities would have precluded immediate assembling of prefabricated buildings, and the normal necessity for prompt discharge of vessels would have forced resort to open storage. The possibility of relief was further complicated by the repeated shifting of the center of supply activity to the newer bases, whose undeveloped state made open storage virtually obligatory for many months.

With the comparatively limited number of cargo vessels, supply troubles would have been considerably eased could air transportation have been employed more freely. What was most needed was more cargo planes, more cargo parachutes, and better delivery technique. There was not enough time during the war to fill these requirements in more than small part, but the QMC did learn how valuable planes might be as supply carriers when other means of transportation had become unavailable or unusable. That knowledge was to be ap-

plied in the postwar years to the development of better air cargo methods.

The potential packaging and packing problems of overseas areas had not been fully comprehended before Pearl Harbor, but early wartime experience quickly revealed the wastefulness of flimsy packaging and packing. Actions then taken to correct defects proved their value and served as guides to still greater improvements in the postwar era. The development of sturdier V-containers in particular pointed the way to much better fiberboard cartons. From its trials the QMC had indeed learned much.

CHAPTER VIII

Class I, II, III, and IV Supply Problems

Quartermaster items were ordinarily provided in adequate quantities, in spite of many handicaps. On but few occasions after the fall of the Philippines did troops suffer from hunger, and then only for short periods of time. There were frequent scarcities of some items of food, it is true, yet men did not starve for lack of them; they merely ate larger quantities of available items. Nor did they long go ill-clad or ill-shod though some articles of apparel and footwear might be temporarily unavailable. By improvising new items and substituting obtainable articles for missing articles, the ill effects flowing from long-continued scarcities of a few of the so-called housekeeping items were mitigated. In the all-important matter of gasoline supply combat units were adequately provided for. They did not always receive all the gasoline they wanted, but lack of this vital fuel halted no operation and never more than temporarily inconvenienced fighting troops. Provision of Quartermaster items thus in general caused but slight trouble for supply officers. It was the problems associated with shortages—sporadic though they usually were—which demanded of quartermasters the greater part of their time, gave them the greatest anxiety, and brought down on their heads the most criticism.

Class I Losses

The most persistent Class I—that is, subsistence—problem facing the QMC was the heavy loss of food. In the absence of accurate stock records the extent of this loss cannot be determined precisely, but it was probably largest in 1942 and 1943, when storage and distribution conditions were at their worst. Articles packed in tin or fiber containers showed severest wastage. At Port Moresby in June 1943 more than 162,000 of the 1,015,000 food cans then inspected by the Veterinary Service were pronounced unsuitable for issue. Twenty-two percent of the evaporated milk, 40 percent of the lima beans, and lesser percentages of tomatoes, cabbage, corned beef, and peaches were condemned.[1] A survey of the canned food held by the 41st Division in the Oro Bay area at this time revealed that 40 to 50 percent of the evaporated milk, 20 to 40 percent of canned fruits, and 20 to 25 percent of canned vegetables were unfit to eat. One observer concluded that at least 40 percent of the rations in the Southwest Pacific were then "spoiled or unconsumable." In September it was estimated that losses

[1] Rpt, Base Vet Advance Base, 6 Jul 43, sub: Rpt, 21 May–30 Jun 43. ORB AFWESPAC QM 430.

were running at the rate of 2 percent every month.[2] In the South Pacific, too, losses accumulated at a prodigious rate. In the first eight months of 1943 the Veterinary Service condemned about 3,500,000 pounds of evaporated milk and enormous quantities of canned fruits and vegetables.[3] Only Hawaii escaped wholesale condemnations of stored food.

Heavy subsistence losses resulted not only from storage in the open and from inferior packaging and packing but also from such causes as shipping accidents and enemy attacks. Unit messes were notoriously wasteful of food; their cooks often had neither training nor experience in the preparation of meals and were in general lax in the performance of their duties, neglecting to separate spoiled from unspoiled meats and vegetables and by their ineptness ruining many a meal.[4] Pilferage further increased losses. This evil was particularly prevalent on board ship, on docks, and in open storage, where supplies were easily accessible to passers-by. The problem was an especially serious one for the QMC, for its food items were in greater demand than the supplies of other services. The generally small size of these items, which made them easy to hide, further encouraged petty thievery.[5]

Though losses of nonperishables decreased somewhat after mid-1943, they remained high. In March 1944 the War Department estimated that 12 percent of such food moved in the previous year from the United States to the South Pacific and 17 percent of that moved to the Southwest Pacific could not be accounted for.[6] In the twelve months between 1 May 1943 and 30 April 1944 in the latter area, the Chief Quartermaster's record, covering food from Australia as well as the United States, agreed with the War Department figure. It ascribed losses to the following causes: spoilage, 5.44 percent; shipping accidents, 5.44 percent; pilferage, 3.40 percent; excess issues, 1.36 percent; and unknown causes, 1.36 percent. This estimate did not include losses in combat and in unit storerooms, kitchens, and messes. The Subsistence Division, OCQM, USASOS, listing slightly different causes of destruction, placed the total figure at 19 percent, or 2 percent higher than that given in the other calculations. According to this estimate combat hazards and deterioration each caused a loss of 6 percent; pilferage, a loss of 5 percent; accidents in transit, 1 percent; and enemy action ashore, 1 percent.[7]

These estimates may all have been too low. This possibility is suggested by their failure to include wastage in units, by the declaration of the Chief Veterinarian, USASOS, who was responsible for most inspection of nonperishables, that storage losses in New Guinea during 1943 amounted to about 13.6 percent, and by the continued condemnation in the following year of nonperishables in proportions somewhat higher

[2] (1) Rpt, Surg Subbase B, 23 Jun 43, sub: Survey of Canned Food. ORB AFWESPAC QM 430. (2) Rpt, Lt Col R. C. Kramer, 9 Sep 43, sub: Trip to New Guinea, 30 Aug–7 Sep 43. ORB AFWESPAC AG 430.

[3] (1) Rpt, Capt King, 24 Dec 43, sub: Packaging and Packing Subs in New Caledonia, pp. 10–11. OQMG SWPA 400.162. (2) Rpt, Capt King, 4 Nov 43, same sub. OQMG POA 400.162.

[4] Memo, Maj William H. Hall, Asst IG, for CO Base A, 9 May 44, sub: Subs Losses at Base A. OQMG 333.5.

[5] (1) Memo, QM for CG ADSEC, 9 Sep 43. ORB AFWESPAC QM 370.43. (2) Ltr, QM ALAMO Force to QM ADSEC, 12 Oct 43. AFWESPAC QM 312.

[6] Ltr, CofS to Overseas Areas, 22 Mar 44, sub: Subs Losses in TOPNS. ORB USAFINC 430.

[7] Personal Ltr, Brig Gen Edward B. McKinley to Gen Gregory, 11 Nov 44. OQMG POA 319.25.

than were given in the estimates.[8] In March 1944 condemnations at Port Moresby, where storage conditions were comparatively good, amounted to 2,143,000 pounds, or 16 percent of all the food examined. Yet wholesale condemnations had been made at this base only nine months before. All but 10,000 pounds of the 541,000 pounds of canned corned beef and all but 8,000 of the 410,000 pounds of canned beets were pronounced unfit to eat. All of the C and J rations, all but a tiny fraction of the D rations, all the hominy, dried apples, and assorted biscuits were condemned. Less than 5 percent of the canned tomatoes and of the raisins were found edible, and 70 percent of the margarine and much of the canned orange juice and dehydrated vegetables were unusable.[9] Wholesale condemnations, like those at Port Moresby, lend weight to the belief that even in 1944 the total loss of nonperishables in the Southwest Pacific may have run as high as 25 percent. Because of slightly better storage and handling conditions, losses in the South Pacific may have been 5 to 10 percent lower. For comparable reasons the Central Pacific Area probably had an even smaller wastage.

Supply of Subsistence in Advance Areas

Heavy subsistence losses were one of the main causes for what was perhaps the major Quartermaster problem in the Pacific—recurrent scarcities of some food items at advance bases and in combat zones, particularly in New Guinea. But this problem was not produced by any single cause; it developed out of the whole complex of conditions that hampered Quartermaster activities in that part of the world. As General Frink pointed out, shortages developed in New Guinea not so much because items were scarce in the Southwest Pacific Area as a whole as because they could not be sent to the proper places in the proper quantities at the proper times. Area-wide stocks of such commodities as flour and sugar were in general more than ample to fill all requirements, yet they were repeatedly unavailable at advance bases and to troops in the field.[10] More or less chronic scarcities indeed existed only in boneless beef and some of the more popular vegetables, but such scarcities were made more acute by the tendency of island installations to issue these favored items in sizable quantities as long as they were available. This failure to conserve limited stocks did much to promote the "feast-and-famine" cycle characteristic of many unit messes. A directive of February 1944 ordered base commanders in New Guinea to prepare monthly menus which would be based on actual stocks and expected receipts and which would list the amount of each item to be served at every meal. Because of the uncertainty of receipts, this method of controlling issues proved futile. Bases themselves usually ignored the menus and continued, much as in the past, to overissue popular items.[11]

Ration problems in New Guinea came to a climax in late 1943 and early 1944. Usable cargo space was then at a low level in relation to the rapidly rising troop strength, and combat units were often stationed at unexpected and widely scattered points for which no adequate supply plans had been formulated. Weeks sometimes passed before work-

[8] Memo, CQM for G–4 USASOS, 16 Feb 44, sub: Wastage Factor. ORB NUGSEC DISTDIV 430.

[9] Memo, Dir of Distr for CG USASOS, 27 Mar 44. ORB NUGSEC DISTDIV 430.

[10] Conf, 15 Mar 44, sub: Min of Special Staff Secs Hq USASOS. ORB AFWESPAC QM 337.

[11] (1) USASOS Regulations 30–16, Sec. II, 28 Feb 44, sub: Daily Ration Issue. (2) USASOS Ltr, GSQMT 430, 6 Jun 44, sub: Issue of Subs.

able arrangements could be made to provision these points. All bases on the island encountered great difficulties in maintaining enough stocks for troops in training, at rest camps, and in operational zones. These installations even found it hard to supply soldiers at the bases themselves.

After August 1943 the movement of cargoes from the West Coast direct to New Guinea introduced a fresh obstacle to equitable distribution, for distribution agencies in Australia then found it almost impossible to ascertain how many supplies from the United States were being landed at northern bases or even what bases were receiving the supplies. Consequently, these agencies could not determine what supply points were most in need of food. Late in 1943 the development of a new War Department shipping document, giving complete information concerning items and quantities shipped and discharge points, paved the way for at least a partial solution, for it gave distributing agencies a much better conception of the dispersion of supplies coming from the United States.[12]

Distribution of food supplies reached a critical phase in the opening months of 1944, when many new supply points were established within a short time and the arrival of many operational cargoes from the United States held up the discharge of subsistence cargoes from Australia.[13] On 15 March Maj. Gen. James L. Frink told representatives of USASOS distribution agencies called together to contrive means of relieving food scarcities that he had received "frantic wires in the last 24 hours from bases in the forward area." Milne Bay needed 2,000 tons of flour but had only 1,480 tons; Oro Bay needed 1,300 tons but had on hand only 526 tons; Lae and Finschhafen were equally bad off. Declining Port Moresby was the only base that had enough flour, and it had double its requirements. The maintenance of regular bread issues in forward areas supplied by other bases depended on the receipt of flour by air. Sugar was even scarcer than flour. Milne Bay needed 900 tons but had a mere 100 tons. Stocks stood at equally low levels at Oro Bay and Lae, which needed, respectively, 568 and 307 tons of sugar but actually had only 103 and 35 tons. Finschhafen required 153 tons and possessed none. Again, Port Moresby alone had adequate stores.[14]

Stocks of nonperishables were unbalanced throughout New Guinea in March 1944, but those at Lae and Finschhafen were in the worst shape. Subsistence at Lae was unbalanced as between such fundamental components of the ration as canned meats and fruits, and there was also marked maldistribution within these components Whereas this base had a 26-day supply of canned meats and vegetables, it had only a 1-day supply of canned fruits, fruit juices, and salt, and a 2-day supply of milk. No tobacco whatever was on hand. Of a 26-day supply of canned meat, 23 consisted of corned beef and corned beef hash; of a comparable supply of canned vegetables, 12 consisted of carrots, 8 of cabbage, and 4 of beets —all of limited acceptability. At Finschhafen fourteen basic elements of the ration were entirely lacking—canned fruits, rice, macaroni, rolled oats, jam, syrup, peanut butter, tea, cocoa, pickles, pepper, vinegar, tomato sauce, and flavoring. These were all

[12] QM SWPA Hist, IV, 15–16.

[13] Memo, CQM for CofS USASOS, 26 Feb 44, sub: Subs for Base E. OQMG SWPA 319.25.

[14] Conf cited n. 10.

essential in view of the variety they gave to the menu.[15]

Nonperishables were not much better balanced at other bases, and there were notable examples of maldistribution as between bases. In early February Oro Bay had on hand a 71-day supply of lard and butter but only a 15-day supply of salt. It had a 180-day supply of fruit juices whereas Lae had but a 1-day supply. At Milne Bay corned beef and C rations were "hopelessly in excess" of any conceivable requirement, but more acceptable items, like coffee, canned fruits, sugar, cheese, and dehydrated potatoes and onions, had been almost exhausted, and the base Quartermaster was begging for their replenishment.[16]

The maldistribution of perishables was even worse than that of nonperishables. Acute shortages of fresh provisions prevailed everywhere in New Guinea. For days and even weeks early in 1944 lack of reefers at Milne Bay held up the transfer of perishables to forward installations. On 31 January neither Port Moresby nor Oro Bay had any fresh beef or poultry, yet these two bases together were responsible for provisioning 103,000 of the 232,000 men in New Guinea. Finschhafen then had only a 2-day supply of these provisions, and Lae only a 7-day supply. Even the 14-day supply at Milne Bay fell short of the amount needed for regular supply. Bacon and ham were as scarce as beef and poultry. Finschhafen had a mere 1-day supply; Oro Bay, a 2-day supply; Milne Bay, a 5-day supply; and Port Moresby, a 7-day supply.[17] New Guinea, in short, was almost without fresh meat. Even more deplorable was the status of fruits, vegetables, and eggs. Not a single base had any fresh fruit. Only one had any fresh vegetables, and it held but a single day's supply. Milne Bay and Lae possessed a 6-day and a 2-day supply of fresh eggs, but the other bases had none. Butter was available in larger but still inadequate quantities. Port Moresby stocked a 12-day supply; Milne Bay, an 11-day supply; and Lae, a 5-day supply. But at Oro Bay and Finschhafen butter stores were wholly depleted.[18] Ten days later levels of perishables in general showed only a slight rise. Whereas stocks of beef and butter at Port Moresby had passed the 30-day level, and enough beef had been received at Oro Bay to set up a 27-day level, other perishable stores at these bases and Milne Bay showed little if any change. At Lae and Finschhafen the status of stocks had so deteriorated that neither installation had any sort of fresh provisions.[19]

During the rest of 1944 both perishables and nonperishables remained more or less unbalanced, but shortages were never so marked as in the opening months of the year. Some excess stockages appeared at Port Moresby and Milne Bay as these installations were left farther and farther to the rear of combat operations. The new and growing bases at Finschhafen and Hollandia, however, continued to encounter difficulty in matching supplies and requirements. At Finschhafen on 15 May, there was only a 2- or 3-day supply of such staples as canned meat, canned and dehydrated fruits and vegetables, flour, coffee, evaporated milk, and sugar. No cigarettes and only a single day's supply of other tobacco

[15] Rpt, Col R. C. Kramer, 10 Mar 44, sub: Trip to Advance Bases. ORB AFWESPAC AG 430.2.

[16] Ltr, QM DISTBRA to DISTDIV USASOS, 5 Feb 44, sub: Subs. ORB NUGSEC QM 430.

[17] Memo, Dir of Distr for G–4 USASOS, 3 Feb 44, sub: Perishable Subs Levels. ORB NUGSEC QM 430.

[18] *Ibid.*

[19] Memo, Dir of Distr for G–4 USASOS, 13 Feb 44, sub: Perishable Subs Levels. ORB NUGSEC QM 430.

products were on hand.[20] Though such low stock levels occurred but rarely, food was seldom obtainable in the variety needed for satisfying meals.

Unbalanced stockages were reflected in subsistence issues at bases, but to a slighter extent than at the supply points of the combat forces dispersed along the north shore and on the outlying islands. This disparity, while in the main a consequence of distribution difficulties, resulted in part from the natural tendency of bases to take for their own troops a disproportionately large share of what was available. Higher echelons and other organizations that controlled airplanes employed them to bring coveted food and tobacco direct from Australia. The "silent blessing" given to this practice by the commanding officers of these organizations stimulated the discriminatory traffic.[21]

Troops at or near bases were in general fed somewhat better than those in advance units, but even they usually received only a monotonous fare. This fact is illustrated by the slim issue of perishables at Finschhafen in December 1943. During the whole month there were but five servings of boneless beef, one of turkey, especially made at Christmas, six of eggs, three of potatoes, and three of butter. For several weeks in February and March 1944 the base was obliged to confine its meat issues to canned corned beef hash and meat and vegetable hash and stew and its vegetable issues to canned cabbage, beets, carrots, and tomatoes.[22] Of these items there was an abundance. Consequently, troops did not suffer from hunger but only from lack of the varied diet to which they were accustomed.

When bases received deliveries of fresh provisions in excess of their refrigerator capacity, they were obliged to issue the surplus quickly in order to keep it from spoiling. For this reason troops at Oro Bay, between 22 and 24 November 1943, were daily served nineteen eggs and bountiful portions of beef and butter. Such fortunate soldiers were said to be on a "prince and pauper" fare, for they gorged themselves for several days and then went back to a dreary fare of canned goods.[23]

As the Sixth Army moved westward to Aitape and Hollandia in April, to Wakde and Biak Islands in May, and to Noemfoor Island and Sansapor in July, stringing new supply points along the far-flung north shore, distribution difficulties were intensified. Biak lay 815 miles west of Finschhafen and 345 miles west of Hollandia. Noemfoor Island and Sansapor, respectively, 435 and 645 miles west of Hollandia, were still more remote. From May to July troops beyond Finschhafen had to be supplied with fresh provisions largely by air. But heavy tactical demands on available planes made impossible any substantial abatement of the scarcity of perishables. The few air shipments gave only scattered and temporary relief to ground troops. Lt. Col. Clarence E. Reid, quartermaster of the U.S. forces at Biak, commenting on shipments to his area, asserted that they were nearly always brought to the air base on nearby Owi Island and that several days elapsed before he learned

[20] Rpt, QM INTERSEC USASOS, 20 May 44, sub: Weekly Opns Rpt. ORB NUGSEC QM 430.

[21] XIII AFSC, War Critique Study, I, 73. Library of Congress.

[22] (1) Ltr, QM Base F to CQM USASOS, 30 Dec 43, sub: Perishable Subs. ORB NUGSEC QM 430. (2) Memo, Col Cordiner for Lt Col J. D. Jacobs, 29 Feb 44, sub: Subs Problems. OQMG SWPA 319.25.

[23] (1) Personal Ltr, Col Elmer F. Wallender to Col Cordiner, 1 Dec 43. ORB AFWESPAC QM 312. (2) Ltr, CQM to INTERSEC, 22 Dec 43, sub: Distr of Perishables. ORB NUGSEC QM 430.

that they had come in.[24] Even air organizations, if actively supporting combat operations, were not much better provisioned than ground organizations. Early in August, for instance, Maj. Gen. St. Clair Streett, commanding the Thirteenth Air Force at Noemfoor Island, reported that his troops had received no perishables by sea for two months and only sporadic shipments by plane. His men, he declared, had "to forage perishables almost entirely" from relatively well-stocked Navy shore organizations.[25]

Only when air units were not actively engaged in operational missions could they utilize their transport craft to obtain perishables. They might then bring fresh provisions not only from Australia but also from New Guinea bases, which lacked reefers to supply all the forward points in their distribution areas. Air units with the necessary means of transportation often asked these bases for the unshipped provisions, and some of the bases acceded to these requests. Ground troops considered such action unfair because it diminished the already small stocks available for their supply, and bases were finally instructed not to comply with these requests unless authorized to do so by higher authority.[26]

In mid-August the Fifth Air Force allocated six planes to the regular transportation of fresh provisions for ground and air troops alike. These planes flew from Finschhafen or Hollandia to forward areas and carried on each trip about 5,000 pounds of boneless beef, salted ham, or butter. Their flights resulted in a slight betterment of rations, but Lt. Gen. Walter Krueger, commander of the Sixth Army, maintained that at least fourteen planes were needed to insure an ample supply of perishables for forward elements. He suggested that four planes be run regularly to Aitape, an equal number to Biak, and two each to Wakde Island, Noemfoor Island, and Sansapor. Tactical requirements precluded such an allotment of aircraft.[27]

Even the limited quantities of perishables in forward areas could not always be distributed equally among units. In May, for example, three small shipments consigned to the Humboldt Bay–Tanahmerah Bay region arrived by water and were all issued to the 41st Division at Humboldt Bay. The 24th Division and other organizations at neighboring Tanahmerah Bay received none; even the hospital there had no fresh food. The explanation of this inequity was the presence of better landing places at Humboldt Bay, the absence of roads between that point and Tanahmerah Bay, the inadequate dump and cold-storage equipment in the latter area, and the natural tendency to provide first for the forces most easily reached. But whatever the causes, the surgeon of I Corps declared that the result was a ration incapable of maintaining good health.[28] Early in August Maj. Gen. Frederick A. Irving, commander of the 24th Division, reported that poor sup-

[24] Memo, QM USF Biak for QM ALAMO Force, 15 Jul 44. ORB Sixth Army AG 333 (Investigation 41).

[25] Ltr, CG Thirteenth AF to CG FEAF, 10 Aug 44, sub: Army-Navy Perishables. ORB AFWESPAC AG 430.2.

[26] See, for example, QM NUGSEC to QM Base A *et al.*, 19 May 45, sub: Unauthorized Issues of QM Sups. ORB Base F QM 400.

[27] (1) Personal Ltr, Gen Krueger to Maj Gen Ennis C. Whitehead, 22 Aug 44. ORB Sixth Army AG 430. (2) Rpt, QM Base G, 6 Sep 44, sub: Perishables Shipped to Forward Areas. ORB Base G QM 430.2.

[28] (1) Rpt, Capt J. J. Sullivan to CG USF APO 24, 26 May 44, sub: Rpt of Investigation APO 24. ORB Sixth Army AG 333 (Investigation 47). (2) 24th Inf Div G–4 Journal, 1 Jun 44. ORB Base G QM 319.1. (3) Smith, *Approach to the Philippines*, pp. 77–83.

ply during the previous four months had "made the use of prepared rations, rather than the balanced field ration, necessary for extended periods." Some units, he declared, were forced to eat packaged rations "exclusively for extended periods." Not until the end of June, he added, had conditions materially improved.[29]

At that very time, however, the surgeon of the 1881st Engineer Aviation Battalion, which was performing heavy manual work on a 24-hour-a-day schedule seven days a week, reported that the unit's rations were still unsatisfactory. During the previous four weeks, he declared, the ration had been constantly deficient in quantity by 30 to 40 percent. This considerable deficit bore with particular severity on organizations, which, like the battalion, operated on a 24-hour schedule and daily served five meals. To compensate for the vitamin deficiency caused by the total absence of fresh foods, the surgeon issued each man two vitamin tablets a day. According to Maj. W. G. Caples, who commanded the battalion, hunger was undermining the health of his men, some of whom had already been hospitalized. Yet the battalion was no worse off insofar as the quantity of its rations was concerned than were many other units supplied by the 24th Division at Tanahmerah Bay. That division had only a 7-day supply of unbalanced rations ashore and afloat and only five trucks to distribute this limited supply to units widely scattered along the coast.[30]

Early in July an officer investigating the exceptionally bad ration supply of the 34th Infantry Regiment bivouacked at Hollandia concluded that "technically all units are getting ample food" but that "actually they are not, as the ration issued has been mainly 'C' ration and after several days the troops can not eat it." [31] Some companies had been for days entirely without flour, sugar, coffee, milk, butter, salt, and types of canned vegetables that their men would eat. Mess sergeants had even been obliged to request food from air, service, and other favorably situated organizations outside the regiment. Some of these noncommissioned officers refused to beg rations, for they regarded such action as degrading to combat units. Officers and men alike felt "highly incensed by what they consider to be a grossly unfair distribution of rations," and their anger was intensified when food-seeking sergeants returned with reports of organizations eating roast beef and maintaining "their own PX where ice cream and other delicacies are sold to the troops of the unit only." [32]

The sense of being discriminated against was especially aggravated by the disparity between Army and Navy rations. Through naval supply channels construction battalions and other Navy units on shore obtained fairly well-balanced and appetizing meals even when nearby Army units were eating an unpalatable fare. This fact is not surprising, for logisticians have long recognized that organizations having the readiest access to superior means of transportation are better supplied than are those less fortunately situated, and there is no doubt that the Navy possessed more and better means of shipping rations than did the Army. The larger naval vessels all had ample refrigeration capacity from which perishable provisions were taken for sailors on shore.

[29] Ltr, Gen Irving to CG I Corps, 6 Aug 44. ORB Base G QM 333 (Investigations 52).

[30] (1) Rpt, Capt Walter S. Hunt, 23 Jan 44. (2) Rpt, Maj. W. G. Caples, 23 Jun 43. ORB Base G QM 333 (Investigations 52).

[31] Rpt, 2d Lt Harry T. Grube, 8 Jul 44, sub: Result of Investigation. ORB Sixth Army AG 333 (Investigations 41).

[32] *Ibid.*

Naval units occasionally had so much fresh food they bartered their surplus stores with Army organizations. Such marked contrasts between the subsistence of the two services aroused bitter criticism and angry discontent among hungry soldiers. To some extent similar reactions, varying in intensity with the quality of Army rations, were encountered among troops nearly everywhere in the Pacific.[33]

Few forward organizations were ever as bad off as those in the Hollandia–Tanahmerah region from May to August 1944. Most combat troops received enough food to provide a full ration if bulk alone was considered. The experience of the 1st Cavalry Division typified that of the majority of combat organizations in New Guinea. Though this division had ample food, it proposed in February 1944 the deletion of canned beets and parsnips from the menu and recommended in place of canned cabbage, carrots, and beets more beans, peas, corn, asparagus, and sweet potatoes. Instead of so much corned beef it wanted more Vienna sausage. It also desired more yeast and baking powder and more macaroni and chili powder.[34] USASOS headquarters was unable to act favorably on these proposals. Australian vegetable production was so lacking in variety that beets and parsnips could not be eliminated. To prevent waste, it asserted, "these stocks must be consumed." [35] Low Australian production of the other items wanted by the 1st Cavalry also precluded their delivery in larger quantities.[36]

Meanwhile the rations served to the 1st Cavalry declined in quality. In May that organization, still in the Admiralties several weeks after having finished its tactical operations there, complained that during the previous sixty days it had received fresh beef at only three meals. "Every man," Maj. Gen. Innis P. Swift, commander of the division, asserted, "is sick and tired of corned beef and corned beef hash." There was no baking powder whatever, and only enough flour for one issue of bread a day.[37] There was no flour at all for rolls, biscuits, pancakes, dumplings, pie crust, or cake, nor was there any lard or lard substitute. Scarcely any sugar, milk, salt, or fresh fruits and vegetables were available. The men, General Swift added, "say that dehydrated foods are all right for about a week, but after that they are nauseating." "The only way," he concluded, "to get a square meal is to get some Jap souvenirs and trade them to the CB's." [38]

During 1944 report after report from the Sixth Army stressed the continued preponderance of canned corned beef, corned beef hash, carrots, cabbages, and beets in shipments from Australia. The monotony of meals was intensified by extensive use of wholly packaged rations, usually C rations, which contained too many unattractive components and less than stipulated amounts of some acceptable items. In one shipment of 600,000 C rations to Biak two-thirds of the meat components consisted of corned beef hash.[39]

As the year closed, startling disparities still existed in perishable stocks. In Novem-

[33] (1) Ltr, CG 1st Cav Div to CG ALAMO Force, 3 May 44. ORB Base F QM 430.2. (2) Ltr cited n. 25. (3) Ltr, TQMG to Senator Robert A. Taft, 2 Apr 45. OQMG POA 430.

[34] Rpt, Conf on Rations 1st Cav Div, 9 Feb 44. ORB AFWESPAC AG 430.2.

[35] *Ibid.*, 3d Ind.

[36] *Ibid.*, 4th Ind.

[37] Ltr, Gen Swift to Maj Gen Edwin D. Patrick, ALAMO Force, 3 May 44. ORB Base F QM 430.2.

[38] *Ibid.*

[39] See, for example, TWX, CG USASOS to CO INTERSEC, 27 Aug 44. ORB AFWESPAC AG 430.

ber, Thirteenth Air Force groups at Sansapor received only 1½ pounds per man of perishables, nearly all fresh meats, whereas groups on Guadalcanal in October received 115 pounds per man, of which about 27 pounds were fresh meats, 69 pounds were fresh vegetables, and 9 pounds were butter. Throughout their stay at Sansapor, Thirteenth Air Force groups received only small and fluctuating quantities of perishables. In September they were issued 2½ pounds per man of fresh meat, in October 8 pounds, in November 1⅕ pounds, in December 12 pounds, and in January 6 pounds. The groups on Guadalcanal fared much better, obtaining in three successive months 29, 17, and 37 pounds of fresh meat. Apart from the chronic distribution difficulties, these remarkable inequalities sprang from the necessity of supplying air units at Sansapor through the Quartermaster section of an infantry division already burdened with countless routine duties, from the fact that New Guinea bases were called upon to give heavy logistical support to offensive operations in the Philippines at a time when there were still many troops to be supplied in New Guinea itself, and from the rapid decline of Guadalcanal as a supporter of forward and combat elements and the consequent availability of more rations for troops on Guadalcanal itself.[40] Around Sansapor the scarcity of perishables and the dearth of variety in canned foods meant that both air and ground forces had for a time almost nothing to eat but C rations, dehydrated vegetables, and spam. Not until the Philippines were reached, did rations become much better. In June 1945 members of the Thirteenth Air Force on Leyte each received 25 pounds of fresh meats, in July 41 pounds, and in August 18 pounds. But stocks of butter and fresh vegetables remained low.[41]

[40] XIII AFSC, War Study Critique, I, 73, 77. Library of Congress.

. *Class II and IV Supplies*

The distribution of Class II items (clothing and equipage) and Class IV items (general supplies, that is, articles of general utility) was ordinarily a less important matter than that of food and Class III items (petroleum products), for troops could operate over lengthy periods of time with limited quantities of clothing and general supplies but could not long survive without food nor conduct modern warfare without gasoline. To the procurement and distribution difficulties that made Class II and IV supply a hard task was added, then, the lack of a sense of urgency.

Shortages

From the outset recurrent and sometimes acute scarcities appeared in these classes. By October 1942 they were almost depleted in New Guinea. Stocks in Australia were then limited and unbalanced, but the quartermaster at the Brisbane base assembled 2,500 tons of supplies to meet the needs of the advance bases. Unfortunately, he could obtain neither vessels nor planes for their movement, and meanwhile the advance bases clamored for replenishment. At the end of three weeks, space for part of the cargo was finally allotted on northbound vessels, but until well into the following year similar instances of shipping delays occurred—much more often than for other Quartermaster items.[42]

[41] *Ibid.*

[42] Ltr, QM Base Sec 3 to CQM USASOS, 3 Dec 42, sub: QM Critical Items. ORB AFWESPAC QM 400.

Chiefly because of procurement difficulties in the United States, there were chronic scarcities of some items of jungle clothing and equipment, which had been specially developed to meet the extraordinary requirements of tropical warfare. For that reason the issue of these supplies was confined to units assigned or attached to the Sixth Army and to a few designated organizations in operational areas. As combat activity increased, shortages at times became so severe that issues were restricted to Sixth Army units actually operating in combat zones. By this means damaging shortages in tactical forces were averted.[43]

Early in 1943 many other Class II and IV items in the Southwest Pacific were also being issued only to designated combat units in New Guinea and to organizations being equipped in Australia for coming offensives. The shortages that led to the adoption of this procedure were reflected at the advance bases, many of which then had almost no stocks of warehouse, laundry, bakery, and salvage equipment, field ranges, mess outfits, portable typewriters, and duplicating and stencil-cutting machines. Without these supplies administrative, storage, cooking, laundry, and salvage activities were gravely handicapped. At some bases it was indeed impossible to provide all Quartermaster services. Even such indispensable items as trousers, jackets, work suits, bedding, and dinnerware were scarce. Inevitably, these shortages increased tremendously the personal discomforts of troops in New Guinea.[44]

While it was true that such widespread shortages of essential items were usually short-lived, local scarcities, especially of "expendable" items, that is, those consumed in use, such as napkins, tooth paste, and insecticides, were often particularly severe. Of sixty-five expendable items requisitioned from the Oro Bay base by the Fifth Air Force in November 1943, only thirteen were on hand in the necessary quantities. Thirty-one were not obtainable at all and twenty-one only in quantities less than required. To replenish exhausted supplies, stopgap shipments of the most urgently needed stores were made by air from Port Moresby, the sole base in New Guinea with adequate stocks of the scarce items. Among the articles forwarded were insect repellents, toilet paper, brooms, scrub brushes, and spoons. Extreme necessity alone brought about such use of planes. A more permanent solution for shortages like those at Oro Bay was eventually found in higher priorities for the movement of badly needed expendable items.[45]

Early in 1944 the base at Lae completely lacked socks and other articles of clothing, and troops supplied by it could obtain none of these vital items. Fifth Air Force units solved the problem for themselves by sending one of their crash boats—high-speed motorboats used to rescue survivors of forced landings of aircraft at sea—to Port Moresby in order to obtain the missing articles. USASOS, supposedly in possession of vessels for transferring materials by water, was thus placed in the anomalous position of seeing the air force supply the shipping for this purpose. Late in April Class II and IV stocks at Lae were still generally far below authorized levels. The Intermediate Section, USASOS, attributed this unfavorable situ-

[43] (1) USASOS Regulations 30-12, 16 Mar 44, sub: QM Clo and Individual Equip. (2) *Ibid.*, 21 Jul 44.

[44] Rpt, Plng and Control Br OCQM USASOS, 30 Mar 43, sub: QM Stocks. ORB AFWESPAC QM 400.

[45] Ltr, CG Fifth Air Force to CG ADSEC USASOS, n. d., sub: Shortages of Expendables. ORB AFWESPAC QM 400.226.

ation to the unusually heavy demands made by the Fifth Air Force on the base's limited resources.[46]

Even after the return to the Philippines, stocks of Class II and IV items, unlike those of other Quartermaster classes in the Southwest Pacific, remained inadequate. This situation was usually ascribed to the unexpectedly heavy requirements of Filipino civilians and the continued slowness of deliveries from San Francisco.[47]

Like the New Guinea bases, those in the South Pacific experienced frequent shortages of clothing, equipage, and general supplies, but they were less severe than in the Southwest Pacific and occurred mainly at new installations. For several months after the establishment of the base at Guadalcanal, its inability to handle ships arriving direct from the West Coast caused temporary distress, but with a few exceptions scarcities disappeared once the base was fully operative.[48]

In the Central Pacific Area, shortages presented even less of a problem. Soldiers' complaints sprang more from allegedly inadequate allowances of socks, underwear, work suits, and towels than from actual scarcities. The survey of the Pacific Ocean Areas, conducted by the OQMG late in 1944, revealed a general demand among troops for larger issues of these items. Commenting on this finding, one officer maintained that allowances had proved ample for normal needs but that lack of laundry facilities and the consequent delay in the return of clothing had produced the appearance of scarcity.[49]

Though the supply of Class II and IV items was not fully satisfactory anywhere in the Pacific, the most annoying problems sprang from the storage difficulties encountered with such specialized items as "protective clothing," from the "tropical deterioration" affecting textile and leather goods, and from the chronic scarcity of tents, sized items in the correct proportions, and spare parts for mechanical equipment.

Storage of Protective Clothing

The QMC stored "impregnated clothing," which had been treated by the Chemical Warfare Service to safeguard wearers from gas attacks, and distributed such clothing in accordance with plans made by that service. If there seemed to be any possibility of gas warfare by the enemy during a coming operation, protective clothing was shipped with the troops. Since impregnation lessened the resistance of textiles to deterioration, the better types of storage were at first used for clothing so treated. But as it became increasingly improbable that the Japanese would embark upon gas warfare, such storage was devoted more and more to ordinary clothing in heavy demand, and protective clothing was often simply placed in the open, with all the hazards this presented. Even under good conditions the serviceability of impregnated garments seldom exceeded twelve months. Better methods of impregnation, adopted in the zone of interior late in 1944, lengthened the useful life of such garments, but few

[46] (1) Memo, QM ADVON Fifth AF for DISTBRA USASOS, 13 Mar 44. ORB AFWESPAC QM 312. (2) Ltr, CG INTERSEC USASOS to DISTBRA, 29 Apr 44, sub: Class II and IV Sups. ORB NUGSEC QM 400.

[47] QM SWPA Hist, VII, 63–64.

[48] Memo, QM SOS SPA for D/SS, 21 Jun 43. ORB USAFINC G–4 430.

[49] (1) Rpt, Field Progress Br OP&C Div OQMC, Nov 44, sub: POA QM Opns. (2) Rpt, Lt William B. Seininger OP&C Div OQMG, 9 Dec 44, sub: Trip to POA. (3) Rpt, QM CPBC, n. d., sub: Questions on QM Opns from OQMG. All in OQMG POA 319.25.

garments impregnated after that date arrived in the Pacific. The apparel handled by the QMC was therefore particularly susceptible to deterioration. The storage problem was worsened as a result of the fact that many garments issued to individual troops on their departure from the United States or later in the Pacific areas were turned in to the bases. This additional burden on the bases was necessitated by inability of units to furnish adequate safeguards for apparel that soldiers indifferently cast aside because of the unlikelihood of gas warfare. Even a well-intentioned soldier found it hard to take good care of his protective garments, for if he put them in a clothing bag, they imparted a sickening odor to his other garments.[50]

The process of turning in impregnated apparel was a troublesome task that demanded the collection of hundreds of articles from individual soldiers. After transfer to Quartermaster salvage warehouses, "impregnated clothing of all types, sizes, and colors" was likely to be "jumbled in wild disorder, and interspersed with gas masks, shoe impregnite, and protective covers." [51] Months sometimes elapsed before sufficient men could be spared to sort the mess, clean dirty garments, and store the whole lot. At Port Moresby in April 1943 protective clothing was piled in the open and protected by tarpaulins that left six feet of the side walls exposed to the weather. Many garments, particularly shirts and gloves, were already so badly rotted as to be worthless. Stitched seams had generally distintegrated, and apparel dyed green for camouflage in the jungle was turning yellow—next to red, the most conspicuous color. In the South Pacific, protective clothing was stored in sheet metal warehouses, but these structures were little better than open storage for they furnished no ventilation except through the doors.[52]

Even after protective garments were no longer issued to individual soldiers, such apparel continued to be kept at bases, ready for issue if chemical warfare broke out or there was strong evidence of its imminence. If operational commanders approved, impregnated clothing was also carried as unit equipment in combat. As a further protective measure, chemical processing companies, which began to arrive in the Southwest Pacific in June 1943, accompanied large operational forces to impregnate clothing in case of need. When American troops landed on Leyte, however, most of the protective apparel in the Southwest Pacific Area was still stored at Hollandia. A considerable period of time would of necessity have elapsed before these stocks could have been delivered in the distant Philippines, where American troops had only the impregnated garments carried as unit equipment. In the Pacific, fortunately, the general conviction that the Japanese were unable to start gas warfare proved correct. The disturbing potentialities of unpreparedness nonetheless suggest the need for a method of handling protective clothing that will maintain large stocks in close proximity to operational areas.[53]

[50] (1) Hawaiian Dept Cir 104, 12 Aug 43, sub: Prot Clo. (2) Ltr, CMLO Base Sec 3 to CCMLO USASOS, 7 Nov 43, same sub. ORB AFWESPAC QM 420.

[51] Ltr cited n. 50(2).

[52] (1) Ltr, CMLO to G–4 Advance Base, 16 Apr 43, sub: Prot Clo. ORB AFWESPAC QM 420. (2) Ltr, Capt John S. Renard SPBC to Mil Plng Div OQMG, 28 Mar 45, sub: Prot Clo in SPA. OQMG POA 422.3.

[53] (1) Ltr, CINCSWPA to ALF *et al.*, 7 Nov 44, sub: Issue of Prot Clo. (2) Memo, Lt Col Jasper L. Cummings for Col R. C. Kramer, Jt Sup Bd SWPA, 8 Feb 45, sub: Impregnated Clo. Both in ORB AFPAC AG 421.

Tentage and Tarpaulins

Several factors combined to make tentage chronically scarce. In addition to the sizable inroads made on base stocks by issues of tents to organizations coming from the United States without those supposed to accompany them,[54] tents lost through the wear and tear of combat operations had to be replaced. Whole divisions sometimes had to be re-equipped. This need arose after the 1st Marine Division arrived in Australia, fresh from the savage fighting on Guadalcanal, and after the 32d Division lost the bulk of its tentage during the early operations in New Guinea.[55] Another serious drain on the available supply was produced by the efforts of units, "through hook or crook," as one officer expressed it, to "obtain tentage in excess of their true needs." [56]

During 1942 and 1943 assembly and hospital tents were virtually unprocurable in the Southwest Pacific because of their unauthorized employment for mess and storage purposes. Hospital tents were so scarce early in 1943 that shelter could not be provided for all the sick and wounded.[57] Tents for housing troops were hard to obtain, partly because the established allowances employed by ports of embarkation in editing requisitions were based on the requirements of settled areas with permanent dwellings available for the use of soldiers rather than on the requirements of areas destitute of such dwellings. In New Guinea staging and replacement camps had to be maintained at each base for casuals, for units coming to the island for assignment, and for units during their staging and rest periods. At these camps tents, whether occupied or not, had to remain standing, ready to accommodate any troops which might arrive. Encampments had to be kept also for men on leave or on their way to or from Australia. Finally, although not authorized by prevailing allowances, tents had to be furnished for offices and administrative and supervisory staffs at new bases and even at some old ones.[58]

The rapid deterioration of canvas was as important a reason for shortages as unauthorized issues. In mid-1943 an Australian scientific mission investigating the condition of military supplies and equipment found that almost all tents in New Guinea leaked.[59] It concluded that the main explanation for this defect was "the prevalent and continual high humidity, which prevents any effective drying of stores which become damp, and causes frequent and unavoidable condensation even on stores well protected from the rain." [60] Moisture saturating tentage over prolonged periods facilitated the growth of molds, which, in turn, produced holes in the fabric. Canvas in storage was often so badly riddled that, when erected, it was wholly unserviceable. Lack of rotproofing in the United States until mid-1944 heightened the damage, particularly in poorly packed, stored, and ventilated stocks. Most tents leaked within six months and in another six months were use-

[54] See above, pp. 148–49.

[55] Personal Ltr, Col Cordiner to Maj Gen Gregory, 9 Jun 43. ORB AFWESPAC QM 370.43.

[56] Memo, n. s., for Sup Div OCQM USASOS, 26 Feb 43, sub: Class II and IV Problems. ORB AFWESPAC QM 370.

[57] Memo, Chief Surg for G–4 USASOS, 14 Nov 42. ORB AFWESPAC QM 424.

[58] Rpt 18, Capt Orr, 30 Aug 44, sub: Misc QM Matters, pp. 22–28. OQMG SWPA 319.25.

[59] Magee, *Service Materiel Under Tropical Conditions*, p. 62.

[60] *Ibid.*, p. 5.



OPEN STORAGE OF CANVAS ITEMS *for prolonged periods in the South Pacific Area frequently rendered them unserviceable.*

less. Had not sizable numbers of thatched huts been utilized as offices, warehouses, and living quarters, a truly critical housing problem might have developed.[61]

Tropical deterioration affected tarpaulins—in fact, all canvas items and duck and webbing equipment as well—in the same way it did tentage. In the United States the OQMG early in the war recognized the seriousness of the fungus problem and conducted extensive experimentation in mildewproofing, but though much was learned about the problem, it was not possible before the end of hostilities to apply satisfactory protection to materials sent to the tropics. Early in 1944, therefore, the OQMG urged the Pacific areas to take special storage precautions, but even before this advice had been received, both the South and Southwest Pacific Areas had begun to stress the need for better warehousing and packaging of canvas goods and had required local manufacturers to utilize existing though inadequate methods of "tropicproofing." Quartermasters in the field themselves waterproofed many tents to reduce mildewing. These remedial measures alleviated but did not solve the problem, for complete tropicproofing could not be undertaken with the limited means available. In any event no known methods offered complete protection against fungi. At the close of the war it was still reported that

[61] William Lawrence White, "Deterioration of Quartermaster Fabrics in the Tropics," *QMR*, XXVI (November–December 1946), 16–17, 63–65.

"even under the best storage conditions" all types of canvas swiftly deteriorated.[62]

Clothing, Towels, Blankets, and Footwear

In unventilated storage places cotton clothing and towels, like canvas supplies, became moldy and developed an unpleasant odor, but extensive deterioration was almost unknown, except in case of extreme neglect. For example, cotton materials in use were not subject to unusual decomposition, but dirty garments, lying about in heaps for some time awaiting laundering, quickly deteriorated. Blankets made of wool, a protein substance fairly resistant to molds and other fungi, were less likely to deteriorate than were cotton goods, but, when wet, they quickly rotted if not promptly laundered.[63]

Footwear and leather goods in general were subject to fairly rapid deterioration, chiefly because of the fats and oils employed in tanning the leather. These components furnished the main elements on which molds lived, for leather itself was a rather stable protein not very susceptible to attack. Fungus growths were most likely to develop on shoes lying in poorly aired structures, but moldy footwear never became quite as much of a problem for the U.S. Army as for the Australian Army, whose storage huts in general were not as well ventilated as those of its ally. Molds were particularly liable to grow on the cotton stitching, and most of the work of shoe repair depots resulted from failure of the seams in uppers and soles. The Australian mission that investigated tropical deterioration suggested the substitution of waxed linen stitchings as a corrective. Decomposition of leather in American shoes was caused principally by rust of metal parts. Leather developed a high moisture content, which, together with excessive humidity, caused such parts to corrode. Rust, in turn, weakened the resistance of leather to wear and shortened the life of shoes.[64]

Size Tariffs

As in other overseas areas, there were insufficient sizes of clothing and footwear available for the troops. Various causes some originating in the procurement process and others in the distribution pipeline between the manufacturer and the ultimate consumer in the Pacific, combined to produce this result.

Incorrect size tariffs, that is, national schedules listing the proportions in which the various sizes of clothing and shoes were to be procured, was perhaps the major cause. The inaccuracy of tariffs is not surprising in view of the issue of almost 6,000 sizes of shoes and garments of all sorts to men of varying ages and physiques. At best the published tariffs were no more than rough approximations of the number of sizes required by an army whose average age and weight were constantly changing and whose component organizations had widely differing needs. The tariffs were useful as guides in the procurement of sized items for depot stocks but had small value

[62] (1) Rpts, 1, 2, and 3, R. S. Penniman, Wesco (Australia) Proprietary Ltd., 15 May, 30 Jun, 30 Aug 43, sub: Tentage Coloration and Preservation. ORB AFWESPAC QM 424. (2) Conf, 13 Oct 43, sub: Tropicproofing and Packaging. ORB AFWESPAC QM 400.16. (3) Ltr, TQMG to QM Depots *et al.*, 20 Jun 44, sub: Storage of Tentage. ORB AFWESPAC QM 424. (4) Memo, G–4 43d Inf Div for Dr. Mann, WD Obsr, 15 Mar 44, sub: QM Sups. OQMG POA 319.25. (5) Ltr, CG 7th Inf Div to CG USAFPOA, 19 May 45, sub: Tropical Deterioration. ORB Tenth Army AG 400.

[63] Magee, *Service Materiel Under Tropical Conditions*, pp. 74–75.

[64] *Ibid.*, pp. 70–74.

to organizations requisitioning supplies. Units, indeed, were directed to base requisitions not on published schedules but on the sizes their actual experience showed to be needed. Sometimes, however, tariffs necessarily served as the standard of distribution. They were so employed in the early days of the Pacific areas before supply officers had gained knowledge of the sizes normally in demand among their troops and when the zone of interior had no more reliable basis for making the automatic shipments prescribed during this period than the national size tariffs. Such use of tariffs was also made when a base simply requisitioned clothing and footwear in bulk without specifying the desired percentages of different sizes. As late as August 1944, some Pacific bases still had such inadequate data on the requirements of the organizations drawing supplies from them that 40 percent of their requisitions merely requested bulk shipments. Since organizations seldom required sized goods in the proportions stipulated in the tariffs, they received an assortment of supplies that did not fully meet their needs. Worst of all, these shipments had a cumulative effect, for, as they continued, the initial discrepancies were compounded and excesses and shortages accentuated.[65]

Several other causes contributed to the unbalancing of stocks of sized items. Limited time for loading cargoes and unavailability of shipping space occasionally resulted in movements from the West Coast that consisted of only a few sizes. Once cargoes arrived in the Pacific, distribution among the widely scattered supply points in line with local requirements was often impossible, for area shortages might force the substitution of unrequisitioned sizes. Even if clothing and footwear were delivered in conformance with estimated requirements, rapid loss of weight by troops serving in tropical regions and the broadening of soldiers' feet as a result of protracted wearing of ill-fitting shoes might invalidate previous calculations of requirements by increasing the demand for small trousers and jackets and wide shoes. The procurement of footwear in Australia further complicated the distribution of shoes in the proper sizes since that dominion for nearly two years provided shoes in but three widths.[66]

The disproportion between the sizes of clothing received by issuing organizations and those which they actually needed is illustrated by a delivery of trousers and jackets made by the *John Foster* to the 6th Infantry Division at Wakde Island, a shipment described by the division's commander, Maj. Gen. Edwin D. Patrick, as "fairly representative" of prior movements of clothing received at that place.[67] Despite the fact that only 23 percent of the command required jackets of sizes 38 or larger, 6,861 of the 7,891 jackets delivered by the *John Foster,* or 87 percent, were of these sizes. The contrast between requirements and deliveries of trousers was equally marked. Only 5 percent of the division needed large sizes, but 3,802 or 49 percent of the 7,482 trousers delivered fell into this category.[68]

Similar reports of shortages in small sizes and excesses in large sizes came from all parts of the Pacific. Surveys conducted in the Sixth Army, in the seven largest bases of

[65] (1) Memo, CQM for Col Herbert A. Gardner, 18 Apr 42. ORB AFWESPAC QM 421. (2) Memo, C&E Br for S&D Div OQMG, 15 Aug 44, sub: Shortage of Clo in SWPA. OQMG 420.

[66] (1) Memo cited n. 62(4). (2) Personal Ltr, Brig Gen James L. Frink to Brig Gen Alexander M. Owens, OQMG. OQMG SWPA 420.

[67] Ltr to CG Sixth Army, 8 Oct 44, sub: Clo on *John Foster.* ORB Sixth Army AG 420.

[68] *Ibid.*

the South Pacific Area, and in the divisions passing through Hawaii revealed that nowhere did stocks of clothing and footwear accurately reflect actual needs. In Hawaii local conditions intensified the shortage of small sizes, for native inductees were predominantly Japanese, Filipinos, Hawaiians, and mixed breeds, who were all of slight physique and required small sizes in much larger quantities than did troops from the United States.[69]

Lacking enough of the small sizes, the QMC was of course obliged to issue the larger sizes. Had units possessed the means of altering poorly fitted garments, the resulting discomfort of many soldiers could have been remedied, but few units were equipped to do this work. Freedom of movement and combat efficiency, General Patrick noted, were in consequence often impaired.[70] Capt. Robert L. Woodbury, who observed tactical operations on Leyte for the OQMG, reported that even at the front he had seen infantrymen "without shoes because not enough small sizes are included in the tariff." [71] Such extreme incidents, fortunately, were exceptional; most soldiers got along as best they could with what was available. But when they were garbed in uncomfortable clothing, morale was perceptibly lowered.

Though size difficulties were never corrected, they were alleviated by the establishment of local size tariffs. In October 1944 Brig. Gen. Charles R. Lehner, Sixth Army Quartermaster, prepared a tariff table based on the experience of that organization and requested that it be used in the assembling of future shipments. The OQMG in Washington asked the San Francisco Port of Embarkation to make the downward or upward adjustments in stock levels required by the new schedule. But even then the size problem was not solved, for requirements fluctuated as new troops arrived and old ones departed and always varied somewhat from division to division.[72]

Spare Parts

Throughout the war technical services were harassed by inability to obtain sufficient spare parts to keep intricate mechanical equipment in operation. The major Quartermaster items involved in this problem were materials-handling, bakery, cooking, shore refrigeration, laundry, salvage, and reclamation equipment, typewriters, comptometers, and adding and other office machines. In varying degrees all these types of equipment were rendered unusable by the wearing out or loss of essential parts. "Every unit," Captain Orr reported in June 1944, "which has a piece of Quartermaster equipment has a parts problem." He then pointed out that since every unit had typewriters and other office equipment and an M1937 field range for cooking, the problem existed "for every unit, be it large or small." [73]

The more complex, the newer, and the less standardized a machine, the greater was the difficulty of securing replacement parts, particularly for fork-lift trucks and warehouse tractors. Within the Pacific areas the storage and distribution of parts for these and other materials-handling machines

[69] (1) Ltr, CG SOS SPA to CG SFPOE, 1 Apr 44, sub: Tariff Sizes. USAFINC AG 420. (2) Personal Ltr, Col James C. Longino to Col Doriot, 9 Oct 44. OQMG SWPA 420. (3) Rpt, QM CPBC, n. d., sub: Questions on QM Opns from OQMG. OQMG POA 319.25.

[70] Ltr cited n. 67.

[71] Rpt, 11 Jan 45, sub: Rpt of 10 Jan 45. OQMG SWPA 319.25.

[72] Rpt, QM Sixth Army, 8 Oct 44, sub: Size Tariffs for Sixth Army. OQMG SWPA 420.

[73] Personal Ltr to Maj William H. McLean, OQMG, 25 Jun 44. OQMG SWPA 319.25.

formed a major segment of the Quartermaster mission until January 1944, when these duties were shifted to the Ordnance Department. The Corps, however, continued to obtain parts in the United States and distribute them to theaters of operations.[74] The importance of materials-handling equipment, at times called "the keystone of the entire supply structure," can hardly be overstated.[75] Every technical service used such equipment for warehousing supplies and loading and unloading shipments. Unless replacement parts were available, the whole supply process might be delayed. Col. Henry W. Bobrink, chief of the Stock Control Branch in the OQMG, exaggerated only slightly when he declared that "the greatest problem facing the Quartermaster Corps is of spare parts for materials-handling equipment." [76]

Overseas areas encountered difficulty from the very outset in obtaining parts for such equipment from the zone of interior. Parts manufacturers simply did not possess the means of meeting quickly the fifteenfold increase in demand that stemmed from huge military purchases; moreover, for some months early in the war the OQMG wanted machines rather than replacement parts. The problem was further magnified by the absence of a centralized parts procurement program until one was established in May 1943 under the administration of the OQMG. Before that date depots had tried with scant success to buy parts as they were needed. Distribution, too, was at first decentralized, parts being stored at all supply installations. A similar system operated in the Pacific areas.[77]

Centralized procurement had the advantage of facilitating the concentration of the thousands of materials-handling parts in a few depots, but it still left many troubles unsolved. There were no official lists of replacement parts, for the War Department had not developed its own specifications for most types of materials-handling equipment and had simply procured commercial models, the complete cataloguing of whose parts required months. Manufacturers' lists, which were used in the meantime, were incomplete and inaccurate and did not cover all models, and even these lists were not always available at Pacific bases. At best it was not easy for requisitioning agencies either overseas or in the zone of interior to order the proper parts; sometimes it was impossible. Manufacturers added to procurement troubles by arbitrary substitution of new parts not interchangeable with old ones. Not until June 1945—too late to help overseas areas— could the OQMG provide the chief means for adequate requisitioning, fairly complete and accurate manuals that catalogued materials-handling parts, supplied the nomenclature and stock numbers indispensable for proper ordering, and indicated what parts were interchangeable. Since detailed information regarding these matters was lacking during most of the war, requisitioning was everywhere pretty much "a shot in the dark proposition." [78]

Several additional factors accentuated the unreliability of requisitions. One was

[74] WD Cir 35, 28 Jan 44, sub: Maint of Materials-Handling Equip.

[75] Ltr, CG CPBC to CG SFPOE, 9 Sep 44, sub: Parts for Materials-Handling Equip. OQMG POA 451.93.

[76] Memo for CG ASF, 17 Jan 44, sub: Stock Control. OQMG 400.291.

[77] (1) Ltr, ACofS for Opns ASF to TQMG, 20 Feb 43, sub: Spare Parts. OQMG SWPA 451.93. (2) AG Memos 35-82-43, 1 May 43, and W5-9-43, 15 May 43.

[78] (1) P. 14 of Rpt cited n. 58. (2) Ltr, CG INTERSEC to CG ASF, 6 Oct 44, sub: QM Opns in SWPA. OQMG SWPA 400.

the absence of figures from overseas experience showing probable future requirements. Another was the inaccurate inventorying of stocks both in the United States and in the Pacific. Because of the large number of parts, estimated in the thousands, and the lack of an accepted nomenclature applicable for identification purposes, these deficiencies were almost insoluble. Reliable inventories were particularly difficult to make in the Pacific because the similar appearance of many different parts led men, untrained in their handling, to store them with the wrong items. Proper marking of parts, especially as to identification, on their shipment from the United States would have alleviated this problem, but such marking was applied to only about 75 percent of movements. Still another factor rendering requisitioning difficult was the broad fluctuation in demand brought about by the wide variations in age of equipment in use. The consequent uncertainty about future requirements made the submission of accurate requisitions an almost impossible task. Actually, there was no normal rate of issue for most items.[79]

An equally serious cause of shortages, along with these inaccurate requisitions, was the slowness and inadequacy of deliveries of materials-handling parts from the United States. These deficiencies are illustrated by the high proportion of requisitions from the Central Pacific Base Command that remained largely or wholly unfilled. At the beginning of September 1944 no deliveries whatever had been made on eleven of the thirty-one requisitions submitted between 1 January and 31 May. Not a single one of the other twenty requisitions had been completely filled; only eight had been more than half filled. On the twenty requisitions submitted between the beginning of June and the end of August nothing had been received on nineteen and only 1 percent on the other. A survey of materials-handling parts overseas, conducted in February 1944 by ASF headquarters, revealed that tardy deliveries in the Central Pacific had delayed the loading and discharge of interarea cargoes. A year and a half later incomplete requisitions were still causing marked shortages.[80]

Difficulties, similar to those encountered in obtaining materials-handling parts, were encountered with other Quartermaster parts. Some bases possessed no catalogues whatever for commercial types of refrigerators and typewriters, for mimeograph, ditto, and adding machines, or for baking, and sewing and other reclamation equipment. These installations found it hard to requisition needed parts. At least one base was obliged as late as the beginning of 1945 to compile its own catalogues for all typewriters and bakery equipment and for several kinds of office machines.[81]

During 1942 and 1943 deliveries of parts for the M1937 field range were confined almost entirely to the sets of essential parts that accompanied shipments of ranges from the United States. These sets, which provided an initial stock, were made up in the erroneous expectation of a roughly equal demand for all parts and were "most wasteful of parts with little turnover and totally in-

[79] Ltr, CG CPBC to TQMG, 6 Aug 45, sub: Improvement of Spare Parts Sup in POA. OQMG POA 400.4.

[80] (1) Memo, Rqmts Div ASF for TQMG, 22 Feb 44, sub: Parts for Materials-Handling. OQMG POA 451.93. (2) Ltr, CPBC to SFPOE, 9 Sep 44, same sub. OQMG POA 451.93. (3) Ltr cited n. 79.

[81] Ltr, Maj Harold A. Naisbitt to TQMG, 8 Mar 45, sub: Observations on Gen Sups. OQMG SWPA 319.25.

adequate for parts with high turnover." [82] In mid-1944 maintenance stocks began to arrive in slightly larger quantities. Nevertheless the Sixth Army reported in September that many units still had no field range parts and were encountering trouble in preparing meals.[83] Shortages in this field indeed continued to plague troops until the very end of hostilities.

Refrigeration parts, too, were decidedly scarce. In January 1944 more than fifty refrigerators at Oro Bay were inoperative. Requisitions submitted by this base three months before remained totally uncompleted. Later in the year Finschhafen reported that its requisitions for laundry as well as refrigerator parts—requisitions which had been forwarded to San Francisco six to twelve months before—were still unfilled and that much equipment in consequence could not be used. Officers at this base, according to Captain Orr, had abandoned hope that these requisitions would ever be completed. Some relief was afforded by makeshift parts fabricated by local Ordnance troops, but many indispensable items could not be manufactured on the spot. "Cannibalization," that is, the tearing apart of damaged equipment to obtain vital parts, was frowned upon but in emergencies was extensively practiced. From time to time conditions similar to those at Finschhafen prevailed at other Pacific bases. In October USASOS noted that small motors for electrically driven refrigerators and sealed motor units for household refrigerators were acutely scarce everywhere in New Guinea. Commercial refrigerators, brought in by the Air Forces, introduced another perplexing problem, for USASOS possessed no information about their parts and hence could not requisition them properly. Because of all these perplexities shore refrigeration, never available in adequate quantities, became still scarcer.[84]

Poor packing led to considerable corrosion of parts, but by early 1945 packing by Quartermaster depots in the zone of interior had improved tremendously, and parts were arriving in better condition. Those packed by manufacturers, however, were sometimes so badly corroded as to be unserviceable. This was notably true of typewriter, sewing machine, and shoe machinery parts shipped in cheap paper envelopes that went to pieces after one or two handlings.[85]

The problem of fairly distributing all the many parts that made up an assembled typewriter among the countless issuing and using agencies was never solved. The absence of manufacturing sources in the Pacific areas and the broad dispersion and huge numbers of typewriters mainly accounted for this failure, which at times kept hundreds of machines out of use and even interfered with the transaction of administrative business. By mid-1944 the number of unserviceable typewriters in the Southwest Pacific had grown so large and so few using agencies had means of repairing them that a spare parts depot was set up at Brisbane to rebuild worn-out machines. The protracted delays incurred in shipments to a point as distant from advance bases as Brisbane led in August to the establishment of a comparable depot at Finschhafen. Early in 1945 still

[82] P. 23 of Rpt cited n. 58.

[83] Ltr, Sixth Army to Base H, 27 Sep 44, sub: QM Shortages. ORB AFWESPAC Sixth Army AG 400.

[84] (1) P. 21 of Rpt cited n. 58. (2) Ltr, CO Base B to CG INTERSEC, 30 Oct 44. ORB NUGSEC AG 673.

[85] Ltr, CG USAFPOA to TQMG, 6 Aug 45, sub: Spare Parts. OQMG POA 400.4.

another installation was established, this time at Manila.[86]

In the middle of that year the concept of centralized storage was adopted for all Quartermaster spare parts, and a depot for issuing parts to the forces in the Philippines was being set up in Manila when hostilities ceased. An installation specializing in International Business Machines parts was also being established there. The QMC had thus rightly concluded that well-stocked central depots furnished a better method of promptly locating and issuing replacement parts than did scattered base installations, none of which could possibly possess sufficient stocks of all parts.[87]

During 1945 the scarcity of Quartermaster replacement parts was also alleviated by extending to virtually all items the practice of shipping a six-month initial supply of parts with the equipment. In July Captain Orr nonetheless pessimistically reported from Okinawa that the problem still awaited solution. Spare parts depot companies, modeled on similar units in other technical services, he thought, might at least provide the trained men needed for proper storage and identification.[88] Captain Orr's gloomy report was supported by surveys conducted by the Southwest Pacific Area and the Central, South, and Western Pacific Base Commands in May and June. These surveys showed that stocks of parts, especially for materials-handling equipment, remained far below requirements. Only in the South Pacific, where shrinking troop strength made stores, originally too small, generally ample, was the supply situation satisfactory, and even there the stock of materials-handling parts did not yet match demands.[89]

All the surveys urged the preparation of more up-to-date, profusely illustrated catalogues and the provision of initial stocks through the shipment of a larger number of complete sets with the equipment. One report suggested that these sets contain a one-year supply rather than the six-month supply currently furnished. The most serious objection to sets was that in the past they had included too many items seldom called for and too few items in heavy demand. The surveys agreed on the value of higher replacement factors and a working force better trained in the identification of stocks. The Southwest Pacific Area urged the creation of spare parts supply and service platoons, the establishment of centralized control and storage of parts in each area, and the employment of technical teams to proffer advice on better handling methods. Had V-J Day not come before these suggestions could be applied, they would almost certainly have mitigated the parts problems.[90]

Class III Supply

Petroleum products, like rations, were key supplies vital to the conduct of modern war. Without these fuels, bombers and fighters could not accomplish their tactical and strategic missions, planes could not carry emergency cargoes, ships and trucks could not transport the rations, ammunition, and weapons that changed mere groups of men into fighting forces, tanks and mechanized

[86] (1) Sec I USASOS Memo 49, 28 May 44, sub: Repair of Typewriters. (2) Sec IV USASOS Memo 85, 29 Aug 44, same sub. Both in ORB AFWESPAC AG 400.

[87] QM SWPA Hist, VII, 69–72.

[88] Rpt 4 (Okinawa series), Capt Orr, 15 Jul 45, sub: QM Opns on Okinawa. OQMG POA 319.25.

[89] (1) QM SWPA Hist, VII, 71–72. (2) Ltr, CG USAFMIDPAC to TQMG, 6 Aug 45. OQMG POA 400.4.

[90] Ltr cited n. 89(2).

artillery could not be operated, generators could not furnish power for communications equipment, field ranges could not bake bread, and combat troops could not be provided with hot food or electric light.

Petroleum products consisted of various categories—kerosene, fuel oil, diesel oil, lubricants, aviation gasoline, motor gasoline, and unleaded gasoline for field ranges and radar equipment—divided in turn into different grades, which were all covered by Army specifications. Because of their indispensability petroleum products generally commanded somewhat higher shipping and handling priorities than did clothing, equipage, and general supplies. Since Class III products embraced a small number of items, subject to only minor storage hazards, they presented fewer problems than did the numerous items, often fragile and susceptible to quick deterioration, which composed other classes.

Supply in the Southwest Pacific

In the Southwest Pacific Area the U.S. Army at first drew its petroleum products from the Australian Army, for supply conditions made the pooling of these items virtually mandatory. After the fall of the Netherlands Indies, the source of most of Australia's gasoline and oil in peacetime, these products were imported from Iran and on lend-lease from the United States and South America. Since there were few military installations for handling these large shipments, they were received, stored, and drummed at commercial terminals in Australian ports. Owing to the impracticability of establishing separate stocks for both the American and the Australian fighting forces, United States organizations filled their requirements from oil company reserves and from the military supply centers of its ally. Even imports consigned to the American forces were turned over to the Australian Army. This was true not only of tanker shipments but also of U.S. Army 55-gallon steel drums, widely used for transporting and storing petroleum products. These were usually called 44-gallon drums since the imperial gallon, used in Australia, contained roughly 5 U.S. quarts, instead of 4, as did the American gallon.[91]

To simplify supply operations, U.S. forces at first used chiefly the same products the Australians did. As with rations, this was an unsatisfactory arrangement, for these products were poorer in quality than those furnished by the zone of interior and were available in too few grades. At times the only motor gasoline in stock contained between 12 and 15 percent of locally produced power alcohol. Though mixing gasoline and alcohol in this way relieved the shipping shortage by diminishing the importation of gasoline, it increased unduly the vapor pressure of the fuel, particularly in tropical areas, and hastened the formation of objectionable gum deposits. For these reasons blended gasoline furnished less power than did standard grades. Alcohol, moreover, because of its affinity for water, separated from gasoline if water entered fuel tanks, necessitating removal of the resultant mixture. Less but still substantial difficulty was experienced with other fuels. A partial solution of these problems was ultimately found when Australia adopted many American specifications and when the

[91] (1) USAFIA Memo, 24 Apr 42, sub: Class III Sup in Australia. (2) Ltr, CINCSWPA to CG USASOS, 14 Oct 43, sub: Handling Class III Sups. ORB AFPAC G–4 463.7.

U.S. Army reduced to a minimum the number of petroleum items it employed.[92]

Whereas in Australia, with its excellent commercial facilities, the storage and handling of petroleum supplies by the Commonwealth Army offered few difficulties, so that the pooling of petroleum products was applied there during the entire war period, in New Guinea U.S. forces from the beginning thought that the system worked poorly. In September 1942 a Quartermaster officer reported that at Port Moresby "no proper routine" had been set up for the issue of gasoline. Petroleum stocks in the main Australian dumps, this officer declared, were badly classified, and frequently drums bore no marks identifying the contents or indicating the date of filling. Some products, used solely by the U.S. Army, could be located and identified only by having Americans search the dumps. Moreover, no adequate means existed for determining future or even current requirements.[93]

In mid-1943 an especially unfavorable situation developed at Milne Bay and Oro Bay. Increasing numbers of American troops were then being scattered through these areas, but the Australian stations did not possess adequate means of transportation to deliver oil and gasoline promptly to U.S. organizations. USASOS therefore entered into an agreement with the Commonwealth Army by which the QMC assumed the entire responsibility of arranging for the handling of petroleum products for these particular organizations from the time they were shipped from Australian ports until they reached the ultimate military consumer.[94] The new system applied only to limited areas around Milne Bay and Oro Bay, but a telling argument for its expansion to all New Guinea was the growing realization that supply through Australian channels gave U.S. forces no adequate control over the reserves it needed to insure constant availability of Class III products. These reserves, in fact, frequently fell below a desirable margin of safety. Mainly for this reason the two armies agreed late in the year that the QMC would distribute petroleum supplies to all American troops outside the Australian mainland.[95]

Under the new system the OCQM calculated all the petroleum requirements of the Southwest Pacific Area except those for the Air Forces and submitted requisitions covering these requirements to Australian sources. Base section quartermasters received the supplies from the Australian Army in mainland ports and arranged with cargo control officers for their transportation northward. In New Guinea the base quartermasters kept records of consumption and stocks on hand and each month submitted to the OCQM requisitions covering their needs during the next thirty days.[96] Until Decem-

[92] (1) Ltr, CQM to G–4 USAFIA, 13 Jun 42, sub: Gasoline-Alcohol Blends. (2) Ltr, QM USASOS to CQM USAFFE, 4 Apr 43, sub: Alcohol-Blended Gasoline. Both in ORB AFWESPAC QM 463.7.

[93] Rpt, Maj H. W. McCobb, 8 Sep 42, sub: Class III Sups. ORB AFWESPAC QM 333.1.

[94] (1) Memo, Lt Col J. D. Jacobs for Col Cordiner, 9 Jul 43, sub: Class III Sup to Advance Bases. (2) Memo, QM for Trans USASOS, 29 Sep 43, sub: Class III Shpmts to Oro Bay. Both in ORB AFWESPAC QM 463.7.

[95] (1) Ltr cited n. 91(2). (2) Memo for the Records, 1 Nov 43, sub: Handling Class III Sups. ORB AFPAC G–4 463.7. (3) OCQM Tech Memo 85, 28 Nov 43, sub: QM Class III Sups to Advance Bases.

[96] (1) Ltr, CG USASOS to CINCSWPA, 26 Aug 43, sub: Sup of Class III Products. (2) Ltr, CG USASOS to Sec and Base Comdrs, 27 Nov 43, same sub. ORB AFPAC QM 463.7. (3) Memo 85 cited n. 95(3).

ber 1943 these officers also controlled the filling, cleaning, and repair of drums, but after that date these duties were assigned to the Corps of Engineers. In New Guinea that service was already responsible for the installation, maintenance, and operation both of bulk storage tanks receiving liquid fuels from tankers and of pipelines carrying these supplies from rear to advance establishments. The Ordnance Department procured and maintained tank trucks and other vehicles for distributing gasoline, but QMC troops operated all such equipment. The Corps also obtained and distributed drums, cans, and other dispensing equipment required in moving gasoline and oil from bulk storage to using elements. The QMC brought petroleum products to Air Forces as well as other supply depots, but airmen unloaded, stored, and issued these supplies.[97]

In carrying out its responsibility for determining petroleum requirements, the OCQM used consumption factors based on previous use, logistical instructions, kind of operation, conditions under which future consumption would probably occur, and expected losses from enemy action. Since the elements that went into the establishment of factors varied constantly with operational plans and geographical shifts of troops, the factors themselves underwent frequent changes. The consumption factors, issued by the Chief Quartermaster in September 1944, expressed the requirements in U.S. gallons per man per day for the principal petroleum items as follows: [98]

Class III Supplies	*U.S. Gallons*
Total	1.483
Motor gasoline	0.900
Range fuel for powered equipment	0.090
Range fuel for cooking	0.090
Automotive diesel fuel	0.300
Lighting kerosene	0.020
Power kerosene	0.018
Engine oil	0.046
Gear oil	0.016
Grease	0.003

When the Philippines were reached, each of these factors was automatically increased by 25 percent. Later, as experience accumulated in this new area of active combat, further modifications were introduced to reflect the changed operational conditions. The revised factors, published in February 1945, were as follows: [99]

Class III Supplies	*U.S. Gallons*
Total	1.38841
Fuels:	
Motor (all purposes)	0.830
Unleaded gasoline	0.150
Diesel oil	0.320
Kerosene	0.028
Engine oils:	
OE-10	0.0015
OE-30	0.0360
OE-50	0.0075
Lubricant, GO 90	0.0120
Greases:	
General purpose CG-1	0.00208
Wheel bearing WB-2	0.00114
Water pump	0.00019

The QMC found the fair distribution of petroleum products among using elements less baffling than that of rations but a difficult task nonetheless. The most bothersome problems stemmed from the complete lack of means for bulk storage in New Guinea during the first year and a half of hostilities;

[97] (1) Ltr, CG USAFFE to CG USASOS, 5 Jul 43, sub: Handling Avn Gas. (2) Ltr cited n. 96(2).

[98] OCQM Tech Memo 45, 6 Sep 44, sub: QM Class III Sups.

[99] OCQM Tech Memo 9, 22 Feb 45, sub: Rqmts for Class III Sups.



BULK PETROLEUM PRODUCTS STORAGE *facilities included tanks, shown under construction (above) in New Guinea, and the drumming plant at Espíritu Santo (below).*



occasional scarcities of coastal tankers for service between the northern bases; the shortage of drums; inadequate drum-filling plants; and insufficiency of cargo space for 55-gallon drums from Australia.

The unsatisfactory means of bulk distribution outside the populated regions of the Southwest Pacific forced sea-going tankers to discharge most of their cargoes at large Australian commercial terminals, which always had capacity available for military use. Normally, they could handle between 10,000,000 and 12,000,000 U.S. barrels. At the end of March 1945, their capacity totaled 11,962,839 barrels, five times the number available even then in the rest of the Southwest Pacific Area. Of this huge amount, about 4,158,922 barrels were allotted to motor gasoline, 2,746,770 to fuel oil, 2,432,774 to diesel oil, 1,598,613 to aviation gasoline, and 1,026,769 to kerosene.[100]

Not until mid-1943 did the construction of bulk storage tanks start at the New Guinea bases, and then only on a limited scale. Since these bases were to be used but slightly after the campaign for recovery of the Philippines had started, large, permanent facilities were not wanted. Instead the Army built small or medium-sized tanks, capable of handling 100-octane aviation gasoline, a few additional grades of gasoline, and two or more kinds of fuel and diesel oil. Where airfields were located within a radius of about twenty miles of bulk storage centers, pipelines were laid to supply aviation gasoline. At the fields themselves small bolted tanks were built for dispensing gasoline to trucks, which delivered the fuel to planes. In the islands outside Australia and the Philippines, bulk storage at the end of March 1945 amounted to but 2,068,900 barrels, less than 17.5 percent of that in Australia. Of this total 763,900 barrels were devoted to fuel oil, 760,900 to aviation gasoline, 290,850 to diesel oil, and 253,250 to motor gasoline.[101]

Even this restricted capacity could not always be utilized efficiently. At some ports the water was so shallow that large vessels could not approach the storage tanks; at others the tanks were so small that vessels could unload only part of their liquid cargoes. In such cases, vessels had to put in at another port. What was needed was more small tankers for movement between bases and between bases and forward supply points, and more oil barges which could be towed from Australia for delivery of cargoes in shallow harbors to tanks of limited capacity. But these requirements could seldom be wholly met.[102]

When the U.S. forces returned to the Philippines, the means of transshipping petroleum products from New Guinea to the new area of operations and of storing them proved unequal to the vastly increased demands. In this emergency Base K on Leyte could supply only purely local requirements. Conditions in the Philippines, in fact, bore a marked similarity to those encountered in New Guinea in the early days. In March 1945, six months after the invasion of Leyte started, only 399,500 barrels, or less than a fifth of even New Guinea's low capacity, could be stored, and stock levels had fallen below a proper margin of safety. Extensive construction, much of it permanent and aimed at providing storage for 2,029,000 barrels, was begun in and about Manila on its reoccupation, but until the very end of

[100] Rpt, 31 Mar 45, sub: Bulk POL Storage Facilities, SWPA. ORB AFPAC G–4 463.7.

[101] (1) Ltr, CINCSWPA to CG USASOS, 24 Aug 43, sub: Bulk POL Storage Facilities, SWPA. (2) Rpt cited n. 100. ORB AFPAC G–4 463.7.

[102] Masterson, Transportation in SWPA, pp. 402–07.

the war bulk deliveries at most outlying points had to be made by oil barge.[103]

The shortage of bulk storage and pipelines everywhere in the Southwest Pacific forced the transportation and storage of most petroleum products in containers, which occupied about 75 percent more space than did an equal quantity of fuels carried by tankers. In October 1943 drummed motor gasoline was being issued at Oro Bay alone at the rate of 26,000 gallons a day, or 780,000 a month. If this huge amount could have been moved by tankers, about 5,000 ship tons would have become available for other supplies.[104] A year later, after storage tanks and pipelines had been built at Milne Bay, Oro Bay, Lae, and Finschhafen, the Chief Quartermaster estimated that the new distribution system had cut requirements for motor gasoline drums from 286,000 to 133,000. In terms of shipping the saving represented 44,000 measurement tons.[105] In addition to using more cargo space, drumming of petroleum products had the disadvantage of requiring the services of many more men than did the system of bulk storage and transportation.

The high priorities assigned to petroleum products normally meant that drums could be shipped promptly from Australia to advance bases. Occasionally, cargo space was indeed available in more than necessary quantities. Yet at times there were not enough vessels even for Class III supplies. In September and October 1943, for example, about 80,000 filled drums were tied up at Sydney alone. So badly crowded was the base section there that it temporarily suspended drum-filling activities. This emergency, according to the Chief Quartermaster, originated in the "congestion at unloading ports and the accumulation of vessels both at Advance Base ports and at Townsville," where they awaited naval convoy.[106] In order to save shipping and facilitate a more even distribution of oil supplies in future exigencies, the QMC recommended that units entering advance areas no longer take along the standard 60-day supply but only a 15-day supply if they were going to points with bulk storage and only a 30-day supply if going to points using drummed products. This suggestion led late in 1943 to the adoption of the principle that only troops bound for regions without established bases would be accompanied by Class III items; the exact amount would be determined by the special conditions surrounding each movement.[107]

Proper supply of petroleum products hinged more on the availability of 55-gallon drums than of cargo space. Unfortunately, these containers were in poor supply on account of the inadequate equipment for repairing them, the belated inauguration of large-scale shipments from the West Coast, and the small amount of Australian production. The shortage was intensified by the loss of 20 to 30 percent through rough handling and failure to replace bungs—a particularly serious omission, for it permitted the entrance of dirt and water, which rusted containers and rendered fuel unusable. Even if drums exposed to the weather were not rusted, thorough cleaning with special equipment was necessary before they could be safely used. Nevertheless this indispensable task was often neglected. As a conse-

[103] (1) QM SWPA Hist, VI, 45–49; VII, 74–84. (2) Rpt cited n. 100.

[104] Ltr, QM ADSEC to CQM, 23 Oct 43, sub: Bulk Storage at Base B. ORB AFWESPAC QM 463.7.

[105] Memo, CQM for G–4, 4 Sep 44, sub: Class III Sup Levels. ORB AFWESPAC QM 463.7.

[106] Memo, CQM for G–4 USASOS, 28 Oct 43, sub: Class III Sups at Advance Bases. ORB AFWESPAC QM 463.7.

[107] QM SWPA Hist, IV, 50.

quence many old containers were in unsatisfactory condition. At Lae early in 1945 Quartermaster inspectors found that most of the 21,000 drums held enough sediment, water, and other injurious substances to preclude issue to combat units.[108]

Because of these circumstances drums at times became so hard to obtain that prescribed replacement levels could not be maintained in advance areas. In August 1943 these areas needed more than 330,000 containers yet could obtain only 164,000, leaving a deficit of 166,000. By December the shortage had increased to 240,000. Building of more storage tanks would have reduced such deficiencies but not wholly eliminated them, for a growing proportion of available gasoline and oil had to be drummed and kept as a reserve stock for new bases and tactical organizations lacking bulk equipment.[109]

Not only were containers in tropical regions scarce but they had the further disadvantage of hastening the deterioration of stored gasoline, particularly high octane motor fuel, which was extremely susceptible to the formation of gum deposits. For this reason rotation of stocks was strictly enjoined in order to insure the issue of usable supplies. Some stocks nonetheless became too old for safe utilization, and in May 1944 USAFFE directed that stores six months old could not be issued until representative samples had been tested and found satisfactory.[110]

As petroleum needs rose late in 1943, the number of available drums, though still inadequate, also rose. At the same time cargo space was allotted on a more liberal scale. But the full benefits of these favorable developments could not be realized because of the lack of drum-filling plants. This deficiency indeed threatened to become a serious handicap to smooth supply. For some weeks it was impossible to fill all drums or utilize all assigned shipping space. Additional filling plants were hastily built at bulk terminals in Australia, and for the first time such plants were constructed in New Guinea. It was nearly a year, however, before these measures solved the drum-filling problem.[111]

The shortage of containers remained to the end a major difficulty despite constant efforts to increase their availability. Directives dealing with the care and inspection of drums were issued, yet heavy wastage continued. Other instructions stressed the speedy return of empty containers to filling points and, if necessary, repair points, but manpower shortages and more urgent tasks often prevented compliance. Attempts to increase the number of serviceable drums by reclamation of damaged containers were mostly nullified by want of adequate equipment.[112] The construction of additional drum-manufacturing plants in Australia produced better results but still not enough containers. In this contingency requisition-

[108] (1) Ltr, Maj Gen John A. Chapman ALF to CQM USASOS, 15 Aug 43, sub: Class III Stock Levels. ORB AFWESPAC QM 463.7. (2) Ltr, Col Cordiner to Col J. D. Jacobs, 11 Dec 43. (3) Memo, n. s., for the Records, 3 May 44, sub: POL Handling Policy. Both in ORB AFWESPAC QM 463.7. (4) Rpt, CG Base E, 8 Mar 45, sub: Hist Summary, Feb 45. ORB Base E AG Mil Hist File.

[109] Ltr cited n. 108(1).

[110] Ltr, CG USAFFE to CG Sixth Army, 24 Mar 44, sub: Rotation of Gasoline. ORB AFWESPAC QM 463.7.

[111] (1) Memo, CQM for G-4, 6 Dec 43, sub: Class III Sup in New Guinea. (2) Rpt, CQM, 3 Apr 44, sub: Activities of OCQM, 1 Jan–31Mar 44. Both in ORB AFWESPAC QM 314.7.

[112] (1) Ltr, CQM to QM ADSEC USASOS, 6 Nov 43, sub: Handling of Class III Sups. ORB AFWESPAC QM 314.7. (2) Memo, POL Office for POL Pers Base B, 29 Mar 44, sub: SOP. (3) Memo, same for Tank Wagon Drivers, 31 Mar 44, sub: Instructions. Both in ORB AFPAC G-4 463.7. (4) OCQM Tech Memo 10, 28 Feb 45, sub: Class III Sups.

ing on the San Francisco Port of Embarkation was plainly advisable, but the policy of exhausting local resources before tapping those of the zone of interior led to postponement of this action until the close of 1943, when 250,000 drums were ordered.[113]

Of the two principal types of 55-gallon drums—14-gauge, galvanized heavy drums and light ungalvanized drums—the heavy drums were much better. If these containers received good care, they withstood many trips and an indefinite number of refillings. Even in exceptionally rugged country they went through about fifteen trips before needing repairs. Light drums, on the other hand, could not endure much rough handling. They were particularly unsuitable in forward areas where most of them required general repair after three or four trips.[114]

Despite the scarcity and other disadvantages of 55-gallon containers, they served a greater variety of purposes in the Pacific than anywhere else. In most overseas theaters they were used simply for storage at bases, but below the equator they were also used for the much different task of supplying gasoline to motor vehicles in the field. Such employment of drums was contrary to U.S. Army policy, which prescribed 5-gallon cans for this operation. It was a practice that constantly surprised men from the European Theater of Operations, where 5-gallon cans were looked upon as the most desirable means of fueling vehicles in combat zones. This departure from ordinary procedure stemmed mainly from the lack of bulk transportation facilities. In the Pacific there were no long pipelines and no railroad tank cars, such as were used in France to bring gasoline close to the front, where it was placed in storage tanks and decanted into 5-gallon cans for issue to consumers. Service troops found that 55-gallon drums afforded the most practicable means of transporting fuels in forward areas and often in advance areas. This practice was particularly widespread in the opening months of hostilities when practically all petroleum products were received in drums. The extreme scarcity of men who could be spared for decanting fuels into 5-gallon cans at this time was still another reason why it proved expedient to use the large containers under the same conditions in which the ETO utilized the smaller ones. Comparatively unfamiliar with the handling of cans, most quartermasters came to prefer drums to cans on the ground that they quickened handling and refueling operations.[115]

Another reason for extensive use of the larger containers was the difficulty of procuring 5-gallon cans locally. Delivery of 300,000 cans from Australian sources was expected by 1 October 1942, but few were received on that date. Gasoline supply companies in consequence often had no containers other than 55-gallon drums and of necessity adjusted their activities to these receptacles, which they equipped with hand- or motor-operated pumps. But a special effort was made to provide vehicles outside Australia with at least eight filled 5-gallon cans as an emergency reserve. Continued employment of drums as the standard unit of supply became unavoidable when USASOS headquarters late in 1943 decided not to

[113] (1) Rpt, Col Cordiner, 2 May 43, sub: Trip to New Guinea. ORB AFWESPAC QM 463.7. (2) Ltr cited n. 101(1). (3) Ltr, QM Base B to CQM, 28 Oct 43, sub: Svc Station Tankage. ORB AFWESPAC QM 633.

[114] Rpt, n. s., 23 Feb 44, sub: 55-Gal Survey. ORB AFWESPAC QM 463.7.

[115] USAFFE Bd Rpt 197, 2 Feb 45, sub: QM Questionnaire.

order from the United States the machine tools needed to increase Australian can production—a decision based upon the already established preference for drums and the vital need of conserving local tin resources for the canning of food.[116]

The problem of handling bulky 55-gallon drums was solved in various ways. If winches and fork-lift trucks were available, they were used to load the containers on cargo trucks; if they were not available, drums were manually rolled onto trucks with the help of planks. Pipes, attached to the drums, drew fuel into vehicular tanks and, when necessary, into 5-gallon containers. When used for the latter purpose, each pipe was fitted with several nozzles to facilitate simultaneous fillings of more than one can.[117]

Early in 1945 the I Corps asked many infantry officers whether they desired the general substitution of 5-gallon cans for 55-gallon drums. All these officers, the corps reported, said no, arguing that drums were much the better containers. On a 2½-ton truck with a 1-ton trailer cans could carry only 875 gallons whereas drums could carry 1,375 gallons, or 500 gallons more, thus materially reducing the number of trucks needed in transporting gasoline. Drums also made possible comparable savings in labor, for eleven times as many small as large containers were required to load, unload, and store the 11,000 gallons daily issued to an infantry division. Use of these containers, it was claimed, cut the time for loading trucks by as much as 90 percent. Vehicular tanks, the I Corps also reported, were filled faster from drums equipped with hand-operated or motor-driven pumps than from cans to which a nozzle tube was attached to avoid an excessive and dangerous waste of gasoline. Filling the tank of a 2½-ton truck from cans took, according to the I Corps, about thirty minutes. When a drum equipped with a hand pump was used, only five minutes were necessary. The corps further pointed out that the cleaning and care of cans consumed much more time than did that of drums. Tops, for example, had to be screwed tightly on eleven times as many small as large containers in order to prevent water from mixing with gasoline.[118]

Because of the advantages claimed for 55-gallon drums they remained the standard containers for unit supply until hostilities ended. On Okinawa gasoline supply companies indeed "had considerable difficulty in getting units to take motor gasoline" in the 5-gallon cans included in assault shipping to meet unexpected emergencies. "Only by forcing" their issue "could stocks be reduced." [119] Except during the first few days, there was, actually, no demand for small containers. This fact was attested by the turning in of 35,000 cans at one salvage dump and 20,000 at another.

Supply in the South and Central Pacific

The distribution of petroleum products in the South Pacific did not differ essentially from that in MacArthur's command. In New Zealand, as in Australia, local sources supplied American troops. Army forces else-

[116] (1) USAFIA Memo 124, 18 Jun 42, sub: 4-Gal. Cans. (2) QM SWPA Hist, I, 45. (3) Rpt, n. s., 25 Oct 44, sub: QM Class III Monthly Rpt. ORB AFPAC G-4 457.

[117] (1) Transmittal Sheet, R&D Br to Opns Br Mil Plng Div OQMG, 16 Oct 44, sub: Capt Orr's Rpt 19, 10 Aug 44. OQMG SWPA 319.25. (2) Ltr, 1st Lt Russell J. Terpenny, OQMG Obsr, to OQMG, 8 Aug 45, sub: T/O&E's. OQMG POA 400.34.

[118] Ltr, CG I Corps to CG Sixth Army, 28 Mar 45, sub: 5-Gal. Cans. ORB Sixth Army AG 463.

[119] Rpt cited n. 88.

where depended upon products shipped in by the U.S. Navy for the use of all armed services. At the island bases the QMC performed much the same functions as it did in New Guinea, receiving the products from tankers or supply depots and issuing them to consumers. The most notable difference was the responsibility of the Corps for supplying not only Army troops but also shore-based Marine and Navy units and New Zealand ground forces. At each base petroleum products were pooled for the benefit of everyone. For this purpose Marine as well as Army storage depots were utilized.[120]

The Navy seldom had enough tankers or freighters for the delivery of all necessary petroleum, but the chief handicap to effective supply proved to be the shortage of discharge facilities. Throughout 1943 there were still too few storage tanks ashore to receive all the bulk gasoline delivered by water, and as in the Southwest Pacific, this deficiency was met by large movements of drummed fuels. But this expedient, too, ran into difficulties. On Guadalcanal even the means of unloading drums promptly were still lacking in October, and at Nouméa 2,500,000 gallons of packaged gasoline were being held in the harbor until the jam at Guadalcanal broke. Not until early in the following year did deliveries become easier.[121]

At that time a drumming plant, with a monthly capacity of 4,000,000 gallons, was built at Espíritu Santo to supply forward areas. By working three shifts a day, this installation made possible substantial savings in both delivery time and cargo space. In general, however, drum-handling capacity remained rather limited. The Guadalcanal base could unload only 1,000 drums a day and Green Island only 800. Yet the South Pacific Area, like MacArthur's command and for much the same reasons, never experienced a truly serious shortage.

In the Central Pacific the petroleum supply situation was similar to that in its sister area to the south. Perhaps the most noteworthy difference was the continued dependence of the Army in Hawaii upon local commercial firms, which distributed gasoline to military storage tanks in the Honolulu region. Elsewhere the Navy carried out this task.

Quartermaster Units in Class III Supply

Everywhere overseas, three types of Quartermaster units were concerned largely or wholly with Class III distribution. Gasoline supply companies, trained in the zone of interior as units for filling cans and for long distance transport, were intended to receive fuels from bulk facilities maintained by the Engineers, put gasoline into 5-gallon cans, transport them to distribution points, and exchange filled for empty cans. Truck companies provided transportation from distribution points to forward areas where troops assigned to operational forces picked up the supplies. Finally, salvage repair companies reclaimed damaged or deteriorated containers.[122]

Gasoline supply companies, by far the most important of the three types of units, performed duties quite different from those prescribed in their tables of organization. In the absence of roads and of a regular incoming flow of gasoline and oil, storage

[120] COMSOPAC to CG SPA, 2328 of 6 Jul 43, sub: Sup of POL SPA. OQMG POA 319.25.

[121] Memo, Dep Dir Control Div ASF for TQMG, 13 Oct 43, sub: Rpt of CG ASF on SPA. OQMG POA 319.25.

[122] Ltr, Actg Dir of Plans and Opns ASF to CINCSWPA, 15 Aug 44, sub: Class III Sup. ORB AFPAC G–4 322 (Drums).

became an activity of tremendous significance, and these companies usually operated as depot agencies rather than as carriers and distributors.[123] The 834th Quartermaster Gasoline Supply Company, stationed at Hollandia from December 1944 to the end of hostilities, reported that its actual operations differed so widely from those for which it had been prepared that much of its training proved valueless. It stored as many as 200,000 drums of gasoline, oils, and greases at one time and supplied both local issues on the base and shipments to forward areas. Yet the "company had no training whatsoever" in the receipt, loading, unloading, drumming, storage, and inventory of shipments.[124] Men had to be trained for all these tasks, and a special stock record section, composed of checkers and record clerks, set up. Not all the work of the company was completely unrelated to its training. It transported gasoline and oils to outlying filling stations by 2,000-gallon tank trucks and hauled gasoline by tanker to points 20 miles from the bulk distribution center. During a 9-month period the company filled 75,000 drums at a specially built plant.

In early combat operations one or two gasoline supply platoons were attached to each task force; later, one or two companies were used. Even in tactical operations the units served more as depot than transporting agencies, usually stocking a 30-day supply for ground forces. Hauls from beaches or docks were generally short, and trailers, gasoline dispensers, and 5-gallon cans were in consequence seldom used. Not until they reached Luzon, with its fairly good road net, could gasoline supply companies be employed in their originally designated capacity of long-distance haulers.[125] In practically all campaigns the companies served chiefly as operators of Class III dumps, of which two were normally maintained—one for routine distribution and another for reserve stocks. The units also issued gasoline at filling points and in 55-gallon drums, supplied all other kinds of fuels and lubricants, and often helped the Engineers operate bulk installations. In short, nearly all the major Quartermaster Class III operations were centralized in the gasoline supply companies.

During 1944 a novel Quartermaster unit, the petroleum products laboratory, appeared in the Southwest Pacific. Staffed by about three officers and fifteen enlisted men, it conducted its main operations at a semipermanent base laboratory but carried a three-ton chemical trailer, which served, when necessary, as a mobile laboratory on beachheads or at supply points.[126] Before the war ended, units of this kind had been employed by the Southwest Pacific Area at several bases and in the Philippine offensives and by mid-Pacific combat forces on Okinawa. The laboratories had been created by the War Department to insure that only products of the proper quality were issued. Such units were especially needed in the Pacific. Drummed Class III supplies repeatedly arrived with identifying marks obliterated, making it impossible to know the age of the product or its octane number. Fuels and lubricants, long in storage, might contain water, rust, or gum that rendered them unserviceable. Products captured from the Japanese might have been deliberately contaminated before abandonment. Only

[123] Rpt, Col Charles R. Lehner, Sixth Army QM, 13 June 44, sub: QM Questionnaire for AGF Obsrs.

[124] Ltr, CO 834th QM Gasoline Sup Co to QM Base G, 24 Sep 54, sub: T/O for Gasoline Sup Co. ORB AFWESPAC Base G 322.3 (Unit Orgn).

[125] USAFFE Bd Rpt 197, 2 Feb 45, sub: QM Questionnaire.

[126] T/O&E 10-547, 25 May 43, sub: QM Petroleum Products Laboratory.

laboratory tests could resolve the doubts raised by these possibilities.

At bases petroleum products laboratories inspected samples of all shipments brought in by tanker, checked the accuracy of markings on incoming containers, and periodically examined stored items for signs of deterioration and departures from sound storage practices. The laboratories even examined containers at filling stations. Captured supplies were inspected not only for contamination but also for evidence of geographical origin. Insofar as their equipment permitted, mobile laboratories operated in much the same manner as base laboratories, but their more limited resources occasionally forced them to seek help from the bases in determining octane numbers.[127]

Some of the problems discussed in this chapter would have caused less trouble if they had been better understood at the outset of hostilities. The shortage of spare parts could almost certainly have been remedied had the Corps realized sooner how scarce they would become. If parts had been procured more aggressively in the zone of interior in 1942 and if at the same time storage of these articles had been centralized in fewer installations both in the United States and overseas, much of the trouble later encountered might have been averted. Heavy losses of supplies, too, might have been materially reduced had the principles of tropical storage been more generally disseminated and had stocks been more closely guarded in order to diminish pilferage. If more and better tropicproofing had been applied to textile and leather goods, they would have deteriorated less rapidly, but Pacific quartermasters knew little of this method of preservation and the method itself was not fully developed. Whether sized articles could have been furnished in proportions more accurately reflecting troops' needs is doubtful. Because of their diverse national origins, U.S. troops represented nearly all the world's peoples, and no country-wide table of sizes was likely to mirror very exactly those actually required in any one unit. The main reliance should have been put, not on country-wide, but on organization, tables. Yet even had such a shift been made, many organizations could not have compiled size tariffs in time for their special needs to be reflected in purchases in the United States. Nor would this shift have settled the distribution problems that often forced the issue of ill-fitting clothing.

Most of the more complicated supply problems dealt with in this chapter could not be easily solved. Some of those posed by recurrent shortages in forward areas were indeed so difficult that it is hard to see how the QMC could have done much more than it did to alleviate them. The roots of these problems mostly lay in causes that transcended the capacity of a single technical service to produce a solution. They were found in the world-wide character of the conflict that made it impossible for even so highly industrialized a country as the United States to furnish everywhere enough distribution facilities; in the concentration of military preparations in pre-Pearl Harbor days on the requirements of a war against Germany, with the result that full comprehension of the logistical needs of a Pacific war was achieved only belatedly; in the early decision to assign troops fighting Germany a higher supply priority than those

[127] AFWESPAC OCQM Tech Memo 28, 9 Jul 45, sub: SOP for QM Petroleum Products Laboratories.

fighting Japan; in the extraordinary physical conditions under which the Pacific war was waged; and in the tendency, inevitable when tactical operations were carried out on a "shoestring," to cut the number of service troops and facilities to a minimum. General circumstances, much more than the shortcomings of any military element, explain most of the supply shortages.

It is a noteworthy fact that the items quartermasters had the most trouble in distributing promptly were those which bore little or no direct relationship to combat activities and which in consequence received low handling and delivery priorities. Items recognized as vital to the successful outcome of a tactical operation offered much less difficulty. A notable illustration of this is the comparative ease with which the QMC furnished petroleum products. While the higher echelons responsible for determining priorities and providing personnel tended to neglect clothing, general supplies, and at times even food, they exerted every effort to smooth the flow of petroleum products. Chiefly for that reason, these products were usually supplied in adequate quantities. If all articles handled by quartermasters had been similarly favored, the Corps would have had fewer shortages to contend with.

CHAPTER IX

Morale-Building Services

Besides procuring, storing, and distributing supplies and equipment, the QMC also performed other services that were important to the combat forces it supported. It baked bread, fumigated and laundered clothing, provided baths, assembled, classified, and repaired worn-out and discarded items, and performed all duties connected with the care of the dead except one, collection of bodies on the battlefield. Of these services only two—baking bread and repairing salvaged items—had supply connotations.[1] The others were significant chiefly because they promoted sound morale and good health. Care of the dead had in addition a sentimental value, for it represented a determined effort even under battle conditions to carry out time-honored funerary customs.

In the peacetime Regular Army the Quartermaster services were mainly furnished under contract by commercial bakers, launderers, repairers, and morticians. But in wartime, civilian contractors were beyond the reach of combat forces, and Quartermaster companies were formed to supply these services. In December 1941 the creation of these units had just started, and for more than a year few were ready for overseas use. The first fully trained units went to North Africa. For more than two years the War Department sent scarcely any bakery, laundry, bath, salvage, or graves registration companies to the Pacific. If field forces operating there obtained these services during this period, it was only through improvisation. When appropriate units did arrive, they were too few in number. They had been set up in expectation of utilizing large numbers of civilian helpers, but since there was an almost complete lack of suitable workers outside the British dominions and the Philippines, they could not operate in the contemplated manner.

Equipment not always well adapted to Pacific conditions proved another hampering factor. With the exception of bakery and graves registration outfits, these services depended mostly on large, heavy equipment carried in trailer-vans. This equipment was often so cumbersome that it could not be transported over difficult terrain and of necessity remained in one place, regardless of the location of the troops it was meant to support. Much of this equipment, moreover, could not be adapted for use by operating units that were necessarily small because of the wide dispersion of troops and because of the tactical exigencies of jungle and island-hopping warfare. In amphibious fighting, when assault forces of varying sizes sometimes landed on separate beaches and fought more or less independently of each other, inability to break up equipment for operation at several points was particularly embarrassing. For all these reasons

[1] WD Conf on Theater Adm, 7–12 Feb 44, sub: QM Functions in TOPNS. Hist Br OQMG.

units employing heavy trailer-carried machines could seldom function with maximum efficiency even when they were located not far from the battle area. The practice of keeping that area as free as possible of noncombat elements naturally forbade the operation of service units there. If activities pertinent to a service had to be conducted in the battle zone, they were delegated to infantrymen who were assigned such tasks as the collection and the transportation of abandoned articles and human remains to assembly points where salvage and graves registration detachments picked them up.

Bakery Operations

Of the special Quartermaster services none was more useful than provision of fresh bread. Fresh bread, many field commanders maintained, was the most important component of the ration. It represented about 10 percent of the food consumed by U.S. troops and was the only major element of the ration normally served three times every day. Soldiers probably resented its absence from a meal more than that of any other food. But the frequent servings expected by them required processing in the field, something not necessary for other ration components, which came already prepared for cooking or heating in mess kitchens. Processing, in turn, demanded a specialized organization and elaborate equipment. Bakery companies met both these needs. One company was capable, mechanically, of supplying about 40,000 troops at a daily rate of 8 ounces per man. It employed sixteen dough-mixing machines and thirty-two gasoline-burning ovens, called M1942 field bake ovens, which represented a vast improvement over the wood-burning type of 1917. The 1942 version was a readily portable model that permitted a company to be broken up into sixteen sections. Each section had two ovens, and each operated independently of the others. This flexibility, so much greater than in most other service units, was perhaps the outstanding feature of the bakery company.[2]

Disadvantages as well as advantages were involved in the use of the M1942 ovens. They were hard to clean and keep in repair. They broke down repeatedly because of lack of spare parts, and, like other pieces of baking equipment, were difficult to ship.[3] Before an island jump was made, a company had to stop production, crate its thirty-two ovens, sixteen dough-mixers, and other utensils for forward movement, and obtain thirty-six 2½-ton trucks or their equivalent for transporting this cargo to the docks. Sometimes low shipping and landing priorities delayed its departure. On arriving at the combat area bakers had to locate, unpack, and reassemble the equipment and once more obtain trucks and set up an operating center. During this whole period, lasting for weeks, no bakery bread was produced. If combat units wanted bread, they had to bake it themselves.[4]

Quartermasters in the European theater, where British mobile baking equipment rather than M1942 ovens was generally used, contended—probably correctly—that

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[2] (1) Mil Tng Div OQMG, QM Handbook, Bakery Co, Mar 43. (2) Rpt of Food Conf Conducted by OQMG, 1–30 Apr 46, II, Exhibits A, B, and C. OQMG 337.

[3] (1) Exhibit D, pp. 16–17, of Rpt cited n. 2(2). (2) Ltr, QM to CG 41st Div, 17 Jun 43, sub: Field Range Parts. ORB AFWESPAC QM 400.312 (Rqmts). (3) Rpt, Capt Orr, 25 May 44, sub: Rpt 3 (LETTERPRESS), pp. 28–32. OQMG SWPA 319.25.

[4] Rpt, Lt Col John MacManus, Jul 45, sub: Bread and Related Opns in PTO. Gen. Robert M. Littlejohn Collection, Ft Lee, Va.

employment of the British unit would shorten such costly interruptions. This unit was a heavy, self-contained, machine-operated bakery, with three 2-deck ovens, capable of a maximum output of 30,000 pounds a day. It required no crating for shipment, was moved easily by trailer, and was loaded and discharged quickly. Its operation took fewer men and less gasoline than did that of the M1942 oven.[5] Though it could be shipped in less time than the U.S. oven, it could not be broken down for operation by independent sections. To Pacific quartermasters this was an overriding objection. While conceding that British-equipped bakeries were probably superior for use with mass armies fighting in continental areas, they maintained that only American-equipped bakeries could furnish the large number of small sections essential in island warfare.[6]

Until mid-1943 there were no bakery companies whatever in the South and Southwest Pacific. In Australia their absence did not deprive soldiers of bread, for adequate quantities were obtained from commercial bakeries under reverse lend-lease contracts or from civilian bakeries used as Quartermaster establishments.[7] In areas to the north the situation was far different. The provision of bread there became chiefly a responsibility of the regular mess cooks who, though they lacked standard baking equipment, used field ranges to turn out at least limited quantities of a reasonably palatable product. Advance areas, particularly those of the Fifth Air Force, occasionally received bread flown in from rear bases.[8] When bakery companies did begin to arrive, the problem of providing bread was appreciably alleviated, but it was still impossible to supply the prescribed quantities in advance and forward areas. A few companies, which came without equipment, were obliged to delay the start of their operations or resort to time-consuming and inefficient improvisations.[9]

There were in addition other hampering factors. The low gluten content of Australian flour and particularly the severe shortage of milk, yeast, and baking powder in New Guinea made it difficult to produce loaves of the proper size and flavor. In July 1944 the Sixth Army reported that scarcity of yeast and baking powder had reduced its average bread issue to five ounces per man per day in contrast to the prescribed eight ounces. While inadequate issues caused by these shortages were not entirely typical, they occurred rather often, especially in advance areas.[10] Tropical conditions also diminished production. In hot, humid weather yeast was overly active and, if not cooled, swiftly deteriorated; with refrigerators almost unobtainable, losses reached substantial figures. Proper storage for flour was likewise seldom available, and at times half

[5] (1) Bakery Sec, OCQM SOS ETO, A Mobile Field Bakery, British Equip, 1943, p. 1. DRB AGO Adm 276 (QM Subs). (2) Pp. 14–16 of Conf cited n. 2(2).

[6] (1) Rpt, Capt Orr, 10 Apr 44, sub: Rpt 2 (LETTERPRESS). OQMG SWPA 319.25. (2) Ltr, CG USASOS to TQMG, 8 May 45, sub: Redeployment of Bakery Cos. (3) Ltr, TQMG to CG POA, 17 Apr 45, same sub. Both in ORB AFPAC QM 321 (QMC).

[7] (1) Memo, QM Base Sec 3 for Base Svc Comd, 13 Nov 43, sub: U.S. Army Bakery. (2) Rpt, Base Sec 3, n. d., sub: Major QM Activities, 22 Dec 41–31 Mar 44, p. 9. ORB ABCOM AG 314.7.

[8] Ltr, Deputy AF Com to CG ADSEC USASOS, 20 Sep 43, sub: Bakeries for Advance Areas. ORB AFWESPAC QM 433.

[9] See above, pp. 149–50.

[10] (1) Ltr, Base Surgeon to CO Base Sec 3, 29 Nov 43, sub: Bakeries. ORB AFWESPAC QM 633. (2) Ltr, CG Sixth Army to CO Base F, 31 Jul 44, sub: Yeast and Baking Powder. ORB Sixth Army AG 433.

or more of this indispensable ingredient spoiled.[11]

Still another hindrance to full production was the absence of an abundant supply of pure water. Many streams were contaminated, and there was no piped water, such as forces operating in thickly populated countries found almost everywhere. Cans were at first virtually the only water-carrying equipment authorized by the War Department, but they were too small to provide a satisfactory method of delivery. Late in the war large collapsible tanks and a 250-gallon trailer were added to company equipment, but some observers thought that three more trailers were needed in order to give one to each platoon.[12]

Operational plans usually assigned bakeries higher shipping and landing priorities than they gave to laundry, bath, and salvage companies. They also tried to provide an adequate number of bakeries but the constant shortage of appropriate units generally prevented this. Nevertheless combat forces on the whole fared rather well. In the fighting on New Guinea bakeries were at work within a few days after the initial assaults had been launched. On Leyte the first one arrived on A plus 4, but it had no baking equipment and was obliged to use the most readily obtainable substitutes, old 1917 wood-burning ovens, ordinarily considered archaic. Wood for these ovens was hard to secure, not because timber was scarce but because the extra men required to cut and haul it could not be spared from other duties. Despite this problem and roads so poor as to be at times completely impassable, hospital patients and combat soldiers were each provided with 7 ounces of fresh bread daily and other troops with 5.6 ounces. Elsewhere, chiefly because of late landings, operational experience was occasionally less favorable. In Mindanao no bakery bread was issued for more than a month. Most troops on Okinawa waited for six to ten weeks before they received any. As late as L plus 45 the daily issue even to combat soldiers and to the ill and wounded averaged only about 4.8 ounces a day; not until L plus 100 did all troops receive the standard quantity.[13]

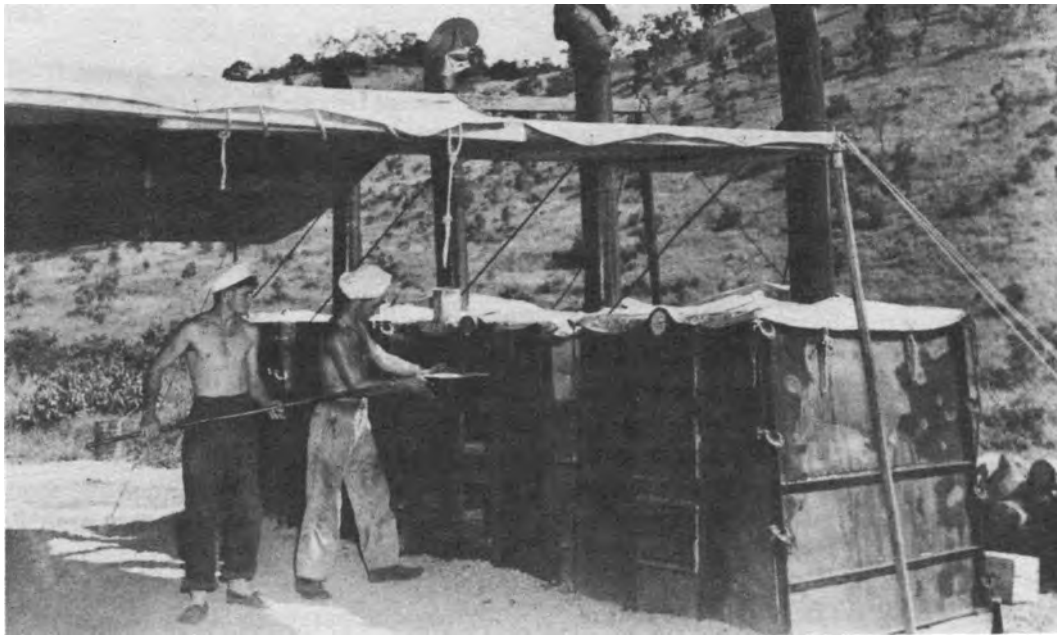
When comparatively large issues were made, whether in combat areas or at rear bases, the explanation was usually the continuous operation of all available equipment. Hard-pressed bakeries did not confine their activities to the eight to sixteen-hour daily range normally found outside the Pacific but made bread twenty-four hours a day.[14] Constant operation was almost customary in the Southwest Pacific where a unit often supplied double the number of men it was supposed to. At Biak seven bakery sections, set up to care for 17,500 men, landed on D plus one and immediately began round-the-clock operations. Four months later, they had lost only four days' production—one day for welding equipment pep-

[11] (1) Anon., "Flour + Water + Ingenuity = GI Bread," *QMTSJ*, III (24 December 1943), 5. (2) Anon., "Chow Talk," *Infantry Journal*, LVI (April 1945), 53.

[12] (1) Rpt, Sixth Army QM, 13 Jun 44, sub: QM Questionnaire, 30 Mar 44. ORB AFPAC Pacific Warfare Bd File. (2) Rpt, Capt H. F. Stewart, 30 Nov 44, sub: QM Obsvr's Rpt 2 to USAFFE Bd. (3) Rpt, 1st Lt Russell J. Terpenny, 25 Sep 45, sub: Review of T/O&E's. Both in OQMG POA 400.34 (T/O&E's).

[13] (1) Ltr 30, Capt Orr to Col Doriot, 26 Oct 44. OQMG SWPA 319.25. (2) USAFFE Bd Draft Rpt, 19 Jan 45, sub: Answers to QM Questionnaire. ORB AFPAC AG 333.1. (3) Rpt, AA Rep USAFFE Bd, 18 Jan 45, sub: QM Questionnaire. ORB AFPAC Pac Warfare Bd File. (4) Rpt 4 (Okinawa series), Capt Orr, 15 Jul 45, sub: QM Opns on Okinawa. OQMG POA 319.25. (5) Island Comd Rpt Actn Rpt Okinawa, 8-XV-16.

[14] Pacific Warfare Bd Rpt 34, 17 Aug 45, sub: QM Questionnaire. ORB Pacific Warfare Bd File.



FIELD BAKERIES IN OPERATION *at Port Moresby (above) and at Milne Bay (below).*



pered with Japanese shot and three days because they had no flour. At that time 56,000 troops, or more than three times rated capacity, were being supplied.[15] Almost equally remarkable records were achieved at rear bases. In July 1944, for instance, baking was being done at Finschhafen for 94,000 soldiers by a unit supposed to supply only 40,000.[16]

Overtime work did not in itself provide an adequate supply. If enough equipment was not available, units had to improvise substitutes to prevent a complete halt of production. Even lack of ovens did not necessarily mean that bakers did not bake. This fact is illustrated by three detachments, each of fifteen men, which were sent to the New Hebrides to supply 16,000 troops but found that they had no ovens or dough mixers and few other utensils. They employed scrap lumber to fashion mixers and clean clothing to proof loaves. They scoured the islands for ovens and finally located several old Dutch ones imported at some long-forgotten date. Since there were too few of these valuable finds to fill all demands, they devised substitutes from 55-gallon oil drums, an expedient occasionally used elsewhere. The front of a drum was cut out and a steel plate welded into it as a shelf on which bread could be baked. In the absence of pans the dough was put directly on the plate. The stopgap ovens each held about eight 2-pound loaves. They burned out in two or three weeks, but new ones were speedily made.[17]

Bakers were almost equally proficient in the improvisation of substitutes for scarce ingredients. On Kiriwina Island, off northeastern New Guinea, they used fermented coconut milk in place of yeast. When there was not enough flour at the Guadalcanal base, they used either 60 pounds of raisins to 100 pounds of flour or half flour and half wheat cereal. Under similar conditions cooks of the 41st Division found ground up hard biscuits suitable. At Saidor and elsewhere in New Guinea bakers, lacking water, drilled wells.[18]

By ingenuity and almost constant utilization of available ovens, then, bread was provided. It is difficult to see how a greater production could have been obtained from such limited resources. Under conditions like those in the Pacific the only way to increase the supply quickly would probably have been through the issue to field forces of bread baked and canned by commercial contractors in the United States. After the war there were, indeed, some who favored this idea. They argued that the canning of bread was, obviously, the modern way to supply that product. It would, they contended, save manpower and shipping space and insure a smooth flow of supply at less cost. The Army would have to give up baking just as the American family had. But opponents of the plan maintained that there was no substitute for freshly baked bread as a builder of morale. The canned variety, they pointed out, became moldy and was inferior in taste and flavor and so less acceptable to soldiers. Moreover, there would actually be no saving in shipping space, for, excluding water, unbaked bread ingredients occupied considerably less space than they did when baked and enlarged by fer-

[15] Ltr cited n. 13(1).

[16] (1) *Ibid.* (2) Min of Conf of Gen and Sp Staff Secs Hq USASOS, 4 Jul 44, p. 8.

[17] Anon., "Flour+Water+Ingenuity=GI Bread," *QMTSJ*, III (24 December 1943), 3–5.

[18] (1) Anon., "Baker—Guadalcanal," *QMTSJ*, V (1 September 1944), 5. (2) Anon., "Island Hopping Bakers Supply Sixth Army," *QMTSJ*, VIII (3 August 1945), 18.

mentation and by the addition of air and water.[19] In the end it was determined to make no basic change in the system of supplying bread in the field. The best solution to the problem of inadequate issues seemed to be more and better baking equipment—equipment that would be made available more promptly than it had been in World War II.

Laundry Service

Laundry units, which carried and operated their essential equipment, such as washers, tumblers, and water heaters, on heavy trailers, supposedly furnished the services required by hospitals and by individuals in the field. In the Pacific they actually did this for hospitals, which had priority, but there were too few of them to do much work for individual soldiers. The number of pieces handled for troops, though greatly exceeding that handled for hospitals, nevertheless represented only a small percentage of the total number in need of cleaning. If the ordinary unit of two trailers worked sixteen hours a day, seven days a week, each trailer still served only 3,000 soldiers a week at the normal rate of about twenty-five pieces a man. In many places, moreover, no trailers were available. Even if they were, the difficulty of hauling them over rough terrain often prevented their location at sites that permitted maximum service. It is not strange therefore that in most parts of the Pacific laundries accepted individual wash only at the low weekly rate of six to eight pieces a man.[20]

Once a tactical organization had been alerted for combat activity, laundry service, like bakery service, ceased—frequently for six to eight weeks while laundrymen prepared for and made the trip and set up a new installation. Trailers ordinarily arrived some days after the initial assault had been delivered, but even then they could not be landed if trails had not been developed on shore. They were, in fact, immobilized until engineers had built a passable road to a point with sufficient water for cleaning purposes.[21] The extent to which some organizations lacked service is illustrated by the 37th Division, which participated in the campaigns for New Georgia, Bougainville, and Luzon. In July 1945 its quartermaster reported that during his three years overseas the division "had no laundry service at all in the field." It enjoyed, he added, "only one two months' period during which laundry facilities were available for about 10 out of 100 officers of Field Grade. Our blankets were laundered once in three years." [22]

While not many organizations fared as badly as did the 37th Division, infantry troops in general were obliged to devote much time to washing their own garments. In the Southwest Pacific between February and June 1945 it was estimated that such activity consumed about 3,000,000 man-hours a week. Had eighteen additional laundry companies been furnished, the same work could have been done in about 205,000 man-hours.[23] Whenever portable laundry machines were obtainable, they pro-

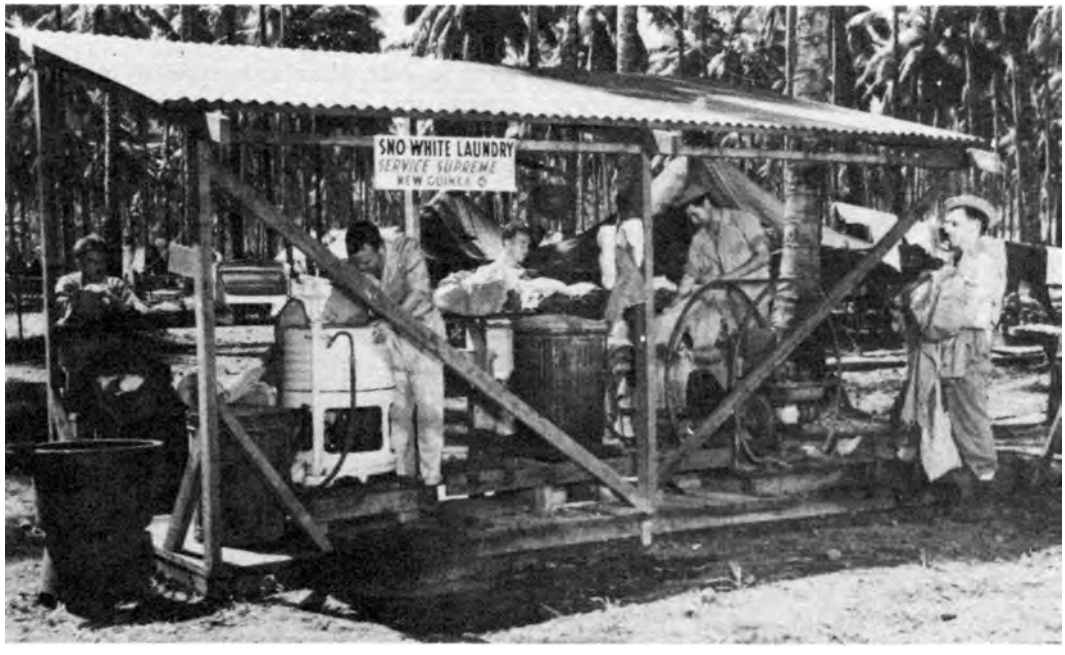
[19] Rpt of OQMG Food Conf, Subcom Rpt on Bakery Activities, pp. 12–13.

[20] (1) USASOS Regulations No. 30-21, 16 Sep 42, sub: QMC Svc Ldries. (2) USAFFE Bd Rpt No. 96, 2 Feb 45, sub: QM Mobile Ldry Equip. ORB AFPAC Pacific Warfare Bd File. (3) Ltr, Lt Col C. E. Richards to CG USAFMIDPAC, 6 Jul 45, sub: POA QM Opns. OQMG POA 319.25.

[21] (1) Ltr, Ldry Off to Base QM Sub-Base D, 4 Jun 43, sub: Mechanical Difficulties of Mobile Ldry Unit. ORB NUGSEC QM 414.4 (Laundries). (2) Ltr, 1st Lt Russell J. Terpenny, Obsvr, to Gen Doriot OQMG, 7 Aug 45. OQMG POA 319.25.

[22] Rpt, DQM 37th Div, 7 Jul 45, quoted in Rpt, Opns Br Mil Plng Div OQMG, 27 Aug 45, sub: QM Ldry Svc in Field. OQMG SWPA 414.4.

[23] QM SWPA Hist, VII, 92.



LAUNDRY FACILITIES IN THE SOUTHWEST PACIFIC *were a problem only partially solved by unit equipment (above) and Quartermaster laundry trailers (below).*



vided a reasonably satisfactory means of self-service, but in zones of active fighting they could not be widely utilized. A few organizations employed unit funds to buy household washing machines in the United States, and some ingenious soldiers even improvised washers out of oil drums by rigging jeep motors to revolve them. But most troops simply used soap and a scrub brush.[24]

Troops stationed at bases below the equator were not much better off than those in operational areas. Commercial laundries were available in the two British dominions, but even in these countries not all military requirements could be filled.[25] The New Guinea bases were much worse off. Here there were no laundry units at all until well into 1943. At the end of June 1944 the platoons of three recently arrived companies were divided between the bases and the Sixth Army, but their manpower and equipment were so inadequate that even at the bases, except for Milne Bay, they could do washing only for hospitals.[26] About this time seventeen laundry platoons, specially designed for hospital service, arrived. They provided welcome manpower but did not mitigate the shortage of equipment, for, being set up to employ washers regularly furnished with prefabricated hospitals made in the zone of interior, they brought no washers of their own. This was a serious oversight as Australian sources were unable to supply the missing equipment. Not until washers hastily requisitioned from the United States arrived late in the year did the hospital platoons prove of much value.

Large "fixed laundries," capable of caring for 5,000 troops at the peacetime rate of twenty-five garments a soldier, were rarely set up at SWPA island bases, for these bases were looked upon as merely temporary establishments. In all New Guinea the only sizable installation of this type was the one at Milne Bay. It turned out about 2,400 pounds of dry wash an hour, a production so substantial that in the first half of 1944 Milne Bay alone among New Guinea bases laundered clothing for individuals.[27]

At the outset the South Pacific, like New Guinea, had no laundry units. In early 1943 a few mobile types arrived, and toward the close of that year three fixed installations were built—a 10,000-man-capacity unit in New Caledonia and two 5,000-man-capacity units, one in the Fijis and another in Espíritu Santo.[28] In the Central Pacific, mobile laundries were employed almost entirely for hospitals. Five fixed installations, three of which had been built after Pearl Harbor, served individuals. Operating only one eight-hour shift a day, they could do laundering for about 50,000 troops.[29] Their labor force was drawn from local civilians who were paid at rates somewhat below the

[24] (1) Ltr, S Sgt Rudolph F. Gerisch to Chief Salvage and Reclamation Div OCQM USASOS, 28 Mar 43, sub: Portable Ldry. (2) Memo, Maj Stevens Manning for QM INTERSEC, 29 Apr 44, sub: Laundries Advanced Areas. Both in ORB NUGSEC QM 414.4.

[25] (1) Rpt, Capt R. P. Nelson, 23 Jan 43, sub: Inspection Trip to Brisbane and Townsville. ORB AFWESPAC QM 333.1. (2) Ltr, CG Base Sec 3 to CG USASOS, 1 May 44, sub: Ldry Svc. ORB NUGSEC QM 486.3. (3) Rpt, CQM USASOS, 5 May 44, sub: Inspection of Base Sec 3. ORB NUGSEC QM 331.5.

[26] QM SWPA Hist, V, 67.

[27] (1) Memo, OCQM for G–4 USASOS, 8 Dec 43, sub: Ldry Facilities Advanced Areas. ORB AFWESPAC QM 486.3. (2) Ltr, QM Base F to OCQM USASOS, 30 Jun 44. ORB AFWESPAC QM 400.93.

[28] (1) Rpt, QM SOS SPA, 28 Jul 44, sub: Ldry Activities in SPA. ORB USAFINC AG 331.5. (2) Ltr, CG SOS SPA to TQMG, 13 Aug 44, sub: Rpt of QM SOS SPA. OQMG POA 319.25.

[29] Rpt, Lt Col Joseph E. McMullen and Maj Philip H. Foote, 24 Sep 45, sub: QM Ldry Facilities in WPBC. OQMG SWPA 333.1.

wartime Hawaiian average for comparable work. Because of this discrepancy there was a heavy labor turnover, which caused a constant shortage of experienced operatives. "Special assignments," such as assistance in outfitting entire divisions, further delayed laundering for individuals. Usually, soldiers' wash was not returned for about two weeks. Most troops preferred commercial firms, which charged more than Quartermaster laundries, but which lost fewer articles and returned bundles sooner and in cleaner and more wearable condition. In December 1944 it was estimated that such firms did more than half the washing for troops in Honolulu.[30] A comparable situation existed in other localities where troops could find civilians to clean their clothing. In the liberated Philippines outside Manila in July 1945, when military laundries were still scarce, 90 percent of the soldiers had their soiled garments cleaned by Filipino women.[31]

Army service in general provoked criticism similar to that in Hawaii and the Philippines. Late in 1944 a survey of six Pacific Ocean Areas bases, which on the whole were better supplied with Quartermaster laundries than most parts of the Pacific, showed that, while these units served about 78 percent of the troops, there were many complaints about the inferior work. The most common objection was the frequent failure to return all pieces. Forty-five percent of the soldiers questioned declared that items were missing the last time their bundles were returned. Oahu had the highest proportion of men with this grievance, 65 percent, and Guadalcanal the lowest, 20 percent. Authors of the survey pointed out as a possible explanation of the relatively slight loss on Guadalcanal that this base did not employ the standard pin method of individual identification. Instead, six to eight men put their dirty clothes in a single bundle, which made one washer load; when the bundle was returned, each man picked out his own belongings. In general the pin method was not a suitable means of identification. The reason, the surveyors suggested, may have been that the shortage of manpower made it impossible to form a group of specialists with no duties other than the sorting and marking of clothing. They noted that men who performed these tasks usually also operated washers and dryers and had too little time to carry out any of their duties efficiently.[32] Seventy percent of the soldiers who were asked if some other kind of laundry had proved superior to Quartermaster service gave affirmative answers. They endorsed at least one of these alternatives—civilian or Navy establishments, washerwomen, or "myself." [33]

Though some of the criticism leveled at Quartermaster laundries reflected mainly the time-honored propensity of soldiers to find fault with their lot, there was ample justification for many of the complaints. After inspecting the Pacific bases in the spring of 1945, Quartermaster General Gregory declared that "the poorest job being done by the Quartermaster Corps" was its laundry service. Noting that troops "after a comparatively short period of fighting" particularly needed the boost given to

[30] (1) Rpt, Lt William B. Seininger OP&C Div OQMG, 9 Dec 44, sub: Trip to POA. OQMG POA 319.25. (2) Ltr, Capt H. W. Taylor to Gen Doriot OQMG, 21 Jul 45. OQMG MIDPAC 331.5.

[31] (1) Ltr cited n. 30(2). (2) Rpt, Lt Col C. E. Richards to CG USAFMIDPAC, 6 Jul 45, sub: POA QM Opns. OQMG POA 319.25.

[32] Rpt, Field Progress Br OP&C Div OQMG, Nov 44, sub: POA QM Opns. OQMG POA 319.25.

[33] *Ibid.*

morale by clean apparel, he urged the increased utilization of fixed laundries as a remedy.[34] During the following summer an installation of this type, able to care for 15,000 men, was completed at Saipan, but the poor water supply prevented its operation.[35] At this time several other isolated bases had authorized fixed laundries, but the higher priorities given to more urgent projects prevented the construction of these establishments.[36]

Even had a larger number of fixed laundries been built, they would have benefited chiefly only the troops at rear bases. Combat soldiers would have derived no advantage. As it was, individual service remained at the end of the war, as it had been at the outset, the most conspicuous weakness of the laundry service. In the South Pacific between 1 July 1943 and 30 June 1944, the longest period covered by adequate figures, only 66,000 troops were cared for even at the low rate of six pieces a week.[37] Statistics for the last eight months of hostilities in the Southwest Pacific reveal that in January 1945 some 775,000 pieces were washed every week for hospitals, which had about 38,000 beds, but only about 125,000 pieces for troops. This very low figure stemmed principally from the complete or partial stoppage of laundry activities in combat areas. Between February and May more units came into operation, and the number of pieces handled more than doubled to an average of 1,900,000 a week. Even then full service was supplied to only about 40,000 men, a bare 6 percent of the total number in the theater, and of these men few were combat soldiers.[38]

Progress toward better service for infantrymen was nevertheless being made as the war drew to a close. An OQMG observer wrote that at Okinawa "for the first time" in a Pacific offensive fairly satisfactory laundering was done for individuals. But even there minimum service could not be started until about L plus 50 when the first laundry unit arrived. It adopted the Guadalcanal system of having small groups turn in their soiled garments in a single bundle and so materially simplified its task. Shortly before fighting ceased, a second unit came into operation and made it possible to furnish a certain amount of service to 70 percent of the troops.[39]

Had the war in the Pacific lasted longer, the arrival of units from Europe would doubtless have led to vastly improved individual service. The fact that on the whole this service remained unsatisfactory until the very end suggests that the QMC may have made a mistake in giving the few available laundries cumbersome equipment that could not be transported readily and that required operatives with considerable skill and experience. Perhaps it should have given more thought to the large-scale issue, particularly to combat organizations, of an easily portable washer that any soldier could have operated. Such a machine would almost surely have produced better results

[34] Memo, TQMG for CG ASF, 14 Mar 45, sub: Tour of POA and SWPA. OQMG POA 319.25.

[35] Ltr, QM HUSAFMIDPAC to TQMG, 20 Jul 45, sub: Visit to Forward Areas. OQMG POA 319.25.

[36] Rpt cited n. 29.

[37] Rpt, QM SOS SPA, n. d., sub: Ldry Production FY 1944, Exhibits A, B, C, D, E. ORB USAFINC QM 414.4.

[38] QM SWPA Hist, VII, 92–94.

[39] (1) Rpt 4 (Okinawa series), Capt Orr, 15 Jul 45, sub: QM Opns on Okinawa. OQMG POA 319.25. (2) Island Comd Actn Rpt Okinawa, 8-XV-26.

than did the expedients actually employed in the field. Certainly, the frequent utilization of household washers implied that similar machines, better fitted to field conditions, might have been at least a partial solution.

Bath, Sterilization, and Fumigation Operations

In War Department theory, if not always in Army practice, bath, sterilization, and fumigation units worked in conjunction with nearby laundries, which washed and reissued clothes turned in for sterilization or fumigation. Their major function, again in War Department theory, was ceaseless war on head and body lice. Wherever these insects were prevalent, bath units were responsible for their eradication. In France during World War I, lice, facetiously dubbed "cooties," had infested crowded trenches and barracks. They were not merely a nuisance; they were a never-ending menace to health. The body louse, for example, transmitted trench fever, a common World War I ailment characterized by muscular pains and sudden, recurrent fevers. Elimination of infestation hinged upon the ability of soldiers to keep themselves and their clothes clean. In 1917 and 1918, soiled garments were "deloused" by exposure for about 15 minutes to steam that had been heated to a temperature of about 40 degrees above the Fahrenheit boiling point. To carry out this task, sterilization centers were set up in France and operated by division quartermasters wherever large bodies of troops were stationed. While clothing was being cleaned, the soldiers themselves were bathing in neighboring showers. As they emerged from their baths, they were issued clothes freshly sterilized and cleaned by neighboring laundries.[40]

Between the two world wars no need existed for an agency that would carry out military sterilization of the 1918 type. Not until the hectic days of 1941 and 1942 brought the prospect of renewed battle on lice was such an organization—the Quartermaster sterilization and bath company—created. Equipped along World War I lines, it was designed to operate with laundry companies in combat zones and with salvage repair companies in rear areas. Its most important piece of equipment was a heavy trailer-van, which carried water-heating machinery, a dozen showers, and a large sterilization chamber. In early tests this vehicle proved much too ponderous for easy movement on poor or congested roads. The ensuing demand for greater mobility and the decision reached in late 1942 that methyl bromide was a better disinfesting agent than steam led to the establishment of a new and more mobile unit, the fumigation and bath company. This development did not mean the complete abandonment of the old companies; some of them continued to be employed so that benefit might be derived from the vans and sterilizers that had already been bought.[41]

The fumigation and bath outfit had the same functions as the sterilization company, but it differed from the older unit in its use not only of methyl bromide but also of

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[40] (1) QMC School, Schuylkill Arsenal, Philadelphia, Pa., Operations of the Quartermaster Corps, U.S. Army, During the World War, Monograph No. 9, Notes of Army, Corps, and Division Quartermaster Activities in the American Expeditionary Forces—France, pp. 60–61. (2) Historical Div, Dept of the Army, *United States Army in World War, 1917–1919*, 17 vols. (Washington, 1948), XV, 375.

[41] Rpt, Capt Keith K. Eggers QM School, 3 Jun 43, sub: Fumigation and Bath Co. OQMG 322



FUMIGATION AND BATH COMPANY *providing services for combat troops in tropical areas.*



a collapsible fumigation chamber transported on a comparatively small truck instead of a bulky sterilization chamber transported on a heavy trailer-van. The fumigation chamber was intended, primarily, for employment in combat areas. In rear areas a specially developed rubber bag, about twenty-five by sixty inches, was used for delousing. The clothes of six to eight soldiers, together with an ampul of methyl bromide, were placed inside the bag, which was then sealed. The ampul was broken from the outside, and in about forty-five minutes the released gas fumigated the garments.[42]

World War II actualities soon dispelled the belief that large-scale delousing operations would be required. Conditions overseas were unfavorable to infestation by lice. These insects became most prevalent in static warfare in which large bodies of men lived together for months in dirty, congested quarters; the danger from them was at its height in cold winter weather when soldiers, especially in northern countries, were likely to live in ill-ventilated surroundings. But none of these conditions were common in the open warfare of 1941–45, with its almost constant movement of troops, and there was in consequence slight need for sterilization or fumigation equipment. This was particularly true in the tropical Pacific areas—a fortunate circumstance because they had no bath companies until late 1944.[43]

It was rather the lack of the bath units carried by these companies that soldiers in the Pacific felt most keenly. Each unit contained twelve to twenty-four showers, and since showers enjoyed tremendous popularity among soldiers, many requests for bath units without fumigation chambers were submitted to the zone of interior. But few arrived, and troops were often obliged to wash themselves in streams, often unsanitary, carry water in buckets to their tents, or even bathe out of a helmet.[44] Occasionally, enterprising soldiers improvised hot showers, based on the ever valuable 55-gallon drum. Such improvisation also required a portable air compressor or tire hand pump, steel pipe, valves, nipples, hose, and, finally, ration cans for the shower heads, usually three in number. The first step in the construction of this novel device was to make a rock base open on one side so that a fire could be built under the drum. Next, the shower heads and steel pipe were put together and suspended from a tree or other overhead support. The valve stem and hose connection were then installed. Care was taken to insure that the air pressure in the drum never exceeded twenty pounds; otherwise the container would burst. If an air pump could not be found, a gravity instead of a pressure device might be used. Though highly ingenious, these improvisations were too inconvenient and complicated to be undertaken often. They accordingly offered no real solution for the lack of showers.[45]

The Leyte campaign saw a fumigation and bath company functioning for the first time in a Pacific offensive. With little need for fumigation activities, this unit operated almost solely as a provider of baths. Since

[42] OQMG Tng Cir No. 14, 17 Jun 43, sub: QM Fumigation and Bath Co (Mobile).

[43] (1) Risch, *QMC: Organization, Supply, and Services,* I, 164–66. (2) Rpt, Capt Orr, 25 Jun 44, sub: Answers to Questionnaire, 14 Jun 44. OQMG SWPA 319.25.

[44] (1) Rpt 2, Col Rohland A. Isker, 10 Apr 44, sub: Observations in SWPA. (2) Ltr, Capt Orr to Col Doriot, 17 Oct 44. (3) Rpt 18, Capt Orr, 30 Aug 44, sub: Misc QM Matters. All in OQMG SWPA 319.25.

[45] (1) Ltr, CO 49th Fighter Gp to CG Fifth Air Force, 9 Dec 42, sub: T/BA Equip. ORB AFWESPAC QM 370.43. (2) Anon., "Beat Your Drum (Oil) Into an Improvised Shower," *QMTSJ,* VII (12 January 1945), 10–11.

the Medical Corps found many streams contaminated, the company depended upon a single well dug by the Engineers in a rear area. Even then there was water enough for only half the bath equipment. Never was the company able to operate all its showers at one time. Its activities, moreover, were confined to the area immediately about the well. This situation emphasized the need for the inclusion of a water purifier in the equipment of the unit—a consideration apparently overlooked in the United States where the company was developed, possibly because an ample supply of good water was always available.[46]

On Okinawa a sterilization as well as a fumigation company was utilized. Neither unit could function according to its stated mission. The eleven-ton trailer-vans of the sterilization outfit could not be hauled over the poor roads and were employed mostly in rear areas and rest camps. One trailer assigned to the 77th Division bogged down in mire three times on its way to an advance position and finally had to be moved by a bulldozer. No effort was made to haul it forward again, and it remained in the same location throughout the campaign although the division progressed far beyond that point. The vans in any event were of little help because they provided troops with only twelve showers. Instead of these units, twenty-four head units, fabricated from discarded materials by the company on Oahu, were set up in squad tents.[47] The fumigation company improvised comparable units. In order to serve more soldiers this outfit was divided into four sections rather than the prescribed two platoons. These sections furnished baths for parts of three Army divisions and for thousands of marines, service troops, and Seabees. From late May, when the sections began operations, until the end of June they cared for about 600 men a day. As word spread that showers were available, more and more soldiers took advantage of them. One section served 2,300 troops in a single day in early July. Since men fresh from the front had not enjoyed any opportunity for normal bathing, no limit was imposed on the time that bathers could spend under a shower. Usually, they spent about ten minutes. Enthusiastic bathers gave high praise to the unaccustomed privilege.[48]

Experience in the Pacific as a whole strongly confirmed, then, the conclusion reached elsewhere that modern warfare demanded, not so much a fumigation company as a bath outfit equipped with mobile shower units that could be set up wherever troops were assembled in substantial numbers. In mid-1944 the numerous complaints regarding the unavailability of showers overseas stimulated the OQMG to start the development of small bath units that could be carried on a 2½-ton truck and operated by only six men, but no unit of this sort was actually created. The project nevertheless probably indicated the direction in which attempts at innovation would move. Bath companies had proved too large and too inflexible for effective utilization; smaller, more mobile outfits seemed the obvious answer to the insistent call for better bath facilities.[49]

[46] (1) Rpt cited n. 12(2). (2) USAFFE Bd Rpt 118, 19 Feb 45, sub: QM Equip and Sups. ORB Pacific Warfare Bd File.

[47] Ltr, Maj Charles E. Foster, Hq USAFMIDPAC, to OQMG Intel Officer, 1 Aug 45, sub: Observations of QM Activities on Okinawa. OQMG MIDPAC 319.25.

[48] (1) Rpt cited n. 13(4). (2) Rpt 1 (Okinawa), Maj Charles E. Foster, 1 Aug 45, sub: QM Activities on Okinawa. OQMG POA 319.25.

[49] Risch, *QMC: Organization, Supply, and Services*, I, 166.

Salvage and Reclamation

Quartermaster salvage and reclamation operations in the Pacific constituted a helpful means of replenishing stocks of supplies and equipment, particularly in advance areas. Footwear, clothing, and tents were the chief Quartermaster items handled by salvage and reclamation units; foodstuffs were handled, if at all, by the Veterinary Corps. "Salvage" was concerned not only with partly or wholly unserviceable articles; it was concerned also with new or usable articles that had been lost or abandoned in battle zones or elsewhere by U.S. or enemy troops. Since prompt delivery of new supplies and equipment to the Pacific theaters often was not possible, the main purpose of salvage activities was the speedy return of recovered items to American soldiers.[50] Another important objective was the shipment to the United States of unserviceable items that would provide raw materials required by American industrial plants to maintain peak production.[51] Among these items were scrap iron, including such articles as stove plates and grates; scrap aluminum; nonrepairable rubber tires, tubes, and life preservers; mismated shoes and other leather articles; lead and lead battery plates; and nickel electrodes of discarded spark plugs. Financial savings, if, indeed, any were to be achieved, constituted a minor consideration.

Three types of units—salvage collecting companies, salvage repair companies, and salvage depots—were used in theaters of operations. Collecting and repair companies were semimobile units that were usually assigned to corps or to geographical areas and split into sections, each of which operated as an independent organization. Salvage depots were sizable, fixed installations, which alone had the intricate equipment needed for major repairs. They were administered by specially trained repair units and in the Pacific were usually located at base ports. Collecting companies had as their main operating equipment twenty-eight small trucks and trailers for transporting recovered articles. Repair companies depended principally upon two shoe repair, two clothing repair, two textile, and two metal repair trailers; since their equipment was of the simplest sort, they were confined largely to minor repair jobs. Salvage depots carried out the more complicated operations. They rebuilt shoes and replaced component parts of garments and machines. They reclaimed not only Quartermaster items but also property not repaired by other technical services. Though manufacturing was not one of their regular functions, they occasionally made work suits from rejected clothing, and bunks, bins, shelves, and pallets from discarded lumber. Ordinarily, depots were organized into various divisions, some of which specialized in the reclamation of particular items—textile, leather, rubber, canvas, and metal goods—and others in the disposal of irrepairable supplies.[52]

All salvage activities hinged on the ability of collecting units to gather worn-out and discarded articles. In quiet areas these units assembled supplies and equipment turned in by troops at weekly or other designated intervals. In combat areas they picked up articles, non-Quartermaster as well as Quartermaster, that infantrymen in a necessarily unsystematic fashion had gar-

[50] TM 10-260, 15 Mar 43, sub: QM Salvage—TOPNS.

[51] (1) WD Ltr AG 400.74 OB-S-SPUPT-M, 19 Aug 43, sub: Return of Overseas Salvage. (2) WD Memo 30-44, 28 Jul 44, sub: Salvage and Scrap to be Returned From Overseas.

[52] TM 10-260, 15 Mar 43, sub: QM Salvage—TOPNS.



SALVAGE OPERATIONS *included the use of shoe repair trailers capable of operation in forward areas (above) and rear area clothing repair shops at salvage depots (below).*



nered on the battlefield and transported to assembly points. When fighting ceased, collecting troops entered the combat area and with the assistance of labor troops conducted the first careful search for supplies lost or discarded in the heat of battle. As salvage accumulated at the assembly points, collecting teams separated it into the main general classes of supply and removed it to salvage dumps. Here, aided by troops from other technical services, they further divided it into four classes determined by degree of usability. Class "A" comprised new supplies and equipment; Class "B," serviceable articles in need of minor restoration. These two classes were if possible handled by repair units operating in the field and sent back to the organization from which they had come. Unserviceable materials, which could be made usable by major repairs, formed Class "C." Class "D" consisted of unreclaimable items—items which could not be restored but which might contain badly needed spare parts or scarce materials. Classes "C" and "D" were both handled by salvage depots.[53]

In the South and Southwest Pacific lack of sufficient units, qualified technicians, and essential equipment as well as trying physical conditions prevented the performance of salvage activities precisely in accordance with this procedure. It was mid-1943 before the first salvage organizations arrived, and then they came only in small numbers. In the Central Pacific the presence on Oahu of qualified troops, fairly elaborate equipment, and commercial service firms enabled the QMC to carry out routine salvage and reclamation activities pretty much along prescribed lines. Even here there were shortages of special equipment for some tasks. A notable example was the almost complete absence of magnet cranes and other machines needed for the salvage of accumulations of scrap metals, estimated in the summer of 1942 to total 50,000 tons, which were badly required for steel and other metal plants in the United States.[54]

The South Pacific Area, hard pressed for manpower, placed salvage and reclamation among its most dispensable services, and these activities were at first virtually unknown even in improvised form. During the Guadalcanal campaign few items were recovered from the battlefield, for not many combat soldiers could be spared for this task. Some clothes in need of major renovation, it is true, were collected in anticipation of the early arrival of repair units that never came, but no sustained effort was made to gather such articles despite the danger of a severe clothing shortage among troops none too well clad at the start of the campaign.[55] Four months after fighting on Guadalcanal had ceased, salvage operations in the South Pacific were described as "practically nonexistent." [56] There were still no collecting units and but one repair platoon and two repair detachments. Though scantily equipped, these small units furnished the nucleus for the Quartermaster-operated base salvage services that were set up in September 1943 for the benefit of the Army, Navy, and Marine Corps. The opportune arrival of two collecting companies and additional repair organizations greatly facili-

[53] (1) USASOS Regulation 30-10, 15 Sep 42, sub: QMC Salvage Activities. (2) *Ibid.*, Feb 43. (3) USAFFE Bd Rpt 190, 15 May 45, sub: QM Salvage Collecting Co, T/O&E 10-187.

[54] (1) Memo, QM for CG Hawaiian Dept, 28 Jul 42, sub: Scrap Metal. (2) Ltr, CG Hawaiian Dept to CG SOS, 11 Aug 42, sub: Salvage of Scrap Steel. Both in ORB AGF PAC AG 400.93 (Salv).

[55] Anon., "Salvage Saga: Guadalcanal," *QMTSJ*, V (27 October 1944), p. 24.

[56] Ltr cited n. 28(2).

tated the inauguration of these new activities. One collecting company was assigned to the Guadalcanal base, and notwithstanding that it had few trucks and scarcely any equipment for obtaining scrap metals, it "gave the island a clean sweep from one end to the other," and assembled a huge mass of materials from the former battlefield.[57]

The only advantage the Southwest Pacific had over its neighbor was that a major segment of its forces was stationed in Australia where the Commonwealth Army for many months collected, stored, and distributed salvage items for the U.S. forces and where commercial firms did much of the repair work on shoes and tents. The employment of civilians for sewing and other reclamation jobs further eased the situation by making possible the establishment of sizable salvage depots. Because of these favorable circumstances the QMC in Australia was able to carry out reclamation activities on a rather substantial scale.[58]

Until late 1943 the position of the Corps in New Guinea was no better than in the South Pacific. At the advance bases, details composed of both combat and service troops working under the direction of a Quartermaster sergeant collected repairable items from military units at designated times, classified them, and then, since there were no means for making even minor repairs, shipped them to Australia—a wasteful but unavoidable procedure. Weeks ordinarily passed before vessels could be found in New Guinea to transport the recovered supplies. After the Australian bases had received the items, additional weeks elapsed before repair work could be started. These delays postponed for months the reissue of badly needed articles and at times obliged advance bases to distribute so much new equipment in place of that turned in for repair that total issues of some items increased by 50 percent.[59]

The establishment of repair centers in New Guinea would have made costly reclamation in Australia unnecessary, but during the first half of the war this manifestly desirable step could not be taken. Machines for reclaiming such important items as shoes and tents were almost unobtainable. Even if they had been procurable, there were few technicians qualified to operate them. Pending the arrival of salvage outfits, the QMC therefore set up footwear and clothing repair schools in Australia to train troops and civilians who were to be sent north.[60] In June 1943 New Guinea's first repair shop, which handled footwear, began operations, but the establishment of reclamation centers in general proceeded slowly.[61] In October the Fifth Air Force quartermaster reported that 26,000 troops in the Port Moresby region still had no way of having shoes mended. Men who wore out soles of their shoes, he wrote, "must draw a new pair which is of course a big waste." [62]

From late 1943 on, the amount of salvage and reclamation work performed in

[57] Memo, Control Div ASF Hq for TQMG, 13 Oct 43, sub: Rpt on SPA Opns. OQMG POA 319.25.

[58] (1) Rpt, Base QM Base Sec 4, 31 Jul 42, sub: Shoe Repair. (2) Rpt, Salvage Office to Base QM Base Sec 3, 18 Oct 42, same sub. Both in ORB AFWESPAC QM 486.3. (3) Rpt, QM Salvage Office USASOS, 31 May 43, sub: Reclamation and Salvage Opns in SWPA to 30 Apr 43. OQMG SWPA 319.1. (4) QM SWPA Hist, II, 97–100; III, 66–76.

[59] Rpt, QM Salvage Office USASOS, 29 Apr 43, sub: Salvage Activities Mar 43. ORB NUGSEC QM 400.93.

[60] Off of QM USASOS, Shoe Repair Lectures, May 1943. ORB AFWESPAC QM 421.3.

[61] Ltr, QM USASOS to CQM USAFFE, 16 Apr 43, sub: Salvage in New Guinea. ORB AFWESPAC QM 400.93.

[62] Memo, QM Fifth Air Force for CQM USASOS, 18 Oct 43. ORB AFWESPAC QM 333.1.

both the South Pacific and the Southwest Pacific steadily rose as experienced technicians and appropriate equipment finally arrived, but even then available resources did not match the magnitude of the task. The problem of how to maintain minimum salvage services with limited means remained a constant source of trouble. At the end of April 1944 there were in the whole Southwest Pacific only four repair companies and one collecting company, whereas current troop strength demanded at least six collecting and nine repair companies. Even the lone collecting company had come only in the preceding February.[63]

The newly arrived units, all semimobile, were divided among the bases and troop concentration points outside Australia. Repair units could not operate trailer-mounted equipment in forward areas and in consequence could not function as the mobile organizations they were meant to be.[64] Usually, these units removed their equipment from the trailers and put it in thatched huts or temporary buildings at advance bases. This action facilitated operations by providing workers with better ventilation and more space. These advantages, in turn, made possible the elimination of the protracted rest periods needed in the tropics by men who labored in poorly ventilated trailers.[65]

Despite the inadequacy of facilities for minor repair jobs, some sort of repair section was available to most units in New Guinea by mid-1944. Unfortunately, these shops were often located many miles from troop concentrations. This drawback, together with other supply problems, usually made it impracticable to return to original wearers any apparel except shoes; other items were commonly turned over to bases for redistribution in bulk.[66]

Meanwhile facilities for making major repairs in the island had been provided. At Milne Bay in November 1943 the 28th Salvage Depot Headquarters Company started the first fixed installation in New Guinea for major repairs on material shipped from forward bases. This company had enough skilled operatives to supervise a thousand or more civilian employees, but since there were few candidates for jobs, its members served as artisans rather than as foremen. Because of its small labor force, the depot turned out only about 30 percent of the work that a fully manned establishment would have normally produced.[67] A large part of the clothing sent to it was in very poor condition, much of it beyond reclamation. The added repair and disposition burdens thus laid on the depot were attributed to the "hard service" that apparel received in the field, to "failure of unit commanders to turn in" unusable garments before they were "completely beyond repair," and to the protracted storage of material awaiting

[63] (1) Memo, Reclamation and Salvage Div for Plng and Control Div OCQM USASOS, 26 Feb 43, sub: Reclamation and Salvage Problems. ORB AFWESPAC QM 337. (2) Rpt, Reclamation and Salvage Div OCQM USASOS, 23 May 44, sub: Salvage and Reclamation Activities, Apr 44. ORB AFWESPAC QM 319.1.

[64] Ltr, CG USASOS to CG ASF, 18 Jul 44, sub: QM Repair Installations. OQMG SWPA 331.5.

[65] (1) Ltr, QM USASOS to CQM USAFFE, 22 Mar 43, sub: Destinations of Salvage Repair Companies. ORB AFWESPAC QM 431. (2) Ltr, CG USASOS to CG ASF, 29 Nov 43, sub: Salvage Activities. ORB AFWESPAC QM 400.93.

[66] Ltr, Col Walter T. O'Reilly, USAFFE Bd, to CG AGF, 20 Aug 44, sub: QM Information. ORB AFPAC Pacific Warfare Bd File.

[67] (1) Ltr, QM USASOS to QM U.S. Advance Base, 7 Jul 43. (2) Ltr, CO Base A to CG USASOS, 29 Nov 43, sub: Salvage Depot. Both in ORB AFPAC Pacific Warfare Bd File.

movement, often under circumstances that hastened deterioration.[68]

In August 1944 Base F at Finschhafen, which had just recently become the site of another major repair installation, reported that it operated under conditions similar to those at Milne Bay. At that time it was receiving a monthly average of 500,000 pounds of Quartermaster supplies and equipment. "A great portion of this material," it declared, consisted of "nonrepairable canvas, cots damaged beyond repair and damaged metal containers which are too light to be classed as scrap metal." Because of "lack of proper segregation and packaging" of clothes and web equipment, it added, "less than five percent" of these items had proved reclaimable.[69]

Of the reasons cited by the two salvage depots as responsible for the large amount of irrepairable material, two were of primary significance. One was the remissness of troops in turning in badly worn articles, a negligence that stemmed in some measure from fear that replacements would not be issued. The other was the frequent refusal of supply sergeants to accept proffered material on the ground that it was not yet in sufficiently poor condition. The survey of Quartermaster activities in the Pacific Ocean Areas late in 1944 demonstrated the importance of these two factors. It showed that in the previous thirty days a high proportion of clothing had been found to need repair; at that time, in fact, 50 percent of shoes required mending, 31 percent of work suits, 26 percent of trousers, 18 percent of shirts, 17 percent of socks, and 4 percent of underwear. Yet only half the articles in need of renovation had actually been turned in for either major or minor repairs.[70]

Before late 1944 salvage collection in direct support of combat forces fared much worse than did repair activities in rear areas, being, as in Guadalcanal days, a poorly performed function of provisional groups composed of infantry as well as service troops. After that date, however, it was done to a considerable extent by a few recently arrived collecting units. Infantrymen in particular had felt the absence of regular collecting troops, for they could take with them into operational zones no more than small quantities of replenishment supplies. They accordingly had special need for quick repair in the field of unserviceable items and for retrieval of lost or abandoned items. Unless such equipment was properly collected, this requirement could not be met. While provisional groups could bring a good deal of battlefield salvage to collecting points, they lacked the time and training for accurate classification and the means of prompt transportation to repair shops.[71] Even after standard collecting units became available, repair activities in combat areas generally remained on a provisional basis because trailer-carried equipment could not be moved readily. Full advantage could not, therefore, be derived from collecting units, and a main objective of salvage and reclamation operations, the speedy reissue to field organizations of repaired articles, could be achieved only in part.

Collecting units nevertheless carried on their regular activities in the Leyte campaign. A platoon landed on A plus 9 and

[68] Ltr, CO 28th QM Salvage Depot to CO INTERSEC USASOS, 8 Apr 44. ORB NUGSEC QM 400.9.

[69] Ltr, CG Base F to CG INTERSEC USASOS, 3 Aug 44, sub: Salvage from Forward Areas. ORB NUGSEC QM 400.93.

[70] Field Progress Br OPC Div OQMG, Survey of POA QM Opns, Nov 1944, SR 3-4, 7. OQMG POA 319.25.

[71] QM SWPA Hist, V, 63–66; VII, 86–87.

attached a squad to each of the division Quartermaster companies. These squads employed Filipino helpers and set up assembly stations on the routes followed by the trucks that carried salvage back from the battlefield. The platoon also sent out roadside teams to scour bivouacs, dumps, and trails. Supplies that could not be put to immediate use went to a base salvage dump.[72] Procedures like those on Leyte were followed in Luzon where a collecting outfit also went ashore soon after the initial landings.[73]

At Okinawa low shipping priorities prevented the early support of tactical elements. Not until L plus 30 did a collecting company begin to function. With the help of borrowed trucks it cleared abandoned beach dumps, picked up discarded materials wherever they could be found, and classified large accumulations of supplies gathered by combat units.[74] The 27th Division employed a large provisional unit, called the 27th Combat Salvage Collecting Company. This outfit, made up of troops who had battle experience but were medically certified as unsuitable for further infantry duty, was assigned not only the normal functions of a collecting unit but also the gruesome chore of gathering the dead on the battlefield, a duty normally given to combat soldiers but one they seldom carried out systematically. The company was divided into three platoons, and each platoon was in turn divided into three squads for support of battalions.[75] Though these squads sometimes worked under enemy artillery and sniper fire, they recovered a large variety of immediately valuable articles. Among the Quartermaster articles were 1,838 canteens, 1,353 haversacks, 1,420 jungle kits, 350 cases of field rations, and substantial quantities of shoes, mess and web equipment, helmets, entrenching tools, and gasoline cans and drums. Among non-Quartermaster articles were 634 rifles, 47 Browning automatic rifles, 26 bazookas, 796 bayonets, 15,000 rounds of .30-calber ammunition, 1,000 rifle grenades, 5,000 hand grenades, 3,330 rounds of 60-mm. mortar ammunition, 1,000 rounds of 81-mm. mortar ammunition, 1,000 rounds of 37-mm. antitank ammunition, 5 flame throwers, 76 grenade launchers, and a miscellaneous collection of explosives, radios, and telephones.[76] In addition the company recovered 608 American dead, buried over 1,000 Japanese, established two cemeteries, and in emergencies served as litter bearers, ammunition carriers, and perimeter guards for infantry battalion command posts.

The two provisional repair units on Okinawa were typical of those employed in the closing phases of the Pacific war. One was a small shoe repair shop, manned by troops from a collecting company and a service unit. Set up on L plus 35, it renewed about 250 pairs of shoes a day. Even earlier, on L plus 10, a typewriter and office-equipment repair shop, which utilized seven enlisted men from a Quartermaster depot company, had begun to renovate machines at the rate of 450 a month.[77] Valuable though these units were, they were too few in number and too small in size to perform more than a minor part of the necessary repairs.

Throughout the Pacific both air and ground forces deplored the dearth of stand-

[72] (1) *QMTSJ*, VIII (21 September 1945), 9. (2) Pac Warfare Bd Rpt No. 34, 17 Aug 45, sub: QM Questionnaire.

[73] *QMTSJ*, VIII (10 August 1945), 11.

[74] Island Comd Actn Rpt Okinawa, 8-XV-25.

[75] 27th Div Actn Rpt Nansei Shoto, pp. 89–90.

[76] *Ibid.*

[77] Island Comd Actn Rpt Okinawa, 8-XV-25.

ard repair services in combat areas. They particularly lamented the poor means provided for the renewal of shoes, perhaps the item of apparel that could least easily be dispensed with. Task forces could not carry with them sufficient stocks of footwear. Nor could they provide for the shipment of adequate replacement stocks during the operation. Repair shops, which might have alleviated the inevitable shortages, were not ordinarily set up until the fighting had ceased. In the interim, the deputy commander of the Fifth Air Force noted in July 1944, there were occasions when not enough usable footwear was on hand to supply all troops. He urged as a corrective the early arrival of standard shoe repair outfits in operational zones. About this time the Sixth Army quartermaster submitted similar recommendations. But it was never possible to carry out these proposals.[78]

Though collection and repair activities were often disappointing to the combat forces, a considerable mass of scarce materials was shipped to the United States for industrial use. In the South Pacific such movements up to the close of March 1944 totaled 24,000,000 pounds of heavy and light ferrous scrap, nonferrous scrap, fired cartridge cases, tires, tubes, scrap rubber, and airplane parts.[79] The Southwest Pacific Area calculated that between March 1942 and December 1944 it forwarded 34,000 ship tons of salvage.[80] It also estimated that reclamation work during these thirty-four months resulted in the reissue of enough articles to save the cargo space occupied by 72,000 ship tons. This work, it further reckoned, had saved $19,150,000 which otherwise would have been spent on new supplies. The theater estimated that as of 30 September 1944 reclaimed articles of clothing and equipage numbered, respectively, 6,880,000 and 4,610,000.[81] By far the greater part of these articles had been reclaimed in Australia. Salvage depots in the South Pacific manufactured as well as reclaimed articles. Among the unusual articles that they fabricated were special-purpose and odd-size uniforms for the QMC and trusses and braces for the Medical Corps. For some months collecting units in this theater also carried out graves registration functions.[82]

Graves Registration Service

Graves registration units were concerned with every activity relating to the care of the dead except the collection of bodies under battle conditions. Standard procedures required that they enter the combat zone as soon as it was free of danger, pick up the bodies that infantrymen had brought to collecting stations, and make the first systematic search for remains. Sometimes, for reasons of morale and sanitation, hasty burials in isolated spots might be necessary, but this practice was discouraged and, if it proved unavoidable, sketches of the physical surroundings were to be made to facilitate the future location of scattered in-

[78] (1) Ltr, Deputy Comdr Fifth Air Force to CG INTERSEC USASOS, 21 Jul 44, sub: Salvage Units for Forward Areas. ORB NUGSEC QM 322.3. (2) Ltr, Sixth Army QM to Pacific Warfare Bd, 13 Jun 44. ORB AFPAC Pacific Warfare Bd File.

[79] Rpt, QM SOS SPA, May 44, sub: Salvage Shipped to U.S. OQMG POA 319.25.

[80] Rpt, CQM USASOS, Jan 45, sub: Summary of Salvage Opns, 1 Mar 42–31 Dec 44. ORB AFWESPAC QM 319.25.

[81] Rpt, CQM USASOS, Nov 44, sub: QM Items Reclaimed and Returned to Stock. ORB AFWESPAC QM 319.25.

[82] Maj Maurice B. Sinsheimer, Jr., and Capt George F. Hallman, "Laundry and Salvage Operations in the South Pacific," *QMR*, XXIV (September–October 1944), p. 35.

terments. Generally, the dead were moved as soon as possible to cemeteries designated by division commanders. Since graves registration units were primarily administrative outfits, they merely supervised burials; the actual digging of graves and the transportation of remains were functions normally performed by service troops. Every effort was made to identify bodies at least tentatively. This was a simple matter if identification tags were attached; otherwise identity had to be determined from letters, dental work, and fingerprints. If remains were badly mutilated, identification might prove impossible. The units also registered graves, collected personal property of the dead, and arranged for its shipment to next of kin. Though only one of these activities was, strictly speaking, "graves registration," that term was used to embrace all mortuary responsibilities.[83] Graves registration units, set up primarily for support of troops in combat areas, were composed of specialists in these responsibilities. The peacetime U.S. Army had no organizations of this sort, for commercial morticians were always available to care for its dead. Not until the spring of 1942 did the formation of these units even start.[84]

In the Southwest Pacific the want of trained troops handicapped graves registration throughout the war, particularly during the first two years. The organization of this service took place piecemeal "under pressure of unforeseen circumstances and without strict regard to the dictates of high level policy." It was "an indigenous growth, improvised for the express purpose of meeting a series of local emergencies." [85] The first of these emergencies arose in Australia early in 1942 when bodies began to accumulate and require suitable disposition. In the haste of arranging for the feeding, quartering, and training of the troops who poured into Australia, little attention had been given to care of the dead. But once that problem became urgent a program was improvised. It was based on interment in Australia because shipment to the homeland was barred by the wide dispersion of troops and by the absence of supplies for preserving bodies on a long voyage. Isolated burials were to cease, and all the deceased were to be concentrated in U.S. Army cemeteries, one of which would be set up in each base section in Australia. The program was to be carried out at Headquarters, USAFIA, and at base sections by officers who would arrange with Commonwealth authorities for the exclusive use of designated burial plots and with local morticians for the embalmment and transportation of bodies. These procedures, based on those employed in the United States, were suitable to the roughly similar conditions prevailing in Australia. But no provision was made for the formation of graves registration units to support tactical elements. Nor was any provision made for training in the identification of remains, perhaps the main problem posed by battle dead. The improvised program thus did not answer the growing need for a policy suitable to combat areas.[86]

[83] (1) TM 10-630, 23 Sep 41. (2) T/O&E 10-297, 6 Nov 43.

[84] (1) Memo, War Plans Br P&C Div for Mem Div OQMG, 31 Jul 41, sub: QM GR Co OQMG 293. (2) "List of Quartermaster Graves Registration Units in Army of United States," compiled by Organization Sec, Opns Br AGO, 23 Mar 46.

[85] Edward Steere, *The Graves Registration Service in World War II* (QMC Historical Studies, 21), p. 33.

[86] (1) QM SWPA Hist, IV, 80–82. (2) Rpt, GRO to CQM USAFIA, 21 May 42, sub: Cemeteries and GR. ORB AFWESPAC QM 333.1 (Insps).

Even its proper application in Australia was made difficult by the inadequate mortuary standards of commercial undertakers and by the inability of local manufacturers to supply satisfactory caskets. These problems were in one sense a blessing, for they obliged USAFIA to create a small provisional organization composed of thirty-seven men, most of whom had been morticians in civilian life. This group was instructed in the techniques of Army graves registration and then used to supplement Australian services. While not designed specifically for battle duty, the organization gave its members sufficient experience to enable them to perform many of the mortuary tasks demanded in combat. When the Papuan campaign started, it was fortunate that this unit existed, for the War Department had rejected a theater request for a single graves registration company, and no trained noncommissioned officers would have been available for service in New Guinea had the theater itself not already created the nucleus of a mortuary organization, however small.[87]

Useful though this nucleus was, technicians were still far too few in number to furnish fully satisfactory service for the forces fighting around Buna. Until early January 1943, when a second lieutenant arrived, the only specialists were six technical sergeants, two of whom were assigned to each of the three U.S. regiments. They served with details of infantry troops and supervised the collection, identification, and burial of the dead, with virtually no direction from combat officers. Their activities were somewhat simplified because the Buna campaign, like most of the Pacific operations before Leyte, was a battle of position rather than a campaign of maneuver. The combat zone in consequence covered a relatively small area, and it was easier to establish temporary cemeteries than it would have been in a campaign that involved constant troop movements. In the Urbana Force the graves registration sergeant "braved the dangers of the Front with a squad of men to bring the dead back so that they would not be buried" in isolated spots but concentrated in three small cemeteries.[88] On the Warren Front, however, almost continual firing by snipers forced the burial of many dead "where they lay." Not until early January could these isolated remains be disinterred and a search begun for the missing. Three details, each made up of a technical sergeant and five enlisted men, performed these tasks. Frequent consultation with combatants about the disappearance of soldiers in action materially facilitated the recovery of bodies, but many of the dead remained unlocated.[89]

The initial step toward a better graves registration establishment was taken in January 1943, when the 1st Platoon, 48th Quartermaster Graves Registration Company, was activated at Port Moresby. It consisted of nineteen technical sergeants who had received specialized training in Melbourne. The creation of this unit was accompanied by a division of mortuary functions outside Australia. Base commands were to maintain cemeteries, and platoon headquarters were to distribute mortuary supplies and select men for temporary assignment to infantry organizations.[90] But specialists were still too scarce

[87] (1) QM SWPA Hist, II, 86–87. (2) Rpt, CQM USASOS to G–4, 27 Aug 42, sub: Weekly Rpt of Activities. ORB AFWESPAC QM 400.1024.

[88] Hist of 1st Plat 48th QM GR Co, Jan 43–Jan 44. DRB AGO.

[89] QM SWPA Hist, IV, 90.

[90] Rpt, Lt Col C. E. Butterworth, 24 Aug 43, sub: Rpt of Insp Trip. ORB AFWESPAC QM 333.1.

to furnish combat elements with an adequate number of technicians. Throughout 1943 they continued to be assigned to tactical units only in pairs or small detachments. Working under officers designated by task force commanders, they directed the collection and identification of the dead, chose sites for temporary cemeteries and isolated burials, and supervised interments. In the Morobe–Salamaua operation of June–September 1943 four enlisted men were the only theater graves registration troops that could be spared for attachment to the 162d Regiment. One of them was assigned to each of the four columns into which this widely scattered organization was divided. Other organizations were even worse off, being wholly dependent for supervision upon inexperienced chaplains and noncommissioned tactical officers.[91] In all combat forces perhaps the worst feature was the extensive employment of front-line soldiers in the demoralizing task of handling their own fatalities.

All this contrasted sharply with the contemporary situation in North Africa, where graves registration, initially on a provisional basis, became more and more an activity carried out by specialists. As technically trained troops in increasing numbers arrived from the United States in the spring and summer of 1943, this trend became particularly marked. In the Southwest Pacific, on the other hand, not a single graves registration unit came until the following November. Its arrival facilitated the division of labor among those who cared for the dead, but there were still too few technicians and too many gaps in mortuary supplies.[92]

In the assault on Los Negros in the Admiralty Islands early in 1944, graves registration troops were so scarce that only one sergeant and five privates could be assigned to the attacking force, which aggregated more than a division. Normally, a force of this size would be entitled to an entire platoon. The graves registration section did not land until D plus 9. Its late arrival as well as its small size accounted in considerable measure for the numerous deficiencies in the care of the dead. For some days this service was carried on wholly by organic troops, and throughout the operation these troops furnished the bulk of the needed details. Faults in routine handling of burials were common. Many grave markers bore no information whatever; identification tags were attached to markers by strings rather than by screws; and Japanese bodies were not separated from American remains. Frequently, no effort was made to identify the unknown dead. As recording clerks were generally unavailable, facts needed to verify an identification were seldom indicated. Finally, because temporary burial sites were not mapped, concentration of remains in cemeteries was delayed. It is significant that where a larger number of qualified men was available, as at the cemetery set up on neighboring Manus Island, much less reason existed for criticism. But on Manus, as on Los Negros, some burial reports contained no information about the cause of death and neither listed nor noted the disposition of personal effects though they might have given valuable clues to identity.[93]

[91] Opn Rpt 162d Inf Regt—Morobe–Salamaua, 29 Jun–12 Sep 43. DRB AGO 341-70.2 (21585).

[92] Steere, *Graves Registration Service,* pp. 43, 57–58.

[93] (1) *Ibid.,* pp. 144–46. (2) 1st Plat 604th GR Co Hist Rpt, 9 Mar–28 May 44. DRB AGO QM Co-604-Pl-(1)-0.3 (11525) M. (3) Rpt, Capt James C. MacFarland, QM Sec Sixth Army, 8 May 44, sub: GR Activities in Admiralty Islands. ORB 1st Cav Div 293.

On both islands the widest departure from prescribed practices was found in the disposal of enemy dead. The small mortuary details, barely able to care for American bodies, could not give Japanese bodies the same attention they gave their own. Strict adherence to the Geneva Convention prescribing equal treatment of the dead, whether friend or foe, was impossible.

Due to the tactical situation at the outset of the operation it was impossible to bury each enemy dead separately, and to make Reports of Interment. Enemy dead were in front of allied forward elements and it would have been impracticable to risk lives in order to bury enemy dead. When the initial objectives were taken it was necessary to bury the enemy dead immediately in a number of common graves as the bodies had begun to decompose and were a serious menace to the health of the Allied Forces.[94]

Owing to the uniformly heavy Japanese casualties and the swift deterioration of remains in the hot, insect-laden atmosphere, the disposal of enemy dead came to be regarded throughout the Pacific as a matter of field sanitation rather than of graves registration. The customary practice was to bury remains as speedily as possible, at times in huge graves that contained several hundred bodies.[95] Under the prevailing conditions there was no feasible alternative. Only theaters, like the European, which had large pools of civilian labor as well as a relatively plentiful supply of graves registration units could follow the pattern prescribed at Geneva.[96]

In the thrust at Hollandia in April 1944 graves registration support was provided on the largest scale yet seen in the Southwest Pacific. An entire company was available, and one platoon from this unit was attached to each division. These platoons accompanied assault troops during the critical phases of the attack and so avoided the mistake made at Los Negros. The comparative abundance of technicians did not mean, however, that they were always utilized to the best advantage. The G–1 after action report of the 41st Division noted that liaison between combat commanders and attached graves registration elements had been ineffective.[97] Probably because of this fact, landing force commanders did not establish any cemeteries during the assault phase. To obviate such lapses in the future, the report recommended that some specialists accompany the headquarters of the division to which their units were assigned. It also recommended that before an operation started a short graves registration course be given to chaplains and at least one officer or noncommissioned officer in each unit down to and including companies. A course of that sort, the report noted, had been given before the Hollandia offensive and had proved its value.

The South Pacific Area had meanwhile been coping with much the same problems as had the Southwest Pacific. Like its neighboring area, it had established at the outset small burial plots at the island bases, but it had made no provision, as had been done in Australia, for a trained group capable of caring for combat dead. When the first U.S. Army units went ashore on Guadalcanal late in 1942 to relieve the exhausted 1st Marine Division, there existed not even a small nucleus of technicians such as had carried out graves registration at Buna.[98]

[94] Rpt cited n. 93(3).

[95] (1) 37th Div After Actn Rpt Bougainville, 8 Nov 43–30 Apr 44. (2) Steere, *Graves Registration*, pp. 137–40.

[96] Steere, *Graves Registration*, pp. 111–12, 115.

[97] 24th Inf Div Hist Rpt Hollandia Opn, Annex 4. DRB AGO 342-0.3.

[98] Personal Ltr, Col Joseph H. Burgheim to Gen Gregory, 24 Feb 43. OQMG POA 319.25.

A provisional graves registration unit had to be hastily created on the island itself. Search for technically fitted men unearthed a field artillery corporal who had been a mortician and he was promptly put in charge of the cemetery that had been set up by the Marine Corps. With the help of six enlisted men and a crew of native laborers, he corrected the haphazard plot layout in accordance with standard specifications. But he could not always follow basic procedures. The "battered condition" and rapid decomposition of bodies interred in emergency burial places forced the postponement of concentration activities for some weeks.[99] Troops who could be spared for noncombat duties were so scarce that too much concern for the dead might have endangered the living. Maj. Gen. J. Lawton Collins, who commanded the 25th Division, saw corpses laboriously borne over "terrible trails" under a scorching sun, while wounded men lay unattended on the battlefield. This, he maintained, was false sentimentality wholly out of place in war. For this reason troops were directed to bury the dead quickly in graves "far enough off the trail so that," when it "is extended, a bulldozer does not carry away the cross erected to mark the grave." [100]

Not until six months after Japanese resistance had been crushed on Guadalcanal, did the first graves registration company trained in the zone of interior, the 49th, land in the South Pacific. Its members were immediately attached to provisional units and helped care for those who died in desperately fought battles in the jungles of New Georgia. Insofar as tactical conditions permitted, remains were evacuated to central burial points, but shortages of men and trucks still necessitated emergency burials on the battleground.[101]

The opening of offensive activities in the Central Pacific with the attack on the Gilberts found that area not much better prepared to handle mortuary work than its two sister areas had been earlier. It had no units trained for this work, and even the detachment of 164 Quartermaster officers and men formed to handle Quartermaster services in the Gilberts had no plans for graves registration. This responsibility was to be accomplished by a provisional detachment of fifty-nine officers and forty enlisted men of the 27th Division who had taken a two-week course at the Army morgue in Honolulu. Scanty though this instruction was, it at least constituted a better preparation than had been made for Guadalcanal.[102]

In the Gilberts, as well as on other Central Pacific atolls, graves registration was influenced strongly by the terrain. Instead of the rugged topography of New Guinea and Melanesia, there was firm open ground that presented few of the barriers to movement that were encountered in the jungles and mountains below the equator. But there were also tactical conditions unfavorable to care of the dead. The Gilberts campaign was planned as a short, all-out offensive rather than a prolonged operation like that around Buna, and the final death toll was expected after only a few days of hard fighting. This fact meant that "Any indifference toward prompt removal of the dead, friend or foe alike would be hazardous to health. Where formerly the price of victory had precluded adequate provision for care

[99] (1) *Ibid.* (2) Steere, *Graves Registration Service*, p. 45.

[100] 25th Div Opn Rpt Guadalcanal, 17 Dec 42–5 Feb 43, Sec. V, p. 120. DRB AGO 325-33.4.

[101] (1) 25th Inf Div Opns Rpt Central Solomons, 16 Aug–12 Oct 43, p. 124. (2) Rpt, 25th Div QM, n. d., sub: QM Opns in Central Solomons and New Georgia. ORB USAFINC QM 370.2.

[102] QM MIDPAC Hist, pp. 105–06, 109–10.

of the dead, now the menace of disease to a victorious force determined the sort of graves registration program which should be addressed to this situation." [103]

With quick recovery of the dead thus imperative, careful plans were made before the Gilberts assault to achieve this objective. Combat troops and the 105th Infantry Band would move remains from the front to a nearby trail, where labor or reserve troops would transfer the bodies to collecting points. Details, directed by provisional graves registration troops, would then carry the bodies to the island cemetery. If evacuation of the deceased proved impractical, combat soldiers could make emergency battlefield burials of known remains, but only graves registration specialists could inter unidentified bodies. Thus one important lesson taught by earlier operations was to be applied.[104]

This mortuary plan could not be executed as planned. Evacuation even of U.S. dead could not be completed during the period of active fighting, for enough troops were not available to finish the task within the short time permitted by swift tactical developments. Of equal urgency was the disposal of thousands of decomposing Japanese bodies—a problem intensified by the presence of American soldiers "in the same area which several hours before was a battlefield." [105] Prompt burial of these remains was essential, yet in only a few instances could this task be carried out without considerable delay.

Mortuary operations in the Marshalls followed much the same pattern as in the Gilberts. The main difference stemmed from the opportune arrival of the first regularly constituted graves registration company in the Central Pacific, an event which made possible the attachment of about fifty well-trained men to the task force. Because of this development the bodies of most American combat dead were collected and removed to island cemeteries with little delay. But once again the problem of enemy remains arose. After the assault troops had departed from Kwajalein on D plus 6, the chief task was in fact the burial of some 4,000 dead Japanese. Even then the vast accumulation of debris and the stench of decomposition held up this grisly work for some days. Bodies were sprayed liberally with sodium arsenite to arrest nauseous odors and the germination of insects, but actual removal of the dead took so long that the establishment of defense installations by the garrison force was dangerously retarded.[106] Unless larger and better trained detachments were employed, a careful after action analysis warned, the same problem would arise in future campaigns.[107]

In the plan for the Saipan operation, accordingly, somewhat more generous provision was made for graves registration support. One platoon was allotted to the assault force and two platoons to the garrison force. A notable innovation was the assignment of responsibility for the actual spraying of Japanese remains to a small sanitary detail composed of troops from medical collecting units specially trained in this technique. The most serious defect in the execution of the Saipan plan was the shortage of trucks that prevented quick evacuation of

[103] Steere, *Graves Registration Service,* p. 134.

[104] 27th Div AdmO 11, 26 Oct 43. DRB AGO P&O File Drawer 1235.30.

[105] Rpt, Hq USAFICPA, 17 Jun 44, sub: Participation of USAFICPA in GALVANIC Opn, p. 95.

[106] (1) Rpt, HUSAFPOA, Participation in Kwajalein and Eniwetok Opns, Annex I. (2) QM MIDPAC Hist, pp. 133–39.

[107] Rpt, Lt Gen Robert C. Richardson, 9 Feb 44, sub: Visit to Marshalls. ORB USAFPOA FLINTLOCK Opn.

the dead to collecting points. In a protracted battle the number of vehicles would probably have been ample, but the rapid advances and heavy casualties put too much strain on the slender transportation resources allotted to mortuary units.[108]

The evacuation system broke down entirely on 7 July when a reckless enemy attack left 406 Americans and thousands of Japanese dead within a single square mile of the 105th RCT area.

In this situation a company from a battalion of the attached engineer group was assigned the mission. Ten trucks shuttled between the battlefield and an LVT landing point, where the bodies were transferred to 30 amphibious tractors and carried by water to Yellow Beach 3, where the tractors came ashore and went directly to the cemetery. The difficulties of locating bodies among the thousands of Japanese dead, of recovering bodies from shell holes which had filled with water, and the collection of bodies which had been badly shattered by mortar fire made it impossible to complete collection of these dead in less than 4½ days, notwithstanding the amount of personnel and transportation involved. This delay in evacuating our dead is believed to have had a depressing effect on the morale of troops in the area, and was the subject of adverse comment by individual Marines.[109]

An estimate, described as "undoubtedly conservative," placed at more than 7,000 the number of Japanese interred in mass graves. More than 200 civilian internees helped carry out this grim task. Generally speaking, a deep trench was dug with a bulldozer, and Japanese bodies were laid in it, counted, and sprayed with sodium arsenite. The bulldozer then filled the excavation. Finally, a marker indicating the approximate number of enemy dead was erected.[110]

At this time the entire problem of recovering human remains was under study in the Central Pacific. Here, as in every theater of operations, the traditional dependence upon infantrymen for locating the bodies of those who fell in battle had yielded poor results. USAFICPA Circular 93, 5 June 1944, attempted a fundamental solution of this problem. It authorized the establishment of provisional field salvage units whose major function would be, not the recovery of mere equipment but of human remains. These units would evacuate and bury Americans during the assault phase and later spray and dispose of enemy dead. They would thus relieve combat troops of an unwelcome task "at a time when the tumult of battle" incited "an urge to pursue and kill." [111] The policy laid down in Circular 93 was followed as closely as possible in subsequent Central Pacific operations.[112]

On Leyte, for example, the provisional graves registration company assigned to the XXIV Corps was assisted by an attached field salvage unit that carried out no salvage work until its mortuary chores had been completed. The Southwest Pacific forces on Leyte attempted no such basic innovation. Though two graves registration platoons—one for each infantry division—were provided, no reserve whatever was available at corps or army headquarters, and supervision over the care of the dead became a responsibility of division quartermasters.[113]

[108] (1) 27th Div G–4 Saipan Rpt, Annex 2 to AdmO 2, 9 May 44. (2) *Ibid.*, QM Annex.

[109] 27th Div G–1 FORAGER Opn Rpt, p. 7.

[110] *Ibid.*, p. 4.

[111] Steere, *Graves Registration Service*, p. 141.

[112] 7th Div Opn Order, 28 Aug 44, sub: STALEMATE II, par. 2, Evacuation. DRB AGO P&O Drawer 1230:35.

[113] X Corps FO 1, 30 Sep 44, sub: Leyte–Samar Opn. DRB AGO P&O 1244:123.

The campaign for the recovery of the Philippines introduced new strategic and tactical factors that profoundly modified graves registration procedures. Lengthy campaigns of maneuver now replaced the battles of position which had characterized most of the previous Pacific operations. On Leyte the combat zone was limited, not by the area of a tiny atoll, but by that of a comparatively large island and the battle raged without interruption for nine weeks, making it necessary to establish many temporary cemeteries and bury many soldiers in isolated plots. Because of the large area over which combat troops advanced and the inability of Southwest Pacific Area division quartermasters to give close supervision to mortuary activities, Southwest Pacific divisions could not complete their graves registration work before they departed from the island. After the Eighth Army took over the occupation of Leyte, it found many dead still unburied and many isolated graves either unreported or incorrectly reported. These unfavorable conditions materially strengthened the contention that a larger number of graves registration units was needed and that these units should accompany the assault waves.[114]

Despite increasing recognition of the need for better care of battle dead, graves registration troops were available in the Luzon campaign at a rate only about half that of the concurrent campaign in Europe.[115] While one platoon was provided for each division, there were few troops that could be allotted to the corps or to army reserve. As combat troops moved forward from the beaches, the rapid pace of their advance governed the selection of cemeterial sites, which, for convenience, were set up at division collection points. So swift did the thrust through Luzon become that the dead had to be transported twenty-five or more miles for burial even in temporary cemeteries. Accordingly, divisional functions were limited to evacuation of remains and responsibility for burial was shifted to a rear-echelon organization, the Army Service Command, which employed its labor troops for the interment of remains brought to collecting points.[116] In the final stages of the operation the greatest possible number of dead was exhumed and concentrated in two semipermanent cemeteries.

Preparations for the seizure of Okinawa, main island of the Ryukyus, involved the XXIV Corps, a large part of which was on Leyte. For this offensive, the climactic battle of the war against Japan, the allotment of graves registration units, as of virtually all other Quartermaster organizations, was the most liberal yet made in the Pacific. Eight platoons were furnished, two of which were attached to the Corps, and one to each of the five Army divisions. One division eventually received a second platoon. The Pacific Ocean Areas system of associating provisional field salvage units with mortuary units was another feature of the Okinawa plan, which specifically provided that divisions would organize salvage units "from organic or attached service personnel." As soon as the tactical situation warranted, preferably on L or L plus 1, these units would gather bodies from local collecting points, supervise the excavation and filling of graves, and guard against looters. Combat commanders would provide labor troops for moving the dead to local collecting points. Infantrymen remained responsible for the disposition of enemy dead but

[114] Eighth Army Rpt Leyte–Samar Opn, 26 Dec 44–8 May 45, p. 68.

[115] Steere, *Graves Registration Service*, p. 156.

[116] Sixth Army After Actn Rpt Luzon, QM Sec.

were to be assisted as much as possible by field salvage units.[117]

The 96th Division plan for evacuating remains on Okinawa is noteworthy, for it provided graves registration technicians in zones of action. In all tactical units of this division a "burial and graves registration officer" was to be appointed. In battalions and higher echelons he would be helped by a "burial and graves registration section." While battalion sections were to be made up wholly of combat personnel, regimental sections would include three enlisted men from the graves registration platoon serving the division and twelve laborers from the attached Quartermaster service company. The division Burial and Graves Registration Section would include the attached platoon less individuals on detached duty and have as its major function the supervision of all mortuary activities.[118]

Graves registration on Okinawa in general proceeded according to pre-landing plans. Eight temporary cemeteries, including two of the Marine Corps, were established. They contained altogether 9,227 graves, the largest number for any Pacific operation. Of this number only 328 were unidentified. The 96th Division made more burials than any other Army organization—1,643, of which 1,601 were Army dead.[119] At no time were bodies transported more than twenty miles, a distance too short to require a shift in the control of evacuation and burial from the division to a rear echelon, as had been done on Luzon. At the end, the 27th and 96th Divisions were evacuating dead to the Island Command Cemetery, an action that perhaps indicated a trend toward early consolidation of burials in a corps or army plot. That a general development of this sort would have saved considerable time and labor in handling bodies was the final judgment of Island Command headquarters. "Terrain and tactical conditions on Okinawa," it maintained, "warranted a larger consolidation of burials than occurred." Under comparable circumstances in the future, it concluded, "burials should be consolidated." [120]

At Okinawa graves registration, which had been steadily improving since the days of Buna and Guadalcanal, reached perhaps the peak of its accomplishments in the Pacific. Three years before, few quartermasters, let alone combat commanders, had known much about graves registration, for it was a wartime service, the practice of which had become an almost forgotten art between 1918 and 1941. But experience was a first-rate teacher, and with it came knowledge and comprehension. Gradually, too, fairly well-trained units arrived, but there were never enough of them. In the Pacific war as a whole, the persistent shortage of these units, the rapid deterioration of bodies, and the frequent failure to provide graves registration troops early in an operation, caused a high percentage of isolated burials, inadequately marked graves, and incorrect recording of facts regarding the dead. Most important of all, there was a larger proportion of unrecovered bodies and unidentified bodies than in better manned theaters. All these shortcomings rendered more difficult the postwar tasks of searching for and recovering the unlocated dead, of identifying the unidentified, of verifying old identifications, and, finally, of disposing of remains in accordance with relatives' wishes

[117] XXIV Corps AdmO 10, 10 Feb 45, sub: Opn ICEBERG, Annex Love, par. 2. DRB AGO P&O Drawer 1238:33.

[118] 96th Div FO No. 12, 5 Mar 45, sub: Opn ICEBERG, Annex 11, App. 6. DRB AGO P&O Drawer A1237:25.

[119] Tenth Army Actn Rpt Okinawa, p. 11-I-38.

[120] Island Comd Actn Rpt Okinawa, p. 8-XV-30.

either in permanent overseas military cemeteries or in sites selected by the family in the United States. These tasks might have been less formidable had graves registration units been trained before Pearl Harbor and shipped promptly to overseas areas and had the prewar doctrine that made combat troops responsible for recovery of their own dead been modified to permit the use of technicians in areas of actual combat. Certainly, the application of similar measures in a new emergency would obviate at least some of the mistakes of World War II.

Weaknesses, comparable to those which characterized graves registration, also marred the performance of other Quartermaster services. All these services were hampered by inadequate manpower and by the tendency to assign units, once they became available in the zone of interior, to the forces in Europe rather than to those in the Pacific. When trained companies did arrive in the latter theater, they often proved ill-fitted for use by the relatively small, dispersed forces that normally conducted island warfare. These forces found it particularly difficult to employ the bulky and inflexible trailer-carried equipment of laundry, repair, and bath companies. In the few instances in which combat organizations improvised more suitable units for operational use, the results proved reasonably gratifying, but in general tactical troops simply went without the services. The carelessness with which infantrymen collected salvageable materials and combat dead in battle areas made clear the need for a general reconsideration of the wisdom of assigning these duties to front-line soldiers.

In the Pacific, then, the QMC found provision of its miscellaneous services a harder task than that posed by its supply responsibilities, and one it accomplished less satisfactorily. Some of the difficulties could have been avoided had more service units been available earlier and had equipment been adjustable to the peculiarities of Pacific warfare. If these requisites had been met, graves registration would have suffered from fewer shortcomings, troops would have obtained more bread, more baths, and better shoes, and their clothing would have been laundered more satisfactorily and more frequently.

CHAPTER X

Logistical Support of Combat Operations

The QMC was established and continued in existence for a single reason—to help insure victory in battle by providing American fighting men with essential supplies. If the Corps failed to achieve this objective, it failed in its basic mission. Logistical support thus became the overriding consideration to which all else was sacrificed. Formulation of supply plans for each new operation as it came along was the first step toward providing such support. As soon as the highest headquarters of the armed services in the United States and the Pacific had decided upon the seizure of a Japanese-held area and set the approximate size of the naval, air, and ground forces required for such an enterprise, Pacific headquarters, in cooperation with the combat organizations assigned to the operation, worked out supply plans in general terms.

In the Central Pacific, the J–4 Section of CINCPOA had responsibility for supervising and integrating logistical plans. It maintained direct contact with G–4, Headquarters, U.S. Army Forces in the Central Pacific Area (HUSAFICPA), which, in turn, kept in close touch with technical service officers of its own headquarters and of participating tactical organizations. A similar system prevailed in the South Pacific.[1] In the Southwest Pacific, MacArthur's headquarters, an inter-Allied, interservice command, had much the same role as did CINCPOA. It co-ordinated the logistical planning of USASOS and of the operational headquarters—the Allied Air Forces, the Allied Naval Forces, the Allied Land Forces, and the ALAMO Force (U.S. Sixth Army), which, until it was discontinued in September 1944, organized special task forces for ground offensives carried out chiefly by U.S. Army troops.[2]

In the earliest Pacific campaigns, before the higher headquarters had become well organized, logistical planning was pretty much a hit-and-miss affair, but as experience accumulated it became more and more systematized. At best it was a complex matter involving the onerous task of adjusting

[1] (1) Mid-Pac Hist, VII, 47–50. (2) Logistics Support for the Unified Command and Overseas Theater, an Address by Maj Gen Herman Feldman, The Quartermaster General, at Army War College, Ft Leavenworth, 6 Feb 51. OQMG 352.12.

[2] The staff of the ALAMO Force and of the Sixth Army was identical. As Sixth Army, it was subordinate to the Allied Land Forces, commanded by Australian General Sir Thomas Blamey; as ALAMO Force, it directed operations of ground organizations composed mostly of U.S. Army troops and was subordinate only to MacArthur's headquarters.

the supporting capabilities of the technical services to the precise needs of future campaigns. Its difficulty was increased by the strategic necessity for offensive operations that followed one another so swiftly as to afford little opportunity for careful preparations or for the assembly of supplies in the desired quantities. Realistic planning was rendered still harder by the practice of not immediately revealing to participating organizations what specific area would be the objective, a procedure that obliged units to carry out their planning with a typical rather than an exact objective in view. Even after the area of attack was identified, logistical planning usually had to be conducted without complete information regarding Japanese strength and the beaches, roads, trails, and other physical features that would be encountered. Absence of definite information about the exact quantity of certain types of equipment to accompany an operational force was still another complication. For example, data as to the quantity and type of vehicles that would have to be supplied with petroleum products seldom became available in early planning stages, and requirements for Class III supplies were of necessity roughly estimated on a gallon "per-man-per-day" basis rather than on the more accurate vehicular factors.[3]

In Quartermaster planning the first matter studied was the number and types of units necessary to carry out Quartermaster functions. These requirements were based not only upon total troop strength but also upon climatic conditions, the size of the territory to be occupied, and the availability of water and other public utilities. Whatever estimates were submitted, higher headquarters nearly always scaled them down in order to provide as large a proportion of tactical troops as possible. In explanation of its reductions in the estimates of the Quartermaster Section, Sixth Army, General Headquarters, Southwest Pacific Area, pointed out that the War Department assigned a certain number of troops to the area, out of which allotment the area commander was obliged to select the units he considered most vital to the execution of his mission. As Brig. Gen. Charles R. Lehner, Quartermaster of the Sixth Army, noted, this procedure created an unbalanced ratio between combat and supporting units.[4] Wherever, according to Col. James C. Longino, assistant quartermaster of this army, the Corps rendered inadequate service, the shortage of supporting units was largely responsible.[5]

In the Southwest Pacific Area, after the troop basis had been determined, the Quartermaster Section of the Sixth Army selected specific supporting units from Quartermaster organizations assigned to USASOS. Until U.S. troops returned to the Philippines, task forces ordinarily included only from 4,000 to 45,000 men, and the smaller Quartermaster units—squads, sections, and platoons—were often the only ones available for provision of Quartermaster services. In the larger task forces companies furnishing the more important services were at times augmented by one of these smaller units. Units chosen for operational duty continued to engage in base activities until about ten days before the task force was scheduled to sail. They were then officially assigned to the force for the duration of its mission. In the Sixth Army, Quartermaster officers frequently found that USASOS units needed

[3] OQMG, QM Gasoline Supply Opns, WW II, 15 Apr 48, pp. 46–49.

[4] Ltr, Lehner to Chief of Military History, 31 Mar 53. OCMH.

[5] Ltr, Col James C. Longino, USA (Ret) to Maj Gen Albert C. Smith, Chief of Military History, 11 Apr 53. OCMH.

to be more fully equipped and trained in order to carry out combat duties efficiently. As far as possible in the limited time available, these requisites were provided. When, as often happened, regularly established and trained units were unavailable, provisional units were organized to the extent permitted by the total allotment of troops. If such units could not be formed, task forces were of necessity deprived of some services.

In the Central Pacific, composite detachments often filled the gaps left by the shortage of Quartermaster units. Some of these detachments were made up of men trained for almost every sort of Quartermaster operation; others contained men qualified for only two or three specialties. The composite Quartermaster unit formed by the 7th Garrison Force to serve as part of the base establishment in the Gilberts consisted of 5 officers and 159 enlisted men from service, truck, bakery, laundry, and salvage companies, and it handled all Quartermaster responsibilities except those involving care of the dead. Since there were no available graves registration companies, men from the 27th Division were selected to form a provisional unit.[6]

In calculating its requirements for food, gasoline, and utility items, the Quartermaster Section, Sixth Army, refused to accept published War Department tables of maintenance requirements as fully applicable to the Southwest Pacific and even questioned War Department estimates of shipping space requirements per man per day for the four classes of supply. On the basis of its own experience the Quartermaster Section developed charts showing the weights and cubes of the different rations, the maintenance needs per man per day for the principal kinds of gasoline, fuel, and grease, the petroleum requirements of tanks, trucks, diesel equipment, field ranges, landing craft, and radar equipment, and the daily demand, expressed in pounds, for each class of supply.[7] All these charts underwent constant revision to reflect changing tactical and geographical conditions and the growing accuracy of issue figures.

Development of Special Supply Requirements

Amphibious and island warfare required special as well as standard equipment and forced radical departures from War Department Tables of Equipment. Quartermaster planners indeed found that one of their most important problems was the determination of what articles should accompany assault forces. For example, in August 1943, when plans were being laid for the Gilberts operation, a showdown inspection of the 27th Division, then in Hawaii, revealed grave shortages in equipment which could not be filled from stocks on hand, and much equipment so old and badly worn it could not undergo further usage. Close study of conditions likely to be encountered in the Gilberts disclosed a need for Quartermaster items normally issued only in small quantities or not at all. The scarcity of drinking water caused the hasty requisitioning of 3,000 canvas water buckets, 15,000 5-gallon water cans, and 11,000 additional canteens from San Francisco, and the necessity for some means of quickly cutting paths through tangled undergrowth led to the ordering of 10,000 machetes. Since some soldiers would be out of touch with organization kitchens, the division also

[6] QM Mid-Pac Hist, pp. 105–06.

[7] OQMG, Group and Battalion Operations, World War II (hereafter cited as OQMG, QM Gp and Bn Opns), 15 Jul 48, pp. 21–24. Four of the charts are published in this document.

submitted requisitions for 750 cooking outfits, each sufficiently large to provide hot food for 20 men. To furnish troops with a convenient means of washing their mess gear, the Corps of Engineers in Oahu manufactured 300 hot water heaters. From salvaged cots, tents, and tarpaulins the Hawaiian Quartermaster Depot fabricated 2,000 grenade carriers, each capable of holding four missiles. Finally, it bought locally 7,000 half-ounce metal containers to enable troops to carry salt tablets with the least possible danger of deterioration.[8]

Vital equipment and supplies were not always obtained with as little trouble as the 27th Division encountered, for local manufacture and purchase could rarely be accomplished as satisfactorily as in Hawaii during preparations for the Gilberts offensive. Nor, in general, was there much time for procurement of supplies from the United States. Even when the period of preparation was fairly lengthy, scarcities at home often delayed or prevented shipments. New items in particular were likely to be in poor supply, for several months were necessary to start production and the ETO and MTO usually had first call on available stocks.

Logistical Planning for Operations Against Yap, Leyte, and Okinawa

The manner in which supply requirements and other aspects of detailed Quartermaster logistical planning were ordinarily developed in the last two years of the war is illustrated by the preparations made by the 7th Division for the operation which was first planned against the island of Yap, one of the Caroline group, but which finally emerged as the assault on Leyte, the opening phase of the reconquest of the Philippines. In getting ready for this enterprise, the division, then on Oahu, worked under the general direction of Headquarters, USAFICPA. Its technical service sections began determining their logistical requirements in April 1944. The G–4 Section coordinated this project. To ascertain his needs, the division quartermaster established a special planning section, composed of a captain, a second lieutenant, and a sergeant, which acted under his direct supervision. As these, like other divisional planners were uninformed as to the precise objective, they assumed an amphibious landing on a medium-sized island. They determined the requirements for such an attack partly by studying shortages and partly by analyzing supply operations on Kwajalein two months before, paying particular attention to what items had proved satisfactory, what could be eliminated, and what new items were needed. Though higher headquarters set the total quantity of each general class of Quartermaster supply that could be transported, the 7th Division quartermaster planning group had considerable leeway in selecting the items and determining the quantities of each it wanted.[9]

Its recommendations, along with those of other technical services, were cleared through the 7th Division G–4 Section, which submitted them to Headquarters, XXIV Corps, for approval and consolidation with recommendations of the 96th Division, the other major combat unit of the corps, and for submission to still higher headquarters. Much discussion ensued between the various bodies of planners, but by late June tentative decisions had been reached. During the next few weeks changes

[8] Rpt of Participation of USAFICPA in GALVANIC Operation, 6 Aug 43–Feb 44, Sec. XVIII, pp. 73–74.

[9] 7th Div KING II G–4 Rpt, App. E (QM Rpt), pp. 1–2. OCMH.

in tactical plans necessitated minor revisions of supply lists, but in early August, when Yap was finally announced as the operational objective, clothing and equipment lists were ready for publication. Shipping shortages obliged the task force to limit trucks to half the number authorized in tables of equipment. Once this decision had been made, the office of the division quartermaster easily calculated gasoline and other petroleum requirements by simply taking the estimated average consumption of each type of vehicle under combat conditions and multiplying that figure by the number of vehicles.[10]

Meanwhile practically all Quartermaster elements in the 7th Division had become engaged in logistical preparations. The Operations Section in the office of the division quartermaster made preliminary plans for storing items sent direct to Hawaii from the United States, and other sections of the office attended to procurement of supplies and formulation of loading plans. The arrival of large cargoes from the United States inaugurated a period of intense activity for the 7th Quartermaster Company, the divisional Quartermaster unit, at Fort Kamehameha. Besides performing normal garrison duties, it issued equipment to bring stocks up to authorized levels, received, stored, and recorded incoming Quartermaster cargoes, and attended to the "palletized unit loading" of part of these shipments. For several weeks the latter task, carried out on the parade ground of the fort, almost monopolized its energies.[11]

Palletized unit loading, virtually unknown even in commercial circles before the war, was a novel method of speeding up the handling of cargo by assault forces. Unitized loads, commonly termed "sleds" in the Central Pacific, consisted of a number of containers strapped to pallets, that is, wooden floorings resting on stringers so as to permit the entry of the fork of a lift truck. Such loads made it possible to handle scores of containers as a unit and to utilize ship's gear, cranes, fork-lift trucks, and other mechanical aids in raising, lowering, moving, and stacking supplies.[12] Use of sleds did away with time-consuming manual loading of thousands of containers one by one. Palletized cargoes were quickly discharged into landing craft, dragged off on shore, and towed, two or three at a time, by tractors over the beach and, if necessary, some distance inland. Palletization, in the words of one observer, eliminated the "bucket brigade practices" inseparable from hand-carrying. The saving in manpower reached large proportions. It was claimed, for instance, that unitization made unnecessary the employment of the 36 men required to deliver the 432 K rations that constituted a single sled load.[13]

All this did not mean that the new method of shipment had no drawbacks. The process of palletization itself demanded considerable time and labor, and the loaded sleds occupied more cargo and storage space than did supplies shipped in the ordinary way. In being towed to dumps, sleds damaged uncompleted roads. Moreover, their handling demanded much mechanical equipment—a factor that, in view of the scarcity of this equipment, confined their use to amphibious landings where the savings they effected were most marked. Even in such operations they diverted so many tractors from other essential activities that

[10] *Ibid.*, G–4 Rpt, p. 2.
[11] *Ibid*, App. E, p. 2.
[12] Alvin P. Stauffer, *Quartermaster Depot Storage and Distribution Operations* (QMC Historical Studies No. 18), pp. 121–35.
[13] OQMG, QM Gp and Bn Opns, pp. 38, 42.

their value was materially diminished.[14] Nonetheless they were widely utilized by Central Pacific forces from the Gilberts to Okinawa. In the Southwest Pacific they found no favor until 1944 and then were employed but slightly. Palletization, according to the quartermaster of the Central Pacific Area, "should be limited to highly emergency supplies associated with the assault operation." Loss of shipping space, he added, barred use of the novel method after an area had been fully occupied and the saving of time had become less significant.[15]

When the 7th Quartermaster Company, along with other technical service units, participated in palletization of assault cargo for the projected attack on Yap, it became part of an enterprise in whose development the QMC had played an important role. In collaboration with Central Pacific Engineers that service had designed the sled and the method of loading applied in the Kwajalein and subsequent Central Pacific Area operations. This sled had proved the most suitable kind of pallet, for it had runners that slid easily over the coral of Pacific atolls and required less lumber and less time for construction than did the toboggan type of pallet. These were both important features since supplies coming from the United States were not unitized, and sleds for each new operation had to be hurriedly built in Hawaii.[16]

Petroleum products, combat rations, and other items packed in strong containers of uniform size and shape, were the Quartermaster supplies most successfully palletized. They were strapped together in the rectangular, flat-topped loads essential to solid stacking and efficient handling by mechanical equipment. No effort was made to palletize clothing and general supplies. Quartermaster loads, each weighing about 1,500 pounds, generally constituted from 20 to 25 percent of all unit loads.[17] In preparation for the projected Yap campaign the 7th Quartermaster Company palletized about half the combat rations and 5-gallon cans scheduled for shipment with the landing force.[18]

While the company was performing this task, the office of the division quartermaster drew up elaborate loading plans indicating the kind and amount of assault supplies, whether palletized or not, to be carried on landing craft. To prevent total loss of an item through the sinking of a single vessel, all ships in the same group were to carry the same items in the same proportions. In addition to combat rations, gasoline, and lubricants, cargoes would include bread components, salt tablets, atabrine, and one extra work suit for each man. Except for small replacement stocks of the most needed garments, no maintenance stores were to be carried; they would be provided by block vessels coming direct from the West Coast. As the date for the departure of the 7th Division approached, assault supplies were taken to the piers where the Quartermaster company made

[14] (1) Ltr, CINCSWPA to ALAMO Force *et al.*, 28 Jul 44, sub: Palletized Cargo. (2) Ltr, CG ALAMO Force to CINCSWPA, 8 Sep 44, sub: Pallets in Amphibious Opns. Both in ORB Sixth Army AG 451.9. (3) Rpt, Maj Robert E. Graham, Jr., 1 Dec 44, sub: KING II Opn, p. 18. ORB USAFINC AG 370.2.

[15] (1) OQMG, QM Gp and Bn Opns, p. 40. (2) OPD Info Bull, Vol. I, No. 1 (20 Jan 44), pp. 6–8.

[16] Memo, Maj Maynard C. Raney for ACofS G–3 HUSAFICPA, 16 Feb 44, sub: Test of Palletized Sups. ORB AGF PAC AG 400.

[17] Annex B, Pt. C, 7th Div GO 63, 27 Nov 43, sub: Sled-Pallet Rpt, pp. 24, 25, 39. OQMG POA 319.25.

[18] (1) 7th Div KING II G–4 Rpt, Table II. (2) Memo, Dir of Plans and Opns ASF for ACofS G–4, 11 May 45, sub: G–4 Rpt USAFPOA. OQMG POA 319.25.



PALLETIZED SUPPLIES *at a supply dump on Kwajalein.*

sure that they came in the prescribed quantities and were then placed aboard ship in line with the loading plan. Quartermaster troops also participated in simulated landings and distribution of items to troops on shore.[19]

In mid-September 1944, after the division was at sea, word suddenly came that its objective had been shifted from Yap to Leyte. This change intensified logistical difficulties. Supplies and equipment, ample for a short operation on a small island like Yap, were inadequate for a prolonged battle on sizable, stoutly held Leyte. In particular, more rations, insect repellents, salt tablets, and atabrine were needed, not to mention such items as PX supplies and laundry soap for individual washing, stocks of all of which, because of the additional time required to reach the new and more remote objective, were quickly depleted. On arriving at Eniwetok, the assistant division quartermaster flew to Finschhafen to obtain more of these items—a venture that achieved partial success. The additional supplies were moved to Manus Island in the Admiralties, where the division put them on whatever vessels could be made available. Troops on Leyte nevertheless were not supported as well as they would have been had that island been the announced objective from the beginning.[20]

The battle for Leyte had not yet reached its final stage when the 7th Division quartermaster began preparation of supply plans for the coming Okinawa campaign. Not-

[19] 7th Div KING II Rpt, App. E, p. 3.

[20] *Ibid.*, p. 2, Incl. 1.

withstanding that the 7th Quartermaster Company was still busily supporting combat activities, part of its members were diverted from this task to help man huge Quartermaster dumps being established on Leyte to supply the division in the new offensive. More than 7,000 tons of materials had been assembled by the beginning of March 1945. On the 4th, shipments to "loading out" points started, and by the 25th all supplies for the opening phases of the new operation had been placed aboard ship. Meanwhile the troops and trucks of the company had been loaded on twenty-two vessels. During the voyage the elements of the unit were assigned to larger groups to hear lectures about what might be expected on Okinawa. These lectures, supplemented by maps, plaster reliefs, and photographs, conveyed information that was later to prove helpful in truck operations and in the establishment of dumps. On L Day, 1 April, most of the company landed and began to carry out the combat aspects of its logistical plan.[21]

Quartermaster Units in Combat Operations

Preliminary preparations for operational supply were only a single phase of logistical activities. Much more important was the adequacy of the support actually rendered to tactical soldiers in battle. This was a matter that depended upon the number of Quartermaster troops, the terrain of the combat zone, the availability of roads, trails, trucks, and human carriers, and the amount of Quartermaster cargo actually discharged on the beaches. These conditions, which varied from operation to operation, largely determined how well Quartermaster troop units carried out their duties.

Division Quartermaster Company

These units were the agencies through which the QMC gave direct support to tactical organizations. In general the most important supporting unit was the Quartermaster company that formed an organic part of the infantry division and had as its primary mission the supply of Quartermaster items. In many Pacific operations this company indeed provided all or nearly all the Quartermaster troops. Composed of a small administrative staff, one service platoon, and three truck platoons, it had about 10 officers and 183 enlisted men. The service platoon was set up to furnish the labor for receiving and checking incoming food shipments and for breaking them down, that is, dividing a score or more of items into lots proportionate to the strength of the fifteen or so divisional units. This platoon also had responsibility for handling clothing and equipment and for checking gasoline and oil receipts to determine if they met the needs of the 1,000 to 2,000 vehicles belonging to divisional units. The three truck platoons had as their chief function the transportation of troops, ammunition, rations, water cans, captured materials, and enemy dead—indeed, almost anything that had to be transported. The Quartermaster company was charged with guarding Quartermaster installations, particularly supply dumps, and was therefore designated a combatant unit and provided with rifles, machine guns, grenade launchers, and intrenching tools. The division quartermaster, operating under the supervision of G–4, co-ordinated company operations. His office received and processed requisitions for QM

[21] Opn Rpt, 7th QM Co, Ryukyus Opn, 1 Apr–30 Jun 45, pp. 3–5. DRB AGO 307-QM-0.3 (25373) M (1 Apr–30 Jun 45).

items from divisional units, arranged for the time and place of deliveries, and in close collaboration with G–4 allocated trucks among divisional activities. Normally, G–4 controlled all vehicles used for tactical purposes.[22]

The tasks actually performed by a divisional Quartermaster company in the Pacific varied markedly from those prescribed when this type of unit was established, primarily with continental warfare in mind. In that sort of warfare the service platoon would have received supplies at distribution dumps maintained by army or corps troops, but in island warfare—before the Philippines were reached—a division, or a reinforced division, usually operated alone, and the company itself had to set up and maintain distribution centers.[23] Another difference between island and continental warfare was the persistently amphibious character of supply even when conventional land fighting followed the seizure of a beachhead. Supply depended upon ships which arrived only at irregular intervals. To insure the availability of ample stocks, the company had to store if possible a 10- to 30-day supply of vital articles instead of the 1- or 2-day supply common in continental areas with good railroad and highway systems capable of delivering freight daily.[24] Maintenance of such high stock levels placed a heavier burden on troops and equipment than the War Department had foreseen when it set up the divisional company. The difficulty of attaching extra units to a division for protracted periods of time to help the Quartermaster company perform these added tasks further complicated the problem. While such units could be and indeed often were attached to divisions, the general shortage of service troops ordinarily forced their quick detachment and assignment to base installations. Had Pacific operational forces been able to follow the ETO practice of shifting attached service units about from division to division as need arose, the problem would have been considerably less serious, but the necessity of using separate beaches normally prevented employment of such units for supply of several organizations.[25]

Truck platoons, too, performed functions somewhat different from those envisioned when the divisional company was established. A platoon leader, for example, was supposed to accompany his unit on convoy and supervise the maintenance of vehicles. Actually, the dangers encountered in the early stages of combat operations usually prevented the convoying of trucks. It was faster and safer to dispatch them singly or in groups of two at more or less regular intervals. Platoon leaders were in consequence utilized largely for other activities. During the operations of the 7th Division, for example, these leaders usually supervised Class I, II, and III supply dumps.[26] Summing up his wartime impressions of the transportation requirements of a division in the Pacific, an Army Ground Forces observer declared:

> Normal transportation assigned a Division is inadequate in quantity and type. Age of vehicles is a positive factor of reduction. No cargo vehicle (2½ ton 6x6) should be retained

[22] (1) T/O&E 10–17, 15 Jul 43, sub: QM Co, Inf Div. (2) OQMG Quartermaster Operations in Divisions, World War II (hereafter cited as OQMG, QM Opns in Div), 15 Jul 48, pp. 2–9, 15–16.

[23] Ltr 2, Capt Robert L. Woodbury, OQMG Obsvr, to Dir Mil Plng Div OQMG, 5 Sep 44. OQMG POA 319.25.

[24] Pacific Warfare Board Rpt 34, 17 Aug 45, sub: QM Questionnaire. ORB Pacific Warfare Bd File.

[25] Rpt 1 (Okinawa series), Capt Robert D. Orr, 6 May 45, sub: QM Activities on Okinawa, pp. 25–27. OQMG POA 319.25.

[26] P. 2 of Rpt cited n. 21.

by a unit when the mileage thereon exceeds 25,000 miles as the combat performance thereafter normally expected must be reduced by half. The present fifty-one 2½ ton cargo trucks authorized a Division Quartermaster should be increased to ninety-nine, providing six truck platoons of sixteen vehicles each, with provisions for army or corps replacement of a portion thereof, during combat at least, by DUKW's, Amtracks, 1½ ton cargo or ¾ ton vehicles as the terrain may demand.[27]

Owing to the operating problems encountered by divisional Quartermaster companies, numerous recommendations were made for increasing their equipment and troop strength. In May 1945 Lt. Gen. Walter Krueger, commanding general of the Sixth Army, requested USAFFE to authorize the addition of eighteen men to the truck platoon "to provide sufficient drivers for 24-hour operation." The service platoon, he continued, needed twelve more men "to increase the labor personnel." [28] After the New Georgia operation the XIV Corps suggested that an entire service company be assigned to the division quartermaster. In fact, since divisions often operated alone, without benefit of the laundry, salvage repair, bakery, bath, and graves registration elements, normally available from units attached to army or corps, Pacific quartermasters and OQMG observers often recommended that a full Quartermaster battalion, capable of providing not only more laborers and truck drivers but also other Quartermaster services, be substituted for the Quartermaster company.[29] Headquarters, Army Ground Forces, in Washington refused to consider these suggestions on the ground they lacked theater approval and did not "originate in a theater where the bulk of the Quartermaster Companies, Infantry Division . . . are operating." In any event, that headquarters added, "tables of organization must be applicable to all theaters." [30]

Unable to obtain an increase in their regular allotment of troops and equipment, divisional Quartermaster companies tried to carry out their combat functions by working on a 24-hour schedule. At times they supplemented their normal strength by the formation of provisional units. At Bougainville, for example, the Quartermaster company of the Americal Division used vehicles assigned to artillery battalions and troops assigned to infantry regiments to make up a provisional truck company. This special unit employed altogether ninety-six 2½-ton cargo trucks. For weeks these vehicles worked on the beaches in volcanic sand and salt water. The combination of these two elements wore out brake shoes in less than ten days, and wheels had to be changed about once a week. The shortage of mechanics and spare parts hampered repair work, and about a fifth of the trucks were usually unserviceable.[31] If troops could have been made available, Quartermaster companies might have formed all sorts of provisional units, but in actuality they were normally able to organize only salvage and graves registration units. After landing at Cape Sansapor in Dutch New Guinea, the 6th Quartermaster Company established a provisional salvage platoon, which included twenty-eight men by the end of the campaign. This platoon was divided into four teams, each composed of five men, who col-

[27] Ltr, CG AGF to CG ASF, 21 Dec 45, sub: Obsvr Rpt. OQMG POA 319.25.

[28] Quoted in Rpt cited n. 24.

[29] (1) Memo, QM CPBC for Col Rohland Isker, 4 Jul 44, sub: Augmentation of Div QM Co. OQMG POA 319.25. (2) Ltr cited n. 23. (3) Rpt cited n. 25.

[30] 1st Ind to Memo, TQMG for CG AGF, 2 Oct 44, sub: Augmentation of Div QM Co. OQMG POA 319.25.

[31] OQMG, QM Motor Opns WW II, 15 Jun 48, pp. 68–69.



TRUCKS OPERATING FROM THE BEACHES *rapidly became unserviceable owing to the action of salt water and sand on the moving parts.*

lected salvaged supplies from battalion and regimental collecting points, and a group of eight men, who assembled all supplies by item. Graves registration provisional units were usually considerably smaller.[32]

Division Quartermaster Company in Combat in New Guinea

The operations of the 41st Quartermaster Company in the Hollandia region of Dutch New Guinea illustrate the sort of tasks performed by Quartermaster troops in supporting combat operations in New Guinea. The Hollandia campaign, beset by serious logistical problems stemming from rain, mud, coastal mangrove swamps, steep rugged hills, long narrow passes, jungle terrain, and roads little better than foot trails, represented fairly well the conditions under which the QMC carried out its activities. The operations of the 41st Division began on D Day, 22 April 1944, when it landed on White Beaches 1–4 along the shores of Humboldt Bay. As soon as the first assault waves had gone ashore on White Beach 1, a reconnaissance party, including two Quartermaster officers and two Quartermaster enlisted men examined dump sites and bivouac areas near Pancake Hill, about 600 feet from the narrow, sandy beach. The party selected sites for the ration dumps, the first Quartermaster dumps to be set up, but found that burning Japanese supplies and the swampiness of the area prevented quick construction of a road and made necessary the retention of most trucks and rations on White

[32] *Ibid.*, p. 83.

Beaches 1 and 2. On D plus 1 a Quartermaster detachment of one officer and seventeen enlisted men went to Pim, a village just south of White Beach 4 and at the terminus of the road running inland. This unit was to receive supplies shipped in small boats from the other beaches and issue them to the 186th Infantry fighting its way toward the main objectives, the three Japanese airfields along the shores of Lake Sentani. Other Quartermaster troops on the beaches to the north supplied the 162nd Infantry at and about Hollandia by water until engineers could build a road to Pancake Hill, more than 3 miles south of the town.[33]

As in most of the amphibious operations of the 41st Quartermaster Company, lack of sufficient labor to handle cargo delivered to its beach dumps complicated supply activities. This difficulty arose because no assault troops could be spared from tactical operations and all service troops were turned over to the beachmaster unloading cargo in the limited time available for this essential task. Normally, landing craft were discharged only between 0900 and 1700, when naval safety regulations required such vessels to pull away from shore. Under these circumstances supplies of all sorts were jumbled together and hastily shoved on DUKW's or roller conveyors. This meant that Quartermaster dumps received large quantities of non-Quartermaster cargo that held up the issue of rations and other items.[34]

At Pim the narrow beach and steep terrain forced the Quartermaster detachment for two or three days to maintain dumps on hillsides, where heavy rains soaked supplies and equipment. As soon as the beachhead was widened sufficiently, the detachment moved the Class I and III dumps to much better locations in a coconut grove two miles from the village. By this time the arrival of more Quartermaster troops permitted the assignment of three officers and thirty-seven enlisted men to the new dumps.[35] During the following days most of the Quartermaster company was concentrated in the Pim area, for there was located the 41st Division's chief supply line—the road to Lake Sentani. Arrival of these reinforcements and of service units from the organizations that had landed on Tanahmerah Bay furnished an abundance of manual labor for Quartermaster operations.

Transportation problems were not so easily solved. As was generally true in Pacific operations, the principal sources of trouble were the shortage of trucks and the inadequacy of the road system. The Quartermaster detachment temporarily met the first difficulty by repairing and using five captured Japanese vehicles, but the poor trail to the Lake Sentani plain continued to retard deliveries. Moreover, gauged by jungle standards, this eighteen-mile trail was a long one.[36] Washouts occurred frequently. On one occasion trucks bound for the lake region with rations for the 186th Infantry were stalled from early morning to late afternoon. Not until vehicles were brought to the other side of the impassable section and the rations carried across it by hand and reloaded could the food move forward again. Worst of all, the road deteriorated rapidly under heavy trucking and frequent rains,

[33] (1) Hist Rpt 41st QM Co for 1944, pp. 1–2. DRB AGO 341-QM-0.1 (28061) M 1944. (2) For a full discussion of the Hollandia operation see Robert Ross Smith, *The Approach to the Philippines,* UNITED STATES ARMY IN WORLD WAR II (Washington, 1953).

[34] Anon., " 'Mission Unexpected' was the Watchword of the 41st DQM Company in the Pacific," *QMTSJ,* VIII (7 September 1945), 7.

[35] Opn Rpt 41st QM Co Hollandia Campaign, 15 Apr–19 May 44, p. 3. DRB AGO 341-QM-0.1.

[36] Smith, *Approach to the Philippines,* pp. 17, 80–82.

and from time to time stretches of this vital supply link had to be closed for repairs. Transportation difficulties indeed delayed for some days the removal of the dumps from Pim to the Lake Sentani region, where they could have more easily supplied tactical elements. Finally, the I Corps intensified the transportation woes of the Quartermaster detachment by taking over the captured vehicles, leaving it again short of vital trucks.[37]

On White Beach 1 there meanwhile occurred a conspicuous example of how completely battle hazards might disrupt logistical plans. On the second evening after the landing a Japanese plane scored a direct hit on an ammunition dump, setting off a series of violent explosions that ignited gasoline stores. For two days the conflagration raged virtually unchecked among supplies and equipment massed on White Beaches 1 and 2, destroying 60 percent of the rations, estimated at more than 400,000 in number. The 41st Division was left with scarcely any food except that on White Beach 3. This disaster made it necessary to put the advancing 186th Infantry on half rations, employ captured Japanese subsistence, and transfer subsistence from the forces that had landed at Tanahmerah Bay.[38] Even when ration cargoes could be assembled at Pim, they could not always be moved over the inadequate roads. In this emergency air supply, too, was ineffective. While the Japanese airfields at Lake Sentani fell into American hands on 26 April, they were so heavily damaged as to be temporarily almost valueless for supply of inland forces. The combination of ration scarcities and transportation difficulties indeed compelled the 186th Infantry to live for three or four days mainly on rice and canned fish from seized Japanese stores.[39] At Pim the ration stock steadily dwindled and by 1 May was down to 300 cases. Luckily for hungry troops, large quantities of subsistence arrived in Humboldt Bay two days later.

Except for a few odds and ends of clothing and general supplies, the only Class II and IV items available for issue during the Hollandia operation were those brought in with the assault force. The Quartermaster company on 30 April received a small shipment of blankets and hammocks from Finschhafen and on 10 May an emergency air shipment of some urgently needed articles of clothing and general utility, but aside from these relatively unimportant receipts the troops at Hollandia had to get along with what they had brought with them. A sizable cargo of these classes of supply did arrive in Humboldt Bay on 15 May, it is true, but it was intended for use by the 41st Division in its next operation—that against Biak Island, for which Z Day was 27 May.[40]

Special Problems of Logistical Support

It is not too much to say that in the Pacific there were no really typical Quartermaster operations in combat. Though these operations were all similar in that they involved amphibious campaigns, each new campaign presented details that distinguished it from others. These differences as well as the similarities deserve consideration.

Remote Supply Bases

The campaign for the recovery of Buna, Gona, and Sanananda, which began with

[37] Rpt cited n. 35.

[38] (1) Opn Rpt RECKLESS Task Force, Hollandia, p. 19. (2) Rpt, Capt Orr, 20 May 44, sub: LETTERPRESS Opn, p. 1.

[39] Smith, *Approach to the Philippines*, p. 81.

[40] Pp. 4–5 of Rpt cited n. 33(1).



SMALL BOATS OPERATING CLOSE TO SHORE *were invaluable in the shallow coastal waters surrounding New Guinea.*

a combined Australian–United States assault on 19 November 1942, presented serious logistical problems. These problems sprang largely from lack of complete tactical and logistical preparedness for the campaign which the still weak American forces hastily undertook in order to regain points that in hostile hands would be standing threats to the safety of the Australian mainland. Throughout the operation the main supply bases, Port Moresby and Milne Bay, were remote from the scene of fighting—respectively, more than 300 and 200 miles by water. Not until almost the very end of the campaign could a reasonably satisfactory intermediate base be set up at Oro Bay, and even then the new establishment could not be stocked adequately. In the beginning, moreover, supply over the long water route was a perilous undertaking. Few planes could be spared to protect the landing of cargo, and naval support, too, was limited. Shallow coastal water, coral reefs extending out from shore as much as 20 miles, and lack of docking facilities for nearly 200 miles south of Buna, further handicapped sea-borne traffic. Because of these difficulties only small boats—unhappily, few in number—could be employed.[41]

Cargo, brought in freighters from Port Moresby to the newly established base at Milne Bay, was unloaded onto smaller ves-

[41] For a detailed discussion of the logistical problems of the Papuan operation, see Samuel Milner, Victory in Papua, a forthcoming volume in the series UNITED STATES ARMY IN WORLD WAR II.

sels with a capacity of 50 to 500 tons and shipped to the intermediate bases at Pongani or Oro Bay, respectively, about 35 and 15 miles below Buna. Here supplies were again transshipped, this time to still smaller vessels, usually fishing trawlers, carrying only 10 to 30 tons. These boats then sailed for one of the receiving points set up at coastal villages close to the combat zone.[42]

As these boats sneaked up the coast, high waves occasionally broke over them, damaging or carrying overboard considerable amounts of cargo. But the most ominous peril in the opening phases of the campaign came from hostile planes, which often came and went at will, compelling boats to travel under cover of darkness. When the vessels arrived at their destination, they anchored several hundred yards offshore. Since Transportation Corps troops were not available, Quartermaster troops became mainly responsible for discharging cargoes. "Stark naked, with waves pounding over their heads, they pushed rowboats and native canoes out through the breakers, transferred them back to the beach, making dozens of exhausting trips without rest in order to get the vulnerable trawlers on their way again before daylight." [43]

The Papuan campaign demonstrated that, while remote bases might serve satisfactorily as sources of supply for forces operating in continental areas with suitable means of transportation, in amphibious warfare such bases resulted in supply lines that were too long and tenuous. This was true not only of operations on small islands but also in New Guinea. Though that island was large in area, its transportation problems somewhat resembled those of the smaller islands. Few military groups—and those usually small ones supplied by air—operated deep in the pervasive New Guinea jungle. Areas under attack, which were always located along the coast, became, in effect, islands. In the Papuan campaign reliance upon distant Port Moresby and Milne Bay for currently needed supplies, though unavoidable under prevailing conditions, had thus put the assaulting forces too much at the mercy of disrupted transportation channels.

In subsequent offensives, therefore, the increasing number of specially constructed landing vessels, a new type of small craft capable of discharging supplies directly onto beaches, became a major determinant of the pattern of logistical support. In accordance with this pattern, supplies for the opening stages of an offensive were shipped with the task force and landed during the first few days. Unless these supplies were destroyed in combat or otherwise lost, the assault waves were thus freed of dependence on far-off installations during the opening phases of an operation. The pattern for landing craft in the Biak operation of May–June 1944 was typical of those generally employed. Landing schedules, covering the first few days of the attack and listing the kind and number of vessels and the supplies each would carry, were prepared well ahead of the assault and carried out to the extent that unloading and tactical conditions allowed. In the last year and a half of the conflict block vessels achieved a comparable result insofar as replacement supplies needed in the latter stages of an offensive were concerned.[44]

[42] Rpt, Col Horace Harding *et al.*, 11 Nov 42, sub: Visit to New Guinea, 2–9 Nov 42. ORB I Corps AG 384.

[43] (1) E. J. Kahn, *G. I. Jungle: An American Soldier in Australia and New Guinea* (New York: Simon and Schuster, 1943), p. 88. (2) Opn Rpt 107th QM Det, pp. 1–10.

[44] Maj Herbert E. Gerfen, "Task Force Operation," *QMR*, XXV (September–October 1945), 41.

Use of Landing Craft in Assault Supply

Ordinarily, tactical successes permitted landing craft to beach and start unloading their cargoes within a few hours after the assault waves went ashore. But even such swift discharge of supplies and equipment did not always insure the availability of items needed by combat troops. The better part of a day—usually longer—elapsed before all cargoes could be discharged and prepared for issue. Meanwhile tactical units had often exhausted the stocks of ammunition, gasoline, rations, or other indispensable items they had taken with them. To hasten the provision of such articles during the assault phase of an operation, an LST-DUKW system of supply was developed in the Central Pacific and employed, apparently for the first time in the Pacific, by the 7th Division at Kwajalein.[45] As this system operated in the initial resupply of this division's infantry regiments at Leyte, it furnished what was in effect a motor pool on water. It was based upon 40 DUKW's, or 2½-ton amphibian trucks, each of which was variously loaded with items recorded as to kind and quantity by an Army control officer stationed on a naval ship. The DUKW's were brought to the assault area by LST's (landing ships, tank). As infantry regiments on land required supplies, they radioed their requests to the control officer, who had kept track of their location as they progressed inland. He ordered the appropriate DUKW to proceed to a specified beach, where a regimental officer met and directed it to the proper location, always as near as possible to the front. After delivering the items, the empty DUKW reported back to the control officer, who ordered it either to await instructions or to pick up specific items from one of eight LST's loaded in "drug store" fashion with a mixed cargo of supplies likely to be in demand. If a DUKW was assigned the latter task, it discharged its load at the beach designated by the control officer. Operations of this sort caused the LST–DUKW system of initial supply to be called the "drug store" system.[46]

Distribution Points

This system was utilized for supply of the 7th Division only during the first six hours after the assault waves had swarmed ashore at Leyte. Quick tactical success thereafter permitted LST's to begin discharging their cargoes in bulk on the beach, and the job was rushed to swift completion in order to permit prompt withdrawal of naval ships from their exposed position. Dumps were, in fact, established so rapidly that they could not be properly dispersed and revetted. Within sixty-five hours—substantially ahead of schedule—unloading operations had been completed. By that time Quartermaster distribution points had large stores of Class I and III items, but the incessant inflow of supplies had congested the dumps so much that segregation of stocks by item became a time-consuming task.[47] Trucks of the 7th Quartermaster nevertheless began delivery of combat rations to supply points of the forward regiments the day after the landing.

In order to handle better the huge accumulation of materials, troops of the 7th Quartermaster Company had to bivouac in the dump area. At nightfall on A plus 5—October 25—a Japanese plane dropped in-

[45] OQMG, QM Opns in Div, pp. 62–63.

[46] USAFFE Bd Rpt 126, 15 Feb 45, sub: Initial Sup of 7th Div by DUKW's. ORB AFPAC Pacific Warfare Bd File.

[47] 7th Div KING II G–4 Rpt, App. E, pp. 3–4.

cendiary bombs. One fell in the 7th Quartermaster Company motor pool, a second near the office of the division quartermaster, and a third in an ammunition dump, which "exploded continually for 9 hours and intermittently after that until about 1430 on the 26th." An OQMG observer, who stood only about 200 feet from the ammunition dump, reported that he "jumped into a Jap foxhole which was deeper than my own and dug into the bank with my hands for about 4 hours." Though his foxhole had five large shell fragments in it, he escaped with only a blister on a finger "from a piece of hot shrapnel" which missed his hand "by a hair, a few shrapnel holes" in his coat, and "minor scratches." [48] Many members of the 7th Quartermaster Company were not so fortunate. Thirteen lost their lives, and fifty were wounded.[49]

This disaster interrupted but did not stop Quartermaster activities. As the task force widened the beachhead, the distribution points of the company were advanced in order to keep as close as possible to forward elements. By A plus 6 the unit had set up two advance points near San Pablo airstrip to maintain a 5-day supply of food and gasoline. Soon afterward it established a similar distribution point, maintaining a 2-day supply, at Dulag airstrip, still nearer the front. These three installations drew food and gasoline from Quartermaster beach dumps, which, after A plus 7, were turned over to the XXIV Corps Quartermaster. That officer then assumed the responsibility of keeping forward distribution points well stocked. Units submitted requisitions for clothing and general supplies to the division quartermaster. To prevent creation of immobile stocks of these items, sparingly issued in combat, he approved for presentation to the corps quartermaster only such requisitions as were vital to continued support of tactical forces. Throughout the Leyte operation the division quartermaster followed a basic pattern of setting up Class I and III distribution points in the wake of advancing troops. When an established point was no longer needed, its stocks were promptly issued. After USASOS Base K began operations, unit requisitions for Class II items were submitted to it every ten days and filled from its stocks.[50]

The X Corps had the rare advantage of being able to store many of its supplies in warehouses at Tacloban, but the XXIV Corps, of which the 7th Division was part, was obliged to follow the normal Pacific pattern of setting up dumps in the open. All the disadvantages associated with such exposed storage areas were intensified by their hasty establishment under circumstances that allowed little choice of location. The principal considerations governing the selection of sites were accessibility to roads, if any existed, and proximity to the elements to be supplied. Even firm, dry areas, usable in all sorts of weather, could not be picked unless they met these requisites. If the division advanced rapidly, supply dumps kept pace with it. The nearer a dump was to the front, the smaller its stockage. Ordinarily, a forward distribution point contained a 2-day supply of Class I and III items, while a rear one contained a 5-day supply. Stocks were replenished from army or corps supply points set up at comparatively safe sites some distance behind the divisional dumps.

In mid-November, after elements of the 7th Division had moved rapidly down the east coast from Dulag, seized the important

[48] Ltr, Capt Robert L. Woodbury to Col Doriot, 12 Nov 44. OQMG SWPA 319.25.

[49] Hist Rpt 7th QM Co for 1944, pp. 3–4.

[50] *Ibid.*, pp. 5–6.

town of Abuyog a dozen miles directly south, and struck across the waistline of Leyte to Baybay on the west coast, most of the division was concentrated in that region. Rear dumps were maintained at Dulag and intermediate installations at Abuyog; meanwhile large stocks were built up at Class I and III dumps on the west coast in preparation for a powerful movement northward against the stronghold of Ormoc, where the Japanese were gathering reinforcements from the whole northern part of the island for a determined stand. Ten days after the offensive was launched, these dumps were closed and new ones established seven miles up the coast. On 7 December, the 77th Division landed just south of the Japanese citadel and joined in the attack. Ormoc fell on the 10th. For some days the distribution points, carrying a 1- to 6-day supply level, cared for 77th as well as 7th Division troops.[51]

Land Transportation

The 7th Division used all sorts of transportation methods to keep front-line troops on the west coast of Leyte adequately supplied. The G–4 operations report noted that it had been necessary to employ trucks, large and small landing craft, DUKW's, amphibious trailers, caterpillar tractors, planes, and even carabaos, native canoes, and hand carriage. All these methods had to be used not only because of the normal obstacles to smooth transportation—heavy rainfall, almost impassable terrain, poor roads and trails, lack of bridges, and truck shortages stemming from insufficient shipping space—but also because of the extensive territory that had to be covered. From the rear dumps at Dulag to Ormoc the supply line traversed more than eighty miles. Landing craft ferried supplies down the east coast to Abuyog, where they were transferred to trucks and hauled over mountainous roads to Baybay. Here they were transferred to DUKW's or LCM's (landing craft, mechanized) and carried to truckheads located at various points along the west coast north to Ormoc.[52]

Throughout the northward drive of the 7th Division all trucks of the Quartermaster company and most of its trailers operated continuously as part of the motor pool controlled by the divisional G–4. So treacherous was the road leading from Abuyog to Baybay that the single Quartermaster truck platoon had to be strengthened by the addition of two truck companies from the Fifth Air Force. On one occasion when the road became impassable, the division called for an airdrop of motor gasoline. In answer to this request planes successfully dropped thirty-seven 55-gallon drums on the beach at Baybay. Two truck platoons of the Quartermaster Company received supplies brought to truckheads south of Ormoc and transported them to divisional distributing points or, if conditions permitted, to using units. When the 7th Division shouldered the added burden of supplying the 77th Division, it became obvious that there were not enough trucks to haul the supplies of both organizations. The system of distribution was therefore modified by utilizing LSM's for moving part of the supplies from Dulag around the island to Ormoc, where six vessels were scheduled to arrive every three days. The direct shipment by water reduced the pressure on trucks along the west coast, but supplies meanwhile continued to pour into Abuyog for overland movement. All three truck platoons of the Quartermaster

[51] 7th Div KING II Opn G–4 Rpt, p. 14.

[52] *Ibid.*, pp. 14–16.

company were therefore concentrated on this run.[53]

Air Transportation

From the very beginning of combat operations in 1942, air transportation had been used as an emergency supplement to other methods of moving supplies during combat operations. Since this practice was new to both airmen and infantrymen, satisfactory equipment was not at first available. Cargo parachutes were so scarce that they could be employed only for the most essential or most fragile items—small arms, ammunition, medical supplies, and bottled liquids. Rations, clothing, and personal equipment other than arms were merely rolled in bags or blankets, wired, and "free dropped," that is, dropped without parachute. During the Papuan operations Quartermaster troops, aided at times by men from other services, wrapped the supplies of all Army components and, when parachutes were used, attached the packages to these contrivances. Several Quartermaster troops accompanied the planes and at the proper moment expelled the cargo. Receiving areas on the ground were indicated by panels, smoke signals, and white streamers, but complete accuracy in identifying and hitting these areas from a fast-moving plane proved an almost impossible feat. More than half the cargo dropped without parachute was irrevocably lost, smashing to bits on striking the ground or else falling not on designated targets but deep in the jungle or on inaccessible mountain slopes. Owing to these mishaps, the troops struggling along on land repeatedly went hungry and ill-clad.[54]

During the fighting in the Nassau Bay–Salamaua region of northern New Guinea in the summer of 1943, cargo parachutes of good quality were still scarce, and methods of bundling rations and attaching the packages to the rim of a parachute clearly needed substantial improvement. In mountainous and heavily forested regions, according to Col. Archibald R. MacKechnie, commander of the 162d Regiment, air dropping without parachutes proved "costly, undependable and wasteful of both supplies and manpower," only 40 to 75 percent of the cargoes ever being recovered.[55]

In the New Georgia campaign, conducted at approximately the same period as the Nassau Bay–Salamaua operations, rugged mountains and rain forests at times halted transportation by land and forced resort to paradrops. Of the 118 tons of supplies dropped to field units, more than 59 tons consisted of rations; of 18 air supply missions, 16 involved the delivery of food. On only one mission were Quartermaster items other than subsistence carried. The methods of air supply represented a marked advance over those employed in the Salamaua operations. Three kinds of containers were utilized. The most common type held 192 rations and loose cigarettes. A smaller type carried 80 rations, and a third, still smaller, held three 50-pound bags of rice.[56] C–47 transport planes—usually four to a mission—carried the rations. Occasionally, flights could not start for some hours after the scheduled time. In such cases, cargoes were often dropped after infantry units had moved out of the target areas. As in Papua,

[53] *Ibid.*, App. E, pp. 6–7.

[54] 32d Div Actn Rpt, Papuan Campaign, Sep 42–Mar 43, pp. 2–8, 16–17. DRB AGO 332-0.3 (3365).

[55] Rept, Col Archibald R. MacKechnie, n. d., sub: Campaign of 162d Regt in New Guinea, p. 10. ORB AFPAC AG 370.22.

[56] Ltr, CG USAFISPA to CG AAF *et al.*, 13 Nov 43, sub: Sup by Parachute in New Georgia. ORB USAFINC AG 428.

pilots found it hard to locate these areas. In densely wooded terrain supplies fell more frequently in towering trees, 100 to 150 feet high, than they did on the indicated targets, making "discovery of the parachutes hard and their recovery harder." [57] Retrieval of cargoes was further complicated by lack of troops for protracted searches and by heavy losses incurred in detaching packs from parachutes caught in tall trees. Such packs could be recovered only by shooting in two the shroud lines, which ran from the rim of the parachute to the main cord supporting the pack, thus permitting it to fall. The long drop often split food containers and scattered their contents over the ground. In mountainous and heavy jungle areas of New Georgia, as in the Salamaua region, only about 50 percent of rations were recovered in usable form, but in fairly open country, such as coconut plantations, where parachutes rarely became ensnared in tall trees, losses ran much lower, averaging, it was reported, only about 10 percent.[58]

Meanwhile the significance of air transportation as a vital supplement to slower or temporarily unusable means of operational supply became better recognized, and higher headquarters tried to organize the new method of logistical support in a systematic fashion. General Headquarters, Southwest Pacific Area, at intervals designated certain USASOS bases as stocking points for items that were to be released solely for aerial movement to combat areas, and the ALAMO Force formed an air supply company, whose members were trained in the specialized methods of packing cargo and handling it aboard planes.[59] In the Central Pacific Area the Army Air Forces set up similar organizations.[60]

Air supply equipment and handling procedures, though still crude, were nevertheless steadily improved as the war progressed. Cargo parachutes were better made and obtainable in larger numbers, and identification of dropping areas was rendered easier by aerial photography and radar beams. "Free dropping" gradually declined as more parachutes became available, and losses of supplies, though still heavy, decreased correspondingly. If a limited quantity of parachutes necessitated "free dropping," rations packed in cartons were employed in preference to those packed in metal, for the latter broke open much more frequently.[61]

During the Luzon campaign USASOS bases on Leyte kept constantly on hand for air shipment a ten-day reserve of combat rations for 20,000 men. Actually, no calls for any of this emergency reserve came, for stocks on Luzon met all requirements. But this did not mean that air supply was not extensively utilized. On the contrary, paradrops of regular supplies alone kept many guerrillas in active operation against the Japanese. The Sixth Army reported that 1,319 planeloads, totaling 5,020,000 pounds, were dropped to isolated units between 19 January and 30 June 1945. Of this amount, perhaps 40 percent was Quartermaster in origin. Recoveries varied from 65 to 90 percent, depending upon the terrain and the proximity of the Japanese. The

[57] Opns of 25th Inf Div in Central Solomons, 16 Aug–12 Oct 43, p. 23. ORB USAFINC AG 370.2.

[58] Ltr cited n. 56.

[59] (1) Ltr, Hq ALAMO Force, 14 Feb 44, sub: SOP for Air Sup. OQMG SWPA 319.25. (2) Ltr, GHQ SWPA to CG Sixth Army *et al.*, 8 Sep 44, sub: Emergency Air Sup. ORB Sixth Army AG 400 (Equip).

[60] Lt Col Robert Genny, "Air QM Operations in the Gilbert and Marshall Islands," *QMTSJ* VII (30 March 1945), 14–15.

[61] 8th Army Mindanao Opn Rpt, G–4 Sec, p. 137.

over-all proportion of recoveries amounted to about 87 percent, a figure that indicated a notable advance in retrieval techniques. Supplies were not only dropped but were also landed in substantial quantities on airstrips.[62]

Although the emergency food reserve set up on Leyte for the Luzon campaign went untapped, a similar ten-day reserve for 5,000 men served as a main source of replenishment for the forces fighting on Mindanao. Withdrawals were indeed so heavy that prescribed levels could scarcely be maintained. The heavy demand originated partly in the inability of Base K at Tacloban to make timely deliveries by the long water route to Parang, but an even more important factor was the lack of roads in the rugged interior of Mindanao, an island nearly as large as Luzon. Rations were flown to coastal airfields in the southern island and then flown inland and dropped to forward units. During one period of eight days, 179,000 pounds of rations and 55,000 pounds of other Quartermaster items, chiefly Class II and IV supplies, were brought in from Leyte.[63]

Another unusual feature of logistical support in the southern Philippines was the large-scale utilization of air movements for interisland distribution of perishable food, a development that reflected the swiftly increasing number of planes and the still acute shortage of refrigerated vessels. For several weeks reefers could not be obtained for transportation of fresh foods to Panay, Palawan, and parts of Mindanao, and perishables were delivered to these areas by air. Between 13 and 27 April plane shipments reached the substantial total of 390,000 pounds, not much below normal requirements of 510,000 pounds.[64]

Supply Operations on Luzon

After the return to the Philippines, conditions governing Quartermaster support of combat operations became in many ways better than in earlier campaigns. Service units had become more experienced, and hostile interference with supply activities less significant. These favorable factors, together with the greater quantity of replacement items provided by increased employment of block ships, all made logistical support in some respects an easier task than it had been in New Guinea and the Solomons. But a shortage of service units continued to plague such support. When, for instance, the troop basis for the invasion of Luzon was established, the Sixth Army Quartermaster received 40 to 50 percent fewer units than he had requested. He was denied some kinds of units altogether and was further handicapped by severe reductions in the equipment of others. Under these circumstances the amount and quality of Quartermaster service inevitably suffered.

In populous and fairly well-developed Luzon, Quartermaster activities took on some characteristics of operations in continental areas. Roads, though rarely good by American standards, were at least usable; in some districts there was even limited railway service on hastily repaired lines. Transportation by land thus proved moderately satisfactory, but as was the case during tactical operations on extensive land masses, rapid advances often suddenly lengthened supply routes. Food and gasoline dumps had to be

[62] Sixth Army Luzon Rpt, G–4 Sec, pp. 53–57.

[63] Eighth Army Mindanao Opn Rpt, G–4 Sec, pp. 189–91.

[64] (1) Rad, CO Base K to CG USASOS, 2 May 45. (2) Rad, COMFEAF to COM Fifth AF, 8 May 45. Both in ORB PHIBSEC AG 430.2.

moved quickly in order to keep pace with combat divisions swiftly pursuing retreating Japanese. In the twenty-two days after the landing at Lingayen Gulf the Class I and III dumps of the 6th Division were pushed ahead three times; the last shift moved them forward about sixty miles from their first location. In the next eighteen days four moves, covering about 100 miles, were carried out. The fourth shift required a fifty-mile haul of a ten-day store of food and gasoline. To supply his dumps, the 6th Division Quartermaster drew needed items from Base M or Sixth Army supply installations, which, though not fully stocked and occasionally situated far to the rear, provided the only sources of large-scale replenishment. The Quartermaster Section of the Sixth Army tried to place its supply points within twenty-five miles of the divisional dumps, but because of transportation difficulties and the wide area over which troops were scattered, this was not always feasible. In a few instances 6th Division quartermasters made round trips of 150 miles or more to replenish their Class I and III stores and obtain Class II and IV items requisitioned by combat elements.[65] During the rapid advance across the central Luzon plain to Manila, army and corps as well as divisional quartermasters met difficulties similar to the 6th Division's. For example, the 37th Quartermaster Company, which cared for 32,000 troops, not only maintained regular day-by-day supply but also several times moved up a 30-day reserve stock. "No sooner," declared its commander, "would the dumps be established than the QM's would be far behind the lines." [66]

During the precipitate dash of the 37th Division through the Cagayan Valley of northern Luzon in June 1945 the QMC pushed its dumps ahead almost daily, occasionally "as far as the front lines, only to be fifteen or twenty miles behind in twenty-four hours." [67] The chief obstacle to adequate supply, however, was not the distance of divisional distribution points from the front but their remoteness from the main supply depots. The route from these installations, moreover, crossed mountains so rugged in places that deliveries were sometimes considerably delayed. Scarcities at the front could not be alleviated until air transportation came into use on a large scale during the last six days of June. In that short period planes landed 1,070,000 pounds of cargo at the airfield in Tuguegarao, a Japanese stronghold captured on the 24th.[68] Airdrops supplied scattered tactical units in the northern Cagayan Valley until mid-July, when the port of Aparri at the mouth of the Cagayan River was opened to shipping, and provisions, ammunition, clothing, and equipment that had been assembled at nearby Abulug were brought in to meet American needs.[69]

Long-distance hauling in Luzon put a severe strain on truck transportation, which was relieved but not wholly solved by Engineers' prompt rehabilitation of railways and by utilization of vehicles for twenty-four hours every day. Unluckily, there were too few wheeled conveyances, for shipping shortages, as previously noted, allowed truck units coming to Luzon only half the vehicles called for by their Tables of Equipment. Some Quartermaster truck companies had

[65] 6th QM Co. Hist Rpt, 31 Jul 44–30 Jun 45, Sec. II. DRB AGO 306 QM 0.3.

[66] Col Charles M. Odenwalder, "Lingayen to Manila with the 37th QM Company," *QMTSJ*, VIII (27 July 1945), 22.

[67] The Regimental Staff, The 129th Infantry in World War II (Washington, 1947), pp. vi–vii.

[68] Sixth Army Luzon Rpt, III, 55.

[69] Eighth Army Luzon Mop-up Opn Rpt, pp. 45–46.

indeed arrived with less than twenty cargo vehicles. Far-flung supply lines forced the employment of all available trucks for protracted periods without needed repairs and maintenance, a practice that in the long run seriously reduced the number of usable vehicles. In mid-February the demand for more conveyances became so insistent that combat units loaned some of theirs to Base M so that it could carry out its logistical responsibilities. In referring to the scarcity of equipment in truck companies, the Sixth Army Quartermaster recommended that, if shipping shortages in future operations forced reductions in the number of vehicles, whole units be eliminated rather than most of the vehicles in each of several companies.[70]

Fighting in the mountainous terrain of Luzon at times involved slow progress that posed logistical problems quite different from those of rapid advances. Frequently, Quartermaster units resorted to hand carrying, an expedient earlier employed in the Papuan, Hollandia, and Leyte campaigns.[71] When infantrymen of the 32d Division in north-central Luzon were conducting a bitter struggle against Japanese powerfully entrenched in steep ranges above San Jose, rations could be carried forward only on fifteen-mile-long Villa Verde Trail, a narrow, winding track just wide enough for small vehicles. Owing to the negligible amount of wheeled traffic that could be accommodated, Quartermaster dumps were established at several points along its treacherous course. Since fighting was conducted largely by small groups of men, transportation of supplies presented unusual difficulties, which were met by the employment of about 1,000 natives as hand carriers—many of them Igorot inhabitants of this wild region. Teams, composed of thirty to seventy men, each bearing seventy-five pounds on specially designed packboards, were formed, and for some days these men bore on their backs ammunition, rations, and other vital supplies for the front. The teams made such tortuous progress that Lt. Col. Lawrence E. Swope of the Sixth Army Quartermaster Section asserted that a single carrier could normally supply only three soldiers.[72] In the stubbornly contested advance from Lingayen Gulf over mountainous country to Baguio, formerly the summer capitol of the Philippines, supply units also relied heavily upon human carriers. The service company of the 129th Infantry alone employed approximately 1,000 Filipinos.

Among other unusual logistical expedients of the Luzon campaign was the use of pack animals, once indispensable components of every army and still on the outbreak of war part of the U.S. military organization in the Philippines. In anticipation of future calls for animals from the field forces, the QMC in Australia had early procured hundreds of horses and mules and established a remount depot for breaking them in. Actually, combat organizations, intent on the utmost mechanization, put in no requests for these beasts of burden, procurement ceased, and the depot closed.[73] On rare occasions when pack animals were employed in the Pacific, it was only to meet exceptional needs. The few

[70] Sixth Army Luzon Rpt, III, 58.

[71] For a description of hand-carrying activities in the Hollandia campaign, see Smith, *Approach to the Philippines*, pp. 58, 62–67, 81, 126–28, 149, 322.

[72] Anon., "Luzon," *QMR*, XXV (July–August 1945), 24.

[73] (1) Memo, S&D Div for Proc Div, OCQM USASOS, 18 Jan 43, sub: Proc of Horses. (2) Ltr, CG USAFFE to CG USASOS, 21 Nov 43, sub: Disposal of Surplus Horses and Pack Equip. Both in ORB AFWESPAC QM 454.1 (Horses).



QUARTERMASTER PACK TRAIN *moving toward the front on Luzon.*

beasts required in these emergencies were obtained from local sources and used on a purely provisional basis.

This sort of improvisation was resorted to during the protracted fighting for Baguio in the spring of 1945. The mountainous terrain of that region could be traversed only over steep trails generally impassable to vehicles. Since the 33d Division could obtain few Filipino carriers, searchers scoured the countryside for horses and finally collected a group of forty-eight animals, which they divided into four sections, each composed of twelve beasts. Captured Japanese horseshoes, pack saddles, and halters furnished the means of shoeing and equipping the animals. To each pack section were assigned three soldiers experienced in handling horses. Igorots, familiar with the dangerous trails, served as guides.[74] On missions during April and May 1945 each horse carried a load of about 200 pounds, consisting in the main of ammunition, water, food, and other supplies front-line troops needed most.

Filipino Labor

Throughout the operations in the Philippines infantry divisions employed Filipinos as laborers as well as hand carriers. On Leyte the 24th Division began to hire them as early as A plus 3, when its Civil Affairs Officer and Commonwealth officials set up an employment office in Palo. During the following week they hired an average of 450 civilians a day. The division quarter-

[74] Col Frank J. Sackton, "QM Pack Train on Luzon," *QMTSJ*, VIII (20 July 1945), 8–9.

master used about 300 of these workers in handling supplies on the beach and the remaining 150 in burying battle casualties. As the division advanced inland, the employment office moved with it, but in the interior fewer Filipinos could be hired. Luckily, need for them temporarily slackened. From A plus 10 to A plus 23 the division obtained a daily average of only 125 laborers, who were employed mainly in the construction of roads. During a rapid advance between A plus 24 and A plus 31, about 300 Filipinos carried rations and ammunition to forward units.[75] To a greater or smaller extent most divisions in the Philippines shared the experience of the 24th. After the 7th Division reached the west coast of Leyte, it employed women to wash and mend salvaged garments. These workers made considerable quantities of clothing and equipment available for reissue. The women received no monetary wages but accepted in payment bits of unreclaimed cloth.[76]

With the reconquest of the Philippines the QMC shouldered a fresh responsibility, that of outfitting from head to foot Filipino guerrillas, who for almost three years had resisted the Japanese invaders and were now attached to the U.S. forces. In early May 1945 there were nearly 51,000 guerrillas on Luzon alone. The task of clothing and equipping these new soldiers entailed the filling of heavy demands, which exceeded by a large margin prelanding estimates of probable needs. Protracted delays in the arrival of shipments scheduled against these inadequate estimates made the task especially hard. Replacement stocks and captured enemy equipment of necessity largely served as the source of initial issues. Since Filipinos were mostly of slight physique, small-sized shoes and work suits were in particularly big demand. On Leyte such items of issue were completely exhausted for several weeks, and everywhere in the archipelago the chronic size problem was intensified.[77]

Supply Operations on Okinawa

The Okinawa offensive illustrated the logistical problems encountered by unexpected failure to capture promptly modern ports vital to speedy discharge of cargoes. For nearly a month after it had been hoped that the docks of Naha, Yonabaru, and Baten would be receiving incoming cargoes, these ports remained in Japanese hands or under fire, forcing service and combat troops to carry out unloading activities over reefs and beaches. Logistical difficulties were worsened by torrential rains, violent wind storms, destructive air raids, and a demand for supplies—ammunition in particular—substantially higher than had been foreseen. Adherence to preinvasion resupply schedules became impossible, and ships were called up for discharge, not according to plan, but in response to the most urgent needs of combat elements at the moment.[78]

In the very beginning, failure of tactical units to take ashore the prescribed quantity of supplies necessitated hurried issues from partly discharged B rations. These issues unbalanced subsistence stocks, disrupted other Quartermaster activities, and retarded

[75] 24th Div Hist Rpt, 20 Oct–25 Dec 44, Annex 4, p. 96.

[76] 7th Div KING II G–4 Opn Rpt, App. E, pp. 7–8.

[77] (1) Sixth Army Luzon Rpt, III, 56. (2) 1st Lt Ashley W. Hancock, "Depot Company at Tacloban," *QMTSJ*, VII (20 April 1945), 6.

[78] Roy E. Appleman, James M. Burns, Russell A. Gugeler, and John Stevens, *Okinawa: The Last Battle*, UNITED STATES ARMY IN WORLD WAR II (Washington, 1948), pp. 403–06.

the establishment of efficient supporting operations. Frequent interruptions in the unloading of rations further unbalanced food stores. Such stoppages were caused mostly by the higher priority assigned to ammunition, which was consumed in prodigious quantities. The discharge of a single ship with a cargo consisting mostly of rations occasionally took days. The subsistence supply on shore became so limited for a time that quartermasters could establish no reserve and had to issue food on a day-by-day basis. Class I dumps in general contained few B ration components; the remaining components lay aboard ship. In some sectors the QMC had few even of the incomplete B rations. For several weeks Headquarters, Tenth Army, and Island Command lived on emergency rations so that front-line troops could have B rations.[79]

Within a few weeks discharge conditions improved, and a fifteen-day stock of field rations became available. But at the same time American penetration to the southern end of Okinawa put several divisions twenty-five to thirty miles from Class I dumps. Since tactical units in this area employed their organic trucks exclusively for carrying ammunition, Quartermaster vehicles hauled all the food they could direct to fighting troops; occasionally, rains and inpassable roads necessitated distribution by air. Emergency dumps, established close to the front and supplied by boat, eventually eased the situation.[80]

Class III items, which in general had a higher unloading priority than did rations, flowed smoothly to using organizations. By L plus 15 ample stocks had been landed; beach dumps were operating satisfactorily; and forward supply points had been set up to support both Marine Corps operations in the north and Army operations in the south. Because of expected delays in constructing bulk storage tanks, the first three block shipments of petroleum products as well as the initial 30-day supply brought in by newly arriving units consisted wholly of packaged items, 65 percent of which came in 55-gallon drums. The remaining 35 percent had been placed in 5-gallon cans to facilitate handling if trucks should be unavailable. Scarcity of service troops was the major Class III problem. The QMC had requested four gasoline supply companies, but only two were furnished. They worked on a twenty-four hour schedule and eventually employed forty-eight more tank trucks than were normally provided. Deep mud occasionally prevented the trucks from entering Class III dumps, and drivers at times came under fire. Petroleum issues nevertheless usually matched requirements.[81]

Other Problems of Logistical Support

Consumption Rates

In all combat operations the amount of Quartermaster supplies actually received by tactical troops hinged upon the quantity transported by assault units and resupply vessels and upon discharge, storage, and distribution conditions. These determinants never proved to be the same for any two offensives. Even had they been, a precise statement of consumption rates under operational conditions could not ordinarily be made, for such a statement depended on complete records of stocks received and issued, and the necessarily incomplete organization of Quartermaster activities in com-

[79] Okinawa Island Com Actn Rpt, 13 Dec 44–30 Jun 45, 8-XV-5.

[80] *Ibid.*, 8-XV-6 to 8.

[81] *Ibid.*, 8-XV-14 to 23.



CLASS III SUPPLY DUMP *at Red Beach, Leyte, P. I.*

bat zones seldom permitted such recording. In December 1943 the XIV Corps tried to determine what had been the consumption of the four classes of Quartermaster supply in the New Georgia campaign. The table below shows the estimated number of pounds in each class consumed daily by corps troops alone and by two divisions composing part of the corps: [82]

QM Supply Class	*25th Division*	*43d Division*	*XIV Corps*
Class I	4.0	5.7	6.98
Class II	0.3	0.5	4.86
Class III	3.8	4.0	5.70
Class IV	0.0	0.0	0.14

The larger figures for the XIV Corps probably reflected the greater ease of supplying corps troops who, much more than divisional troops, were likely to be stationed in rear areas where distribution ran into the fewest difficulties. Corps soldiers in general received ordinary field rations at an earlier date than did divisional units, which, for days, often had nothing better to eat than packaged combat rations. The disproportionate consumption of Class II items by troops attached to the XIV Corps, ten- to sixteenfold greater than that of other units, reflected the differing availability of these articles. In rear areas stocks of this class were kept at about normal levels, whereas units going into combat carried only scanty quantities. Most startling of all was the absence of any issue of Class IV supplies to front-line soldiers. The table indeed gives much justification for the constant com-

[82] Ltr, CG XIV Corps to CG USAFISPA, 15 Dec 43, sub: Sup in Jungle Warfare. ORB USAFINC AG 422 (Jungle).

plaint that "Them bastards in the back areas get all the good stuff."

Class II and IV Problems

Extremely restricted issues of Class II items—and even more of Class IV items—generally characterized operational supply. This situation was caused partly by the shipping shortage, which limited both initial and maintenance provision of articles having little direct relation to tactical activities and partly by low priorities assigned to delivery of clothing, equipment, and general supplies in combat zones. On Leyte, belated receipt of these items created so tight a supply condition on A plus 4 that their issue was completely halted in a few rear areas in order to provide supplies at the front. Only the opportune arrival of the first block ship carrying Quartermaster clothing and equipment prevented an acute shortage.[83] During active fighting the higher priorities given to other items often reduced the flow of most Quartermaster Class II and IV supplies to forward units to a mere trickle or stopped it entirely. At such times only articles directly related to tactical activities or to the soldier's health, such as canteens, intrenching shovels, and ammunition bags, were delivered promptly.

Another cause of unsatisfactory Class II and IV distribution was the inadequacy of the replacement factors applied in determining resupply needs. Often they were too low to match combat losses. Partly because of this deficiency, Class II and IV stock levels during the three months of fighting on Leyte "gradually dropped farther and farther" behind requirements.[84] The commanding general of the XXIV Corps declared that the resultant scarcities hampered both combat efficiency and post-operational replenishment. Among the replacement factors enumerated by him as most markedly too low was that for the BAR (Browning automatic rifle) magazine belt, issued and resupplied in accordance with War Department T/O and E's at a rate only half that of the rifle itself. As this efficient firearm was being utilized more and more, the disparity in issues was swiftly reflected in a disturbing shortage of belts. In July 1945 an OQMG observer's report from Okinawa revealed that BAR belts were almost as scarce there as they had been on Leyte.[85] Other important items for which existing factors proved inadequate were rubber boots, tarpaulins, tents, portable typewriters, field ranges, and cooking outfits for small groups.

In amphibious operations the heavier, less used items of individual equipment, such as blankets, ponchos, and shelter halves, were packed in interchangeable pouches, which base installations did not ship for some days after initial supply vessels had departed. Lighter personal equipment, such as extra garments, shoes, and toilet articles carried into combat, was normally packed in soldiers' individual duffel bags before departure for the assault area, taken aboard ship, and left there temporarily when the troops landed. Neither time nor men could be spared to separate these

[83] Rpt, Maj Pasquale P. Maiorano, 22 Nov 44, sub: Obsvr's Rpt (Leyte). OQMG POA 319.25.

[84] Ltr, CG XXIV Corps to CG POA, 19 Mar 45, sub: Replacement Factors on QM C&E. ORB Tenth Army AG 475 (QM).

[85] Rpt 2 (Okinawa series), Capt Orr, 12 Jul 45, sub: Sup of C and E and Rations on Okinawa. OQMG POA 319.25.

bags by unit, and in an unsegregated state they were dumped on the beaches.[86]

During the New Georgia operation, the after action report of the 43d Division declared, so many bags were discharged not long after the assault waves had landed that the beaches became badly congested and the handling of other supplies was slowed. In practically all campaigns substantial losses of luggage occurred on the beaches because there was no covered storage to protect it from pilferers and unfavorable weather, too few men to handle the bags, and there were too few trucks to forward them to the appropriate units. As days—perhaps weeks—elapsed before the interchangeable pouches left at rear bases were forwarded, they, too, were often rifled.[87]

Other areas had similar difficulties. Col. Archibald R. MacKechnie, commander of the 162d Infantry in New Guinea, declared that the storage of clothing and equipment in duffel bags and interchangeable pouches generally meant "the complete loss" of these materials.[88] The 7th Division noted that on Leyte its regiments were "utterly incapable of removing all their baggage, and the Division Quartermaster lacked transportation and personnel to accomplish the task." For days the bags remained in open storage, and in consequence "losses by mildew and rotting amounted to as much as 75%." [89] The 96th Division had a similarly disheartening experience in this offensive. Its 1st and 2d Battalions did not receive any substantial part of their duffel bags for four weeks, and even then only half of them were forwarded to the units at the front. Generally, even the bags that were delivered had previously been "pilfered by troops on the shore" who ripped open padlocked pouches with a knife and removed scarce articles.[90] Losses did not always cease with the receipt of luggage by the appropriate units. Soldiers engaging the enemy of necessity left their bags in unit dumps where they underwent further pilferage. Lacking adequate means of transporting and guarding such impedimenta, tactical units sometimes simply discarded them.

All these losses combined with combat wear and tear to create large shortages in clothing and individual equipment. On Leyte, though 75 percent of the men in the 383d Infantry had received their duffel bags and interchangeable pouches by the end of the first month, lost and stolen articles were so numerous that the regiment encountered considerable trouble in supplying shoes, 400 men lacked ponchos, and a quarter of the unit had no socks. Yet it was regarded as better off than units which had received a smaller proportion of their bags.[91]

In the belief that a ready supply of clothing could be secured only by moving extra garments in bulk lots, several divisions in the Okinawa campaign abandoned the use of individual duffel bags for each man. The 7th Division was one of those which adopted the new method. When it embarked, each man took with him only clothing that he might need aboard ship. On landing he put these garments and a few other personal possessions in a small bag. These bags were then collected from each squad and stuffed into two larger bags. Sufficient duffel bags to carry extra clothing required in the post-

[86] Anon., "Class II in the Assault," *QMTSJ*, VIII (20 July 1945), 4–5.

[87] CG XIV Corps, n. d., Informal Rpt on Opns in New Georgia, p. 46. ORB AFWESPAC AG 314.7.

[88] Rpt, n. d., sub: Notes of the Campaign of the 162d Inf Regt in New Guinea, p. 7.

[89] 7th Div KING II Opn Rpt, pp. 23–24.

[90] Rpt, Lt Col Glenn J. Jacoby, n. d., sub: QM Activities 96th Inf Div, pp. 5–6. OQMG POA 319.25.

[91] *Ibid.*, p. 6.

operational period were also placed in the squad bags. By doing away with the use of interchangeable pouches and individual duffel bags, the number of bags needed by a division of 20,000 men was reduced to 3,000, a quantity that obviously could be handled and guarded more easily than could 20,000. Yet even this compromise did not correct all faults of the older system.[92] Pilferage and unexplained losses, though on a smaller scale, continued. While the new method did not completely fulfill the hopes of its originators, Captain Orr, Quartermaster observer, thought that it had proved successful enough to justify employment in future operations. Actually, the problem of the disappearing bags was probably not much nearer a fully satisfactory solution than it had been in France in 1918 or in Europe in 1945.

In other respects, also, the Okinawa operation reflected an improvement in Quartermaster Class II and IV supply. New types of articles, some of which had been standardized as long as two years before, were for the first time available in the Pacific in reasonably adequate quantities. Moreover, the replacement factors used in determining the thirty-day maintenance allowances were somewhat more realistic than those previously employed.[93] Though the quantities of many items carried on block vessels still proved insufficient, unloading difficulties handicapped distribution activities much more than did inadequate cargoes. As in the case of rations, hard fighting ashore precluded prompt discharge of Class II and IV items. Supply vessels, carrying all kinds of maintenance shipments, instead of being discharged simultaneously, as had been planned, were discharged selectively according to priorities that held up the delivery of clothing and equipment. The delays, together with pilferage, caused acute shortages in some essentials like cots and tents. These scarcities imperiled the proper care of the ill and wounded, but prompt establishment of priorities favoring medical installations alleviated this disturbing situation.[94]

Class I Supply

Special problems arose in the supply of Class I as well as Class II and IV items. Probably the most exasperating problem was the failure of many assault organizations to take with them the prescribed number of rations. As has already been noted, this failure caused much difficulty at the beginning of the Okinawa operation, and it was also a common source of trouble in other offensives. Nondivisional units in particular often neglected to take the stipulated rations with them. Commenting on this deficiency, Colonel Longino wrote:

> . . . More rigorous inspection of task forces before embarkation, closer supervision of the staging and loading of units, and more effective safeguarding of stocks by commanders while en route would eliminate this trouble and greatly improve the fare of combat troops during the early stages of an operation. It would also greatly reduce the problems of resupply.[95]

Pilferage also contributed importantly to Class I scarcities. In referring to this widespread evil, Colonel Longino made the following sharp observations:

> . . . While perhaps only a small fox nibbling at the edges of supplies as they left the United States, after depredations by ships' crews, leakages at intermediate bases, predatory incursions by the black marketeer, and the reck-

[92] Pp. 32–34 of Rpt cited n. 25.
[93] *Ibid.*
[94] Tenth Army Actn Rpt, 8-XV-9 to 12.
[95] Incl 2, Comment 13, of Ltr cited n. 5.

less prodigality of combat troops themselves, pilferage assumed the proportions of a devouring wolf pack in the wake of which ran the spectre of insufficiency at the front. It seems incredible that commanders, usually so watchful against waste of food in mess kits, were not more concerned about the far more serious losses elsewhere. This applies to Class II supplies as well. Austerity at the front could be accounted for partially, at least, by overstocked foot lockers of personnel at every stopping point along the pipe line of supply.[96]

Combatant Activities of Quartermaster Units

While Quartermaster troops suffered far fewer casualties than did infantrymen, they were not entirely immune from the dangers of combat. Like other troops landed during early phases of amphibious operations, they normally underwent some artillery fire and bombing and strafing attacks, and during the course of an operation they underwent further air raids and artillery fire. Nor was their equipment safe. At Hollandia ovens of the 109th Quartermaster Bakery Company sustained serious damage. Even after bakers had patched up this equipment, raiding bombers often interrupted bread-making and forced the unit to set up .50-caliber machine guns in order to protect their ovens. During the Hollandia operation part of the 41st Quartermaster Company, as has already been mentioned, went through a destructive Japanese air raid on White Beach 1, which caused several casualties among unit members. This company encountered other hazards at Hollandia. Artillery fire imperiled its truck drivers and strafing attacks its service troops. When the campaign ended, ten members of the units, including the assistant division quartermaster, had suffered wounds. During the Biak operation, which followed immediately after the Hollandia operation, wounds were inflicted on five more enlisted men. The sixty-three casualties sustained by the 7th Quartermaster Company at Leyte was even more telling testimony of the perils that occasionally befell quartermasters.[97]

At times the possibility of Japanese attack forced units to set up perimeter defenses for their installations. In February 1944, when intelligence officers at Bougainville warned that desperately hungry Japanese, seeking an honorable death, might attempt a headlong attack, Quartermaster troops of the Americal Division protected their entire area by building pillboxes and machine gun positions and putting up a barbed wire fence on which were hung noise devices made of M1 clips with a .30-caliber shell as a pendulum. All machine gun positions and entrances to the area were kept under constant guard, and men from five truck platoons were assigned the defense of specific sectors of the perimeter line. Detailed plans were made for the destruction of dumps and vehicles if that should prove necessary. While the expected Japanese attack did not materialize, the Quartermaster area underwent heavy artillery fire, and the first-aid station in the center of the perimeter at one time was filled to capacity.[98]

Incidents that compelled QMC troops to engage in combat activities scarcely ever arose, but they occurred often enough to render almost pointless the venerable witticism that "The only quartermasters killed in the last war were one who was hit in the

[96] *Ibid.*

[97] (1) Hist Narrative of 41st QM Co for 1944, pp. 13–14. DRB AGO 341-QM-0.1 (28061) M 1944. (2) See above, pp. 274–75.

[98] Anon., "Bougainville QM's Set Up Perimeter Defense for Their Installations," *QMTSJ*, V (29 September 1944), 5–6.

head by a case of beans and another who was killed in a rush to a chow line." [90]

Emergency digressions into tactical tasks may have made the Corps seem a bit less "safe" than tradition pictured it, but only by satisfactory performance of the logistical responsibilities that ordinarily took up all its time and energy could the Corps truly fulfill its mission. The effective manner in which its supporting activities were usually conducted shows that it admirably met that test. The Corps provided in sufficient—often in more than sufficient—quantities the materials and services individual soldiers most needed to meet everyday necessities. Despite supply and manpower shortages, low priorities, mud, rain, rough terrain, and a general lack of the buildings, highways, railroads, and other commercial facilities available in economically well-developed lands, the Corps surmounted all obstacles. After the fall of the Philippines, the American advance nowhere wavered because Quartermaster supplies were not on hand. Though forward elements at times suffered temporary discomfort, enough food, clothing, gasoline, and equipment were always furnished to sustain American operations. The QMC could be justly proud of its achievements.

[90] William H. Peifer, "Quartermaster Troop Units in World War II," *QMR*, XXIX (May–June 1950), 32.

CHAPTER XI

Supplies and Equipment in Combat Use

World War II brought in its train insistent demands for the development of new items of supply and equipment and for the betterment of old items. Military planners realized that unless these demands were met, at least in part, troops could not properly cope with the novel and unexpected exigencies of fighting that extended into every quarter of the globe. In an effort to keep Quartermaster items abreast of wartime requirements, the OQMG in Washington vastly enlarged its research and development program. Brig. Gen. Georges F. Doriot, who, as director of the Military Planning Division, headed this program, from the outset relied heavily upon the advice of technically trained observers he sent overseas to obtain firsthand information about the capabilities of Quartermaster items and the needs of field forces.[1] From their recommendations and those of overseas quartermasters emanated many desirable changes and improvements. Pacific theater experience and suggestions guided the course of much of the research and development work undertaken in the zone of interior.

[1] Risch, *QMC: Organization, Supply, and Services,* I, 76–77.

Jungle Supplies and Equipment

Fighting had barely broken out on Bataan before it was demonstrated that the white color of clothing and equipment imperiled the lives of the hard-pressed defenders. Men, clad in white garments, made glaring targets for enemy bombers and strafers. Troops bathing in streams might disclose their positions if they did not conceal towels and underwear. Neglect of this essential precaution, Col. Thomas W. Doyle, veteran of Bataan, informed the OQMG on his return to the United States in July 1942, caused the death of one of his supply officers. Soldiers washing underwear and handkerchiefs, he added, would ordinarily throw these telltale articles to the ground or dry them on a rock, but this practice, too, endangered their lives. In daytime anything white "had to be pulled in and covered up." [2] Attempts, not altogether unsuccessful, were made to color white materials with the juice of berries and the tannin of tree bark. Experience on Guadalcanal confirmed the necessity of camouflage, but since coffee was more plentiful there than it had been in the Philippines, it constituted

[2] Lecture, Col Thomas W. Doyle, 25 Jul 42, sub: Recent Combat Conditions in Bataan and Matters of Interest to QMC. OQMG 319.25.

the main coloring agent.[3] In the United States the OQMG, aware of the problems presented by bleached supplies and equipment in an age of air warfare, began to procure olive-drab rather than white underwear, socks, handkerchiefs, and towels. Production bottlenecks for some months retarded the delivery of these new materials, but as 1943 progressed, larger and larger shipments of the colored items arrived in overseas areas.[4]

Meanwhile in the Southwest Pacific there had arisen the problem of what changes in Quartermaster supplies and equipment, particularly in the soldier's uniform, might be required by the extraordinary physical conditions found in such places as New Guinea. This problem was complicated by the marked variation in that island's terrain, which ranged from low-lying, insect-infested coastal areas through mountains and valleys covered with lush jungle growths and rain forests to high peaks with low night temperatures. Most of all, the problem was complicated by the lack of any special jungle clothing and equipment except for the bolo, which had been adapted from the long knife used by Filipinos for cutting their way through tangled undergrowth.

Shortly after the catastrophic collapse of the Allied forces in Malaya, MacArthur's headquarters began to study the whole question of jungle equipment. The disastrous Malayan campaign had convinced many U.S. Army officers that the smashing tactical success of the Japanese was ascribable mostly to their light, compact, and easily portable equipment and their skillful utilization of camouflage. Japanese troops, it was claimed, moved swiftly and noiselessly through the most tangled vegetation, constantly infiltrating the lines of their overloaded opponents, who were handicapped by unsuitable and inadequately camouflaged garments and encumbered by heavy equipment that could not be moved without disclosing their presence. To determine what new items might be needed by American troops, representatives of GHQ interviewed Dutch and British veterans of the war's opening campaigns and Americans who had lived for years in Pacific islands. On the basis of the jungle lore of these men a series of recommendations was submitted to OCQM USASOS.[5]

That agency was advised that the khaki cotton uniform and the papier-mâché helmet would both probably be suitable if they were well camouflaged by mottled patches of light green dye or by solid light-green coloring. Footwear presented the main problem. A boot that would last longer than the U.S. Army leather shoe in wet terrain, afford better protection against the entrance of mud and insects, and give a firmer footing on slippery grass slopes, was the basic requirement. Such a shoe might be "of the basketball type, with a strong canvas top, allowing water to drain out, and a thick corded rubber sole," and with the sides of the tongue sewed up to the top to prevent the entrance of leeches.[6] If a boot of this type could not be furnished, one modeled upon the hobnailed shoe worn by soldiers of the Netherlands Indies was desired. That shoe was canvas-topped and leather-

[3] Memo, n. s., for Files, 17 Nov 42, sub: Interv on Jungle C and E in Solomons. Jungle Unit Reading File, R&D Br, Mil Plng Div OQMG.

[4] Memo, Mil Plng Div for Proc Div OQMG, 28 Nov 42, sub: Colored Underwear. In same.

[5] Memo, n. s., for CQM USAFIA, 13 Jun 42, sub: Changes in U.S. Uniform for Jungle Opns. ORB AFWESPAC QM 420.

[6] *Ibid.*

heeled and soled. Both this shoe and the proposed jungle boot, it was believed, would render leggings unnecessary. Leggings at best were unsatisfactory, for, being laced, they required eyeholes and so permitted the entrance of insects. Tightly rolled puttees, smeared with soap or tobacco juice, were thought to afford better protection.

Finally, GHQ informed the Chief Quartermaster that in tropical jungles soldiers could not carry as much individual equipment as they did in temperate climates and that it would therefore be necessary to lighten the weight of loaded packs. This goal, it was suggested, might be achieved by the issue of thinner blankets and by the elimination of gas masks and shelter halves. Instead of shelter halves troops might carry canvas sheets, each large enough to make a lean-to tent for one squad. Bolos, mosquito bars, matches in waterproof containers, emergency rations, and small cooking kits could not, it was thought, be discarded.

Immediate need for jungle supplies and equipment developed in late July and early August, when the enemy landed in the Buna area of northern Papua and advanced south over the mountains toward Port Moresby, a development that obviously demanded retaliatory action by U.S. and Commonwealth forces in order to protect the approaches to Australia. MacArthur, hoping that the War Department could quickly fill his requirements for special items in the coming offensive, sent urgent requests to Washington for 150,000 jungle kits. Among the Quartermaster items that he especially wanted, aside from those previously recommended to the Chief Quartermaster, were gloves, fitted with long gauntlets to protect the wrists from insects, and man- or animal-drawn vehicles especially designed for jungle transportation.[7]

MacArthur's messages arrived in Washington at a time when the OQMG was just starting work on experimental jungle items with the help of Capt. Cresson H. Kearny, a former oil geologist, who had worked for years in South American jungles and since the summer of 1941 had been designing and testing jungle equipment in Panama for the Caribbean Defense Area. Kearny had developed many special items of the sort asked for by the Southwest Pacific Area and some others as well, but few had been fully tested and none were being manufactured. Despite the lack of complete testing, the OQMG on receipt of MacArthur's messages quickly placed production orders and late in August shipped model sets of the equipment by air to the Southwest Pacific Area for field study by tactical units. During the next few months this area submitted additional requisitions and by November had ordered more than 250,000 sets. Shipments could not be started from San Francisco until late November and then only in partial completion of the requisitions. This long delay meant that MacArthur could not obtain the equipment in time for the Buna–Sanananda counteroffensive. That operation was accordingly carried out with items already on hand or items improvised and produced in Australia.[8]

The QMC in that country for a time considered the adoption of the Japanese,

[7] (1) Rad, MacArthur to CG SOS, 20 Jul 42. AFPAC AG 420. (2) Thomas M. Pitkin, *Quartermaster Equipment for Special Forces* (QMC Historical Studies 5, February 1944), p. 206.

[8] (1) Pitkin, *Quartermaster Equipment for Special Forces*, pp. 200–206. (2) Ltr, TQMG to CG USAFIA, 24 Aug 42, sub: Jungle Equip. ORB SWPA AG 381. (3) Rad, CofS to CINCSWPA, 14 Nov 42. ORB AFPAC AG 381.

British, and Australian practice of wearing only shorts and open-necked, short-sleeved shirts. Though Australian officers insisted that this custom kept their men cooler and more comfortable, the idea of adopting it for American use was abandoned when reports were received that 30 percent of the Australian troops in New Guinea were suffering from malaria or from body scratches and infections that could have been prevented had they been better covered. Despite GHQ's initial preference for the cotton khaki uniform, the OCQM concluded that the herringbone twill Army work suit was the best garment immediately available for jungle warfare. It stood up better than did the cotton khaki uniform under the rough usage of combat areas where soldiers often had to crawl over the ground and force their way through tangled vegetation, and its gray-green color could be more easily camouflaged to blend with green foliage than could the yellowish-brown of khaki apparel. The two-piece work suit was chosen in preference to the one-piece coverall because it afforded more ventilation and did not require soldiers using latrines virtually to undress themselves. Work suits of troops bound for forward areas were camouflaged as a matter of course. In conjunction with the Corps of Engineers, which normally did the camouflaging, the QMC determined what shades and color designs were most appropriate, but the haste that necessarily accompanied the preparations for an early offensive precluded extensive use of pattern designs. Work suits in general were simply dyed a darker color. There was at first uncertainty as to what shade of green was best, but though many suits were at first dyed a darker green, No. 7 olive drab was the shade finally selected. Unfortunately, much of the locally procured dye, the main source of camouflaging material, speedily faded.[9]

Since enemy snipers had much success in picking off soldiers who wore distinctive clothing and insignia or carried visible weapons, camouflage was applied not only to work suits but also to mosquito nets, tents, and other canvas equipment, and to personal equipment of light color or shiny appearance which might reveal the presence of Americans. Even helmets were covered with camouflaged burlap tucked around the bottom between the liner and the steel shell. Before the 32d Division moved against the Japanese, it developed a mass-production system for the rapid spraying of materials to be dyed. In accordance with a prearranged schedule units brought both their organizational and individual equipment to the camouflaging plant, which immediately applied the necessary coloring; the units then carried away the wet items and dried them. The 41st Division followed the same general procedure but colored equipment by dipping it into the dye-filled vats of an Australian brewery.[10]

Neither the work suit nor its camouflaging proved fully satisfactory in the Buna–Sananda offensive. Unit reports convinced most Southwest Pacific quartermasters that herringbone twill was not sufficiently porous for prolonged wearing in the tropics. It absorbed more moisture and dried out more slowly than did other cotton materials and made the wearer almost unbearably hot within a few hours.[11] Even the desirability of

[9] (1) Memo, CQM for G–4, 1 Dec 42, sub: Sniper Suits. ORB AFWESPAC QM 420. (2) QM SWPA Hist, III, 111–12.

[10] (1) Memo, CQM for G–3, 22 Jun 42, sub: Camouflaging Tents. ORB AFWESPAC QM 424. (2) Memo, Col Horace Harding for CofS I Corps, 11 Nov 42, sub: Visit to New Guinea. ORB I Corps AG 384.

[11] QM SWPA Hist, III, 112.



CAMOUFLAGED JUNGLE SUIT. *Note the jungle boots worn by the soldier, and the camouflaged helmet.*

dyeing the work suit was challenged. According to Lt. Gen. Robert L. Eichelberger, commander of the I Corps at Buna, the coloring "closed the 'breathing spaces' in the cloth." [12] The dye used to impart a darker green to the gray-green shade ran and eventually "got a grayish-green anyway after having been in the mud for some time." [13] In many instances "during the recent action," Eichelberger asserted, "the undyed uniform was less conspicuous than the dyed." In other instances "the dyed uniform seemed slightly the better." The margin of preference, he declared, was "so slight" that the decisive elements in the final conclusion that camouflaging of work suits ought to be abandoned were the delay and the cost of coloring uniforms plus the fact that unfixed dyes faded and ran.[14]

Besides making a jungle combat uniform out of work suits, the QMC in August had arranged for Australian manufacture of about 2,500 pairs of green sniper shoes, which were inspired by the apparent value of comparable footwear to Japanese troops. These shoes, similar to gymnasium or tennis shoes, were to be used by scouting patrols since they made less noise than did service

[12] Robert L. Eichelberger, *Our Jungle Road to Tokyo* (New York, N. Y.: Viking Press, 1950), p. 39.

[13] Rpt, Brig Gen Jens A. Doe, n. d., sub: Observations in Sanananda Area, 1–25 Jan 43. OQMG SWPA 319.25.

[14] Ltr, CG I Corps to CG Sixth Army, 22 May 43, sub: Dyeing Herringbone Twill Uniforms. ORB I Corps AG 421.

shoes.[15] Service shoes, converted into hobnailed footwear for the sake of firmer footing on slippery, stony, and mountainous terrain and provided with heel plates and rawhide laces, were a common foot covering. After troops of the 32d Division had their regular shoes hobnailed, they discovered that the hobs quickly fell out of old leather soles. As far as practicable new shoes were accordingly issued to soldiers about to go into the combat zone. Late in the year small quantities of footwear procured in Australia and hobbed in manufacture became available and gave less trouble than did the converted type, but both varieties disintegrated rapidly in the mud around Buna. Constant soaking, with no opportunity for complete drying, quickly rotted the leather, and some shoes wore out in only ten days. In early 1943 a small quantity of American-made service shoes with composition soles arrived in New Guinea. They proved much more satisfactory than leather-soled footwear and did not disintegrate so swiftly.[16]

The canvas-topped jungle boot, developed in the United States as part of the special equipment for the Pacific, did not arrive in New Guinea soon enough to be utilized widely in MacArthur's initial offensive. It had rubber soles and canvas tops that at least in theory furnished better protection against mud and insects than did regular leather service footwear plus leggings, but in field tests it did not meet expectations and proved, in fact, ill-adapted for general use by combat troops. It slipped on roots and wet sloping soil and gave insufficient protection against stones and poor support for ankles and arches. Moreover, the canvas tops shrank. The American Division in the South Pacific and several infantry outfits in MacArthur's command claimed that the boot afforded so little protection for the feet that severe blisters developed around the toes. The OQMG attempted to solve this problem by means of removable duck insoles and soft cushion-sole socks. Both items absorbed moisture and perspiration and would, it was hoped, prevent the toes from blistering. The Sixth Army reported that in actual use the insole shrank and did "not fulfill the requirements of an insole under field conditions." [17]

For more than a year the jungle boot, as well as the service shoe, was regularly issued to troops going to Southwest Pacific Area operational areas, but the service shoe more and more became the shoe actually worn in combat zones. At Humboldt Bay in April 1944, for example, most soldiers wore it. One division, it is true, employed the boot, but an OQMG observer was told that this would not be done in the future owing to the discomfort caused by the lack of proper support for the men's arches. The boot, moreover, could not be laced tightly. Its canvas tops chafed the lower legs, and its rubber soles made walking tiresome. It was particularly unsatisfactory "for marching over relatively hard surfaces, through jungle de-

[15] (1) Ltr, CQM to CO QM Base Sec 4, 10 Sep 42, sub: Assemblage of Jungle Equip. ORB AFWESPAC QM 420. (2) Personal Ltr, Col Cordiner to Gen Gregory, 25 Jan 43. OQMG SWPA 319.25.

[16] (1) Ltr cited n. 15(2). (2) Rpt, Capts R. N. Brewster and John F. Horton, 41st Inf Div, 26 Sep 42, sub: Observations of 32d Inf Div, p. 4. ORB AFWESPAC QM 333.1. (3) Personal Ltr, Col George De Graaf to Col Cordiner, 1 Jan 43. ORB ABCOM QM 421.

[17] (1) Ltr, CG SWPA to CG USASOS, 8 Nov 42, sub: Jungle Boots. ORB AFPAC AG 421.3. (2) Memo, Ground QM AGF for TQMG, 24 May 43, sub: Extracts from Obsvrs' Rpts. OQMG 421.3. (3) Memo, TQMG for CG ASF, 11 Oct 43, sub: Gen Brehon B. Somervell's Rpt From Pacific. OQMG 333.1 (Somervell). (4) Ltr, CG Sixth Army to CG USAFFE, 3 Apr 44, sub: Jungle Boots. ORB NUGSEC QM 319.

void of swamp and similar terrain, or where any sort of load" was "carried in the pack." [18] But since it allowed water to run out as rapidly as it entered and dried quickly, the boot had substantial value under conditions where troops' feet were nearly always wet. Soldiers discharging landing craft lying in the surf, Engineer troops working in water for hours while they constructed bridges, and men operating in swampy areas usually preferred it. Patrols also like the boot because it was supple and made little noise.[19] By the beginning of 1944 its issue to combat organizations had generally ceased; requisitioning from the United States had stopped; and remaining stocks were distributed only to units asking for them. The service shoe had become the generally accepted footwear for jungle warfare as well as for other purposes.

For combat operations in rough country infantry troops preferred the hobnailed variety of service shoe. While rubber-soled footwear was suitable in dry terrain, hobnailed shoes gave a firmer footing and quickened progress in muddy areas, on uplands, and in jungles where wet logs, slippery vegetation, and rocky trails abounded. On coral islands ordinary leather soles wore through in a matter of days. Rubber soles, though more satisfactory, sometimes slipped and did not last long under constant use. At Biak rubber-soled footwear wore out in ten days, and fresh supplies had to be flown in and dropped by parachute in order to keep one outfit shod. In similar circumstances hobnailed shoes stood up better and gave better traction than did either of the other types. They were, however, difficult to obtain, for few were manufactured in the United States and Australian production went mainly to the Commonwealth forces.[20]

A tropical combat boot, with rubber-cleated soles and heels, was tentatively developed by the OQMG in 1944 and was well received when tested in the Pacific. Those who wore it had only one major criticism—the extremely narrow spaces between the cleats facilitated the accumulation of mud, especially on the heels, which then became almost as smooth as plain leather or rubber heels. With the correction of this fault the rubber-cleated boot would probably have been better liked than any other kind of footwear. But it was designed specifically as an improved jungle boot, and the war moved out of jungle territory before its development could be completed.[21]

The original jungle boot, with its high canvas top, was intended to give the wearer's feet and legs the same protection the standard canvas leggings did and thus make that item unnecessary. But since the boot had increasingly fallen into disuse, and the service shoe was too low, combat forces had little protection against deep mud except for leggings. They were "one of the most disliked items." [22] They chafed the legs, soaked up water, and took too long to put on and to dry out. Troops, the USAFFE Board noted, "either leave them behind, cut them down to smaller size . . . or put the trousers inside the stockings." Discarded leggings, it continued, were found more frequently than any other item in salvage col-

[18] Rpt 3, Capt Orr, 20 May 44, sub: Rpt on the LETTERPRESS Opn, p. 23. OQMG SWPA 319.25.

[19] (1) *Ibid.*, p. 24. (2) Rpt, Lt Col D. B. Dill, n. d., sub: Observations in SWPA and POA, Oct–Dec 44, p. 2. OQMG POA 319.25.

[20] (1) Rpt, 158th RCT, 4 Oct 43, sub: Boots. ORB AFWESPAC QM 421. (2) Rpt, G–4, 43d Inf Div, 15 Mar 44, sub: QM Sups. OQMG POA 319.25.

[21] (1) P. 26 of Rpt cited n. 18. (2) Rpt 17, Capt Orr, Aug 44, sub: Visit to Australian Army Land Hq. OQMG SWPA 319.25.

[22] USAFFE Bd Rpt 106, 8 Feb 45, sub: QM Info. ORB AFPAC Pacific Warfare Bd File.

lections of abandoned web equipment. Once soldiers, in violation of sanitary regulations, had cast them aside, they had no adequate protection against mud, whether they were marching, fighting, or working in wet dumps. To provide a substitute, the OQMG developed a combat shoe whose distinctive feature was a cuff and buckle top that gave it a height of ten inches as compared with the six inches of the service shoe. Though production of this new item began in the United States in January 1944, few shoes were delivered to the Pacific areas. A year later the X Corps reported that everyone "would like to get" some.[23]

Conspicuous among the pieces of equipment shipped from San Francisco in late 1942 was the jungle hammock, which was expressly designed for soldiers entering a combat area. This hammock was optimistically expected to take the place of tent, shelter half, canvas cot, and mosquito net in regions where these essential items could not be taken either because they were too cumbersome to carry or because of unsuitable terrain. One of the chief virtues ascribed to the hammock was that it permitted men to sleep off the ground and so avoid insects and dampness. Made of a lightweight duck fabric, it had a false bottom that provided a dead air space and prevented mosquitoes from biting the occupant's back. Attached to and over this bottom was an enclosed zipper-opening mosquito net, which in turn was fastened to a rainproof canopy stretched over sticks placed in the ground. The hammock itself was suspended between neighboring trees.[24] This ingenious piece of equipment never fulfilled the high hopes of its originators. Light though it was, it still was too bulky to be carried easily. Most important of all, it proved impractical in operational zones. Front-line soldiers, the Sixth Army reported, did "not like to sleep above ground because of possible aerial bombing" and hostile infiltration, and "soldiers behind the line" wanted "to keep out of the way of shrapnel." In combat areas, the Sixth Army pointed out, it was "essential that troops sleep in fox-holes, dugouts," or slit trenches.[25]

Despite such reports, which flowed in from all parts of the Pacific, the OQMG continued to improve the hammock, simplifying its zipper opening and reducing its weight by increased use of nylon. More than 700,000 hammocks were manufactured in 1944, and 600,000 were scheduled for 1945 procurement. These articles, though not widely utilized by the combat troops for whom they had been developed, nevertheless proved valuable in other ways. Rear areas, recurrently afflicted by severe shortages of tentage and cots, found hammocks satisfactory substitutes. During the wet season, when rain fell incessantly for hours, flooding bivouac areas and preventing tents from being pitched, jungle hammocks kept the troops "high and dry during the sleeping hours." [26] Some men in rear areas, Lt. Col. D. B. Dill, OQMG observer, noted, consistently preferred them for the better protection they gave against crawling and flying insects and slept in them as often as they could. When constantly employed, jungle hammocks had one conspicuous disadvantage—speedy deterioration, which lim-

[23] *Ibid.*

[24] Pitkin, *QM Equipment for Special Forces,* p. 211.

[25] (1) Ltr, CG Sixth Army to CG Adv USAFFE, 1 Dec 44, sub: Jungle Hammocks. (2) Ltr, CG USAFFE to CG ASF, 2 Jan 45, same sub. Both in ORB AFPAC AG 427.

[26] Anon., "Jungle Hammock Pays Off in South Pacific," *QMTSJ,* VII (19 January 1945), 8.

ited their life, according to Dill, to about forty-five days.[27]

The poncho, a rectangular, blanketlike cloak made from raincoat material with an opening in its center for the wearer's head, provided some of the services that the jungle hammock had been developed to supply but seldom did. Normally regarded as a makeshift substitute for a raincoat, it was actually a garment that served many varied purposes. Versatility was indeed its chief recommendation, giving the poncho, rarely a favorite item of issue, a high degree of popularity among combat troops in the Pacific. It served as tarpaulin, as ground sheet for sleeping soldiers, as protection for blankets, as foxhole cover, as rain collector, as pillow, and as blackout against lights from cigarettes and fuel tablets. Two of them, fastened together to form a shelter, served in place of a tent. By thus substituting for half a dozen or so bulky articles the garment markedly lessened the soldier's load.[28]

When fighting started on Guadalcanal, the poncho was not a regular item of Army issue, but early operational experience and observation of the high combat utility of the Marine Corps version of the cloak convinced quartermasters that its issue to Army troops was desirable. Accordingly, in the autumn of 1942 the QMC in the United States began to ship Marine-type ponchos to the Pacific areas, but it did not forward them in quantities large enough for issue to all soldiers. In October 1943, Lt. Gen. Brehon B. Somervell, head of the Army Service Forces, who was then visiting the South Pacific Area and the Southwest Pacific Area, was so deeply impressed with their general value that he ordered his headquarters to procure enough Marine-type ponchos to supply all soldiers in these two areas. His instructions were immediately carried out, and by the close of the year this equipment was being issued in place of raincoats to all troops embarking for the South and the Southwest Pacific Areas.[29]

Front-line fighters valued the poncho mainly as a tent, ground sheet, and protective cover for equipment of all sorts. Some of them, indeed, valued it so highly that they took it into action with them even though they left their packs behind. But they thought it too hot and too heavy for use as a raincoat, officially considered its principal function. This was not really a loss since in combat operations the raincoat itself was objectionable for the same reasons. The heavy fabric employed in both garments was better suited to temperate than tropical climates; in jungles it increased the flow of sweat and interfered with bodily movement to so great an extent that neither piece of equipment could be worn comfortably in the daytime. On rainy nights some infantrymen in quiet sectors did wear the poncho, but those at the front seldom did. Colonel Dill was nevertheless so favorably impressed by its general serviceability that he declared no need existed in the tropics for either raincoat or shelter half.[30]

The high opinion of the poncho held by the infantry and such observers as General

[27] Rpt cited n. 19(2).

[28] (1) IRS, Mil Plng Div to S&D Div OQMG, 22 Dec 43, sub: Ponchos. OQMG POA 422.3. (2) Personal Ltr, Maj Edwin L. Hobson to Gen Doriot, 14 Jul 45. OQMG POA 319.25.

[29] (1) Memo, 1st Lt H. E. Sommer for CG Jeffersonville QMD, 6 Mar 43, sub: Interv with Overseas Pers. OQMG POA 319.25. (2) Memo, Col Frank A. Henning, Stock Control Div, for Dir Rqmts Div ASF, 10 Oct 43, sub: Unsuitability of Army Raincoat. OQMG SWPA 422.3. (3) IRS, Mil Plng Div to S&D Div OQMG, 22 Dec 43, sub: Ponchos. OQMG POA 422.3.

[30] (1) USAFFE Bd Draft Rpt, 19 Jan 45, sub: Answers to QM Questionnaire. ORB AFPAC AG 333.1. (2) Pp. 28–29, 86–87 of Rpt cited n. 19(2).

Somervell and Colonel Dill was not fully shared by corps troops, division service troops, artillerymen, and base supply troops, all of whom operated in rear areas under comparatively favorable conditions. Unlike infantrymen, they did not live for days in close contact with the enemy and the ground. Their work consisted mainly of driving trucks, working in supply dumps, and handling ammunition at artillery positions. These activities were normally carried on at some distance from the front, and those engaged in them had little reason for employing the poncho as a general utility item. They had, moreover, free access to the equipment for which it served as a substitute. Consequently, they did not overlook its clumsiness as readily as did infantrymen. The poncho, in fact, seriously interfered with the lifting and stacking of supplies and with all other manual operations. A lightweight nylon type was developed toward the close of the war, but the Southwest Pacific Area OCQM recommended in May 1945 that in the future raincoats be issued to all troops in place of ponchos. Combat units, it contended, would have no further need for the latter articles, for they were to be amply supplied with shelter halves in preparation for the invasion of Japan. USAFFE approved the OCQM recommendation, but the Sixth and Eighth Armies requested that ponchos continue to be made available to their tactical elements.[31]

The prevalence of malaria-bearing mosquitoes early gave birth to a demand for personal equipment that would protect troops from these dangerous insects. Mosquito headnets and gloves were accordingly procured in Australia and included in shipments from the United States. The headnet, designed to guard the wearer's face and head, was meant for use by troops when sleeping and even when fighting, but, as there was no way of keeping the netting away from the face, few men ever wore it. Soldiers, attempting to sleep in the headnet, felt suffocated and soon took it off. Worst of all, it impeded clear vision, particularly during night fighting when most essential. The glove, made of flannel, was worn even less often than the headnet. It was not only hot and soggy; it also seriously interfered with the handling of weapons and ammunition. The almost unanimous verdict of observers was that neither the glove nor the headnet, even if markedly improved, would ever be generally worn. In any event the availability of mosquito bars in increasing numbers and the development of effective insect repellents rendered other protective measures less necessary.[32]

The U.S. Army machete, a straight, broad-bladed knife, 18 inches long, replaced the shorter, heavier bolo as the main tool for cutting through tangled vegetation. Modeled on machetes developed in South America and the West Indies for slashing cane and clearing out dense underbrush, it depended upon velocity rather than weight for its effect. It permitted quicker and easier swinging by wrist action than did the bolo type and readily cleared jungles of light, resilient growth that "simply sprang away from the slower blow of a heavier, shorter cutting instrument." [33] It was a particularly useful tool for making paths

[31] (1) Rpt, CQM USASOS, 1 Jun 45, sub: OCQM Activities, May 45. DRB AGO F223. (2) Rpt 2 (Okinawa series), Capt Orr, 12 Jul 45, sub: Sup of C and E and Rations on Okinawa. OQMG POA 319.25.

[32] (1) Personal Ltr, Capt Orr to Gen Doriot, 1 Oct 44. OQMG 319.25. (2) USAFFE Bd Rpt 118, 19 Feb 45, sub: QM Equip and Sups. ORB Pacific Warfare Bd File.

[33] Ltr, TQMG to CG ASF, 25 Oct 43, sub: Jungle Equip. OQMG POA 319.25.

through thick vegetation. Not until the Philippines were reached and fighting took place more and more in the open country was it much criticized. Soldiers found little need for the machete under these circumstances and began to discard it, claiming it was so long when suspended from their belts that it hit their legs and caught on brush. Some units in consequence issued only one machete to a squad.[34]

The flotation bladder was another unusual piece of equipment. Made of rubberized fabric, it was planned as a swimming aid. It was tucked under the uniform over the chest and stomach and inflated, when necessary, by blowing through a small rubber tube. The bladder supplied sufficient buoyancy for the wearer to swim deep streams when he was fully clothed and equipped. Actually, streams were seldom wide or deep enough to warrant use of the bladder in swimming, but it occasionally served as a water carrier or an auxiliary canteen. At Hollandia the soldiers of at least one regiment, fighting in an area where water was scarce, met their individual requirements by once a day filling two bladders. The major service of this piece of equipment, however, was one not contemplated by its originators—that of providing an excellent pillow for soldiers who otherwise would not have enjoyed this luxury.[35]

With troops in jungle areas forced to carry much of their own equipment, the OQMG developed a jungle pack specially designed to lighten their burden. The pack was a water-resistant pouch large enough to hold a soldier's hammock, spare clothing, and rations. On top was a small zipper-opening sack for canteen, medical kit, mess gear, and other small articles. As the pack itself was not waterproof, two waterproof bags, which could be fitted inside, were developed. One was a small food bag, cylindrical in shape, five inches in diameter and twelve inches in depth, and weighing only two ounces, which protected rations from dampness. Each combat soldier received six or eight of the bags. They were supposed to be placed in the jungle pack, but were normally carried on troops' belts and used as utility sacks for spare socks, toilet articles, tobacco, matches, knives, can openers, photofolders, and other personal belongings.[36] The second bag, a clothing sack, had a like evolution. It weighed seven ounces and was intended to hold sleeping equipment and extra clothing within the pack. In actuality it was used mostly as a field substitute for the barracks bag, a departure dictated largely by the demand for the lightest possible pack. A soldier participating in an amphibious operation put clothing and other personal articles not required in combat into a clothing bag, marked it with his name, and placed it along with those of several other men in a duffel bag, which, presumably, arrived eventually at the correct company dump. Here he could pick it up during a rest period when he would need its contents.[37] The articles carried in the clothing bag generally consisted of a complete change of apparel plus a blanket,

[34] USAFFE Bd Rpt 147, 7 Apr 45, sub: QM Bull 12. ORB Pacific Warfare Bd File.

[35] (1) Ltr, CG USAFISPA to CG ASF, 10 Apr 44, sub: Component Parts of Jungle Kit. USAFINC AG 422. (2) Rpt 11, Capt Orr, 15 Jul 44, sub: Answers to Questions in Ltrs from OQMG. OQMG SWPA 319.25.

[36] (1) Ltr cited n. 33. (2) Rpt cited n. 34.

[37] (1) Pitkin, *QM Equipment for Special Forces*, p. 210. (2) Rpt, 1st Lt Robert L. Woodbury, 1 Jun 43, sub: Observations of QM Activities in SWPA, 1 Feb–15 May 43. OQMG SWPA 319.25. (3) Personal Ltr, Col Charles P. Bellican to Gen Doriot, 8 Aug 45. OQMG POA 319.25.

towels, and perhaps a few personal possessions.

The jungle pack itself, contrary to the originators' broad conception of its employment, was utilized only for the few essential articles needed in a combat zone. In the Southwest Pacific, troops normally carried in their packs only a poncho, one or two pairs of socks, a pair of trousers, handkerchiefs, two waterproof food bags, one flotation bladder, a two-day supply of operational rations, a container of canned heat, a meat can with spoon, and a small towel. When front-line soldiers went into action, they seldom carried packs; they simply left them in organization dumps and put a few rations and personal belongings in a poncho, which they strapped to their cartridge belts or belt suspenders.[38]

Captain Orr, the ubiquitous OQMG observer in the Southwest Pacific, reported that the troops who had participated in the Hollandia operation considered the jungle pack and the two waterproof bags on the whole fairly satisfactory. There was, however, general criticism of the size of the pack, which, admittedly, was too large for the small amount of gear it carried. Some men also claimed that it rode too low on the back, that the straps chafed the shoulders, and that, when it was drawn up in walking, the intrenching shovel hit them.[39] What they wanted was a smaller pack with felt-padded shoulder straps or a pack composed of detachable sections that could be dropped, if not needed, and retrieved later by salvage crews. Meanwhile the OQMG was working on a new pack, which was standardized in April 1945. Known as the cargo-and-combat field pack, it consisted of two parts. The lower part, called the cargo pack, held the equipment normally placed in the waterproof clothing bag. The upper part, called the combat pack, contained the items actually needed by fighting troops. Toward the end of the Okinawa operation the cargo-and-combat pack appeared in scattered quantities, and front-line troops generally praised it.[40]

Operational Rations for Ground Combat Forces

Since organizations fighting the Japanese could not manage kitchens and prepare hot meals for themselves, a constant effort was made to supply such meals from company kitchens located several miles back of the front. Hot food was highly important, for it gave soldiers' morale a lift seldom imparted by cold food. Yet to provide it was not an easy task. During an amphibious operation the low landing priorities for A and B rations and for cooking equipment, the unsorted state of supplies on beachheads, and the narrowness of the initial combat zones sometimes precluded the establishment of kitchens for ten days or more. If operations became mobile, kitchens could seldom keep pace with the constantly moving troops, and this circumstance alone might prevent the supply of hot food. In jungle territory, even in static warfare, the absence of roads rendered impossible the normal method of using quarter-ton trucks to take to the front marmite cans filled with hot provisions. The problem was further complicated by the scarcity of substitute equipment and manpower. If native laborers were obtainable and the front was relatively quiet, they might carry hot food by hand three or five miles over steep, slippery

[38] (1) Rad, CG USAFFE to TQMG, 16 May 44. ORB AFPAC AG 381. (2) Rpt cited n. 31(2).

[39] Pp. 42–43, 54–56 of Rpt cited n. 18.

[40] (1) Risch, *QMC: Organization, Supply, and Services*, I, 126–27. (2) Rpt cited n. 31(1).

trails to the troops actively engaging the enemy. But if there was much shelling, this could not be done.[41]

Because of all these difficulties special operational rations that could be carried by combat troops themselves were extensively employed. These rations, individually boxed or canned, contained long-lasting foods that troops would be able, if circumstances dictated, to consume unheated. But most of the constituents were more palatable if eaten warm, and canned heat was therefore provided along with the rations if possible. Before these rations were standardized, they had been scientifically studied by food experts and tried and pronounced acceptable by soldiers in the United States. These tests were ordinarily carried out under good conditions that could seldom be duplicated in operational areas. The rations provided for them, moreover, were fresh rations produced and canned and packaged only a few weeks before. They were unaffected by deterioration, heated whenever this would enhance their palatability, and eaten under comfortable circumstances, often in regular messes. The original conception of combat rations had been that they would be stored in well-protected warehouses overseas and be not more than a year old when consumed. Actually, in the Pacific areas they were often exposed to the worst possible storage conditions, were usually from one to two years old, and frequently were eaten during the nervous excitement of battle, when few men had much appetite.[42]

Overseas areas judged operational rations on the basis of sustenance, palatability, and portability. A relatively high sustaining value characterized all the rations but varied somewhat from type to type according to differing caloric values and vitamin contents. Palatability was beyond question highly desirable, for food discarded because of bad taste was no better than no food at all. Since rations that could not be carried easily by combat soldiers burdened by military paraphernalia might be thrown away, ready portability, too, was essential. Yet the importance of both palatability and portability was, apparently, not fully appreciated at the time the first wartime rations were developed. Palatability at best was difficult of achievement because the necessity for using nonperishable rations entailed the exclusion of all fresh provisions and the inclusion of products specially prepared to give them lasting qualities—often at the expense of taste appeal. Nor was portability easily attained, for it was hard to combine that quality with substantial bulk and high caloric value.

When the Guadalcanal and Buna offensives started, the C ration was the only operational ration on hand in large quantities in the South Pacific Area and the Southwest Pacific Area. Composed of three meat or M units and three bread or B units, it was seriously lacking in variety. Meat constituted half of each of the three M units, commonly referred to as a meat and beans unit, a meat and vegetable hash unit, and a meat and vegetable stew unit. The meat component of the first two consisted of 40 percent beef and 10 percent pork, that of the third unit was all beef. The vegetable components of these M units were also much the same, beans and tomatoes being found in fairly large proportions in both the beans and

[41] (1) Rpt, CG XIV Corps, n. d., sub: Informal Rpt on Opns in New Georgia, pp. 42–45. (2) Rpt, CG XIV Corps, n. d., sub: Lessons Learned in Bougainville Campaign, pp. 106–09. Both in ORB AFWESPAC AG 314.7.

[42] Rpt of Food Conf Conducted by OQMG, 1–30 Apr 46, I, Lecture by Col David B. Dill, 4–5. OQMG 337.

the stew units, and potatoes in both the hash and the stew units. Only two other vegetables were used—carrots for the stew and onions for the hash. There was even less variety in the B units, which all contained the same kind of cracker, hard candy, and soluble coffee in the same quantities. The cracker, called the "C Square Biscuit," was of a special noncommercial type, reinforced with vitamins and calories at the expense of taste. The OQMG was keenly aware that the C ration would become monotonous if it were the only food available over protracted periods. But at the outset that office regarded this ration simply as an emergency reserve that would be utilized at most for only a few days at a time. It did not foresee that in some instances the ration would actually constitute the backbone of combat food supply in the Pacific for days on end.[43]

To obtain more variety in the subsistence earmarked for emergency use in the Buna–Sanananda operations, USASOS improvised a "rice" ration, having as its main element C components, supplemented by one D ration and a pound and a half of rice. The D ration, designed primarily "to allay the worst hunger of a single missed meal," was composed of three four-ounce cakes, commonly called chocolate bars but really not so much confections as highly concentrated and rather unpalatable mixtures of sugar, cocoa fat, skimmed milk powder, oat flour, vanilla, and chocolate.[44] When utilized as part of the rice ration, it might constitute a meal in itself or it might be taken in small pieces along with other parts of the ration to give all three meals more variety. As the rice ration was generally employed in the Buna–Sanananda operations, breakfast consisted of C biscuits and skimmed milk, perhaps mixed, if heating equipment was available, with cooked rice; dinner, of the D ration; and supper, of a C meat component, again mixed, if possible, with cooked rice. If the rice ration was in short supply, limited stocks were often stretched by using as a single meal only one-fifth of a C meat or biscuit can, mixed with a little rice. When so employed, the QMC pointed out, the rice ration could sustain a man for five days.[45] Since it was actually often utilized in this manner, soldiers not unnaturally found it lacking in appeal.

Even a full C ration offered only a dreary though sustaining diet after the first three or four days. Crackers, stored for a year or more, underwent chemical changes that made them rancid and gave them unpleasant flavors. Colonel Cordiner, visiting New Guinea, reported that "troops simply will not eat them except in the most difficult conditions with the result that there is great wastage." In some places he found that supply dumps were utilizing badly deteriorated cartons of crackers "as dunnage." [46] Meat and hash and meat and stew were disliked almost as much as the crackers. Through lengthy exposure to high temperatures the fat in these components separated from other elements and formed a reddish conglomeration at the ends of the can, so

[43] Harold W. Thatcher, *The Development of Special Rations for the Army* (QMC Historical Studies 6, September 1944), pp. 16–38.

[44] Ancel Keys, "Ration for Airborne and Other Mobile Troops," *QMR*, XXI (September–October 1941), 26.

[45] (1) Ltr, DQM to CG 32d Inf Div, 18 Jun 42, sub: Rations When Vehicles are Unavailable. ORB SWPA AG 381. (2) Memo, CQM for G–4 SWPA, 25 Aug 42, sub: Jungle Rations. (3) Memo, n. s., for G–4 SWPA, 25 Aug 42, sub: Rice as Added Component of C Ration. (4) Memo, CO 186th Inf Regt for CQM, 16 Oct 43. All in ORB AFWESPAC QM 430.2.

[46] Personal Ltr to Gen Gregory, 3 Apr 43. ORB AFWESPAC QM 370.43.

distasteful in appearance that soldiers repeatedly threw the whole mass of food away. With age the onions, carrots, and meats acquired new and less acceptable flavors and, according to some consumers, came to look and taste like "dog food." Most troops found the soluble coffee unpalatable. Had utensils been available for heating the hash and stew, these components would have been vastly improved, but front-line troops seldom had such equipment.[47] Yet despite these frequently objectionable features, hungry soldiers thoroughly appreciated the C ration if it was not too badly deteriorated. In the Papuan operations the men of the 162d Regiment, obliged to live for days on "bully beef" and hard biscuits, hailed the ration as a delicacy when shipments finally reached them.[48]

For carrying purposes the C ration had the disadvantages of a relatively heavy weight—about five pounds—and of an awkward cylindrical can that occupied an excessive amount of space in soldiers' packs. These characteristics made the ration unsuitable for units in contact with or pursuing the enemy. Troops obliged to carry the cumbersome burden for long periods of time protested vigorously. The almost universal demand was for a rectangular can, which could be fitted snugly into place, but such a container could not be provided owing to the impracticability of retooling plants for the manufacture of a can little used commercially.[49]

The C ration had one notable merit in that it supplied a quantity of food approximating that customarily eaten by soldiers. While some other combat rations were comparable to it in caloric value and vitamin content, they did not always furnish sufficient bulk and often left partakers still craving food. The C ration, on the other hand, if entirely consumed, provided troops with a normal amount of sustenance and so allayed the sensation of hunger created by an empty or partly empty stomach. This virtue, at first inadequately appreciated, won increasing recognition as knowledge of the ration accumulated. Another conspicuous virtue of the C ration was its tin packing, which warded off deterioration for a longer time than did the nonmetallic packing of some other operational rations. Owing to the prolonged storage of subsistence under poor conditions, this feature was of particular importance. The superior packing of the C ration and the adequate bulk furnished by its constituents led Southwest Pacific Area and South Pacific Area supply planners to prefer it to any other operational ration available before the 10-in-1 type arrived from the West Coast early in 1944.[50] Because of this preference and because substantial quantities could be procured in Australia, this ration was used more extensively in the Pacific in 1942 and 1943 than in other overseas theaters.

The rice element of the improvised rice ration posed much less difficult questions than did the C components. It is true that, if water for cooking was unobtainable, this cereal, so valuable in making the soldier's fare less monotonous, could not be utilized. But lack of water for such purposes was not common enough to rule out rice. Even when there was no culinary equipment for feeding small groups, soldiers desiring

[47] Rpt, 1st Lt Robert L. Woodbury, 5 Jan 43, sub: QM Observations in SWPA. ORB AFWESPAC QM 319.25.

[48] William F. McCartney, *The Jungleers, A History of the 41st Infantry Division* (Washington, 1948), p. 45.

[49] Thatcher, *Special Rations,* p. 31.

[50] Rpt, Lt Col Emil F. Klinke, 29 Nov 42, sub: Notes on Combat Opns in Buna Area. ORB I Corps AG 384.

cooked rice could obtain it by the simple expedient of using canned heat to prepare it in their canteen cups.[51]

The concentrated richness of D rations, the third major element of the rice ration, temporarily assuaged hunger, often before a whole cake was eaten. Some men, particularly if they ate rapidly, could not consume much of a cake without being nauseated. The chocolate, moreover, made troops thirsty; if drinking water was unavailable, this might be a rather distressing result. Another objectionable feature was the quick melting and deterioration of the bars. Despite the fact that D rations furnished no more than passing satisfaction, they served reasonably well as a substitute for a missed meal and so fulfilled the object for which they had been developed.[52]

Supply conditions in Papua occasionally required use of the Australian emergency ration, which had as its main constituent a six-ounce meat and vegetable plug, composed of dehydrated mutton, potatoes, carrots, and onions, so scored in pressing as to break easily into three equal parts. It also contained a four-ounce plug of dehydrated fruits and nuts—apricots, raisins, currants, and peanuts—and four tea and two milk tablets.[53] To most soldiers this ration had only one attraction—its small size, which made it easy to carry in their pockets. They found it almost inedible when, as was normally necessary, it was eaten cold.[54]

Marine Corps experience with subsistence on Guadalcanal paralleled that of the Papuan force. B rations were scarce—at times unobtainable—and troops lived largely on C rations. These constituted the only food available during the first ten days after the initial landing. Col. Robert C. Kilmartin, a staff officer of the 1st Marine Division, termed C rations unsatisfactory. He claimed that six round cans were too many to get into a man's pack, that the meat components were excessively greasy, and that the biscuits were too dry, particularly when there was no drinking water. Marines, another report declared, could not eat more than half a canful of C hash at a time. Because of the delayed arrival of B rations, they sometimes consumed captured Japanese food—mostly rice, canned beansprouts, taro, greens, and hardtack—and found it fairly edible.[55]

Shortly before the termination of the Papuan and Guadalcanal campaigns sizable shipments of the jungle ration, recently developed by Captain Kearny and the OQMG, were received, but they came too late for issue to any but a few units. This ration, consisting mostly of dry foods, was dubbed the "dehydrated ration." Such subsistence, weighing only about a quarter as much as a nutritionally equivalent amount of ordinary subsistence, which is composed mainly of water, was selected because it helped lighten the load of combat troops and enabled them to carry a larger number of rations. Generous quantities of these components were provided, and the ration in consequence was still rather bulky, weighing, when packed, more than three pounds. Though the soldier's consumption of water was increased by the quantity needed to re-

[51] (1) Kahn, *G. I. Jungle*, pp. 109, 113, 118. (2) Rpt, 1st Lt Robert L. Woodbury, 30 Mar 43, sub: Rpt From SWPA, 23–30 Mar 43. OQMG 400.162.

[52] Ltr cited n. 15(2).

[53] Ltr, CQM to TQMG, 19 Aug 42, sub: Specifications of Australian Emergency Ration. OQMG SWPA 430.2.

[54] Ltr, QM 41st Div to QM Sixth Army, 1 Oct 43. ORB AFWESPAC QM 430.2.

[55] (1) Miller, *Guadalcanal*, pp. 73, 81. (2) Rpt, 1st Lt Robert L. Woodbury, 17 Nov 42, sub: Intervs on Jungle C and E. OQMG Jungle Unit Reading File. (3) Lecture, Col Robert C. Kilmartin, 19 Nov 42, sub: Marine Opns on Guadalcanal. OQMG 352.13.

hydrate the dry components, the developers of the ration, assuming that drinking water would at all times be available for this purpose in ample quantities, anticipated no need to carry any along.[56] Each ration furnished about 3,500 calories a day—all that would normally be required—and a more varied selection of food than did the C ration. Besides substantial amounts of seedless raisins and dried peaches and prunes, the jungle ration contained salted peanuts, dry cereal, C biscuits, K ration meat, concentrated hard candy, cigarettes, and cocoa, coffee, and lemon powders. Composed of foods usually served cold, it had the merit of requiring no cooking utensils. Canned heat and a canteen were all that was needed to warm the beverages.

Field tests of the newly arrived jungle ration evoked both favorable and critical comments. An infantry company at Guadalcanal described it as "infinitely superior" in palatability "to any other ration issued during the recent campaign," but pointed out that it did not provide as substantial fare as did the C ration. This unit also noted that the necessary drinking water often was not available. Most important of all, it pronounced the jungle ration too heavy and bulky for easy use in combat. If the ration was employed as its originators planned, each man would bear in his pack four rations, weighing a total of more than twelve pounds when placed in the waxed carton provided for that purpose. This was much too big a load for troops who had to carry on their persons weapons and equipment indispensable in combat. If heavy rations were added to their load, many soldiers, as all military history demonstrated, would discard them. The War Department suggested that the weight could be lightened to ten pounds by removing the ration components from their packings and putting them in five waterproof food bags. To tactical organizations this method was hardly more acceptable than the original one, for it added still more items to be looked after.[57]

Even more objectionable than the weight of the jungle ration was the inconvenient packaging of its constituents. Peanuts, raisins, dried peaches and prunes, cereals, and powdered milk were all packaged in four-ration or two-ration units. A sealed can of these products could not be opened to obtain food for the first meal without losing its packaging protection against moisture and insects and without exposing its entire contents to the possibility of premature consumption, which in turn would make a varied menu impossible. The meat and biscuits were the only major components packaged as one-ration units. With its one-, two-, and four-ration packaging the jungle ration did not, then, furnish the small, easily portable breakfast, dinner, and supper units that would have been most serviceable. Nor were there sufficient noncombatant troops to break down the ration into such units, or enough small containers available for that purpose. Had this been feasible, troops starting out on combat missions would have been able to take along as many or as few rations as pending operations demanded. Actually, if the jungle ration was issued, it meant giving troops a four-day supply, even when there existed no foreseeable need for so gen-

[56] Ltr, CG USASOS to CG Advance Base, 23 Dec 42, sub: Dehydrated Jungle Rations. ORB AFWESPAC AG 430.2.

[57] (1) Ltr, CO Btry B, 98th FA Bn, to CG Advance Base, 4 Mar 43, sub: Jungle Rations. (2) Ltr, QM USASOS to CQM USAFFE, 16 Mar 43, same sub. Both in ORB AFWESPAC QM 430.2. (3) Rpt, Col James I. Dalton, CO Co E, 161st Inf Regt, 20 Mar 43, sub: Field Test of J Rations. ORB XIV Corps AG 430.2.

erous an issue. The defects of the packaging were plainly manifest during the final phases of the Buna offensive, when isolated troops "in slit trenches" could be fed only "by having rations tossed to them by soldiers who crawled forward to within throwing range." "A man might end up with a whole can of peanuts for a meal or a can of powdered milk." [58] Such disheartening results were inevitable as long as the components were all packaged separately.

Notwithstanding that the jungle ration, if not deteriorated, was rather palatable, supply officers in both the South and the Southwest Pacific came to consider it more a "picnic lunch" than a really nutritional ration that could be served to troops day after day. This fact, together with its unsatisfactory packaging, limited its value so much that in early 1943 its procurement in the United States was first reduced and then stopped. Of the hundreds of thousands of rations sent to these two theaters, comparatively few were issued to combat units except as the fare of reconnaissance patrols and as part of airdropped cargoes. In rear areas they were occasionally used to diminish the monotony of other rations. Because of the restricted demand, most of the stocks eventually spoiled. When, early in 1944, the recently developed and more varied 10-in-1 ration became available, USASOS directed that the remaining stores be disposed of by forced issues twice a month. About the same time the South Pacific Area started to salvage peanuts, raisins, and other edible components.[59]

[58] Rpt cited n. 37(2).

[59] (1) Memo, G–4 43d Inf Div for Dr. Mann, WD Obsvr, 15 Mar 44, sub: QM Sups. OQMG POA 319.25. (2) Memo, G–4 for CQM USASOS, 16 Mar 44, sub: Disposition of J Rations. ORB AFWESPAC AG 430.2. (3) USASOS Memo 39, Sec. III, 30 Apr 44, sub: J Rations. AFWESPAC AG 430.

The problem of suitable packing for combat rations was most satisfactorily met by the K ration, which was broken down into breakfast, dinner, and supper units. The packaged components of each of these units were put up in a rectangular carton, about six inches long, four inches wide, and two inches deep. The size, shape, and weight of these cartons made them appreciably easier to carry than the cylindrical C ration and the bulky jungle ration containers. Soldiers could take with them a two-day supply of food, which weighed only about as much as a one-day supply of C rations; if they desired, they might even carry the cartons in their pockets. Lightness was, indeed, perhaps the chief merit of the K ration. But the use of cartons rather than metallic containers had also the disturbing effect of intensifying the danger of deterioration.[60]

Many supply officers, while approving the lightness of the K ration, considered it to be, like the jungle ration, a picnic lunch. Its early history gave some justification for this belief. It had been developed in 1941 mainly to satisfy the demand of paratroopers for a lightweight ration that would provide sufficient nourishment during the first few days of a landing mission and yet not add unduly to their heavy load of arms, ammunition, and individual fighting equipment. Shortly after the new ration became available, infantry organizations decided it met their need for compact provisions for initial assault troops in amphibious operations, which, like airborne operations, required men to carry a mass of military paraphernalia. Originally, then, the K ra-

[60] (1) Lecture cited n. 55(3). (2) Ltr, Subs Office Base Sec 3 to CQM USASOS, 16 Mar 43, sub: Status of Reserve Rations. ORB AFWESPAC QM 430.2. (3) Memo, G–4 USAFISPA for the Files, 26 May 43, sub: K and Jungle Rations. ORB USAFINC QM 422.

tion was looked upon as one that would be utilized only during the first day or two of an offensive. Its composition in 1942 and 1943 also lent a certain justification to the description of picnic lunch. Though it contained more than 3,000 calories in scientifically approved proportions of fats, carbohydrates, and proteins, these constituents were in a highly concentrated form that furnished little bulk. After eating them, most soldiers still felt hungry.

Despite this shortcoming the K ration furnished food in greater variety than did the C ration of that period. Each meal unit contained chewing gum, dextrose tablets, and either bouillon or lemon-juice powders, none of which were originally included in the C ration, plus two sorts of crackers in contrast to the single C cracker. The supper unit provided in addition a small D chocolate bar. All three meals at first included meat, veal being furnished for breakfast, spam for dinner, and dried sausage for supper. For the sake of variety cheese was soon substituted for meat in one of the meals.[61]

Troops found some K components unappealing. Despite the fact that nutritionally dextrose tablets constituted an ideal source of energy, most men rejected them, thus illustrating the hazard involved in serving unfamiliar foods. In hot weather lemon-juice powders melted into a viscous taffy and lost their flavor and most of their vitamins; even when these powders were fresh, few soldiers would drink the synthetic juice made from them. Long-stored crackers and meats, too, lost their distinctive taste. Some kinds of chewing gum proved objectionable, for their flavors were transferred to uncanned food, which in consequence became inedible. On returning from a lengthy inspection trip to New Guinea, Major Fellers reported that troops tired of the K ration sooner than they did of either the C or the jungle ration.[62] The probable reason was that K rations, packed in cartons and mostly packaged with nonmetallic materials, deteriorated faster than did tin-packed C rations. After a year's storage C rations generally were in better shape than K's.

The exact proportion in which combat troops used the different rations varied according to availability, the difficulty of the operation, the stocks of individual and group cooking utensils, and the personal preferences of supply planners. Operational orders set up the over-all quantities of subsistence, but within these limitations organization commanders determined how much of each ration would be employed. Feeding policies consequently varied not only among divisions but sometimes even among regiments and battalions of the same division.

As far as possible Southwest and South Pacific Area troops in rear operational areas were supplied with B rations, but these rations often lacked not only fresh provisions but also canned foods, bread, and other baked products. Soldiers shifted from the front to rest camps were if possible issued an extra third or half ration. To these men, particularly those who had just been on a C ration fare for one or two weeks, unbalanced B rations appeared to be simply the old C's. This false conception arose because many elements ordinarily included in the B's were missing and because hash and stew, the two components largely responsible for the C ration's monotony, were often served. Sometimes hash and stew provided the only meat in the B ration. Matters were made

[61] Thatcher, *Special Rations*, p. 56.

[62] (1) Ltr, QM USASOS to CQM USAFFE, 27 Jul 43, sub: K Rations. ORB AFWESPAC QM 430.2. (2) Memo, Maj Carl R. Fellers for CO Subs Depot, 15 Aug 43, sub: K Rations. ORB ABCOM GP&C 430.2.

worse by the fact that, normally, the meat in both rations was corned beef. From this unsatisfactory situation sprang most of the numerous complaints that units had been fed nothing but C rations for months on end.[63]

Criticism of the C ration was aggravated by soldiers' tendency to confuse it with the unbalanced B's. In the Southwest Pacific Area troops alleged that Australian-produced C's, the bulk of those consumed during the first half of the war, were inferior to the American product. This belief, for which there was no clear justification, was widely prevalent, and when, early in 1944, receipts of operational rations from the United States rapidly rose, USASOS canceled its unfilled contract demands on local firms.[64]

In the spring of 1944 the OQMG, in response to overseas complaints about the C ration, especially in the Pacific, altered that ration drastically. Variety was substantially widened by the use of ten instead of three meat components and by the establishment of six different menus, each containing three components. The meals now included such favorites as meat and spaghetti, frankfurters and beans, pork and beans, ham and eggs, and chicken and vegetables. Palatability was further increased by the elimination of the hash unit, by the substitution of a better beef stew, and by the addition of cocoa powder and several candies to the biscuit units.[65] A particularly welcome innovation was the inclusion of accessory kits, each holding twelve cigarettes, matches, chewing gum, toilet paper, can openers, and halazone tablets. These tablets were essential in Pacific operations because there was no other way of quickly purifying unusable water. Combat troops regretted the retention of the cylindrical can, the heavy weight of the ration, and the absence from the accessory kit of salt and atabrine tablets, badly needed because of excessive loss of body salt through sweating and because of the high incidence of malaria.

Even before the OQMG produced the improved C ration, it had developed another ration, eventually called the 10-in-1, for feeding hot meals to small groups of troops during the short interval they were in areas beyond kitchens but not yet in contact with the enemy. Under such circumstances the want of kitchens did not exclude the preparation of hot meals if rudimentary cooking equipment, light in weight and easily portable, was provided. The new ration, furnishing food for ten men for one day—hence its name—was often described as simply a B ration so packed that any required number of rations could be speedily obtained. If, for example, two hundred soldiers needed food for one day, the time- and labor-consuming assembly of B components for that number of men could be obviated merely by taking out of storage twenty cases of the new ration. Actually, the 10-in-1 ration was somewhat less than a B ration; for one thing, it had fewer elements, and, for another, it used the individually packed K dinner unit for the noon meal. Yet it was certainly more like a B ration than any other operational ration. Consisting of five menus, each of which contained slightly different breakfast and supper units, it provided a wide range of cereals and canned and de-

[63] (1) Memo, Col John W. Mott OCQM USASOS for GSD, 6 Sep 43, sub: C Rations. ORB AFWESPAC QM 430.2. (2) P. 6 of Rpt cited n. 42.

[64] (1) QM SWPA Hist, V, 37. (2) Rpt, Col Rohland A. Isker, 20 Jul 44, sub: Subs at Hollandia. ORB ABCOM GP&C 430.291.

[65] (1) Ltr, CG USAFFE to CG Sixth Army *et al.*, 3 Nov 44, sub: C Ration. (2) Ltr, CG USAFFE to CG ASF, 14 Feb 45, sub: C Ration. Both in ORB XIV Corps AG 430.2.

hydrated meats and vegetables and avoided the daily repetition of the same fare that had been the curse of the old C's. Another favorable feature, which the 10-in-1 ration shared with the new C's, was the inclusion of accessory kits.[66]

Sixth Army organizations, after they had tested the 10-in-1 ration in forward areas for periods of more than 45 days, pronounced it well suited either for unit messing or as an emergency ration for small groups. But they found it ill-adapted to individual consumption and hence unavailable as a substitute for the C, D, or K ration in combat areas where each man carried his own food. Among its virtues testing organizations particularly noted its utility in speeding the assembly and distribution of B components.[67]

For some months the huge supply build-up for the coming campaign in France held up shipments of both the improved C and the new 10-in-1's. The latter, even in small quantities, became available in the Southwest Pacific only in March 1944, and the modified C ration did not arrive in considerable amounts until the close of that year. The 10-in-1 ration, issued operationally for the first time in the Southwest Pacific during the Hollandia campaign, was warmly received. Though only small quantities were available, it proved so popular that the C type—stocks of which were still of the old variety—was employed less widely than in previous operations. The 10-in-1 ration, Captain Orr informed the OQMG Military Planning Division, "seemed a luxury to those troops who had taken part in the early days of the New Guinea campaign." [68] Supply officers particularly liked the ease with which they could issue it to small groups, not exceeding 200 in number. When however lack of regular rations forced unit kitchens to prepare it for larger groups—a use not contemplated by its developers—the results were less pleasing, for the opening of the numerous small cans required to feed these groups demanded a good deal of time and manpower. Tactical situations occasionally compelled the issue of 10-in-1's to individual soldiers in direct contact with the enemy. When so employed, the food elements, not being packed for individual consumption, were often wasted. Losses were particularly apt to occur under the stress of battle when men who had lost their appetite for normal quantities of subsistence rifled rations for coffee and sweets and threw everything else away.[69] A Quartermaster observer declared that "indiscriminate distribution" of 10-in-1's during the first few days on Leyte, coupled with the "lack of organization in cooking and messing," caused so much waste as to demand severe restrictions on future issues.[70] Yet until the very end of hostilities the general availability and great popularity of this ration led to its extensive utilization under conditions like those on Leyte.

Excessive waste of the 10-in-1 ration prevailed in very small as well as large groups. Groups of less than ten men, such as were found among linemen, bridge guards, truck drivers, outposts, and patrols, were espe-

[66] (1) Personal Ltr, Col David H. Cowles to Col Hugh B. Hester, 1 Mar 43. ORB ABCOM GP&C 430.2. (2) Personal Ltr, Col Doriot to Col Cordiner, 24 Jun 43. ORB NUGSEC QM 430.2.

[67] Ltr, CG Sixth Army to Dir of Distr, Br A, USASOS, 18 Apr 44, sub: Suitability of 10-in-1 Rations. ORB NUGSEC QM 430.2.

[68] P. 48 of Rpt cited n. 18.

[69] (1) USAFFE Bd Rpt, 20 Feb 45, sub: QM Bull 11. (2) Ltr, QM Guam to QM POA, 23 Apr 45, sub: Rations. Both in OQMG SWPA 333.1. (3) Ltr, CG Sixth Army to CG USASOS, 26 Apr 45, sub: Emergency Rations. ORB Sixth Army AG 430.2.

[70] USAFPOA, Participation in the Western Carolines and the Central Philippine Operations, Sep–Nov 44, p. 373.

cially prodigal, for they were too small to consume the entire contents of cans, which held enough subsistence for ten men for one day. Since they ordinarily required food for only one or two meals, the percentage of loss was at times very high, particularly if they left partly used containers behind when they moved to a new location—unfortunately, a common practice.

Though the 10-in-1 was the most popular operational ration, some of its constituents were severely criticized. Troops coming to rest camps from the front, where K rations had been served for days, objected to the K noon meal. There was, they claimed, no reason for serving this meal in camps that had all means for preparing hot food. In combat areas where absence of sufficient usable water often made it impossible to prepare them properly, dehydrated vegetables were heartily disliked. Finally, sausage meat and some other components were unappetizing if, because of lack of canned heat, they had to be eaten cold.

In November 1944 the widespread popularity of the 10-in-1's and the protracted delay in the arrival of improved C's caused the Southwest Pacific Area to consider suspension of further use of C rations, but this idea was dropped because of the small stocks of 10-in-1's and the promise of early delivery of the new C's.[71] On Leyte, Southwest Pacific Area troops still had few of the latter type, but Pacific Ocean Areas units were reasonably well supplied.[72] In subsequent operations the new kind was available in substantial quantities to all organizations. It was most often criticized because of the continued presence of the stew component, which troops repeatedly refused even in its modified form. Yet the new C's were on the whole not unpopular. One regimental S–4 noted that, with them in stock, some troops refused the old type.[73]

Meanwhile the Office of the Quartermaster, Central Pacific Area, had developed a ration specifically designed for troops in the opening phases of amphibious operations. It took this step after learning that during the landings in the Gilberts troops fighting under intense nervous strain had thrown away most of the K ration except for cigarettes and candy. Working in close co-operation with the Hawaiian Pineapple Company in Honolulu, Lt. Col. Clifford C. Wagner developed the assault ration, popularly known as the "candy ration." It consisted of twenty-eight pieces of assorted hard candy, one chocolate peanut bar, and one package each of chewing gum, cigarettes, and matches. It did not supplant the other emergency rations, which, dietetically, were far superior, but served as a "fill in" during the first day or two of an offensive, when troops did not desire heavier fare.[74] The assault ration, produced only in Hawaii, was distinctively a Central Pacific Area item of supply. First utilized in the Marshalls offensive of February 1944, it was issued to Pacific Ocean Areas forces in subsequent operations as a substitute for the K ration during initial landings.

In the series of offensives that started with Leyte in October 1944 and ended with Okinawa in June 1945, combat rations were employed in something like the follow-

[71] Ltr cited n. 65(1).

[72] (1) Rpt, Lt Col Glenn J. Jacoby, 14 Dec 44, sub: QM Obsvr's Rpt (Leyte). OQMG POA 319.25. (2) QM SWPA Hist, VI, 35.

[73] Rpt 1 (Okinawa series), Capt Orr, 6 May 45, sub: QM Activities on Okinawa. OQMG POA 319.25.

[74] (1) Ltr, CG 7th Div to CG USAFICPA, 21 Feb 44, sub: Assault Rations. (2) IRS, QM to CofS USAFICPA, 6 Apr 44, sub: Emergency Candy Rations. Both in ORB AGF PAC AG 430.2.

ing sequence: assault rations (used only by Pacific Ocean Areas organizations), K rations, C rations, 10-in-1 rations, and B rations. Pacific Ocean Areas troops on Leyte had about a 20-day supply of 10-in-1 rations, 7 days of C, 3 days of K, and 2 days each of D and assault rations. By A plus 4, many troops were eating 10-in-1's, but this proved premature, for they then had practically no cooking equipment and could not prepare the rations properly. B rations in general could not be issued before A plus 20 or 30, for until then sufficient components had not arrived to make balanced meals and unit kitchens were not ready to prepare them. The rather marked variations among units that at times characterized the utilization of rations in combat is illustrated by the supplies carried by three divisions in the initial assault on Luzon. Organizations participating in this attack were directed to take with them a 10-day supply of combat rations in addition to those needed on the voyage. Because of failure to comply with this order some units arrived with only a 3-day supply. Troops of the 6th Division had in their packs a 3-day supply of K rations, those of the 37th Division a 1-day supply each of C, D, and K rations, and those of the 43d Division a third of a day's supply of C rations, two-thirds of a day's supply of K rations, and a single day's supply of D rations. Since on Luzon Japanese resistance was not as intense as it had been on Leyte and regular supplies and cooking equipment became available sooner, the 43d Division was eating 10-in-1's by the second night, and on the fourth day the 37th Division was enjoying B rations.[75]

[75] (1) Rpt cited n. 72(1). (2) USAFFE Bd Rpt 138, 29 Mar 45, sub: QM Bull 11. ORB Pacific Warfare Bd File.

Other Special Rations

Combat, long-range, and high-altitude airmen as well as infantrymen required special rations. Before their departure on tactical or strategical missions flying crews were tense, had little appetite, and ate sparingly of the food set before them. For this reason they needed special lunches. Similar lunches were also required by reconnaissance, transport, photographic, and other crews, who often missed their regular noon meals because they were away on protracted flights. The high altitudes at which all these crews flew complicated the preparation of lunches. At a height of 20,000 feet gas in the intestines expanded two and a half times and at 35,000 feet four times. It was accordingly essential to eliminate as many gas-producing foods from fliers' fare as possible. Because of the frequent occurrence of flight fatigue, which was noticeably relieved by nutritious food, crews were also often served a larger evening meal than were ground troops.[76]

Flight surgeons agreed that air crews in general should have a minimum of 3,000 to 4,000 calories daily; that half the calories should consist of protein in the form of fresh red and white meat and fresh eggs; that carbohydrates should not exceed 40 percent of the total caloric intake; and that the worst gas-producers—beans, cabbage, corn, and onions—should be omitted entirely.[77] Unfavorable supply conditions did not permit complete fulfillment of these requirements, but the Pacific areas all authorized supplementary food issues to flying crews.

[76] Personal Ltr, Col Clinton J. Harrold to Col Cordiner, Dec 42 (?). ORB AFWESPAC QM 430.2.

[77] Memo, Flight Surgeon, I Island Comd SPA, 29 Apr 43, sub: Recommended Diet for Flying Pers. ORB USAFINC QM 331.4.

In the Southwest Pacific in November 1942 extra issues included fresh fruit juices or powders, coffee, evaporated or powdered milk, oatmeal or prepared cereal, sugar, and pickles. Fresh eggs and meat, though desirable, were not included because they could be secured only in very limited amounts. As food stocks rose and Air Forces needs were more fully recognized, the list of added issues was expanded to embrace fresh or canned meat, canned tuna fish, dehydrated eggs, cheese, butter, flour, baking powder, yeast, and bread. In the South Pacific supplementary provisions did not furnish quite as much variety as in the Southwest Pacific Area but did contain more perishables. Those in the Central Pacific Area supplied hard candy, canned peaches, pears, and pineapples, canned orange, grapefruit, and pineapple juice, and whole-wheat crackers. In October 1944 this list was broadened to embrace meat, fish, and milk. In preparing special lunches the Pacific areas all gave the largest quantities to crews of heavy bombers, smaller quantities to crews of medium bombers, and still smaller quantities to fighter crews. All crews shared alike in the heavier servings given fliers at dinner.[78]

Issuance of supplementary provisions to flying personnel created a morale problem because ground crews and service troops felt unfairly treated. The sense of discrimination among them was especially strong when flying crews received better food while eating at the same mess. To prevent a general weakening in morale, flight groups occasionally misused the privilege of obtaining supplementary rations by procuring them not merely for flying crews but for all their men. Food intended for 50 persons might actually be distributed to 600, with the result that the flying crews who most needed the extra provisions secured little benefit. In February 1944 Colonel Rogers pointed out that in the South Pacific this practice caused the use of ships and air transports for unauthorized purposes and unjustifiably discriminated against service troops not assigned to air groups. At a conference of AAF and Army supply officers to consider these questions as they had developed in the South Pacific Area, Colonel Rogers praised those air commanders who had established separate messes for flying and nonflying troops and suggested wider application of this practice as a partial answer to the problem of morale. His recommendation bore some fruit, but practical difficulties in most instances prevented it from being carried out, and the problem was never wholly solved in any Pacific area.[79]

Besides the special rations for troops actively engaged in air and ground combat operations, other special rations were developed for hospital patients, laborers, prisoners of war, and civilian repatriates. Shortly after the Marshalls campaign the quartermaster and surgeon in the Central Pacific Area jointly developed a hospital assault ration for battle casualties during the first few days of an operation. A ration of this type was badly needed because none of those carried by assault troops were varied or nourishing enough for hospital patients. The new ration, assembled by Central Pacific Area quartermasters and taken

[78] (1) USASOS Memo 94, Sec. I, 23 Nov 42, sub: Special Ration for Air Corps Pers. (2) USASOS Regulations 30–16, Sec. II, par. 2a, 30 Jul 43, same sub. Both in ORB AFWESPAC AG 300. (3) Ltr, HCPA AG (QM) 430.2-S, 27 Mar 44, sub: Additional Rations for Flight Pers. (4) Ltr, HCPA AG (QM) 430.2/17, 18 Oct 44, sub: Flight Rations. Both in ORB USAFINC AG 403.2.

[79] Rpt, Bd of Officers, SOS SPA, 21 Feb 44, pp. 10–11, 14–15, 18. ORB USAFINC QM 430.

ashore by medical units, provided both fluid and soft foods. It contained bouillon cubes, oatmeal, canned fruits and juices, dehydrated soups and eggs, canned boned chicken, evaporated milk, beverages, sugar, and salt. These components, requiring only water and heating equipment for their preparation, were packed in small cans and assembled in large units, which contained 200 rations weighing altogether about 900 pounds. The hospital assault ration was first used in the Marianas. Southwest Pacific forces also utilized a similar ration from late 1944 on.[80] Meanwhile the War Department had developed a supplemental hospital ration pack, which served the same purpose as did the hospital assault ration, but it was not shipped in quantity to the Pacific before the attack on Okinawa, where both types were used. As the new ration contained no canned chicken and no dehydrated soups or eggs, it did not provide quite as wide a range of components as did the older one.[81]

The question of an appropriate special ration affected hospitals outside as well as inside combat areas. In all three Pacific areas the ordinary field ration formed the basis of issues to hospitals outside combat zones, but it was supplemented whenever practicable by fresh meats, fruits, vegetables, and eggs. In the Southwest Pacific the authorized supplement was half a ration in either kind or cash, as the hospital preferred. If an institution took its extra allowance in kind, it requisitioned rations from Quartermaster stocks; if in cash, it bought the added food in the open market. This system worked unsatisfactorily, for it left little means of supervision over supplementary requisitions, and uncontrolled purchases from commercial sources reduced the amount of perishables available to other Army segments and to the Australian public. In mid-1943 buying in the open market was forbidden, and a special hospital or H ration scale was set up that provided about a dozen items not ordinarily found in the field ration. The most important of these items were canned roast beef, dehydrated soup and vegetables, lentils, powdered malted milk, cookies, syrup, and junket tablets. Dietitians pointed out that the H ration was deficient in milk, butter, potatoes, and vegetables, which were all highly beneficial to underweight patients. A special board, appointed to study this problem, recommended that the daily milk allotment be increased from 1 to 2 pints, that the butter ration of ¾ pound a week be raised by two thirds, that the potato ration be lifted from 3 to 5 pounds, and that the fresh vegetables allowance be increased from 4½ to 6 pounds. None of these foods was obtainable in quantities sufficient to permit the complete adoption of the board's proposals, but an increase of about 30 percent in the components, if supplies were available, was authorized. Because of recurrent shortages the QMC outside Australia could seldom meet the precise requirements of the H ration and was often obliged to issue the ordinary field ration and supplement it by such foods as might be available.[82]

[80] (1) IRS, Surg to QM HUSAFICPA, 18 Apr 44, sub: Unit Hospital Ration Pack. (2) Ltr, CG USAFICPA to CG ASF, 28 May 44, same sub. Both in ORB AGFPAC AG 430. (3) Ltr, CG USASOS to CINCSWPA, 1 May 45, same sub. ORB AFPAC AG 430.2.

[81] (1) Ltr, AG 430 (6 Nov 44) AGOB-P-SPOPPP, 7 Nov 44, sub: Ration-Supplement, Hospital. (2) Ltr, CG USASOS to CG PHIBSEC, 8 May 45, sub: Special Hospital Packs. ORB PHIBSEC 430.2.

[82] (1) QM SWPA Hist, III, 47–48; IV, 22; VI, 32–33. (2) USASOS Reg 30-16, 30 Jul 43, Change 1, 20 Aug 43, sub: Field Rations. ORB AFWESPAC AG 300. (3) Ltr, CG Base Sec USASOS to CG USASOS, 17 Jun 44, sub: Increase of H Ration. ORB ABCOM AG 430.2.

Special rations were required not only for American troops but also for natives serving as stevedores and construction and storage workers at bases and with tactical forces. The precise elements composing native rations varied slightly in line with differing dietary habits and availability of foods. In territories controlled politically by an Allied power the U.S. Army utilized the colonial governments as its agents in dealing with native peoples. Australian and Dutch officials in New Guinea, French authorities in New Caledonia, and British administrators in the Solomons and the New Hebrides hired native employees for the U.S. Army and determined the constituents of their rations on the basis of standards long laid down in local laws regulating contract labor. Generally, the colonial officials responsible for the feeding of native laborers submitted their ration requirements to quartermasters who, in turn, called upon U.S. supply bases for the necessary foods.[83]

The Solomon Islands labor forces were provided a simple ration composed of a mere handful of components. Besides rice, one pound of which was furnished, it contained a quarter pound each of corned beef and salmon plus tea, sugar, C biscuits, and plug tobacco, everywhere a native favorite.[84] Laborers' rations in New Guinea and the Central Pacific were based on a larger number of constituents than in the Solomons. If subsistence stocks in these areas contained sufficient tomato juice, animal fat, wheatmeal, peanut oil, or similar foods, small quantities of these items were added to the Solomons list.[85]

Rice, as the food most in demand among native laborers, occupied the dominant position in all these rations. It had always constituted the major part of the daily fare of Tonkinese and Javanese workers in New Caledonia and the main element in the delicacies prepared for their fetes.[86] In their villages the more backward peoples lived chiefly on yams, taro, breadfruit, bananas, coconuts, fish, wild game, and a few pigs and chickens. But during the previous half century plantation owners in regions inhabited by these peoples had served imported rice to their employees, who came to regard it as a highly desirable luxury. Col. O. C. Noel, British Resident Commissioner in the Solomons, declared that the native regarded rice "as an important part of his compensation for volunteering for work and any decrease of this issue is regarded as a breach of faith." When he returned home on completion of his contract, Noel continued, "one of his most valued possessions was his bag of rice." [87] A quarter century of experience on plantations in the Solomons proved that any diminution of the daily allowance immediately lowered the morale and productivity of workers. This was strikingly illustrated in 1933, when the substitution of maize on Lever Brothers' plantations halted practically all operations.

[83] (1) Ltr, CG Base Hq APO 708 to CG USAFISPA, 1 Mar 43, sub: New Hebrides Labor Pool. ORB USAFINC QM 319.1. (2) Ltr, CG USASOS to Sec and Base Comdrs, 12 Feb 44, sub: Sup of Native Rations. ORB NUGSEC DISTDIV 430.2. (3) Ltr, CG Guadalcanal Island Comd to CG SPBC, 9 Jul 45, sub: Native Ration Scale. ORB USAFINC QM 430.2.

[84] Ltr cited n. 83(3).

[85] (1) Ltr, QMG Australian Army to NGF *et al.*, 26 Oct 43, sub: Native Ration Scale. ORB NUGSEC QM 430.2. (2) Memo, QM Br DISTDIV for CQM USASOS, 15 Feb 44, sub: Native Rations. ORB AFWESPAC QM 430.2.

[86] Ltr, CG SPBC to CG ASF, 31 May 45, sub: Rice for New Caledonia. DRB AGO Plng ASF File (Class I Sup-CPA).

[87] Bd of Officers Appointed to Investigate Native Rations at Island Comd APO 709 (Guadalcanal), 4 Aug 45, sub: Proceedings. ORB Guadalcanal QM 430.2.

In 1945 the necessity of feeding large numbers of liberated Filipinos put heavy pressure on rice stocks throughout the Pacific and brought about a lowering of the daily issue in the Solomons from one pound to three fourths of a pound. The ensuing discontent speedily forced the restoration of the earlier allowance. No program employing native labor, a board of officers investigating this situation maintained, could succeed without the cereal.[88] In New Caledonia similar efforts to reduce issues, though more prolonged, met a like fate.

Native rations, on the whole, were deficient in the vitamins and minerals furnished by the normal foods of primitive peoples. The addition of milk and fresh meat would have been beneficial, but American troops had a prior claim on these scarce supplies. Native laborers, moreover, rejected many common foods, and there was not enough time to accustom them to a better diet. On Guadalcanal, where the ration was particularly wanting in variety, extensive use of polished rice, which was deficient in vitamins, caused an outbreak of beriberi. Since the laborers there were familiar with the unpolished type, it was promptly substituted. In New Guinea unpolished rice had been used from the outset.[89]

By early 1944 the Army in the Southwest Pacific was employing enough Chinese and other Orientals to call for the development of an Oriental or O ration. This ration was somewhat more varied than the native rations, providing 16 ounces of rice, 4 ounces of wheat flour, 14 ounces of fresh vegetables, 5.5 ounces of dried and fresh fruits, 8 ounces of fresh beef, 5 ounces of canned fish, 1.5 ounces of bacon, 1 fresh egg, and small quantities of milk, butter, lard, tea, curry powder, and spices. As many of these components were scarce, substitutions were freely made.[90] The Oriental ration, or its rough equivalent, was employed in feeding Japanese prisoners as well as Oriental laborers. Though Nipponese, like other Asians, normally consumed only about 2,000 calories a day in contrast to the 2,500 to 3,500 calories consumed by Americans, the Geneva Convention of 1929 required that their meals be equal in quantity to those served U.S. troops in base installations. The Oriental ration met this stipulation, providing about 2,600 calories.

In the spring of 1945 the War Department advised the Pacific areas that the world-wide shortage of canned and fresh meats, canned fruits and vegetables, and dehydrated potatoes demanded the stringent conservation of all these foods. USASOS thereupon directed that the prisoner of war ration be modified by the substitution of egg powders, macaroni, spaghetti, beans, and stews for these scarce products. In July the OQMG developed a new ration for Japanese prisoners, but USASOS pointed out that though this ration provided as many calories as Japanese ordinarily consumed, it did not supply enough nourishment to comply with the Geneva Convention. USASOS accordingly continued to use its own scale, modeled at that time on the Philippine Army ration.[91]

[88] *Ibid.*

[89] (1) Ltr, CG SOS SPA to Col Hardin C. Sweeney, 25 Jul 43, sub: Rice. ORB USAFINC AG 430. (2) Ltr, Surg SOS SPA to CG VII Island Comd, 6 May 44, sub: Native Diet. ORB Guadalcanal QM 430.2.

[90] USASOS Regs 30-16, Sec. II, par. 2e, 28 Feb 44, sub: O Ration. ORB AFWESPAC AG 300.

[91] (1) Ltr, CG USASOS to CG LUBSEC *et al.*, 11 Mar 45, sub: Rations Issued to PW's. ORB PHIBSEC 430.2. (2) Rpt, J. B. Harper, 13 May 45, sub: Activities of the OCQM USASOS Apr 45. (3) *Ibid.*, 8 Aug 45, same sub, Jul 45. Both in DRB AGO QM Sec USASOS Hist Rpts.

This ration had been introduced on the American return to the Philippines to meet the requirements of the Commonwealth Army, which was then reconstituted from the guerrilla units that had carried on harassing operations against the occupying Japanese forces. The new ration had a dual objective. One purpose was the elevation of Filipino morale by the provision of most of the nonperishables found in U.S. field rations, which Commonwealth troops regarded as superior. Another purpose was to supply some Filipino staples through the substitution of canned fish for 20 percent of the American canned meat component and of rice for 80 percent of the starchy components. The Philippine labor ration, developed for the thousands of civilians employed by the American forces, contained larger quantities of rice and fish and smaller quantities of meat, flour, milk, and vegetables than did the Philippine Army ration and so reflected more closely the customary fare of the people.[92]

The loss of huge quantities of food in Luzon to the ubiquitous black market obliged the zone of interior to provide many of the elements in the Philippine rations. Early in 1945 the growing scarcity of subsistence in the United States brought about disturbing deviations from the prescribed standards, and in March the War Department ordered the labor ration to be cut drastically and kept well below the Commonwealth Army ration.[93] The sharp reduction in the rice and other favorite components elicited angry protests from workers whose low wages prohibited them from buying additional food in the black market. The superiority of the Philippine Army ration, now more marked than ever, further weakened civilian morale. In May, Base X in Manila reported that its Filipino laborers were suffering from slight malnutrition and that the consequent unrest among them had culminated in strikes and wholesale resignations. Monetary compensation for the reduction in the rice ration from seven to four ounces did not satisfy the men since "the desire for a good meal" outweighed "the desire for small increases in pay." [94] The chief Quartermaster held the inferior labor ration responsible for the inability of the U.S. Army to hire more than a quarter of the workers needed for a large-scale expansion of its supply activities.[95]

Inviting though the ration of Commonwealth soldiers appeared to Filipino laborers, it did not always seem so to the Commonwealth soldiers themselves. Guerrilla units, attached to American military organizations, notwithstanding that they usually operated alone in remote fastnesses, felt a sense of discrimination because they received less fresh meat and fewer perishables than did U.S. troops. Their complaints went unheeded chiefly because they were believed to enjoy unusually favorable opportunities for obtaining poultry and perishables from farmers.[96] Philippine Scout units, incorporated as military police into the U.S. Army, also felt discriminated against when in early June they were placed on the Common-

[92] Ltr, QM Base G to TQMG, 9 Mar 45, sub: Subs Rqmts. OQMG SWPA 430.

[93] (1) Ltr, CG Calif QMD to TQMG, 26 Mar 45, sub: Subs Consumption in SWPA. OQMG SWPA 430. (2) Ltr, CO Base M to CG PHIBSEC, 11 Jun 45, sub: Filipino Labor Ration. ORB AFWESPAC QM 430.2.

[94] Ltr, CO Base X to CG PHIBSEC, 21 May 45, sub: Rice Allowance. OQMG SWPA 430.

[95] Rpt, Civilian Historian OCQM AFWESPAC, 8 Aug 45, sub: OCQM Activities, Jul 45. DRB AGO.

[96] Ltr, CG 1st Cav to CG Sixth Army, 7 Jun 45, sub: Perishables for Guerrillas. ORB XIV Corps AG 430.2.

wealth Army ration. As a result of their dissatisfaction, they were finally given about half the amount of fresh meat issued to their American comrades.[97]

The liberation of the Philippines brought with it still another food problem—that of supplying an Occidental ration to several thousand American and European civilians who had been interned when the Japanese occupied the islands. As the advancing U.S. Army released American citizens, it placed its penniless fellow-countrymen, unable to obtain food for themselves, on a liberal ration. Lack of a formal plan for feeding Allied and neutral nationals and uncertainty whether control of such rationing belonged to the Army or the State Department caused a good deal of confusion. According to one report each freed U.S. citizen in April 1945 received twenty-eight pounds of subsistence a week while other nationals obtained only a sixth as much, or four and two-thirds pounds.[98] Such a striking difference could not be allowed; a uniform scale for all repatriates was essential. USASOS therefore recommended a ration of about ten and a half pounds. Under this proposal that command would sell rations to the State Department, which in turn would sell them to eligible applicants, many of whom now had sufficient funds to buy food. General MacArthur approved the plan, but the State Department lacked the means of setting up sales agencies. The Army was in consequence obliged to shoulder the task of selling as well as procuring the rations. If repatriates did not have money, food was issued to them on a relief basis.

Better planning might have avoided the confusion that accompanied the feeding of repatriates in the Philippines. Better planning might also have avoided some of the deficiencies found in other supplies and equipment throughout the Pacific. While items furnished by the QMC in general served their purpose well, they would have served even better if a full-fledged program aiming at the development of items fitted to diverse tactical and climatic conditions had begun functioning earlier in the OQMG. But such a program could not be established in the period between the two world wars because inadequate military appropriations had to be expended for more immediately significant projects. When, in mid-1940, more money became available, development activities in the OQMG were divided among two of its branches, which to some extent duplicated each other's work. Not until July 1942 were these activities centralized in the Military Planning Division.[99]

Up to that time OQMG research activities covered only a comparatively narrow range of specifically operational items and aimed chiefly at the development of clothing and equipment for special forces, particularly those operating in cold climates. Aside from Captain Kearny's experiments in Panama, work on jungle equipment, for example, had been neglected, and when the Japanese attacked Pearl Harbor, American troops, even in the Philippines, had no specialized equipment for jungle warfare. Nor did the QMC then have much information about what equipment was needed in jungle

[97] (1) Ltr, CO 1st MP Bn (PS) USAFFE to CG USAFFE, 5 Jun 45, sub: Rations. ORB PHIBSEC AG 430.2. (2) Ltr, CG AFWESPAC to CG Sixth Army *et. al.*, 10 Jun 45, sub: Perishables for Filipino Troops. ORB XIV Corps AG 430.2.

[98] Ltr, CG USASOS to CG USAFFE, 28 Apr 45, sub: Food for American, Allied, and Neutral Nationals in P. I. ORB PHIBSEC AG 430.2.

[99] Risch, *QMC: Organization, Supply, and Services*, I, 75–81.

fighting. Even at the end of July OQMG preparations for experimental production of jungle items were just getting underway. The hastily assembled equipment rushed to the South Pacific and the Southwest Pacific in the following year to help support jungle troops usually represented, not the products of careful testing, but rather of quick development of relatively untried items based on imperfect understanding of the tactical and climatic conditions encountered in the oceanic tropics. For at least another year the development of nearly all items used in the Pacific suffered from similar lack of adequate experimentation.[100]

Many erroneous judgments behind production of items having only doubtful or even no utility might have been avoided had it been possible in the years between wars to establish a well-staffed developmental program on a permanent basis. Through such a program, a much larger variety of experimental items could have been produced and tested under widely differing conditions of climate, terrain, and combat. Actually, the QMC developmental program started too late, and until 1943 was inadequately organized and manned. It also suffered from the swift movement of events which did not allow time to determine until relatively late in hostilities the characteristics peculiar to Pacific combat that might affect the serviceability of new items. In a few instances the practice of using as many standard items as possible in all overseas theaters posed special difficulties for Pacific combat troops. C rations were a notable example of such difficulties. Problems of this sort might have been eased had items been modified somewhat to fit particular conditions, but this would have been a costly and time-consuming solution likely to retard production of supplies in the needed quantities. The problems simply did not lend themselves to quick and easy solutions in wartime when speed was indispensable. More carefully developed items were the best solution, but such items could be produced only by a permanent peacetime research and development establishment, staffed by skilled technicians and possessing the elaborate equipment necessary to carry out tests under all kinds of unusual conditions. Such an establishment is the best guarantee that in future conflicts the supplies and equipment provided by the QMC will fulfill the expectations of the combat forces for whose support they are developed.

[100] Pitkin, *QM Equipment for Special Forces*, pp. 198, 203–08.

CHAPTER XII

Problems of Victory

The sudden surrender of Japan, officially concluded on 2 September 1945, signalized the complete victory of the United States and its Allies in the Pacific. In a letter addressed to all Quartermaster troops in MacArthur's command, the Chief Quartermaster, Brig. Gen. William F. Campbell, felicitated members of the Corps on their wartime accomplishments. Proudly, he declared that though "Victories achieved on each new island were carved out by front line troops and tacticians," their successes "were made possible by you who worked and sweated eighteen to twenty hours a day to see that our troops had the supplies they needed when they needed them." He continued in these words:

> Food, clothing, and equipment were scarce in the early days. We were fighting one of two wars then, and our war was being supplied from the small end of the supply horn. Under these conditions yours was not an easy task, but it is to the credit of all Quartermaster personnel in this theater that from the time the American advance began in the Solomons in August 1942, until its culmination in victory on 2 September 1945, not once did our attack falter because of a lack of Quartermaster supplies!
>
> Never before in any war have supply lines been so long. Never before has so much been supplied over such distances. I am confident that logistic experts a few years ago would have said that the execution of the supply operations you have accomplished in the last four years [was] impossible. I am equally confident that historians in the years to come will write of your supply achievements as one of the miracles of this war.
>
> No one can say that this or that arm or branch of the service achieved victory. The credit is shared by one and all alike. But to you of the Quartermaster Corps, the merits of whose activities and accomplishments I have been in a position to judge, I offer my personal appreciation and congratulations for a job well done. You have every reason to be proud of your achievements.[1]

Peace brought with it a drastic modification of the Quartermaster mission. The chief tasks of the Corps now became the supply of troops in the Philippines, Okinawa, Japan, and Korea, the evacuation of rear bases, and the disposition of unneeded stocks. The Office of the Chief Quartermaster, Army Forces Pacific (AFPAC), which had been set up as a special staff section in GHQ AFPAC on 21 August, supervised these new activities, whether they were carried out by U.S. Army Forces, Western Pacific (USAFWESPAC), or U. S. Army Forces, Middle Pacific (USAFMIDPAC).[2]

On 15 and 16 October the more important AFWESPAC quartermasters assembled in OCQM to adopt a plan for swift execution of their new mission. They quickly agreed upon a supply program for the

[1] Adm Div, OCQM GHQ AFPAC, Military History, OCQM, GHQ, U.S. Army Forces Pacific, I, App. III. Ltr to All QM Pers in SWPA, 2 Sep 45, sub: QM Achievement in the War With Japan.

[2] *Ibid.*, I, 1–6, and Apps. I and II.

BLACKLIST operation, as the occupation of Japan and Korea was called. Since the number of troops outside the occupied countries would steadily decline and stocks built up at the older bases to provide for a larger number of men would then far exceed demands, this program envisioned the maximum employment of stores already in the Pacific; only articles otherwise unobtainable would be requisitioned from U.S. sources. Excess stocks from the Philippines and AFWESPAC rear areas would furnish most of the required items, but when practicable, stocks from South and Mid-Pacific as well as Southwest Pacific bases would be employed. Supplies were to be shipped automatically in block loads adjusted to the size of the occupational forces. This system would remain operative until mid-February 1946, when, presumably, a fairly well-stabilized troop strength would permit a return to the normal peacetime method of delivering supplies only in fulfillment of requisitions.[3]

The conferees discussed at considerable length means of carrying out promptly the "roll-up" of rear bases. They agreed that Quartermaster activities at bases should be ended as soon as the troops they supplied had been evacuated. Except at Finschhafen and Hollandia, activities at New Guinea bases would cease about 31 December. Hollandia would close by 1 February and Finschhafen by 1 March. In the Philippines, Base R at Batangas on Luzon would pass to the control of Base X in Manila and become a temporary storage place for unneeded supplies and equipment that rear areas turned in for disposition. With the single exception of Base M at San Fernando, La Union, also on Luzon, other Philippine bases and supply points were to be abandoned by the spring of 1946; for the time being Base M would serve as a war reserve depot. Ultimately, most stocks would be concentrated at Manila.[4]

The chief Quartermaster problem in the closing of bases was the large amount of unneeded supplies. When considered in relation to the number of soldiers, stocks, except of Class III products, stood at high levels. There were several causes for this condition. One was the steady decline in troop strength as more and more men were returned to the United States for discharge from the Army. Another was the rapid build-up of stores after VE-Day in anticipation of the early arrival of many thousands of men from the ETO. Actually, the expected reinforcements never came, and instead of sharp increases, sharp decreases appeared in troop strength. Stockages thus became much more than ample. The absence of combat losses further increased excesses, for supply levels had been set in expectation of such losses. Soldiers indeed required little more than did those in the zone of interior. The rapid abandonment of old points of troop concentration introduced still another complication since bases in New Guinea, the Solomons, and other isolated areas were quickly reduced to the status of mere storage places with few or no supply functions. With scarcely any troops remaining to protect stocks, pilferage rose and losses from deterioration multiplied.[5]

Obviously, a primary means of eliminating excesses in stockages was through a reduction in the inflow of supplies. During the weeks after VJ-Day the Corps accord-

[3] QM Sec AFWESPAC, OCQM Activities, Oct 45. DRB AGO TOPNS Rpts File AFWESPAC QM F212.

[4] *Ibid.*

[5] USAFWESPAC, Semiannual Rpt, 1 Jan–30 Jun 46, p. 25. Hist Br OQMG.

ingly withdrew most of its requisitions on Australia and New Zealand for food, clothing, and general supplies. It retained in force only a few contracts completion of which was necessary in order to provide cold-weather apparel for men going to Japan and Korea. The Corps also withdrew requisitions on the continental United States for items already available in adequate quantities and canceled the sailing of many block ships slated to depart from San Francisco with cargoes for the occupational forces.[6]

The disposition of base stocks presented a more involved problem than did the elimination of incoming shipments. It demanded, first of all, the determination of how much property constituted "surplus," that is, property unneeded by any U.S. Government agency and thus disposable to civilians, American or foreign. In performing this task, Pacific areas were governed by War Department Technical Manual 38-420, issued in September 1945.[7] In line with its stipulations, they first estimated the distribution needs of the bases. Once this had been done, quantities of civilian-type Class II, III, and IV items on hand in excess of Pacific needs could be declared surplus without reference to the War Department. If fresh provisions or other supplies, military or civilian, were likely to be lost through rapid deterioration, they, too, could be immediately declared surplus. But unless such danger existed, neither food nor items of a military type could be so classified without express War Department authorization. Special regulations empowered overseas commands to treat all reverse lend-lease property as surplus and return it to the supplying government.[8] Because of the serious shortage of warehouse space in the United States, surplus property could not be returned there without specific approval from ASF headquarters. The only items exempt from this general restriction were a few badly needed by American industry. Cotton and burlap bags were the only important Quartermaster articles in this category.[9]

Receipt of supplies at still active bases in the Philippines and on Okinawa continued for some months to exceed shipments, but at most of the other bases distribution activities rapidly dwindled. Even before the Pacific commands had received Technical Manual 38-420, they had begun preparations for the disposition of unneeded stocks at these declining installations. In September G–4, Australian Base Section, organized technical service teams which visited depots and determined the quantity of surplus stocks and the original cost and present value of both U.S.-owned and reverse lend-lease surpluses. These teams declared most of the property on the Australian mainland surplus. Virtually all reverse lend-lease stores were in consequence turned back to the Commonwealth.[10] Only a small percentage was booked for movement to the Philippines and Japan. Owing to the shortage of bottoms and the exorbitant expense of shipping, used or deteriorated items whose value had declined to a fraction of the original cost and U.S.-owned supplies—even those of a military type—were also mostly disposed of in Australia. The Army-Navy Liquidation Commission, which had

[6] (1) OCQM AFPAC, OCQM Activities, Aug 45. DRB AGO TOPNS Rpts File USASOS QM Sec (Sep 45). (2) *Ibid.*, Oct 45. Rpts File AFWESPAC QM Sec 3212.

[7] This manual was entitled: Disposition of Excess and Surplus Property in Overseas Commands.

[8] TM 38-420, pp. 13–14.

[9] *Ibid.*, pp. 42, 58–59.

[10] (1) Ltr, Maj Richard Parmalee, ABSEC, to Col R. H. Hobbs, Hq, ASF, 11 Oct 45. ORB AFPAC Rear Ech Reverse L–L File. (2) AFWESPAC Conference, 22 Dec 45, G–4 Mission. ORB Base G AG 400 (1945).

responsibility for this task, at first turned over surplus supplies to the Commonwealth Disposals Commission for sale in small lots to merchants and manufacturers. This procedure, one G–4 officer complained, was so slow that it would keep Americans in Australia for years. Increasingly, therefore, the property was sold in bulk lots to the Commonwealth or to agencies of India, China, and the Netherlands Indies.[11]

Outside Australia, other rear bases also plunged at once into the formidable task of disposing of no longer needed stores.[12] At Finschhafen, U.S. troops, helped by the Australians, Dutch, and Indonesians, toiled long hours in order to hasten their return home. During October, "closing out" activities attained so high a rate that Quartermaster trucks hauled nine times the tonnage they had in the previous month. By 1 November, 85 percent of Quartermaster surpluses had been sold at nominal prices in Netherlands New Guinea and other places in the Netherlands Indies. The difficulty of obtaining vessels for shipments to northern bases, let alone to the United States, mainly accounted for this large shift of property. The Australian Army also profited from the closing of the base. It received a sixty-day food supply, most of which the Commonwealth had originally procured as reciprocal aid for the U.S. Army.[13]

In the old South Pacific Area the Guadalcanal base, which on VJ-Day contained more than 240,000 measurement tons of government property, became the scene of hectic activity. All outlying warehouses were closed as quickly as possible, and all movable property was concentrated near the Kukum docks for disposition by the Foreign Liquidation Commission. It soon found that few buyers were willing to bid at Guadalcanal, for they could obtain the goods they wanted at other bases where commercial vessels for transporting their purchases were available in much larger numbers. Some other method of disposition was imperative. Headquarters, U.S. Army Forces, Middle Pacific, accordingly ordered property that met high standards of serviceability sent to other bases or to the United States for disposition. About three fourths of surplus stock met these standards. The other fourth was badly deteriorated or was obsolete. Authority for its destruction or abandonment was obtained, and it was burned, buried, or dumped at sea.[14]

The Guadalcanal close-out report revealed that the Foreign Liquidation Commission had sold 17,828 measurement tons, or about 7 percent of base surpluses. Of this quantity, 13,277 tons, or nearly three fourths, consisted of motor gasoline, diesel fuel, and other Quartermaster supplies. In monetary terms Quartermaster items realized only the surprisingly small sum of $26,354, a mere quarter of total sales of $100,864; indeed, for each ton of Quartermaster supplies the U.S. Government obtained only two dollars. Property shipped from Guadalcanal to other Pacific bases or to the United States for sale amounted to 165,831 measurement tons, or 69 percent of all Army surpluses. Abandoned or destroyed articles came to 58,831 measurement tons, or 24 percent. Originally, this property had cost $19,888,587, of which $2,027,728 had been spent for Quartermaster supplies.[15]

[11] (1) Ltr, Maj Parmalee to Col Hobbs, 11 Oct 45. (2) Rad, CG AFWESPAC to ABSEC, 10 Nov 45. ORB ABCOM GPA 400.7.

[12] P. 25 of Rpt cited n. 5.

[13] OQM Base F, Hist Summary, Oct 45. ORB Base F QM 314.7.

[14] Hq USAF Guadalcanal, Final Close-Out Rpt, pp. 30–31. ORB USAFINC Final Close-Out File.

[15] *Ibid.*, Exhibits 22–24.

Closing-out operations at Guadalcanal, though not unrepresentative of those found at the more remote rear bases, did not wholly typify such operations in the Pacific. The proportion of abandoned or destroyed property in particular reached higher levels than at any but the most isolated installations. Moreover, few if any bases outside the Solomons and New Hebrides were as severely handicapped in the sale of surplus property as was Guadalcanal by remoteness from civilian markets and by lack of commercial shipping. But everywhere sales suffered from the scarcity of U.S. dollars, which were at first usually demanded in payment of purchases. By January, revised regulations permitting acceptance of bank drafts drawn against dollar balances had materially eased the currency shortage in New Caledonia, and in Australia and New Zealand the termination of reverse lend-lease agreements and the subsequent use of dollars for Army food purchases had provided the currency required by buyers of surpluses.

No fully reliable statistics covering the disposition of unneeded property in the Pacific are available. The G–4 Section, AFWESPAC, which supervised disposal activities at the old Southwest Pacific bases submitted, as of 30 June 1946, approximate figures covering the principal phases of the disposition program in that command. Up to that time it had approved declarations of surpluses totaling for all Army technical services 1,316,000 long tons, with an original cost of $991,804,000. Of this huge quantity, reverse lend-lease property had reverted to the procuring country, about 31,100 tons had been donated, abandoned, or destroyed, and about 1,042,200 tons returned to the United States. Most of the remaining surpluses had been sold to foreign governments by negotiated sales or was about to be so disposed of. The Philippine Commonwealth and the Chinese Government were the chief beneficiaries of this method of sale. They received, respectively, a large part of the surpluses in the Philippines and on Okinawa, and they received this property at little or no cost and thereby materially aided their shattered economies.[16]

Aside from its role in the disposition of surplus property, which, by mid-1946, was fast nearing completion, the QMC had few major tasks attributable directly to wartime operations that remained to be carried out. It was, it is true, engaged in a graves registration program that would continue for several years and that called for verification of the identification of the soldier dead, concentration of their remains in a few Pacific cemeteries, extensive search for the bodies of those still missing, and eventual return of most of the dead to the United States for burial in places chosen by next of kin. Otherwise Quartermaster responsibilities in the Pacific were increasingly like those normally carried out by the Corps in peacetime posts overseas. No longer did it find routine activities handicapped by shortages of men, supplies, and equipment or by transportation troubles. No longer did it have to contend with the insoluble problem of forecasting the supply needs of task forces. Nor did soldiers any longer go without fresh food, beer, tobacco, socks, and well-fitted clothing. In Japan and Korea, as in Hawaii and the Philippines, troops were well fed and well clad.

Yet if the accomplishment of current tasks posed few difficulties, the QMC was faced in the Pacific as elsewhere with the highly important responsibility of planning and

[16] Pp. 25–26 of Rpt cited n. 5.

preparing for the future in a world living under the dark shadow of an apparently interminable cold war relentlessly waged in all quarters of the globe. The necessity of preparing for a future clouded by incalculable hazards confronted the QMC, like all other components of the Army, with a complex problem of preparedness such as the service had never before faced in peacetime. The uncertainties surrounding future Communist actions hampered the efforts of all parts of the Army to achieve a degree of organized readiness adequate to check any aggression. When, for example, the 38th parallel became in 1945 the line separating the Soviet and the U.S. forces occupying Korea, few men foresaw that within five years this division of the country would become the excuse for the invasion of South Korea by North Korean Communists. Had diplomats and strategists possessed the gift of prevision, the Army would probably have retained much of the surplus property it had so hastily sold or abandoned after VJ-Day and would certainly have kept larger stocks in its depots. There were at first neither sufficient troops nor equipment in the Pacific to repel the invaders. Consequently, though the North Koreans did not possess formidable strength, the Army was unable for three months to fight its way north to the 38th parallel.

In spite of the difficulty of foretelling what the Communists would do or even the character of future wars, which might indeed be conducted in so revolutionary a manner as to outmode all prior concepts, the QMC stood ready to play its traditional part as the handmaiden of diplomacy, strategy, and tactics. In that capacity it was prepared within the limits set by budgetary allowances to carry out its routine activities and to plan the execution of the supporting role assigned to it by shifting diplomatic and strategic concepts of future warfare.

Bibliographical Note

Records and studies about Quartermaster Corps activities in the war against Japan fall into three general classes—U.S. Army official records, published works, and manuscript histories. Of these classes, Army records are by far the most valuable, and this volume is therefore based mainly upon them.

U.S. Army Official Records

The quality of Army records relating to Quartermaster activities varies widely from area to area, from activity to activity, and from troop unit to troop unit. In the early months of the war, in the South and the Southwest Pacific as well as in the beleaguered Philippines, shortages of office clerks and equipment prevented maintenance of proper records. To some extent these deficiencies continued until the surrender of Japan. Higher headquarters, which were usually at least fairly well manned and equipped, kept the most complete records. Those at bases varied in quality with the interest of commanders and the ability of file clerks. Quartermaster troop units at best maintained sketchy records of little—often no—historical value. Some of the periodical historical summaries and after action reports are illuminating surveys, but most of them were prepared by men who possessed little conception of what matters had permanent interest. The authors in general stressed matters of merely ephemeral significance; this was especially true of unit histories. Worst of all, some Quartermaster records were apparently destroyed after the war, on the ground that they were not worth preservation. Certainly, the disconcertingly wide gaps that on occasion appear in the documentary record of the Corps cannot otherwise be easily explained.

The scarcity of Quartermaster records is most marked in the study of the fall of the Philippines. Cut off from the outside world by a strangling blockade, American forces in that archipelago in 1942 could use little of the precious space on the few departing submarines and planes to ship records. Most of the records remained in the islands and were destroyed in the final disaster. The only surviving documents of importance to research on Quartermaster operations is a group of G–4 files, apparently sent to Washington from Corregidor before its surrender. These files, designated USAFFE-USFIP Records, are located in the Departmental Records Branch (DRB), AGO. They are especially useful for the study of food conditions both on Corregidor and on Bataan. DRB AGO Finding List 31 gives a detailed inventory of these documents.

The chief source of information on Quartermaster activities during the events that culminated in the fall of the Philippines is the series of reports prepared after the war by higher commanders and key officers who had spent three years or more in Japanese prison camps. The Chief Quartermaster, Brig. Gen. Charles C. Drake, and Quartermaster officers who had performed a major role in supporting the Philippine garrison,

were brought to the Office of The Quartermaster General (OQMG) in Washington to prepare their reports from memory and from notes they had made during their captivity. These accounts eventually became Annex XIII of Gen. Jonathan M. Wainwright's voluminous Report of Operations of USAFFE and USFIP in the Philippine Islands, 1941–1942. This annex, entitled Report of Operations, Quartermaster Corps, United States Army, in the Philippine Campaign, 1941–1942, is referred to in the text of this volume as General Drake's Report. Despite conspicuous gaps and other shortcomings that could not be corrected under the circumstances, Annex XIII furnishes the best account of Quartermaster activities before and during the fall of the Philippines. It is indeed the only source for many aspects of these activities. Chapter I of this volume is of necessity based largely upon it. A copy of the annex is on file in the OQMG. Another copy, attached to General Wainwright's report, is available in Departmental Records Branch, AGO.

Annex XIV, Medical Department Activities in the Philippines, 1941–6 May 1942, throws light on actual food receipts in combat units and on the dire physical results of starvation diets. A few of the annexes devoted to tactical commands, notably number VI, Report of Operations of Luzon Force, 12 March 1942 to 9 April 1942, also give interesting sidelights on these matters.

During the research for this volume the records of overseas commands were located in the Organization Records Branch (ORB), Records Administration Center, AGO, St. Louis, Mo., but have since been removed to the Kansas City Records Center, AGO, Kansas City, Mo. These materials provided most of the information on which this publication is based. The author spent a total of seven weeks at St. Louis in examination of the overseas records. He selected for shipment on loan to the OQMG in Washington about 140 foot lockers of pertinent materials. Informative documents were photostated in whole or part in order to have exact copies for use in writing. Reproduction was made on paper five by eight inches for the sake of greater ease in filing and handling.

The records from St. Louis cover with varying degrees of thoroughness the activities of the QMC at higher headquarters. The records of U.S. Army Services of Supply (USASOS) tell the story of Quartermaster activities in that Southwest Pacific command in adequate fashion, but equally satisfactory material could not be found for the higher supply headquarters of other Pacific areas. Files of base sections everywhere vary substantially in coverage of Quartermaster operations, again proving most helpful as regards General MacArthur's command. Quartermaster materials in the files of task forces, of the Sixth, Eighth, and Tenth Armies, and of infantry divisions and other tactical organizations are also uneven in value; their usefulness is greatest for higher organizations and least for lower organizations. The documentary records of many Quartermaster troop units could not be located, and often, when they were found, proved valueless for the purposes of this volume.

For the Southwest Pacific the most useful group of documents is that of the United States Army Forces in the Western Pacific (AFWESPAC), which now includes the records of USASOS for the entire war period. Other especially useful collections of the Southwest Pacific Area are those of the Australian Base Command (ABCOM) and the New Guinea Base Section (NUGSEC),

which both contain many documents originally part of the files of former base sections in these territorial areas. The records of the U.S. Army Forces, Pacific (AFPAC), contain information on supply matters that required collaboration with Australian agencies or co-ordination between G–4 and the Office of the Chief Quartermaster, USASOS.

The best source of documents for the Quartermaster history of the South Pacific proved to be the Adjutant General and Quartermaster portions of the records of U.S. Army Forces in New Caledonia (USAFINC). These records consist mainly of materials from Headquarters, U.S. Army Forces in the South Pacific (USAFISPA), and from Services of Supply, South Pacific Area, and are particularly valuable for a study of supply activities in late 1942 and in 1943. Usable information on activities at base sections in the South Pacific was also culled from the Adjutant General files of the U.S. Forces in the northern Solomons.

Documents relative to the QMC in the Central Pacific during the last half of the war were conspicuously scarce but for the earlier period were reasonably adequate. Material on the potential dangers to the Hawaiian food supply in wartime and on the plans for stockpiling imported food and building warehouses for reserve stores are printed in Exhibits IP, 133, and 153 of Part 18 of the hearings of the joint committee that investigated the Pearl Harbor attack (79th Congress, Second Session). Parts 19 and 28 contain testimony about the status of the Hawaiian food supply. Additional documents on prewar plans for meeting a food crisis are available at Kansas City in the Adjutant General section of Army Ground Forces, Pacific, files. This collection also provides necessary material on supply activities in the Central Pacific during the year after Pearl Harbor.

The Army Records Section, formerly Historical Records Section, Departmental Records Branch, AGO, in Alexandria, Va., contains historical records of tactical organizations that operated in the Pacific. The after action reports of infantry divisions, of the Sixth, Eighth, and Tenth Armies, and of tactical corps, are often highly valuable for Quartermaster history. Nearly all these reports contain both G–4 and Quartermaster annexes dealing with supply and service problems and achievements from the standpoint of the principal logistical offices of reporting organizations. The annexes convey a reasonably clear picture of Quartermaster support of combat forces in general but ordinarily contain little information about individual Quartermaster units in action. The study of these units is further hampered by the inadequacy of many after action unit reports.

During World War II the OQMG in Washington acquired few documents bearing on Quartermaster activities overseas. The most significant materials in its possession on the Pacific phase of the war were reports prepared by observers the OQMG itself sent out to study the actual utility of Quartermaster items under combat conditions and to determine what new items or modifications of old ones were needed. Particularly noteworthy are the reports of Col. D. B. Dill, Capt. Robert L. Woodbury, and Capt. Robert D. Orr. The latter officer spent nearly two years in the Southwest Pacific, a longer time than any other OQMG observer. Because of his familiarity with the special problems of that area, his analyses of Quartermaster items are especially illuminating. Pacific documents obtained by the OQMG are now located in Quartermaster

Southwest Pacific and Pacific Ocean Areas files in the Technical Records Section, Departmental Records Branch, AGO, at Alexandria, Va. Most of the observers' reports are filed under 319.25.

Papers in this and other bodies of overseas documents wherever located were ordinarily arranged in accordance with the War Department decimal file system. Bulletins, circulars, manuals, and other general directives were almost invariably filed under 300, and when these directives are cited in the text, it should be understood that they were so filed unless another location is indicated. The file locations of other cited documents are specifically indicated in the footnotes. Personnel records were placed under numbers ranging from 200 to 299, each of which represented a different subject. For example, documents pertinent to funerals, burials, and graves registration in general were put under 293 or its decimal subdivisions. Administrative records were assigned numbers in the 300–399 series. In this series, aside from 300, the file numbers most significant to the student of Quartermaster affairs are probably 310.1 (office organization); 314.7 (military history); 319.1 and 319.25 (periodical and other reports); 320.3 (tables of organization); 323.3 (depots); and 333.1 (inspection of posts).

The records of most value to the QMC are found in the 400–499 series, which is devoted to supplies, services, and equipment. It includes much material about the procurement, storage, and distribution of supplies and the characteristics and problems of individual items. The 400.1 series, which deals mostly with the selection, adoption, betterment, and procurement of supplies, is indispensable to an understanding of the general problems of specifications, designs, patterns, sizes, and tariff tables, of the letting of contracts, and of numerous other transactions carried out in the process of buying supplies. This series is also indispensable to a study of the general problems of inspecting, marking, and packing supplies before shipment. The 400.2 series deals with the handling, storage, and transfer of items from one point to another. It contains materials relating to depot administration, stock replenishment, reserve stores, and methods of warehousing supplies and utilizing space. The 400.3 series, devoted to distribution activities, gives information about shipping priorities, preparation and filling of requisitions, and methods of issuing supplies. Farming operations are dealt with under 403. Records about the special problems of general supplies—mostly hardware—are filed in the 410–419 series; those dealing with clothing, footwear, toilet articles, tentage, and other items of individual and organizational equipment in the 420–429 series; and those concerning food in the 430–437 series. Material on tobacco products is found in 439; on horses, mules, and other animals in 454; on funeral supplies in 468; on cold storage in 486.1; and on laundering and repair services in 486.3.

Published Works

The number of books, magazine articles, and other published works containing material about Quartermaster activities in the war against Japan is small and limited in value. No published volume treats of Quartermaster activities as such; most published works are concerned almost wholly with strategy and tactics and normally make only fleeting reference to logistics. Frequently,

Quartermaster activities are not even mentioned. Pertinent magazine articles are confined in the main to *The Quartermaster Review* and the *Quartermaster Training Service Journal.*

Among the published books utilized in studying events associated with the fall of the Philippines were Gen. Jonathan M. Wainwright, *General Wainwright's Story,* edited by Robert Considine (New York, 1946); A. Whitney Griswold, *The Far Eastern Policy of the United States* (New York, 1938); Henry L. Stimson and McGeorge Bundy, *On Active Service in Peace and War* (New York, 1948); and Lt. Gen. Lewis H. Brereton, *The Brereton Diaries* (New York, 1946). The fullest account of prewar planning and food and medical problems in the Philippines in 1941 and 1942 is that of Louis Morton in *The Fall of the Philippines* (Washington, 1953), one of the combat volumes in U.S. ARMY IN WORLD WAR II. Three other volumes in this series contain considerable information on prewar mobilization planning and preparations in the Philippines. They are Maurice Matloff and Edwin Snell's *Strategic Planning for Coalition Warfare;* Mark Skinner Watson's *Chief of Staff: Prewar Plans and Preparations;* and Ray S. Cline's *Washington Command Post: The Operations Division.* All these works are helpful to a study of the strategic concepts into which preparations for Quartermaster support of the defense of the Philippines were fitted. Among articles containing information on the supply of Bataan are the "Bataan Diary of Major A. C. Tisdelle," edited by Louis Morton, in *Military Affairs,* Volume XI (Fall 1947), and Capt. Harold A. Arnold's "The Lesson of Bataan," in *The Quartermaster Review,* Volume XXVI (November–December 1946). Bogart Rogers' "Help for the Heroes of Bataan" in *Cosmopolitan,* CXIX (November–December 1945), an article based on information furnished by Col. John A. Robenson, gives a detailed account of the desperate efforts to outfit blockade-runners in the Netherlands Indies for the relief of Bataan.

Published sources are of almost no significance for Quartermaster history after the surrender of Corregidor. Only the combat volumes of U.S. ARMY IN WORLD WAR II have importance. Though primarily concerned with tactical and strategical developments, they contain useful information about logistical problems in general and occasionally shed light on the provision of gasoline and rations. The volume by John Miller, jr., on *Guadalcanal: The First Offensive* proved especially serviceable.

Manuscript Histories

Two manuscript surveys were of particular service. One is a 330-page History of Quartermaster Operations, U.S. Army Forces, Middle Pacific, During the War With Japan, which appeared as an appendix to the History of United States Army Forces, Middle Pacific and Predecessor Commands, a study prepared by the Historical Subsection, G–2, Headquarters, AFMIDPAC. An annex, attached to the Quartermaster history, contains pertinent statistics and important directives. The other survey, in eight sections, is entitled Military History, Office of the Chief Quartermaster, USASOS. It was prepared semiannually, one of its eight sections appearing every six months until 30 June 1945. While it is by no means a complete account of

Quartermaster operations in the Southwest Pacific, it gives considerable information not easily accessible elsewhere. For the South Pacific there is no general study of Quartermaster activities quite as rewarding as are those for the Middle and Southwest Pacific. But the manuscript History of the United States Army Forces in the South Pacific During World War II, 30 March 1942–1 August 1944 (4 parts), prepared by the G–2 Historical Sections of U.S. Army Forces in the South Pacific Area, and of South Pacific Base Command, contains some useful data.

List of Abbreviations

AAF	Army Air Forces
ABCOM	Australian Base Command
ABSEC	Australian Base Section
ACofS	Assistant Chief of Staff
Actg	Acting
Actn	Action
Adm	Administration
AdminO	Administrative Order
ADSEC	Advance Section, U.S. Army Services of Supply, Southwest Pacific Area
Adv	Advance
AF	Air Force
AFMIDPAC	U.S. Army Forces, Middle Pacific
AFPAC	U.S. Army Forces, Pacific
AFSC	Air Force Service Command
AFWESPAC	U.S. Army Forces, Western Pacific
AG	Adjutant General
AGF	Army Ground Forces
AGFPAC	U.S. Army Ground Forces, Pacific
AGO	Adjutant General's Office
AGRS	American Graves Registration Service
AGWAR	Adjutant General, War Department
ALF	Allied Land Forces, Southwest Pacific Area
APO	Army Post Office
AR	Army Regulation
Arty	Artillery
ASCOM	Army Service Command
ASF	Army Service Forces
Asgmt	Assignment
Asst	Assistant
ASW	Assistant Secretary of War
Atchd	Attached
ATS	Army Transport Service
Avn	Aviation
BEW	Board of Economic Warfare
Bkry	Bakery
Bn	Battalion

Br	Branch
BS	Base Section
Btry	Battery
Bull	Bulletin
C and E	Clothing and equipage
CE	Corps of Engineers
CG	Commanding General
CINCPAC	Commander in Chief, U.S. Pacific Fleet
CINCPOA	Commander in Chief, Pacific Ocean Areas
CINCSWPA	Commander in Chief, Southwest Pacific Area
Cir	Circular
Clo	Clothing
CML	Chemical
CMLO	Chemical Officer
CNO	Chief of Naval Operations
CO	Commanding Officer
CofEngrs	Chief of Engineers
CofS	Chief of Staff
CofT	Chief of Transportation
Com	Committee
Comd	Command
Comdt	Commandant
COMSERONSOPAC	Commander, Service Squadron, South Pacific Force
COMSOPAC	Commander, South Pacific Area
Conf	Conference
CPA	Central Pacific Area
CPBC	Central Pacific Base Command
CQM	Chief Quartermaster
CTF	Commander, Task Force
CWS	Chemical Warfare Service
DCofS	Deputy Chief of Staff
Dept	Department
Det	Detachment
Dir	Director
DISTBRA	Distribution Branch, Distribution Division, U.S. Army Services of Supply, Southwest Pacific Area
DISTDIV	Distribution Division, U.S. Army Services of Supply, Southwest Pacific Area
Distr	Distribution
Div	Division
DQM	Division Quartermaster or Department Quartermaster
DRB	Departmental Records Branch
DSCS	Department Service Command Section, Hawaiian Department

DUKW	Amphibian, 2½-ton, 6x6 truck, used for short runs from ship to shore
Ech	Echelon
EM	Enlisted man
Engr	Engineer
Equip	Equipment
ETO	European Theater of Operations
ExO	Executive Officer
FA	Field artillery
FEAF	Far East Air Force
FM	Field manual
Fwd	Forward
FY	Fiscal year
G–1	Personnel section of higher or divisional headquarters
G–2	Military intelligence section
G–3	Operations and training section
G–4	Supply and evacuation section
GD	General Depot
GHQ	General Headquarters
GO	General Orders
Gp	Group
GPA	General Purchasing Agent
GR	Graves Registration
GRS	Graves Registration Service
GSD	General Service Division
HD	Hawaiian Department
HHD	Headquarters, Hawaiian Department
Hist	History
Hq	Headquarters
HRS DRB AGO	Historical Records Section, Departmental Records Branch, Office of The Adjutant General
HSAC	Hawaiian Seacoast Artillery Command
HUSAFICPA	Headquarters, U.S. Army Forces, Central Pacific Area
HUSAFMIDPAC	Headquarters, U.S. Army Forces, Middle Pacific
HUSAFPOA	Headquarters, U.S. Army Forces, Pacific Ocean Areas
IG	Inspector General
Incl	Inclosure
Ind	Indorsement
Inf	Infantry
Insp	Inspection or inspector
Instl	Installation
Instr	Instruction
INTERSEC	Intermediate Section, U.S. Army Services of Supply, Southwest Pacific Area

Interv	Interview
IRS	Intraoffice Reference Sheet, Office of The Quartermaster General
JAG	Judge Advocate General
JCS	Joint Chiefs of Staff
JPB	Joint Purchasing Board
Lab	Laboratory
LCM	Landing craft, mechanized
LCT	Landing craft, tank
Ldry	Laundry
LofC	Library of Congress
Log	Logistical
LST	Landing ship, tank
Ltr	Letter
LUBSEC	Luzon Base Section
LVT	Landing vehicle, tank
Maint	Maintenance
Mbl	Mobile
MD	Medical Department
Med	Medical
Mid-Pac	Middle Pacific
Mil	Military
Min	Minutes
Misc	Miscellaneous
Mob	Mobilization
Msg	Message
MT	Motor transport
Mtg	Meeting
MTO	Mediterranean Theater of Operations
MTS	Motor Transport Service
Mvmt	Movement
NG	New Guinea
NUGSEC	New Guinea Base Section
OASW	Office of the Assistant Secretary of War
Obsvr	Observer
OCE	Office of the Chief of Engineers
OCMH	Office of the Chief of Military History
OCQM	Office of the Chief Quartermaster
OCT	Office of the Chief of Transportation
OIC	Officer in charge
OO	Office Order
OPA	Office of Price Administration
OP&C	Organization Planning and Control

OPD	Operations Division, War Department General Staff
Opn	Operation
OQMG	Office of The Quartermaster General
ORB	Organization Records Branch, Records Administration Center, AGO, St. Louis, Missouri
Ord	Ordnance
OSRD	Office of Scientific Research and Development
OSW	Office of the Secretary of War
P&C	Purchasing and Contracting
Pac	Pacific
Pers	Personnel
Phil	Philippine
Phil BS	Philippine Base Section
PHILRYCOM	Philippine-Ryukyus Command
P.I.	Philippine Islands
Pkg	Packing
Plat	Platoon
PM	Prime minister or provost marshal
POA	Pacific Ocean Areas
POE	Port of embarkation
POL	Petroleum, oil, and lubricants
POW	Prisoner of war
Proc	Procurement
PTO	Pacific Theater of Operations
PX	Post exchange
QM	Quartermaster
QMC	Quartermaster Corps
QMD	Quartermaster Depot
QMR	*The Quartermaster Review*
QMSO	Quartermaster supply officer
QMTSJ	*Quartermaster Training Service Journal*
R&D	Research and Development
Rad	Radio
Rclm	Reclamation
RCT	Regimental Combat Team
Reg	Regulation
Regt	Regiment
Resup	Resupply
Rmt	Remount
Rpr	Repair
Rpt	Report
Rqmt	Requirement
Rqn	Requisition

S–4	Supply section of regimental or battalion headquarters
S&D	Storage and Distribution
Salv	Salvage
SB	Supply bulletin
SEASFD	Seattle Army Service Forces Depot
Sec	Section
Stf	Staff
SFPOE	San Francisco Port of Embarkation
SG	Surgeon General
Shpmt	Shipment
SOP	Standing operating procedure
SOS	Services of Supply
SPA	South Pacific Area
SPBC	South Pacific Base Command
Sq	Squadron
SSUSA	Special Staff, U.S. Army
Sub	Subject
Subs	Subsistence
Sup	Supply
Supp	Supplement
Surg	Surgeon
Svc	Service
SvC	Service Command
SW	Secretary of War
SWPA	Southwest Pacific Area
T/A	Table of Allowance
TAG	The Adjutant General
TB	Technical Bulletin
T/BA	Table of Basic Allowance
TC	Transportation Corps
T/E	Table of Equipment
Tech	Technical
TF	Task Force
TH	Territory of Hawaii
TM	Technical manual
Tng	Training
T/O	Table of Organization
T/O&E	Table of Organization and Equipment
TOPNS	Theater of Operations
TQMG	The Quartermaster General
Transp	Transportation
TRB	Troop Basis
Trf	Transfer

Trk	Truck
Trp	Troop
TWX	Teletype message
USAFFE	U.S. Army Forces, Far East
USAFIA	U.S. Army Forces in Australia
USAFICPA	U.S. Army Forces in Central Pacific Area
USAFINC	U.S. Army Forces in New Caledonia
USAFISPA	U.S. Army Forces in South Pacific Area
USAFMIDPAC	U.S. Army Forces, Middle Pacific
USAFPOA	U.S. Army Forces, Pacific Ocean Areas
USAFWESPAC	U.S. Army Forces, Western Pacific
USASOS	U.S. Army, Services of Supply, Southwest Pacific Area
USFIA	U.S. Forces in Australia
USFIP	U.S. Forces in the Philippines
UTASFD	Utah Army Service Forces Depot
UTGD	Utah General Depot
VC	Veterinary Corps
Vet	Veterinary
WAC	Women's Army Corps
WD	War Department (now Department of the Army)
WDGS	War Department General Staff
Whse	Warehouse
WO	Warrant Officer
WPBC	Western Pacific Base Command
ZI	Zone of interior

UNITED STATES ARMY IN WORLD WAR II

The following volumes have been published or are in press:

The War Department
- *Chief of Staff: Prewar Plans and Preparations*
- *Washington Command Post: The Operations Division*
- *Strategic Planning for Coalition Warfare: 1941-1942*
- *Strategic Planning for Coalition Warfare: 1943-1944*
- *Global Logistics and Strategy: 1940-1943*
- *Global Logistics and Strategy: 1943-1945*
- *The Army and Economic Mobilization*
- *The Army and Industrial Manpower*

The Army Ground Forces
- *The Organization of Ground Combat Troops*
- *The Procurement and Training of Ground Combat Troops*

The Army Service Forces
- *The Organization and Role of the Army Service Forces*

The Western Hemisphere
- *The Framework of Hemisphere Defense*
- *Guarding the United States and Its Outposts*

The War in the Pacific
- *The Fall of the Philippines*
- *Guadalcanal: The First Offensive*
- *Victory in Papua*
- *CARTWHEEL: The Reduction of Rabaul*
- *Seizure of the Gilberts and Marshalls*
- *Campaign in the Marianas*
- *The Approach to the Philippines*
- *Leyte: The Return to the Philippines*
- *Triumph in the Philippines*
- *Okinawa: The Last Battle*
- *Strategy and Command: The First Two Years*

The Mediterranean Theater of Operations
- *Northwest Africa: Seizing the Initiative in the West*
- *Sicily and the Surrender of Italy*
- *Salerno to Cassino*
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The European Theater of Operations
- *Cross-Channel Attack*
- *Breakout and Pursuit*
- *The Lorraine Campaign*
- *The Siegfried Line Campaign*
- *The Ardennes: Battle of the Bulge*
- *The Last Offensive*

The Supreme Command
Logistical Support of the Armies, Volume I
Logistical Support of the Armies, Volume II

The Middle East Theater
The Persian Corridor and Aid to Russia

The China-Burma-India Theater
Stilwell's Mission to China
Stilwell's Command Problems
Time Runs Out in CBI

The Technical Services
The Chemical Warfare Service: Organizing for War
The Chemical Warfare Service: From Laboratory to Field
The Chemical Warfare Service: Chemicals in Combat
The Corps of Engineers: Troops and Equipment
The Corps of Engineers: The War Against Japan
The Corps of Engineers: The War Against Germany
The Corps of Engineers: Military Construction in the United States
The Medical Department: Hospitalization and Evacuation; Zone of Interior
The Medical Department: Medical Service in the Mediterranean and Minor Theaters
The Ordnance Department: Planning Munitions for War
The Ordnance Department: Procurement and Supply
The Ordnance Department: On Beachhead and Battlefront
The Quartermaster Corps: Organization, Supply, and Services, Volume I
The Quartermaster Corps: Organization, Supply, and Services, Volume II
The Quartermaster Corps: Operations in the War Against Japan
The Quartermaster Corps: Operations in the War Against Germany
The Signal Corps: The Emergency
The Signal Corps: The Test
The Signal Corps: The Outcome
The Transportation Corps: Responsibilities, Organization, and Operations
The Transportation Corps: Movements, Training, and Supply
The Transportation Corps: Operations Overseas

Special Studies
Chronology: 1941-1945
Military Relations Between the United States and Canada: 1939-1945
Rearming the French
Three Battles: Arnaville, Altuzzo, and Schmidt
The Women's Army Corps
Civil Affairs: Soldiers Become Governors
Buying Aircraft: Materiel Procurement for the Army Air Forces
The Employment of Negro Troops
Manhattan: The U.S. Army and the Atomic Bomb

Pictorial Record
The War Against Germany and Italy: Mediterranean and Adjacent Areas
The War Against Germany: Europe and Adjacent Areas
The War Against Japan

Index

Abuyog, 275, 276
Administrative Division, OCQM, USASOS, 61, 63, 66
Admiralties Operation
  disadvantage of support of, from island bases, 150–51
  graves registration in, 251
  significance of, 76
Advance Section, USASOS, 88, 171
Agricultural Branch, Subsistence Depot, 104–05
Agricultural Engineering Section, Subsistence Depot, 105–06
Agriculture, Australian
  expansion of production by, 103, 104–07, 120–21
  impediments to increased production by, 47–48, 103, 104, 105
  mechanization of, 105–06
  products of, 48
  shortage of "mother seeds," 104
  shortage of weedicides, 104–05
  U.S. aid to, 106–07, 121
Agriculture, Hawaiian, 39–41, 42, 43
Ahioma, 87
Air Corps, 60. *See also* Army Air Forces.
Air Transport Command, 88
Aitape, 196
Aitkenvale, 113
Aitutaki, 92
ALAMO Force, 259, 259n, 278
Alexander, Col. Irvin, 33–34
Allied Air Forces, 259
Allied Land Forces, 259
Allied Naval Forces, 259
Allied Supply Council, 63
Anguar, 81
Anhui, 23
Animals, pack, 281–82
Antwerp, 96
Aparri, 280
Armour and Company, 9
Army Air Forces, 85, 86. *See also* Air Corps; Transportation, air.
  cargo planes of, 176
  establishment of air supply units by, 278
Army Exchange Service, 78
Army Ground Forces, 267, 268
Army–Navy Liquidation Commission, 323–24
Army Service Command, 90–91
Army Service Forces, 57
Army Transport Service
  removal of supplies to Bataan by, 12, 13
  responsibilities of, in blockade-running, 17
Arrakan, 20, 22
Auckland, 92, 126, 127
Australia. *See also* Agriculture, Australian; Base sections (Australia).
  agencies of, for procurement, 63
  efforts to supply Philippines from, 21–25
  procurement of QM supplies in, 102–25
  Quartermaster problems in, 48–54
  resources of, 48–54
  transportation in, 49–51
Australian Army
  collection of salvaged items for U.S. forces by, 244
  provision of rations to U.S. forces by, 99–102
  supply of petroleum products by, 213, 214
Australian Council of Scientific and Industrial Research, 104
Automatic supply
  definition of, 145
  operation of, in SPA, 146–47
  operation of, in SWPA, 145–46
  plan for, after V-J Day, 322
  use of, in supply of SWPA bases, 169–70

Bag, cloth, 180, 182
Bag, clothing, waterpoof, 301–02
Bag, duffel
  functions of, in combat, 287, 301
  pilferage from, 287, 288
  use of individual, abandoned at Okinawa, 288
Bag, food, waterproof, 301
Bag, multiwall paper, 184
Baguio, 7, 281
Bakery companies
  74th Field, 7, 18
  109th, 289
  156th, 149
  157th, 149
  158th, 149
Bakery units
  contrast between, in Europe and in the Pacific, 227–28
  equipment of, 227, 229
  handicaps of, 228–29
  improvisations of, 231
  operations of, in combat and rear areas, 229, 231
  organization of, 227
  scarcity of baking ingredients for, 228–29
  shortage of, 228
Baling, 187
Base Section, Okinawa, 90–91
Base sections (Australia)
  classification of, 83

Base sections (Australia)—Continued
control of QM supplies by, 85–86
distribution to advance bases by, 170–71
market centers in, 119–20
mission of, 83
organization of, 83–84
procurement of perishables by, 118–19
Quartermaster sections of, 85–86, 171–72
reduction of activities in, 71, 87, 322
storage at, 86
1 (Darwin)
decline of, 85
establishment of, 84
2 (Townsville)
assembly of convoys at, 218
beginning of, 84, 85
procurement of milk by, 118
stevedoring at, 53
supply of advance bases by, 85, 170, 171, 175, 176
3 (Brisbane)
depots in, 84, 86
establishment of, 84
rise of, 85
supply of New Guinea bases by, 85, 170, 171, 175, 176
4 (Melbourne)
boning room at, 115
decline of, 85
depots at, 86
functions of, in 1942, 84
procurement of perishables by, 119, 175
5 (Adelaide [later Cairns])
decline of, 84
mission of, in 1942, 84
reconstitution of, at Cairns, 85
6 (Perth), establishment and decline of, 84, 85
7 (Sydney)
activities at, in 1942, 84
distribution of supplies by, 170, 171, 175
growth of importance in, 85
leasing of warehouses in, 86
problem of milk procurement in, 118
procurement by, 71, 119, 120
Bases (CPA)
distances as factor in establishment of, 95
geography as factor in development of, 95
Guam, 95, 96
Hawaii, 95
Saipan
cold storage at, 167
description of, 95
laundry at, 236
tonnage handled at, 95–96
Bases (New Guinea)
discharge of supplies for, at wrong ports, 148
disposition of surplus property of, 324
Bases (New Guinea)—Continued
physiography and, 87
rise in importance of, 87
"roll-up" of, 322
variations in food stocks at, 193–96
A (Milne Bay)
redesignation of, as U.S. Advance Base, August 1943, 87
storage at, 87
supply of Buna Operation from, 272–73
B (Oro Bay)
Army farm at, 131
deterioration of supplies at, 191
establishment of, 87–88, 272
scarcity of food at, 194, 195, 196
shipment of food to, 167, 175, 176
shortage of "expendable" items at, 201
C (Goodenough Island), 88
D (Port Moresby)
abundance of cold storage at, 166, 167
depletion of stocks at, by initial issues, 149
establishment of, 88
farm at, 131, 132
losses of food at, 191, 193, 194
storage at, 161, 162
transshipment of fresh food from, 175–76
variations in food stocks at, 194, 195
E (Lae)
clothing stocks at, 201
mission of, 88
F (Finschhafen)
bakeries at, 231
closing of, 324
difficulties in development of, 88
disparity between troops and supplies at, 194, 195
establishment of, as major base, 88
salvage at, 246
tonnage handled at, 88
G (Hollandia)
development of, 89
storage at, 164–65, 175–76
support of combat forces by, 89
H (Biak)
logistical support by, 89
terrain of, 89
United States Advance Base (Milne Bay)
establishment of, at Milne Bay, August 1943, 87
food stocks at, 175, 194, 195
laundries at, 234
refrigeration at, 166, 167
shoe repair at, 245
shortage of gasoline at, 214
storage at, 87, 161, 162, 168
United States Advance Base (Port Moresby)
establishment of, August 1942, 87

Bases (New Guinea)—Continued
United States Advance Base (Port Moresby)—Continued
establishment of, at Milne Bay, August 1943, 87
removal of, to Milne Bay, 87
storage at, 87
support of Buna forces by, 272–73
Bases (Philippines)
K (Tacloban)
establishment of, 90
shortage of gasoline at, 217
work of, in Leyte Operation, 275, 279
M (San Fabian; later San Fernando, La Union)
beginning of, 90
"roll-up" of, 322
support of Luzon Operation, 280, 281
R (Batangas), 91, 322
S (Cebu City), 91
X (Manila)
development of, as major base, 91
disposition of surplus property by, 322
tonnage handled at, 91
Bases (SPA). *See also* Forward Area, SPA.
Bougainville, farm at, 130
Fiji Islands
functions of, 95
procurement of food by, 128
Guadalcanal
disposition of surplus property at, 324
establishment of, 94
farm on, 130
storage on, 165
New Caledonia
development of, as main SPA base, 92, 93
functions of, in QM supply, 93–94
operations of QMC in, 73, 74, 75, 147
procurement by, 128, 130
shortage of QM personnel in , 74
New Hebrides, 94, 95, 325
New Zealand
activities of, 92–93
importance of, 92
storage of rations in, 92
Bataan, 4, 5, 6, 7, 9, 19, 21, 23, 25, 33, 34, 35
clothing on, 15–16
contrast between rations on Corregidor and, 28–29
difficulties of distribution on, 27–28
malnutrition of forces on, 29–31, 32
movement of supplies to, 10–13
petroleum products on, 16–17
Quartermaster units on, 17–18
rations on, 13–14, 26–27, 28, 29, 30, 31, 32
as source of QM supplies, 14–15
Bataan Quartermaster Depot, 17
Batangas (province), 19, 91
Batavia, 23, 24
Batchelder, Lt. Col. Roland C., 143
Baten, 283
Bath units. *See* Fumigation and bath units; Sterilization and bath units.
Baybay, 276
Beef, boneless
advantages of, 113
difficulties in procurement of, 113, 115
shortage of, 193, 196
Beli Beli Bay, 88
Biak Island Operation, 271, 289
bakeries in, 229
use of landing craft in, 273
Birdum, 50
Black market, 318
BLACKLIST Operation, 322
Bladder, flotation, 301
Blamey, Gen. Sir Thomas, 259n
Blankets, procurement in Australia, 124
Block ships
advantages of, 151–52, 157–58
definition of, 151–52
definition of "solid," 153–54
definition of standard, 152–54
disadvantages of, 153, 155–57
evaluation of, 157–58
importance of, to QMC, 152, 157–58
plans for, in the Okinawa Campaign, 154–55
use of, in CPA, 152, 154
use of, in SWPA, 152–54
Blockade-running
Australia as base for, 21–25
in central and southern Philippines, 19–21, 30–31
collapse of, 25
evaluation of, 24–25, 26
motor ships for, 19–20, 30
from Netherlands Indies, 22, 23–24
plans for final effort at, 30
use of submarines for, 21, 25, 34
Bobrink, Col. Henry W., 209
Bohol II, 19
Bohol (province), 20
Boot, jungle, 296–97
Bora Bora, 75, 93
Borneo, 91
Bougainville Operation
improvisation of truck unit in, 268
Quartermaster company in, 289
Boxes, plywood, 187
Boxes, wood
deficiencies of, 180
opposition of depots to, 178
use of, in SWPA and SPA, 188–89
Breene, Brig. Gen. Robert G., 75
Brett, Lt. Gen. George H., 22, 24, 25
Brisbane, 21, 23, 49, 50, 60, 67. *See also* Base Sections (Australia).
Browning Automatic Rifle, 286

Budget, Accounting, and Inspection Division, OCQM, USASOS, 65–66
Buna, 87, 88, 273
Buna Operation
  graves registration in, 250
  supply in, 271–72
Bureau of the Budget, 42
Burgheim, Col. Joseph H., 147, 180
Burma, 117

C–47 transport planes, 277
Cabanatuan Rice Central, 9
Cabcaben, 18
Cagayan Valley, 280
California Quartermaster Depot, 142
Camouflage
  application of, 294
  criticism of, 294–95
  need for, 291–92
Camp Limay, 4, 7, 10
Camp Malakole, 39
Camp Murphy, 11
Campbell, Brig. Gen. William F.
  as Chief Quartermaster, SWPA, 60
  congratulations of, to QM troops, 321
Cans, composite, 182
Cans, gasoline, 5-gallon, 220–21
Cans, tin
  labels on, 182, 185
  procoating of, 185
  scarcity of tinplate for, 185
  shortcomings of, 182
  wastage of food in, 191
Cape Sansapor Operation, 268
Cape York Peninsula, 87
Capiz, 20
Caples, Maj. W. G., 198
Carabao, as source of fresh meat, 14, 26
Caroline Islands, 1, 47, 155
Cavalry division, 1st, 199
Cavite Province, 14, 19
Cebu City, 20, 30, 31, 91
Cebu Quartermaster Depot
  efforts to supply, 10
  establishment of, 6
  local procurement by, 19, 20
  role of, in blockade-running, 19, 20
Cemeteries, 250, 251, 252, 253, 256, 257. *See also* Graves registration services.
Central Pacific Area
  boundaries of, 47
  joint supply activities in, 80
  Quartermaster organization in, 79–82
  reorganization of, in June 1944, 80
Central Pacific Base Command, 80, 81, 154
Chemical Warfare Service, 60, 125, 202
Clothing. *See also* Size tariffs and *names of individual items.*
  deterioration of, 206
  distribution of, SWPA, 170, 171
  problem of specifications for, in Australia, 121, 122
  procurement of, in Australia, 121–24
  rationing of wool for, in Australia, 123
  repair of, 245–46
Clothing, protective
  neglect of, 203
  responsibilities of technical services for, 202
  storage of, 202–03
Clothing and equipage
  inadequacy of allowances for, 202
  issues of, 201, 285
  loss of, in storage, 165
  problems in distribution of, 200–208
  requisitioning of, by combat units, 275
  supply of, in combat areas, 286–88
Coast Farmer, 20, 22, 23
Collins, Maj. Gen. J. Lawton, 253
Combat Salvage Collecting Company, 27th, 247
Consumption rates, 285–86
Containers, corrugated fiber, 178, 180, 182
Containers, solid fiber, weatherproof, 178, 183
Contract demands, 62, 102, 122, 124
Contracts Board, 122
Cooking outfit, 262
Cordiner, Col. Douglas, 67, 69, 101, 138, 139, 145, 146, 178, 304
  as Chief Quartermaster, SWPA, 60
  on shipping priorities, 143
  on stock inventories, 138, 170
Corps, U.S. Army
  I, 30, 197, 221, 271, 295
  II, 30
  X, 275, 298
  XIV, 268, 285
  XXIV, 255, 256, 262, 275, 286
Corregidor, 10
Corregidor, 6, 13, 17, 24
  aid to Bataan from, 14, 29
  Quartermaster operations on, 32–33
  rations on, 28–29, 32, 33
  role of, in blockade-running, 19–21
  stock reserves on, 10, 28, 29
  surrender of, 33
Cots, 148, 149
Curtin, Prime Minister John, 102

Dairy products
  pasteurization of milk, 117–18
  procurement of, in New Zealand, 126
  production of, in Australia, 117
  shortage of milk, in SWPA, 117, 118
  tuberculin tests of cows, 117–18

Darwin, 21, 23, 24, 30, 50. *See also* Base sections (Australia).
Darwin–Alice Springs railway, 85
Defense reserves, 3–5, 6, 10, 28, 34, 35
Dehydration
  advantages of, 103
  application of, 111–12, 126
  growth of, industry in Australia, 112
Dehydration Branch, Subsistence Depot, 112
Department of Commerce (Australia), 63
Department of Supply and Shipping, 63
Department of War Organization of Industry, 63
Depots
  types of, 83–84
Depots, ration
  functions of, in New Zealand, 92
Depots, reserve
  controversy over, in SWPA, 86
Destroyers, 25
Dill, Lt. Col. D. B., 298–99
Disposals Commission, 324
Distress cargoes, 98–99, 121
Distribution
  centralized control over, in SWPA, 71–73, 171
  frequency of transshipments in Pacific, 178, 180
  Quartermaster responsibility for, in SPA, 76–77
Distribution Division, USASOS, 137, 144, 156
  Distribution Branch of, 70, 72, 171
  mission of, 72
  role of, in market center system, 119
  separation of Distribution Branch from, 72
  transfer of, to Intermediate Section, USASOS, 72
Dobodura, 88, 176, 177
Don Isidro, 22, 24
Dona Nati, 23
Doriot, Brig. Gen. Georges F., 291
Doyle, Col. Thomas W., 291
Drake, Brig. Gen. Charles C., 6, 7, 8, 9, 10, 12, 29
  and blockade-running, 19, 20, 21, 22, 24, 31
  requisitions for supplies, 3, 4
Drums, 55-gallon
  handling of, 221
  shortage of, 218–19
  standard gasoline container in Pacific, 220–21
  types of, 220
  use of, as improvised equipment, 231, 234, 239
DUKW's, 270, 274, 276
Dutch New Guinea, 268, 269

Efate, 75, 94
Eichelberger, Lt. Gen. Robert L., 295
Eighth Army, 256, 300
El Cano, 20, 24
Emirau Operation, 76
Emmons, Lt. Gen. Delos C., 43, 45
Engineer Aviation Battalion, 1881st, 198
Engineer Depot, USASOS, 70
Engineers, Corps of, 160, 165, 215, 240, 262, 294
  construction of QM storage facilities by, 160
  responsibilities of, for petroleum products, 215
Eniwetok, 265
Equipment, individual
  description of, 56
  shipment of, in operations, 286–88
Equipment, jungle. *See also names of individual items.*
  demand for, 292–93
  development of, 293
  value of, 294–95, 296–97, 298
Equipment, organizational
  description of, 56
  effect of tardy delivery of, 147, 148, 149–50
  shipment of, 147–50
  unit-loading of, 147–48
Espíritu Santo, 75, 94, 130, 172
European Theater of Operations, 96–97, 143, 220, 267
Excess stocks
  accumulation of, after V-J Day, 321–23
  disposition of, after V-J Day, 322–25
"Expendable" supplies, shortages of, 201

Far East Air Force, 7
Farm machinery, 105, 106
Farms, U.S. Army
  establishment of, 130, 132
  evaluation of, 132–33
  objectives of, 129
  operation of, 129–30
Federal Surplus Commodities Corporation, 43
Fellers, Lt. Col. Carl R., 108, 161, 164, 309
Field artillery regiments (U.S.)
  147th, 21
  148th, 21
Field Ranges
  spare parts for, 210–11
  use of M1942, 227
  World War I, 229
Fifth Air Force, 58, 177, 197, 201, 228, 244, 248, 276
Fiji Islands, 46, 47, 75, 92, 93. *See also* Bases (SPA).
Finschhafen. *See* Bases (New Guinea).
Florence D, 24
Flour, Australian, 116
Food. *See* Rations; Subsistence.
Food Council, 63, 66
Food Production Advisory and Liaison Division, OCQM, USASOS, 66–67
Food Production Division, Subsistence Depot, 104–16
Footwear. *See also names of individual items.*
  Australian production of, 122–23
  deterioration of, 206

Footwear—Continued
lack of proper sizes of, 206, 207, 208
repair of, in combat areas, 244, 247–48
Foreign Economic Administration, 128
Foreign Liquidation Commission, 324
Fort Armstrong, 36, 80
Fort Kamehameha, 263
Fort Stotsenburg, 4, 5, 7, 12
Fort William McKinley, 4, 7, 12, 13
Forward Area (SPA), 94
Fremantle, 22, 23, 24
Frink, Maj. Gen. James L., 157, 175, 193, 194
Fumigation and bath units
demand for more bath facilities in, 239–40
development of, 237
equipment of, 237–39
lack of need for fumigation facilities in, 239, 240
operation of, in combat areas, 239, 240

Gardner, Col. Herbert A., 60
Garrison Force, 7th, 261, 262
Gasoline supply companies
operations of, 222–23, 284
834th, 223
General Headquarters, SWPA, 294
role of, in supply, 58
study of jungle equipment by, 292–93
General Purchasing Agent, 63, 71, 102
General Purchasing Board (Philippines), 128–29
General Service Division, OCQM, USASOS, 64, 65
General supplies
causes of shortages in, 200–202
consumption of, in New Georgia Operation, 285
lack of, in combat areas, 271, 286–88
procurement of, in Australia, 121–22, 124–25
Geneva Convention
and rations for prisoners, 317
and treatment of enemy dead, 252
Ghormley, Vice Adm. Robert L., 75
Gilbert Islands Operation
effect of, on QM functions, 80, 95
graves registration in, 253–54
plans for QM support of, 261–62
Gili Gili, 87
Glassford, Rear Adm. William A., 24
Glove, mosquito
defects of, 300
need for, 293
Goodenough Island, 88, 175
Graves Registration companies
48th, 250
49th, 253
Graves registration services. *See also* Cemeteries.
burial of enemy dead, 252, 254, 255
deficiencies of, 251–52, 257–58
description of, 57, 248–49
effect of terrain on, 253
Graves registration services—Continued
infantrymen used for, 255
influence of tactical conditions on, 250, 253, 256
organization of, 249, 250–51
program for, in Australia, 249–50
program for, in SPA, 252–53
use of civilian morticians for, 249, 250
Graves registration units
activities of, in North Africa, 251
functions of, 248–49
improvisation of, 17, 250, 253, 255, 256, 268
operations of, in combat areas, 250–58
shortage of, 249, 250, 251, 256
Green Islands, 94
Greene, Col. Fred W., 152, 157, 158
Gregory, Maj. Gen. Edmund B., 31, 138, 164, 165
on need for shipping food from New Zealand, 126–27
on quality of laundry services, 235
Gross, Maj. Gen. Charles P., 149
Guadalcanal. *See* Bases (SPA).
Guadalcanal Operation, 299, 306
camouflage in, 291
salvage and reclamation during, 243
supply during, 180
Guagua Quartermaster Depot, 6, 8
Guam, 46, 81. *See also* Bases (SPA).
Guerrillas
rations of, 318
responsibility of QMC for supply of, 283

Hallman, Maj. George V., 111
Halsey, Admiral William F., Jr., 75, 76, 78
Hamilton, Col. Fred L., 144, 156
Hammock, jungle, 298–99
Hanyang, 23
Harbor Defenses of Manila and Subic Bays, 6, 28–29
Harmon, Maj. Gen. Millard F., 75
Hartman, Brig. Gen. George E., 81
Harwood, Col. Otto, 10, 13
Hawaii. *See also* Agriculture, Hawaiian; Office of Food Control; Bases (CPA).
establishment of supply areas in, 39
military government in, 42–46
plan for blockade-running from, 25
role of, in U.S. strategy, 36
Hawaiian Department, 79, 80. *See also* U.S. Army Forces, Central Pacific Area; U.S. Army Forces, Pacific Ocean Areas.
Hawaiian Department Service Forces, 80
Hawaiian Pineapple Company, 312
Hawaiian QM Depot, 36, 37, 38, 39, 262
Hawaiian Sugar Planters' Association, 41
Headnet, mosquito, 300
Headquarters, Base Section, USASOS, 71
Herringbone twill suits, 294–95
Hester, Brig. Gen. Hugh B., 66, 67, 70, 71, 120

Hilo Quartermaster Depot, 39
Hollandia. *See* Bases (New Guinea).
Hollandia Operation, 152, 301, 302
  destruction of QM supplies during, 271
  graves registration in, 252
  Quartermaster supply in, 268–71
Honolulu, 37, 44, 95
Horses. *See* Animals, pack.
Humboldt Bay, 197, 269, 271, 296
Huon Gulf, 88
Huon Peninsula, 88
Hurley, Brig. Gen. Patrick J., 25

Igorots, 281, 282
Iloilo, 19, 30
India, sale of surplus property to, 324
Infantry Band, 105th, 254
Infantry divisions (PA)
  2d, 11
  31st, 31
Infantry divisions (US)
  Americal, 75, 268, 289, 296
  6th, 207, 280, 313
  7th, 262–66, 267, 274, 276, 283, 287
  24th, 197, 282, 283
  25th, 93
  27th, 247, 253, 257, 261–62
  32d, 84, 204, 281, 294, 296
  33d, 282
  37th, 75, 93, 232, 280, 313
  41st, 191, 197, 231, 252, 269, 271, 294
  43d, 93, 287, 313
  77th, 240, 276
  96th, 257, 262, 287
Infantry regiment (Philippine Scouts), 45th, 31
Infantry regiments (US)
  34th, 198
  129th, 281
  162d, 251, 270, 277, 305
  186th, 270, 271
  383d, 287
Initial issues, use of replacement stocks for, 148, 149, 150
Inspection Division, OCQM, USASOS, 64, 65, 66
Inspection of subsistence
  deficiencies of packing as factor in, 182
  problems in, 102, 108, 117, 118
  in storage, 182, 191–94
  Veterinary Corps and, 102, 117, 118
Intermediate Section, USASOS
  allocation of storage by, 168
  transfer of Distribution Branch to, 72
Iran, 213
Irving, Maj. Gen. Frederick A., 197
Isker, Col. Rohland A., 185
Island Command (Okinawa), 91
Iwo Jima, 81

Java, 23, 46
John Foster, 207
Joint Administrative Planning Committee (USAFIA), 22
Joint Chiefs of Staff, 48
Joint Logistical Board, establishment of, 76, 80
Joint Purchasing Board
  functions of, 71, 77
  procurement of food by, 125, 126, 127
  Quartermaster representation on, 77
  role of U.S. Navy in, 77
  storage of food by, 92
Joint Working Board, establishment of, 76–77, 80
Joslyn, Maj. Maynard A., 103

Kauai Depot, 39
Kearny, Capt. Cresson H., 293, 306
Kilmartin, Col. Robert C., 306
King, Maj. Gen. Edward P., Jr., 31, 32
Kiriwina Island, 175, 231
Kitchens, unit, 302, 313
Kolambugan, 19
Krueger, Lt. Gen. Walter, 197, 268
Kukum, 324
Kwajalein Operation, 254, 262, 274
Kyushu, 91, 152

Laboratory and Inspection Branch, Subsistence Depot, 108
Lae, 88
Lake Sentani, 270, 271
Lamao, 14, 17, 18
Landes, Col. Lewis, 67, 69
Landing craft, 273, 274
Landing Craft, Mechanized (LCM), 276
Landing Ship, Mechanized (LSM), 276
Landing Ship, Tank (LST), 274
Laundries, fixed
  obstacles to use of, 236
  operation of, in Hawaii, 234–35
Laundry services
  criticism of, 235–36
  improvisation of, 232, 234
  inadequacy of, for individual soldiers, 232, 234, 236
  use of commercial, 234, 235
Laundry units
  equipment of, 232
  functions of, 232
  operations of, 232, 234–35, 236
  shortage of, 232, 234
Lautoka, 93
Lawrence, Col. Charles S., 9
Legaspi, 20
Leggings, 293, 297–98
Lehner, Brig. Gen. Charles R., 208, 260

Lend-lease, 67, 101, 104
Lend-lease, reverse
  beginning of, 54, 62
  declaration of reverse lend-lease property as surplus, 323
  procurement of supplies under, 102, 110, 116, 120, 121, 125, 127, 128, 213
  services provided under, 54, 228, 234, 244
  value of, 102, 125, 127
Lend-Lease Administration, 67
Lever Brothers, 316
Leyte, 20, 88, 89, 90
Leyte Operation, 153
  difficulties of transportation in, 276–77
  discharge of food cargoes during, 156
  distribution points in, 274, 275
  preparations for QM support of, 265
  Quartermaster services during, 229, 246
  Quartermaster supply in, 274–77, 286
Libby, McNeill, and Libby, 9
Light Maintenance Company, QM, 34th, 7
Lingayen Gulf, 91, 156, 280, 281
Logistical support
  assignment of QM units for, 259–60, 279
  consumption rates for, 284–86
  division QM companies in combat operations, 266–71, 289–90
  establishment of distribution points for, 274–76
  factors determining adequacy of, 266
  native labor in, 282–83
  palletization in, 263–64
  planning for, 257–60, 261, 262–66
  role of QMC in, 259–90
  special requirements for, 261–62
  supply bases for, 271–73
  transportation for, 276–79
Longino, Col. James C., 157–58, 186, 260, 288–89
Looc Cove, 19
Los Baños QM Depot, 6, 8, 12
Los Negros, 251
Luzon Force, 31, 32
Luzon Operation, 88, 89
  air supply in, 278–79
  discharge of food cargoes during, 156
  dumps for QM supplies in, 279–80
  pack animals used during, 281–82
  similarity of, to continental operations, 279–80
  transportation during, 279–82

MacArthur, Gen. Douglas, 8, 12, 17, 19, 21, 22, 23, 28, 30, 76, 81, 102, 147, 319
  and blockade-running from Australia, 25
  as Commander in Chief, SWPA, 47, 48
  as commander of USAFFE, 2, 25
  as Military Advisor to Philippines, 2, 5, 6
  need for jungle equipment by, 293
MacArthur, Gen. Douglas—Continued
  plea for change in strategic plans, 5–7
  protest on lack of organizational equipment, 149
McConnell, Col. Alva E., 10
MacKechnie, Col. Archibald R., 277, 287
McKenzie, Brig. Gen. Henry R., 81
Machete, 300–301
Madang, 87
Maintenance factors. *See* Replacement factors.
Malaya, 99, 292
Malinta Hill, 33
Malinta Tunnel, 32
Manila, 4, 6, 7, 8, 10, 11, 12, 13, 73, 91, 156, 322
Manila Base QM Depot, 5
Manila Bay, 2, 6, 14, 19, 27, 32
  movement of supplies to Bataan by, 12, 13
  source of fish and salt for QMC, 15
Manus Island, 251, 265
Mariana Islands, 1, 47, 95
Mariana Islands Operation, 94
Marine Corps, 29, 76, 77, 90, 284, 299, 306
Marine divisions
  1st, 92, 94, 204, 252, 306
  2d, 93
  3d, 93
Maritime Commission, 173
Mariveles, 27
Mariveles Mountain, 27
Market center system (SWPA)
  establishment of, 118–19
  need for, 118
  procurement of perishables by, 119–20
Marking, 185–86
Marshall, Gen. George C., 22, 25, 30, 31
Marshall, Brig. Gen. Richard J., 10
Marshall Islands, 1, 47, 95, 155
Marshall Islands Operation, 152, 254, 312
Materials-handling equipment
  limitations on use of, 168–69
  shortage of, 37, 38, 49, 51–53, 168–69
  spare parts for, 208, 209, 210
Maui, 43
Maui Depot, 39
Meat Section, Subsistence Depot
  introduction of boneless beef by, 113, 115
  role of, in expansion of meat packing, 111
Meats, canned
  growth in Australian production of, 111
  introduction of U.S. types of, 111
  lack of variety in, 111
  procurement of, in New Zealand, 126
  types of Australian, 110
Meats, fresh. *See also under* Procurement, local (items).
  boning of, 115
  rationing of civilian consumption of, 113, 115

Meats, fresh—Continued
refrigeration for, 113
shortages of, 13, 14, 27–28, 113, 115, 193, 196
Medical Corps, 125, 240, 248
Melanesia, 253
Melbourne, 30, 50, 60, 65, 67. *See also* Base sections (Australia).
Memorial Division, OCQM, USASOS, 63
Mess equipment, 124, 149
Messes
lack of trained cooks for, 115, 192
monotony of, 193, 196, 198, 199, 200
Methyl bromide, 237
Midway, Battle of, 37
Military Planning Division, OQMG, 291, 311, 319
Milk. *See* Dairy products.
Miller, Maj. Milton D., 104
Mindanao, 19, 20, 26, 30, 31, 278
Mindoro, 20
Mira Loma Quartermaster Depot, 142
Mizar, 175
Morobe, 87
Morobe–Salamaua Operation, 251
Motor Transport Division, OCQM, USASOS, 61–62
Motor Transport Service
operations of, on Bataan, 17
procurement of trucks by, 11
responsibilities of, 11
shortage of vehicles in, 11, 12, 27, 28
Mules. *See* Animals, pack.
Murrumbidgee, 117

Nadzab, 88
Naha, 91, 283
Native labor
construction of military facilities by, 160, 161
diet of, 316
graves registration services by, 253
hand-carrying by, 281, 282–83, 302–03
and removal of supplies to Bataan, 10, 13, 17
use of, in unloading supplies, 180, 247
Navajo Ordnance Depot, 142
Naval Construction Battalions (CB's), 198, 199
Naval Limitation Treaty, 1
Navy, U.S., 23, 24, 75, 90, 122, 140, 142, 154
delimitation of POA functions between Army and, 73, 76, 77, 78, 79, 80, 174
distribution of petroleum products by, 222
procurement of fresh foods for, 119
transportation of perishables by, 175
Netherlands Indies, 19, 21, 25, 46, 99, 213, 324
New Britain, 46
New Caledonia, 46, 47, 93, 146, 168, 316, 317, 325. *See also* Bases (SPA).
Newcastle, 49
New Georgia Operation
air supply in, 277–78
consumption of QM supplies in, 285–86
New Guinea. *See also* Bases (New Guinea).
description of, 87
as supply center, 87–89
New Hebrides. *See* Bases (SPA).
New Ireland, 76
New Orleans Port of Embarkation, 140, 141
New South Wales, 50, 84, 117, 118
New York Port of Embarkation, 141
New Zealand, 36, 46. *See also* Bases (SPA).
comparison between Australia and, as supply sources, 125–26
geography of, 54
value of, as supply source, 54, 126, 127
Nimitz, Adm. Chester W., 47, 48
Noel, Col. O. C., 316
Noemfoor Island, 196
North Pacific Area, boundaries, 47
Nouméa, 73, 75, 147, 172, 222

Oahu, 40
Office of the Chief Quartermaster, Army Forces Pacific, 321
Office of the Chief Quartermaster, USAFFE. *See also* Drake, Brig. Gen. Charles C.
preparations of, for Philippine defense, 2–8
re-establishment of, March–October 1943, 67–68
requisitions by, in summer of 1941, 3–4
Office of the Chief Quartermaster, USAFIA. *See also* Office of the Chief Quartermaster, USASOS.
beginnings of, 59, 60–61
contrast between OQMG and, 59
mission of, 59–60
organization of, 61–65
shortage of personnel in, 60, 61, 64–65
transfer of, to USASOS, 65
Office of the Chief Quartermaster, USASOS. *See also* Office of the Chief Quartermaster, USAFIA.
authority of, over QM base sections stocks, 87
effect of frequent reorganizations on, 69
organization of, commodity versus function, 65–67
organization of, December 1942–March 1943, 65–67
reduction of procurement and distribution functions of, 69–72
removal of, to USAFFE, March–October 1943, 67
Office of the Department Quartermaster, Hawaiian Department. *See also* White, Col. William R.
functions of, 37, 39–40
Office of Emergency Management, 42
Office of Food Control
evaluation of, 46

Office of Food Control—Continued
functions of, 42
price regulation by, 43, 44, 45
Office of the Military Governor, Territory of Hawaii, 42, 45
Office of Price Administration, 45, 46
Office of the Quartermaster, Central Pacific Base Command, 81
Office of the Quartermaster, USAFPOA, 81
Office of the Quartermaster, USASOS, 67, 69
Office of The Quartermaster General, 3, 59, 177, 178, 182, 183, 184, 185, 186, 205, 208, 209, 291, 292, 293, 296, 297, 298, 301, 302, 304, 306, 310, 311, 317, 319–20
handling of Pacific requisitions by, 142
relation of, with Pacific areas, 57–58
relation of, with ports of embarkation, 140
survey of POA, conducted by, 202, 235
Officers, QM
commissioning of temporary, 17
officer candidate school, 74
"Remember Pearl Harbor" group of, 60
shortage of, 7–8, 17, 60, 61, 64–65, 74, 98
Okinawa Operation, 154, 155, 312–13
Quartermaster services in, 229, 236, 240, 247, 257–58
supply operations in, 221, 282–84
OLYMPIC Operation
plans for, 91, 152
storage of reserves for, 96
types of block ships planned for, 153
ORANGE Plan. *See* War Plan ORANGE.
Ordnance Department, 7, 125, 211
responsibilities of, for petroleum products, 215
transfer of maintenance of materials-handling equipment to, 208–09
transfer of motor transport to, 60–61
Orion, 27
Ormoc, 276
Oro Bay. *See* Bases (New Guinea).
Orr, Capt. Robert D.
on block shipments, 157
on jungle pack, 302
on lack of organizational equipment, 148
on shipment of individual equipment in operations, 288
on shortage of spare parts, 208, 211, 212
on 10-in-1 rations, 311
Owi Island, 196

Pacific Fleet, U.S., 37
Pacific Ocean Areas, 47, 48
Pack, field, cargo-and-combat, 302
Pack, jungle
contents of, 302
description of, 301–02
Pack, jungle—Continued
need for, 293
objection to, 302
Pack troops, QM
65th, 7
66th, 7
Packaging, definition of, 177n
Packaging, subsistence
deficiencies of commercial, 177–78, 180, 182
efforts to improve, 185
methods of, for locally procured supplies, 188–89
Packing, definition of, 177n
Packing, clothing, equipage, and general supplies, 187–88
Packing, subsistence
"amphibious," 184
commercial, 177–78, 180
damage due to poor, 178, 180
efforts to develop better, 178, 182–84
methods of, for locally procured items, 188–89
multiwall bags for, 184
V-boxes for, 183–84
Palaus Operation, 94
Palawan, 279
Palletized unit loading, 263–64
Panama, 293
Panay, 20
Papuan Operation, 250, 277
Parang, 278
Patrick, Maj. Gen. Edwin D., 207, 208
Petroleum products
bulk storage facilities for, 217–18
consumption factors for, 215, 217
deterioration of, 219
distribution of, 8–9, 214–15, 217–18, 221
establishment of U.S. supply of, in New Guinea, 214–15
inclusion of, in standard block ships, 153, 154
movement of, to Bataan, 10, 12–13
plants for drumming, 219, 222, 223
requirements of, 215, 217, 263
responsibility of technical services for, 55, 56, 94, 214–15
shortage of, 4–5, 16–17, 27, 32
supply of, by the Australian Army, 213–14
use of drums in transporting and storing, 218–20
Petroleum products laboratory, operations of, 223–24
Philippine Army, 2, 3, 4, 27, 31. *See also* Infantry divisions (PA).
Quartermaster supply of, 2, 5, 6
unpreparedness of, 2–3, 7, 8, 11–12, 16
Philippine Constabulary, 11
Philippine Department, 2, 11
Philippine Quartermaster Depot, 5
Philippine Scouts, 2, 4, 7, 12, 16, 17, 318–19

Pilferage, 27, 177, 322
as factor in food losses, 192
prevalence of, in combat zones, 287, 288–89
Pim, 270, 271
Planning and Control Division, OCQM, USASOS, 65
Plant, Col. Thomas G., 61
Polynesia, 47
Poncho, 299, 300
Pongani, 273
Port Augusta, 50
Port-Depot System. *See* Quartermaster Branch, OSD, SFPOE, handling of requisitions by.
Ports. *See* Transportation, water.
Post exchanges
Quartermaster responsibility for, 78, 134
supplies for, in block shipments, 153, 154
Pouches, interchangeable, 286, 287, 288
President Coolidge, 93
President Polk, 23, 24
President's Emergency Fund, 3, 43
Princessa, 20
Priorities, building, for construction of QM storage facilities, 160
Priorities, landing
as factor in delaying discharge of supplies, 288
assignment of, to service units, 229
Priorities, shipping
assignment of, to perishables in CPA, 173–74
assignment of, to petroleum products, 213, 218, 225
assignment of, to Philippine Department, 4, 35
assignment of, to service units, 247
effect of, on movement from West Coast, 143
establishment of, in SWPA, 69
use of, in movements from Australia, 171–72
Procurement
base section responsibility for, 71
centralization of, in SWPA, 69–71
functions of OCQM, USASOS, 59–60, 66, 69–71
responsibility of QMC for, in CPA, 80
responsibility of QMC for, in SPA, 76–77, 78
Procurement Division, OCQM, USASOS, 66
Procurement Division (G–4, USASOS)
relations of, with OCQM, 70
role of, in the market center system, 119
termination of, 71
transfer of, to Base Section, USASOS, 71
Procurement, local
in Australia, 98, 101, 102–25
evaluation of, 132–33
in Great Britain, 98
in Hawaii, 127
in New Zealand, 125–27
in Philippines, 128–29
in South Pacific Area outside New Zealand, 128
Procurement, local (items)
beef, 100, 113, 114, 115, 129
beer, 129
beets, 107, 110
blankets, 124
cabbages, 110, 112, 126
candy bars, 127–28
carrots, 104, 107, 110, 112
clothing, cotton, 121
clothing, wool, 123
coffee, 5, 40, 127, 128
corn, 107, 110, 129
corned beef, 110, 111
dairy products, 117–18, 125, 126
drums, gasoline, 55-gallon, 4, 219, 222, 223
fish, 15, 40, 100, 129
flour, 116, 125
fruit juices, 110
fruits, canned, 100, 126
fruits, dehydrated, 103, 126
fruits, fresh, 40, 118, 119, 120, 129
fungicides, 104
gloves, leather, 124
ham, 116
jams, 110
lamb, 100, 116
lima beans, 107
meat, canned, 110–11
meat, fresh, 14, 112, 125, 126, 127
mess kits, 122, 124
mutton, 116
nurses' clothing, 122
onions, 100, 104
peas, 107, 110
perishables, 118–20
pineapples, 40, 127
pork, 100, 115, 116, 129
potatoes, 42, 100, 120, 126
potatoes, dehydrated, 112
poultry, 116
Ration C, 310
rice, 5, 9, 14, 117
rope, 124
salt, 15
seeds, 42, 104
shirts, 122
shirts, knitted, wool, 122–23
shoes, 122, 123
soap, 124
socks, 122, 123
string beans, 107, 110
sugar, 5, 9, 40, 116, 125, 127
tomatoes, 107, 110
tractors, 105, 106
vegetables, canned, 107–10, 126
vegetables, dehydrated, 111–12, 126

Procurement, local (items)—Continued
vegetables, fresh, 40, 118, 119, 120, 126, 127, 129–32
weedicides, 104
Pueblo Ordnance Depot, 142
Purchasing and Contracting Division, OCQM, USASOS, 62–63

Quartermaster battalion, 130th, 73
Quartermaster Branch, Overseas Supply Division, San Francisco Port of Embarkation
functions of, 140
handling of requisitions by, 140, 142
shortage of personnel in, 141
Quartermaster companies, infantry division
deficiencies of, 267–68
functions of, 266–67
service platoons of, 266, 267, 268
truck platoons of, 266, 267–268
6th, 268
7th, 263–66, 274–75, 289
37th, 280
41st, 269–71, 289
Quartermaster Corps
evaluation of work of, in Pacific, 321
loss of transportation functions by, 49, 50–51
mission of, 55–57
modification of functions of, 321
organization in CPA, 79–82
organization in SPA, 73–79
organization in SWPA, 58–73
responsibilities of, after World War II, 325–26
Quartermaster Section, CPA, 79–80
Quartermaster Section, Sixth Army, 280, 281
functions of, relative to transportation, 49n
role of, in planning logistical support, 260, 261
Quartermaster Section, SOS SPA, 76–78
Queensland, 103, 113, 116, 188
Quezon, Manuel, 3, 19
Quinn, Col. Michael A., 11

Rabaul, 46
Railroads. *See* Transportation, rail.
RAINBOW Plan, 5, 6, 8.
Ration, A, composition of, 55
Ration, assault, 312, 313
Ration, Australian-American, 99–100
Ration, Australian emergency, 306
Ration, B
composition of, 55
defects of, 309–10
inclusion of, in block ships, 152, 153, 154, 155
use of, in combat, 313
Ration, C, 4, 5, 13, 32, 112, 198, 199
accessory kit for, 310
components of, in 1942, 303–04
Ration, C—Continued
improvement of, 310
inclusion of, in block ships, 154, 155
objections to, 304–05, 306, 310
as part of rice ration, 304
Ration, D
composition of, 304
deficiencies of, 306
evaluation of, 306
inclusion of, in block ships, 154
as part of rice ration, 304
Ration, flight, 313–14
Ration, hospital, 315
Ration, hospital assault, 314–15
Ration, jungle, 306–08
Ration, K
advantages of, 308
composition of, 309
criticism of, 309
development of, 308–09
use of, in 10-in-1 ration, 310
Ration, native, 316–17
Ration, Occidental civilian, 319
Ration, Oriental, 317
Ration, Philippine Army
composition of, on Bataan, 27, 28
criticism of, 318
Ration, Philippine labor, 318
Ration, Prisoner of War, 317
Ration, rice, 304, 305–06
Ration, 10-in-1, 154, 155
accessory kit for, 311
evaluation of, 312
similarity to B ration, 310–11
waste of, 311–12
Rations. *See also* Subsistence.
contrast between Army and Navy, 198–99
distribution of, SWPA, 170, 171
inclusion of, in block ships, 152, 153, 154, 155
provision of, by Australian Army, 99–102
stock levels of, 8–9, 13–14, 135–36
types of, 55–56
Rations, emergency operational, 55–56
need for, 303
packing of, 182, 183
standards for, 303
stocks of, 135
"Reefer" ships. *See* Refrigerated vessels.
Refrigerated facilities, ashore
difficulties in procurement of, 166
disparities in availability of, 166–67
shortage of, 41, 44, 113, 116, 165–68
spare parts for, 211
types of military, 165–66, 167–68
Refrigerated vessels
Advance Section, USASOS fleet of, 175–76
conversion of barges to, 174
"leave" ships as, 174–75, 176

Refrigerated vessels—Continued
naval, 174
shortage of, 39, 44, 45, 173–76
turnabout time of, 174, 176
"X-ships" ("lakers") as, 174, 175
Refrigeration companies, QM, 168
Regiment, QM, 12th, 7, 17
Reid, Lt. Col. Clarence E., 196
Replacement factors
accuracy of, 139–40
definition of, 137
improvement in, 288
inadequacy of, for Class II and IV supplies, 286, 288
Requirements. *See also* Replacement factors; Requisitions.
computation of, 137–40
stock records in relation to, 137–38
troop basis in relation to, 138–39, 150
Requisitions. *See also* Quartermaster Section, OSD, SFPOE.
delays in completion of, 141–45
preparation of, 137–38
submission of, for combat needs, 261–62
Research and development, 291, 319–20. *See also under names of individual items.*
Reserves, 135, 136
Ritchie, Lt. Col. Charles A., 168
Roads. *See* Transportation, motor.
Robenson, Col. John A., 23, 24
Rogers, Lt. Col. Carmon A., 76, 314
Roosevelt, President Franklin D., 43
Roxas, Col. Manuel A., 19
Russell Islands, 94, 172

Saidor, 231
Saipan Operation, 254–55
Salvage
classes of, 243
definition of, 241
delays in turning in articles for, 245–46
materials recovered by, 248
need for, 241
shipments of, to United States, 248
shortage of units to process, 243–44
value of, 248
Salvage collecting units
equipment of, 241
functions of, 241, 244, 246
improvisation of, 243, 246, 247
operations of, in combat areas, 246–47
Salvage depots
equipment and organization of, 241
objects of, 241
operations of, 245–46
28th Salvage Depot Headquarters Company, 245–46
Salvage repair units
effect of lack of, 247–48
equipment and organization of, 241
hindrances to operation of, 245
improvisation of, 244–45, 247
Samar, 20
Samoa Islands, 46, 47, 92
San Fabian, 91
San Fernando, La Union, 91
San Francisco Port of Embarkation, 37, 75, 92, 137, 139, 146, 151, 208, 220, 261. *See also* Quartermaster Branch, OSD, SFPOE.
automatic supply from, 145–47
contrast of, with NYPOE, 96
delays in shipments from, 143, 144, 147
depots serving as supply sources of, 140–41
role of, in "block ship" system of supply, 157
space assigned to, for QM storage, 142
subports of, 140, 141
San Jose, 281
San Miguel, Army farm at, 130, 132
San Pablo, 275
San Pedro Bay, 90
Sansapor, 196
Schenectady Plan, 186
Schofield Barracks, 37, 39, 80
Seabrook, Maj. Belford L., 105
Seabrook Farm, 105
Seattle General Depot, 142
Services of Supply, SPA
expansion of, 76
mission of, 75–76
redesignation of, as South Pacific Base Command, 78
Service units, QM
problems of, in combat operations, 267, 268
Sharp, Brig. Gen. William F., 20
Shoes
combat, cuff-and-buckle, 298
hobnailed, 122, 296, 297
service, 122, 296, 297
Short, Lt. Gen. Walter C., 41, 42, 43
Signal Corps, 125
Si-Kiang, 13
Silverman, Maj. Abraham B., 60
Singapore, 23
Sixth Army, 58, 168, 211, 228, 234, 248, 300. *See also* ALAMO Forces; Quartermaster Section, Sixth Army.
air supply of, 177, 196–97
monotony of meals in, 199
need of, for more QM Class II, III, and IV items in combat, 153
problem of sized clothing in, 207, 208
shortage of individual clothing and equipment in, 201
transportation responsibilities of, 49n

Size tariffs
deficiencies of, in supply of clothing, 206, 207, 208
establishment of local, 208
inadequacy of national, 206–07
relation of, to distribution requirements, 207–08
value of, 206–07
Soerabaja, 23, 24
Soles, rubber, 297
Solomon Islands, 94, 279, 316, 322
Somervell, Lt. Gen. Brehon B., 299, 300
South Pacific Area, 143, 299, 308, 314
boundaries of, 47
Quartermaster organization in, 73–79
service commands in, 91–95
shortage of QM personnel in, 73, 74
task force QM activities in, 73–74
South Pacific Base Command. *See* Services of Supply, SPA.
South Pacific Force, 75
South Pacific General Depot
effect of establishment of, on supply, 93
mission of, 93
storage of QM items at, 93–94
Southwest Pacific Area, 58, 60, 292, 299, 302, 314. *See also* U.S. Army Services of Supply; Base sections (Australia); Bases (New Guinea); Bases (Philippines).
boundaries of, 46–47
mission of, 48
organization of supply activities in, 58–73
supply of SPA by, 77–78
Spare parts
cataloguing of, 209, 210, 212
difficulties in shipment of, 187–88
establishment of depots for, 209, 211, 212
inclusion of, in block ships, 154
initial supply of, 212
marking of, 210
procurement of, 209
program of OQMG for, 209
requisitions for, 209–10
responsibilities of QMC for, 208–09
shortage of, 208–12, 227
surveys of, 212
State, Department of, 319
Sterilization and bath units
equipment of, 237, 240
establishment of, in 1941, 237
functions of, in World War I, 236–37
operations of, 240
use of, in combat areas, 240
Stock Control Branch, OQMG, 209
Stock excesses
automatic supply as cause of, 146
block shipments as cause of, 156–57
Stock inventories
inadequacy of, 137–38, 170
use of, for determining base needs, 169–70
Stock levels
computation of requirements for, 137
establishment of, by War Department, 134–36
importance of accurate stock records to, 137–38
in Pacific areas, 135–36
relation of replacement factors to, 139–40
status of, after V-J Day, 322
Storage and Distribution Division, OCQM, USASOS, 66
Storage facilities. *See also* Refrigerated facilities.
availability of, in Hawaii, 27, 38–39
"bures" warehouses, 161–62
construction of temporary warehouses, 53, 92, 95
improvisation of covered, 162, 164, 165, 169
inadequacy of, 86–87, 93, 160–69
open dumps, 160–61, 162–64
space requirements in, 168
warehouses in Australia, 53
Storage operations. *See* Materials-handling equipment.
Strapping, metal, 178, 180
Streett, Maj. Gen. St. Clair, 197
Subic Bay, 2, 6
Submarines, 21, 25, 34
Subsistence. *See also* Market center system; Packaging, subsistence; Packing, subsistence; Procurement, local (items); Rations.
amount of, provided by main supply sources, 120, 127, 134
automatic supply of, from ZI, 145
distribution of nonperishable, 169, 170, 171, 172
distribution of perishable, 173–77, 279
losses of, 191–93
scarcities of, in New Guinea, 193–200
shortages of, in combat areas, 288–89
storage of nonperishable, 160, 161, 164–65
Subsistence Depot
efforts of, to promote canning operations, 107–11
efforts of, to promote dehydration operations, 111–12
functions of, 67
organization of, 104
as part of Procurement Division, USASOS, 70–71
as part of USASOS General Depot, 70
procurement of fresh meat by, 112–16
program of, for enlarged farm production, 104–07
Subsistence Research Laboratory, 185
Sumatra, 46
Supply classes, 56
I. *See* Rations; Subsistence.
II. *See* Clothing; Clothing and equipage.
III. *See* Petroleum products.
IV. *See* General supplies.
Supply Division, OCQM, USASOS, 62, 65, 122, 123

Supply points, 194, 196, 274, 275, 276, 279–80
Supply system, European, contrast between, and that in the Pacific, 96–97
Surplus property, 323–25
Sutherland, Maj. Gen. Richard K., 21
Suva, 93
Swift, Maj. Gen. Innis P., 199
Swift and Company, 9
Swope, Lt. Col. Lawrence E., 281
Sydney. *See* Base sections (Australia).

Taiyuan, 24
Tanahmerah Bay, 197, 198
Tarlac QM Depot, 6, 8, 9, 11, 12
Tarpaulins
  deterioration of, in tropics, 205
  use of, in storage, 162, 165
Tentage
  deterioration of, 148, 204–06
  difficulties of shipping organizational, 148, 149
  inadequacy of allowances for, 204
  mildewproofing of, 204, 205
  shortage of, 148–49, 204–05
  use of replacement stocks for initial issues of, 148, 149
Tenth Army, 91, 154, 285
Territorial Committee on Food Storage, 42
Thirteenth Air Force
  disparity in availability of perishables in, 199–200
  procurement of perishables from Navy, 197
Timor Sea, 24
Tinian Operation, 94
Tobacco, 29
Tokyo, 46
Toney, Capt. Andy E., 60
Tonga Island, 47
Tongareva, 92
Tongatabu, 75
Torres Strait, 87
Trans-Australian Railway, 50
Transportation, air, 35, 166, 228
  cargo parachutes in, 277, 278
  containers for supplies in, 277
  emergency use of, 177, 196–97, 201
  "free-dropping" in, 277, 278
  limitations of supply by, 176–77
  requirements for better, 189–90
  shortage of planes for, 196–97, 277
  significance of, 177, 278
Transportation, motor. *See also* Motor Transport Service.
  difficulties of, in combat operations, 27, 267, 268, 270–71, 276–77, 280–81
  problems of, in Australia, 50–51
Transportation, rail
  deficiencies of, in Australia, 49–50
  use of, in Philippines, 8, 9, 11, 280
Transportation, water. *See also* Refrigerated vessels.
  commercial loading in, 147
  congestion of, at ports, 172–73, 218, 222
  control of shipments by, 170–73
  convoys for, 172–73
  difficulties of moving organizational equipment by, 147–51
  discharge of ships in, 283–84, 288
  distances as factor in, 85, 96, 196
  hindrances to, in Australia, 51–53
  importance of, in New Guinea, 87
  lack of, as factor in sale of surplus property, 324
  port facilities for, 84, 87, 91, 92, 93, 144, 180
  problems of, in logistical support, 271–73, 280
  role of QMC in, 171–72
  selective loading in, 148
  shipments by, direct to New Guinea, 194
  shortage of, 144, 171–73, 194
  turnabout time in, 144, 151, 174, 176
  "unit-loading" in, 147, 148
Transportation activities
  responsibility of QMC for, 7, 8, 49, 50
  transfer of, to Transportation Corps, 49, 49n
Transportation Corps, 125, 148, 150, 171
Transportation Division, OCQM, USASOS, 61
Transportation Service, USASOS, 49, 61, 65
Treasury (Australia), 115
Truck companies
  assignment of, to QMC, 49n
  equipment of, 150
  improvisation of, on Bataan, 17, 18
  responsibilities of, for distributing gasoline, 222
Truck companies, QM
  19th (Air Corps), 17
Tuguegarao, 280
Tutuila, 75
Tydings-McDuffie Act (1943), 1, 3

Ulithi, 81
Umatilla Ordnance Depot, 142
United Kingdom, 53, 103, 113, 144
Units, QM. *See also under names of different types of units.*
  additional training of, 261
  combatant activities of, 289–90
  composite, 261
  determination of requirements for, 260
  equipment of, 226–27, 261
  establishment of new types of, 226
  selection of, for combat operations, 260–61
  shortage of, 7–8, 260, 261, 279
Urbana Force, 250
U.S. Army Forces, Central Pacific Area, reorganization of, as USAFPOA and CPBC, 80
U.S. Army Forces, Far East
  and blockade-running, 19

U.S. Army Forces, Far East—Continued
control of shipping priorities by, 69, 176
establishment of, 2
reconstitution of, in SWPA, 67, 69
U.S. Army Forces, Far East Board, 297
U.S. Army Forces, Middle Pacific, 81, 321, 324. *See also* U.S. Army Forces, Pacific Ocean Areas.
U.S. Army Forces, Pacific Ocean Areas, 80, 81
U.S. Army Forces, South Pacific Area, mission of, 75
U.S. Army Forces, Western Pacific, 321
U.S. Army Forces in Australia. *See also* U.S. Army Services of Supply.
establishment of, 58
organization of QM activities in, 59–65
plans of, for blockade-running, 22
redesignation of, as USASOS, 58
U.S. Army Services of Supply. *See also* Office of the Chief Quartermaster, USASOS.
distribution responsibilities in, 69–71
organization of, 58–59
procurement responsibilities in, 69–71
U.S. Army Services of Supply General Depot
establishment of, 70
opposition to, 70
U.S. Forces in Australia, 58, 60. *See also* U.S. Army Forces in Australia; U.S. Army Services of Supply.
Utah General Depot, 140, 142

V-boxes, 187, 188
delays in production of, 183
development of, 182–83
types of, 183–84
use of, for packing clothing and general supplies, 187–88
use of, for packing food, 183–84
Vegetable Seeds Committee, 104
Vegetables, canned
deficiencies of production methods, 107–08
establishment of new plants for, 107, 108
lack of variety in, 110, 199, 200
production of, in New Zealand, 126
requisitioning of, from United States, 110
Vegetables, fresh
educational program for increased production of, 106–07
expansion of acreage in, 105
mechanization of production of, 105–07
Vegetables, fresh—Continued
production of, in Australia, in 1942, 48
provision of seeds for production of, 104
shortage of acceptable varieties of, 107, 110, 126
Vella Lavella, 94
Veterinary Corps
establishment by, of abattoirs on Bataan, 14
inspection of animal products by, 102, 115, 117, 118
inspection of fruits and vegetables by, 102
inspection of stored food, 182, 192, 193
role of, in salvage, 241
Victoria, 50
Visayan Islands, 2, 19, 20, 21, 26
Visayan-Mindanao Force, 20

Waga Waga, 87
Wagner, Lt. Col. Clifford C., 312
Wainwright, Lt. Gen. Jonathan M., 30, 31, 32
Wake Island, 46
War Department Technical Manual 38–420
provisions of, for disposition of surplus stocks, 323
War Plan ORANGE 3
abandonment of, 6, 7
effect of abandoning, on QM operations, 6–7, 34
provisions of, for Philippine defense, 5
provisions of, for moving supplies to Bataan, 6
War Shipping Administration, 173
Ward, Col. Frederick A., 12, 13
Warren Front, 250
Washington disarmament conference, 1
Weedicides, 104–05
Welch, Col. John P., 171
Wellington, 92
Western Pacific Base Command, 81, 96. *See also* Bases (CPA).
White, Col. William R., 37, 43, 44
Willard A. Holbrook, 21
Woodbury, Capt. Robert L., 208
Woodlark Island, 175

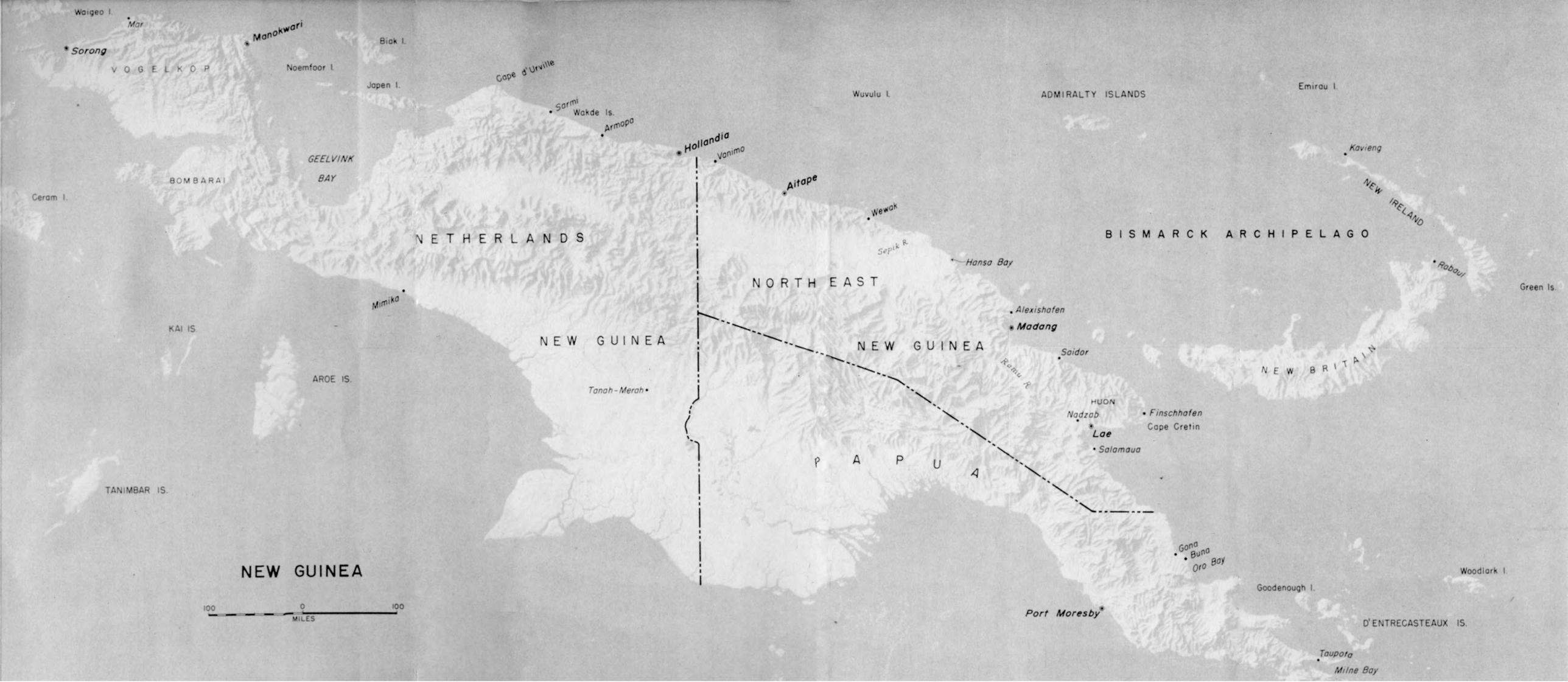
"X-ships," as type of refrigerated vessel, 174, 175

Yangtse Valley, 46
Yap, 262, 263
Yochow, 23
Yonabaru, 283

Zone distribution on Oahu, 39
Zone of interior, 158–59

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Waigeo I.
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Manokwari
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NEW IRELAND
GEELVINK BAY
BOMBARAI
Ceram I.
Aitape
Wewak
NETHERLANDS
Sepik R.
Hansa Bay
BISMARCK ARCHIPELAGO
Rabaul
Green Is.
NORTH EAST
Mimika
Alexishafen
Madang
KAI IS.
NEW GUINEA
NEW GUINEA
Saidor
Ramu R.
NEW BRITAIN
AROE IS.
Tanah-Merah
HUON
Nadzab
Finschhafen
Cape Cretin
Lae
Salamaua
PAPUA
TANIMBAR IS.
Gona
Buna
Oro Bay
Woodlark I.
Goodenough I.
Port Moresby
D'ENTRECASTEAUX IS.
Taupota
Milne Bay
NEW GUINEA
100 0 100
MILES

MAP 2