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QUARTERMASTER SUPPLY

in the

EUROPEAN THEATER OF OPERATIONS IN WORLD WAR II

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QUARTERMASTER SUPPLY

in the

EUROPEAN THEATER OF OPERATIONS IN WORLD WAR II

Volume II

SUBSISTENCE

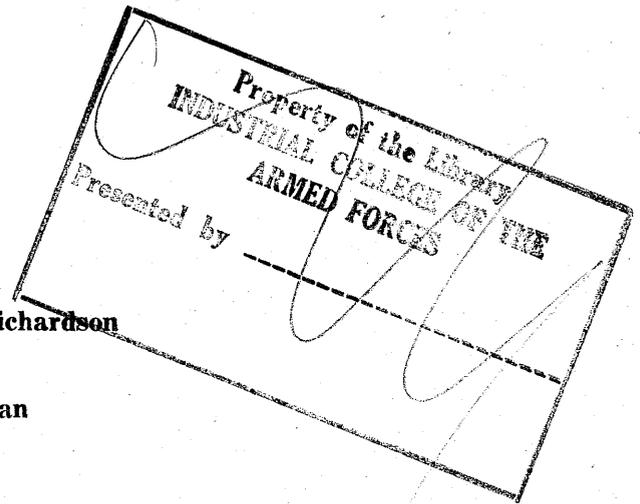
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By

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THE QUARTERMASTER SCHOOL
CAMP LEE, VIRGINIA

1948

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PREFACE

The American soldier in the European Theater of Operations received balanced, nutritious, and palatable food. He was not only the best-fed soldier in World War II but the best-fed soldier of all times. His ration was vastly different from the pork or beef, rum, and vinegar issued to the Revolutionary soldier; from the salt meat, flour or corn meal, and beans or rice issued to the Civil War soldier; and from the hardtack and beef stew issued to the Spanish-American War soldier. Veterans of World War I remember the monotony of their ration—corned beef hash or sliced corned beef, baked beans hot or baked beans cold, bread unlike any that mother ever baked, and canned vegetables of limited variety. The cooking, too, was something they wrote home about, but not in complimentary vein.

By 1941 a vitamin-conscious America knew the effect of diet upon mind and muscle. As malnutrition was found to have caused many men to be rejected by draft boards, the Quartermaster Corps became more and more determined to give to the vast new Army the right kind of food, properly prepared. Much thought and labor entered into the subsistence program of World War II. In the United States farmers and cowboys did their part; scientists worked in laboratories; strong men loaded and unloaded meat and vegetables; instructors expounded the fine art of cookery; food specialists planned and tested; and men and women worked in canning factories, tin mills, and paper plants. All were collaborating

to produce and pack the food that would best serve the needs of fighting men.

This volume, however, tells the story of subsistence in the European Theater of Operations and not of the development of the subsistence program in the Zone of the Interior. It deals with the feeding of United States troops in the United Kingdom and on the Continent and with the feeding of those Europeans who were dependent upon the Quartermaster Service. Volume I of this series is basic to an understanding of the volumes that follow. It treats of over-all plans, policies, and procedures and defines terms and code words peculiar to the European Theater of Operations, which are used in other volumes without definition.

The chronicler of contemporary events or of events in the immediate past treads a path marked by many danger signals. Supporting documents, though accurately quoted or paraphrased, may have been inaccurately prepared. Statistical reports may have been padded. Letters may have been worded in such a way as to conceal facts. The contemporary chronicle, however, when studied in perspective that only the passing years can provide, furnishes the basis for the definitive history that will be written after time shall have dimmed the outline of personalities and after evidence presented by participants and onlookers shall have been evaluated. Therefore, this series, which is to be used for instructional purposes, is not to be considered official.

Eudora Ramsay Richardson

15 March 1948
The Quartermaster School
Camp Lee, Virginia

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CHAPTER 1

LEVELS OF SUPPLY

The establishment of levels of subsistence was basic to BOLERO planning. Immediately after the United States became a participant in World War II, it was clear that a great army must be based in the United Kingdom for subsequent invasion of the European Continent and that victory was dependent upon building up food supplies adequate in quantity and quality for the maintenance of the soldiers' health and morale. The only guides available were the supply levels of World War I. In 1917 a 90-day reserve of supplies had been established for an American expeditionary force. This reserve was distributed as follows:

- 45-day level near base ports
- 30-day level in the intermediate section
- 15-day level in the advance section²

EARLY PLANNING FOR BOLERO

During World War II, however, new levels of supply were laid down to meet new complex problems. These were first established 22 January 1942. For all classes except ammunition, the War Department announced a 60-day level for the United Kingdom (see vol. I, ch. 4). On 6 July the supply level for BOLERO was announced as 60 days plus a 15-day cushion for all classes of supplies. Class I (subsistence) was broken down as follows:

- 55-day level of combination A and B ration
- 17-day level of C or K ration
- 3-day level of D ration

A 45-day supply of the 75-day level was to be located in rear areas, a 20-day supply in forward areas, and a 10-day supply would be in the hands of troop organizations.³

Earlier in the month, Brigadier General Robert M. Littlejohn, the Chief Quartermaster, had written Major General John C. H. Lee, Commanding General, SOS, ETOUSA, that the 75-day level was inadequate to meet the requirements of the European Theater. The primary reasons for this inadequacy were the losses incurred in transit because of improper methods of packing, the necessity of shipping to forward areas rations in excess of the number of men fed, and the substantial quantities of dry rations that would

be required for ROUNDUP. Therefore, he recommended that the level of class I supplies for BOLERO be increased to 90 days and ROUNDUP to 120 days.⁴ On 10 July 1942, Major General Lee approved the recommendation and established the subsistence level as follows:

For BOLERO

- 30 days, A ration
- 37 days, B ration
- 20 days, C or K ration
- 3 days, D ration

90 days

Additional for troops participating in ROUNDUP

- 18 days, B ration
- 10 days, C or K ration
- 2 days, D ration

30 days⁴

COORDINATION OF TORCH AND BOLERO

ROUNDUP was originally scheduled to take place in the summer of 1943. However, it early appeared unlikely that supplies in quantity sufficient to launch and maintain so vital an operation could be amassed by that time; whereas a blow at the enemy in North Africa could be undertaken sooner with a smaller initial outlay of supplies and a smaller demand for continued support. TORCH was therefore decided upon, and ROUNDUP was postponed. A part of the force for TORCH would be assembled and equipped from the forces and supplies already in the United Kingdom; the remainder would be shipped from the United States direct to the invasion beaches.

Preparations for TORCH slowed the BOLERO program. On 22 August 1942 General George C. Marshall, Chief of Staff of the United States Army, cabled Major General Lee that Lieutenant General Dwight D. Eisenhower, Commanding General of the European Theater of Operations, and Brigadier General William M. Goodman, Commanding General of the New York Port of Embarkation (NYPE), had agreed that the levels of supplies to be maintained in the United Kingdom would be 180 days, 90-days' combat

maintenance and 90-days' normal maintenance for 300,000 troops.⁵ All previous requisitions based on a larger troop strength were canceled.⁶ Shipments of class I items would continue to be automatic.⁷

The Chief Quartermaster notified NYPE that the level for class I supplies should be broken down as follows:

80 days, A ration
55 days, B ration
20 days, C ration
20 days, K ration
5 days, D ration

180 days⁸

NYPE replied that the breakdown had not been approved and that the War Department would furnish other information.⁹ The following breakdown was subsequently announced:

67 days, A ration
90 days, B ration
10 days, C ration
10 days, K ration
3 days, D ration

180 days¹⁰

The Chief Quartermaster, on 2 October 1942, recommended that the breakdown of the 180-day supply level be amended as follows:

60 days, A ration
75 days, B ration
20 days, C ration
5 days, D ration
20 days, K ration

180 days

In addition, he recommended that a 60-day minimum and a 90-day maximum level be established for perishable subsistence. He believed these levels to be suited to the needs of the European Theater because of the "necessity for furnishing types C and D rations to all troops moving from the United Kingdom; possible bombing losses of rations in depot storage; requirements of certain limited numbers of emergency rations for training purposes; and a production problem in the United States which gives little assurance that supplies will be available when additional supplies are required."¹¹

The question of levels of supply for the task forces that were to take part in the North African operation was raised frequently during October 1942. On the 26th, the Commanding General, SOS, ETOUSA, recom-

mended to the War Department that a 60-day level of class I supplies be held in the United Kingdom for the task forces in North Africa.¹² On 22 November 1942, 2 weeks after United States troops landed in North Africa, the War Department authorized the European Theater of Operations to ship to TORCH all subsistence supplies in excess of a 75-day level. Thereafter TORCH would be supplied direct from the United States, and the level of subsistence supplies for the United Kingdom would be maintained at 75 days.¹³

The Chief Quartermaster, while in New York for the purpose of investigating the status of requisitions from the European Theater, was requested by the port authorities to break down this 75-day level. His tentative breakdown was as follows:

30 days, A ration
20 days, B ration
5 days, C ration
2 days, D ration
13 days, K ration
5 days, 5-in-1 ration

75 days¹⁴

BUILD-UP IN THE UNITED KINGDOM

The full program for the BOLERO operation was reinstated in February 1943. Inasmuch as TORCH was approaching its final phases and the build-up of supplies was sufficient to insure victory in that campaign, attention could be returned to the primary mission of BOLERO (see vol. I, ch. 1). Anticipating increases in troop strength and planning for combined ground and air operations, the Chief Quartermaster recommended the following change in the breakdown of the approved 75-day level:

30 days, A ration
20 days, B ration
5 days, C ration
3 days, D ration
8 days, K ration
9 days, 5-in-1 ration

75 days¹⁵

The Commanding General, SOS, ETOUSA, approved this recommendation on 22 February 1943.¹⁶

As early as 6 March 1943 doubt existed in the Office of the Chief Quartermaster as to the adequacy of the 75-day subsistence level to sustain the operations of any large frac-

tion of the number of men that might be expected in the future. The Chief of the Subsistence Division, therefore, recommended to the Chief Quartermaster that action be taken to obtain approval of a level of supply altered as follows:

- 45 days, B ration
- 7 days, C ration
- 3 days, D ration
- 10 days, K ration
- 25 days, 5-in-1 ration

90 days¹⁷

On 3 April 1943 NYPE suggested that the maximum total stockage for class I supplies be revised to meet the level of subsistence appropriate to the needs of the next several months while strength in the European Theater was being built.¹⁸ The Office of the Chief Quartermaster made a study of NYPE's suggestions. Completed on 21 April 1943, the study gave the following comparison of present levels and stockages and those that had been proposed:

Present			
	Level of Supply	Stockage for Current Consumption	Maximum Total Stockage
A ration	30 days	30.00 days	60.00 days
B ration	20 days	-	20.00 days
C ration	5 days	1.25 days	6.25 days
D ration	3 days	0.75 days	3.75 days
K ration	8 days	2.00 days	10.00 days
5-in-1 ration	9 days	2.25 days	11.25 days
	75 days	36.25 days	111.25 days

Proposed			
	Level of Supply	Stockage for Current Consumption	Maximum Total Stockage
A ration	38 days	32 days	70 days
B ration	20 days	5 days	25 days
C ration	5 days	2 days	7 days
D ration	2 days	1 day	3 days
K ration	5 days	3 days	8 days
5-in-1 ration	5 days	2 days	7 days
	75 days	45 days	120 days ¹⁹

By proposing that maximum total stockages be set at 120 days, the New York Port of Embarkation had agreed to an increase of the level of supply.

Plans for the maintenance of the higher level were scarcely under way, however, when the War Department, on 25 April 1943, proposed that the level for subsistence supplies be reduced to 45 days.²⁰ Upon recommendation from the Chief Quartermaster, the Thea-

ter Commander cabled The Adjutant General as follows:

Based upon Air Force increase in troop strength, recommend the following changes in levels of supply for ETOUSA: Class one, sixty days for all types instead of seventy-five days for subsistence and sixty days for other types.²¹

On 18 May 1943 the Chief Quartermaster wrote Colonel R. B. Lord, G-4, ETOUSA, that the Quartermaster Service would endeavor to operate according to the 60-day level for class I supplies instead of the former 75-day level and presented the following new comparative breakdown:

- 30 days, A ration
- 20 days, B ration
- 3 days, C ration
- 2 days, D ration
- 5 days, K ration
- days, 5-in-1 ration

60 days²²

The War Department authorized the 60-day subsistence level for the European Theater on 20 June 1943.²³ Thereupon, the Office of the Chief Quartermaster adjusted requisitions upon the basis of the new level. The breakdown was as follows:

- 30 days, A ration
- 10 days, B ration (bulk)
- 10 days, B ration (composite)
- 3 days, C ration
- 2 days, D ration
- 5 days, K ration

60 days²⁴

NYPE approved the new breakdown of the subsistence level on 17 July 1943, supplementing it with a 30-day working stock of type A ration.²⁵

As the increasing success of the Navy's antisubmarine campaign curtailed losses at sea and insured more frequent convoy sailings, the need for a high subsistence level in the United Kingdom had decreased. The War Department, therefore, on 18 November 1943, recommended that the level for class I supplies be reduced from 60 to 45 days.²⁶ On 22 November 1943, the Theater Commander replied that the 45-day level was satisfactory if divided into 30 days type A ration and 15 days operational rations for men to remain in the United Kingdom. However, the proposed 45-day level was not to prevent the accumulation of operational rations for troops headed for the Continent.²⁷ On 3 December 1943 the

War Department approved this 45-day level and the breakdown suggested by the European Theater.²⁸

The Chief Quartermaster, writing from Washington on 31 December 1943, briefly reviewed the stock situation as follows:

Prior to my departure for the States the Subsistence Division OQMG set up a proposed reduction in the Subsistence levels from 60 to 45 days. I concurred in this with the understanding that the 15-day reduction be transferred to operational requirements.²⁹

At the end of 1943 the breakdown of class I supply levels was as follows:

	Level	Working Margin	Total
A ration	30 days	30 days	60 days
B ration	5 days	0 days	5 days
C ration	2 days	0 days	2 days
D ration	2 days	0 days	2 days
K ration	3 days	0 days	3 days
10-in-1 ration	3 days	0 days	3 days ³⁰
	<u>45 days</u>	<u>30 days</u>	<u>75 days</u>

LEVELS FOR INVASION

As plans were taking final form for OVERLORD, the War Department announced on 26 April 1944 that levels for all classes of supplies would be increased by 15 days.³¹ In order to conserve shipping space and transportation facilities and to lessen the burden upon United Kingdom depots, the Chief Quartermaster continued to operate on a 45-day level exclusive of supplies aboard ships in European waters (ex ship). Two days after the increase was announced, he directed that all requisitions be prepared on the basis of 45 days' supply in the depots and 15 days' supply on the rails. Later, however, because of the 18 to 20 days required to get supplies from shipside to depot, he found it necessary temporarily to take advantage of the full authorized level of 60 days ex ship.³²

In reply to a request from NYPE for a breakdown of the authorized level for the theater, the Chief Quartermaster sent the following recommendations for both the Continent and the United Kingdom.

Ex Ship in the United Kingdom

	31 July	31 Oct.	31 Dec.	31 Jan.
A ration	60 days	50 days	45 days	40 days
B ration	—	1 day	1 day	1 day
C ration	—	1 day	1 day	1 day
K ration	—	1 day	1 day	1 day
10-in-1 ration	—	2 days	2 days	2 days
Total	<u>60 days</u>	<u>55 days</u>	<u>50 days</u>	<u>45 days</u>

Ex Ship on the Continent

	31 July	31 Oct.	31 Dec.	31 Jan.
A ration	—	—	48 days (including 10 days non-perishable components of the B ration)	48 days (including 10 days non-perishable components of the B ration)
B ration	7 days	34 days	—	—
C ration	2 days	8 days	2 days	2 days
D ration	—	2 days	—	—
K ration	2 days	6 days	2 days	2 days
10-in-1 ration	4 days	10 days	8 days	8 days
	<u>15 days</u>	<u>60 days</u>	<u>60 days</u>	<u>60 days³³</u>

By September 1944, however, the military situation had changed to such a degree that the Chief Quartermaster advocated identical levels for the United Kingdom and the Continent.³⁴

On 3 December 1944 a requisition for non-perishable requirements through February 1945 was transmitted to the War Department.³⁵ It was based on a 45-day level of supply. The War Department notified the Chief Quartermaster on 16 January 1945 that the 45-day level had not been authorized for the European Theater. If change of the authorized level for class I supplies was desired by the European Theater, the War Department asked that Washington be notified.³⁶

On 24 January 1945 NYPE proposed that the Chief Quartermaster voluntarily accept a reduction of 15 days for all classes of supplies. After conferring with Lieutenant General Brehon Somervell, Commanding General, Army Service Forces, who was then in Europe, G-4 expressed the opinion that the reduction was feasible.³⁷ Subsequently, the Chief Quartermaster, writing to G-4 that the level of subsistence supplies could be reduced to 50 days, suggested the breakdown of 45 days of A rations and 5 days of operational rations. Because requisitions covering subsistence requirements through 30 June 1945 had already been forwarded to NYPE, the Chief Quartermaster requested that the revised level not become effective until July 1945.³⁸

Because of the efficiency of the Communications Zone supply system on the Continent, the Commanding General, SOS, ETOUSA, recommended to the War Department that the 50-day level for class I supplies be authorized. He stipulated, however, that the level was to include commodity-loaded ships in the European Theater.³⁹ The War Department

withheld approval of the reduction until 3 March 1945.⁴⁰ The 50-day level remained in effect until VE-day. Then, with the complete surrender of the German forces, the problem of feeding liberated civilians, former enemy nationals, and Allied military personnel assumed proportions equal to that of feeding American troops. Because of the world food shortage the United States could barely meet its own demands. Anticipating these conditions, the War Department had directed on 23 March 1945 that the 50-day level of food for the American forces be maintained if possible but that the level of supplies for all other groups should not exceed 30 days.⁴¹

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CHAPTER 2

GETTING THE SUPPLIES

The components of the rations that sustained American troops in the European Theater of Operations were obtained through procurement from the British and through requisitions upon the United States and were supplemented through procurement on the Continent. From these sources troops were adequately fed during the long waiting period in the United Kingdom and during operations on the Continent.

PROCUREMENT IN THE UNITED KINGDOM

Rations for the advance guard of United States troops, who reached Ireland on 27 January 1942, and for the staff in London headquarters were furnished at first entirely by the British. The planned arrival of subsistence supplies having failed to materialize, not a pound of American food was available in the United Kingdom for the pioneer expeditionary force of World War II or for the second shipment of troops, which reached Ireland on 2 March 1942.¹

Though supplies began to arrive from America on 18 March 1942, the ration continued to be supplemented from British sources.² The Commanding General of the United States Army Forces in the British Isles (USAFBI) reported on 1 April 1942 that a 107-day supply of B rations, a 37-day supply of C rations, an 11-day supply of D rations, and a 16-day supply of fresh meat had been stocked in Ireland but that there were no class I supplies in London.³ Because no A ration component except fresh meat was available, the United States troops received such perishable foods as were provided in the British ration. On 30 April 1942 the stock level of class I supplies for the United States Army Northern Ireland Forces (USANIF) was reported to be a 116-day supply of B rations, a 37-day supply of C rations, and an 11-day supply of D rations. The London stock level was a 45-day supply of B rations and 2-day supply of C rations.⁴ The British, therefore, were continuing to provide perishable foods.

Meanwhile, negotiations had been begun for large-scale procurement of all classes of supplies available in the United Kingdom (see vol. I, ch. 3). By 25 April 1942 arrangements

had been made for the British to furnish flour (National Wheatmeal), tea, salt, rolled oats, cereals, macaroni, spaghetti, potatoes, fresh vegetables, fresh milk, fresh meat and fish, and mustard. Some of these items were to be supplied by British depots, some by the Meat Importers National Defense Associates, Limited, (MINDAL), and some by the Navy, Army, and Air Force Institute (NAAFI), the British counterpart of the United States Army Exchange Service. USA-FBI had made no commitment to procure from these sources exclusively but had agreed not to purchase in the open market. NYPE was instructed not to ship to the United Kingdom carrots, tea, mustard, and Irish potatoes and to ship no meat but boneless beef. The canceling of other items was under consideration. USANIF was directed to use Northern Ireland meat "to the fullest," to procure locally all other components that were available, and to deal directly with the headquarters of the British troops in Northern Ireland.⁵

No change in the procurement policy had taken place when Brigadier General Robert M. Littlejohn reached London on 4 June 1942, and no change took place immediately after the creation of the European Theater of Operations on 8 June 1942. At the request of the Chief Quartermaster, the Commanding General, SOS, ETOUSA, informed the Commanding General, NYPE, that the anticipated troop strength in the theater would be as follows:

England	Northern Ireland
30 June—23,000	30 June and there-
31 July—42,000	after—55,000
31 August—117,000	
30 September—220,000	

For these troops the Chief Quartermaster wanted automatic shipment of bacon, ham, and boneless beef. The first requisition of class I supplies to be sent from the ETO was for 6,000,000 B rations based on OQMG menu No. 1 and 12,000,000 operational rations. The following items, however, were to be excluded from the shipment of B rations: flour, sugar, crackers, tea, mustard, salt, dry cereals, canned carrots, fresh potatoes, and evaporated milk.⁶

Throughout July, procurement in the United Kingdom progressed satisfactorily. On 15 July the Commanding General, SOS, ETO-USA, asked that the shipment of B rations be discontinued because the components were being supplied by the British.⁷ A few days later he listed the nonperishable foods that could be procured from the British and recommended that only bacon, ham, dried eggs, and dried onions, be shipped.⁸ He was told immediately that his recommendation was approved.⁹

On 2 August, however, came a cablegram saying that components procurable in the United Kingdom would not be excluded from shipments and that all rations would be sent completely balanced.¹⁰ Major General Brehon B. Somervell, Commanding General, War Department, Services of Supply, had ordered the rescission. Having learned through a cablegram from Ambassador John G. Winant to the Department of Agriculture and the Lend-Lease Administrator that the United States forces were drawing rations from common stock maintained by the Ministry of Food and that replacements would be provided as needed, he cabled the Commanding General, SOS, ETOUSA, as follows:

We definitely understood that Eisenhower desired to maintain complete control over food supply for our Army. We also feel it desirable that Quartermaster Corps specify and purchase food supplies in the United States to be shipped to our troops rather than the Department of Agriculture. We believe you should maintain a separate reserve from British Civil Supply, and can see no, repeat no, point in shipping food purchased from Lend-Lease funds for redistribution to our troops. Otherwise we will be continually subject to charges of drawing food from their stocks. The British are to be advised through our appropriate representatives that the proposed arrangement can not, repeat not, be accepted by this office.¹¹

Major General Lee replied on 5 August that steps were being taken to comply with the new directive but urged reconsideration. He asserted that from September through March items that could be procured locally would amount to 236,000 ship tons, that the British would not look with favor upon the use of white flour, that it would be better to eliminate some items from the ration than to use the space required to ship them, that the

British had surplus supplies of some items, and that the British had requested local procurement in order that storage space might be conserved. He concluded the cablegram with the assurance that the United States reserves would be kept separate from the British reserves and that the United States Army would thus have complete control over its food supplies.¹² The War Department accepted the recommendation on 14 September 1942.¹³

On 14 October 1942 Major General Lee transmitted to Lieutenant General Somervell the procedure that had been established upon the basis of the cablegram that approved the procurement of food from British sources. The following components would be procured in the United Kingdom:

1. Those on which the British want no replacements.
2. Those that require replacement of raw materials but must be processed and packed in such a way as to increase shipping space.
3. Those that require replacement in kind if their procurement helps rotate British reserves and thus reduces loss and spoilage.
4. Those that require replacement if they are needed in emergencies by task forces.
5. Those for the procurement of which the War Department had granted special authority.

Accordingly, the following class I items would be procured in the United Kingdom: cereals, cookies, crackers, lamb, salt, fresh potatoes, fresh fruits and vegetables, jams and marmalades, hard candy, vanilla extract, lemon extract, sirup, vinegar, meat sauces, sugar, spices, cocoa, tea, cheese and evaporated milk (for forces in Northern Ireland only), and flour.¹⁴

The establishment of the procedures that led to the procurement of supplies from the United Kingdom made possible the building of stock piles that insured the success of the Continental operation. In addition, it contributed in large measure to the subsistence program that resulted in providing the right kind of food to men preparing for combat and to men engaging in combat. On 19 May 1945 the Chief of the Procurement Division submitted to the Chief Quartermaster the following report of subsistence procured in the United Kingdom from July 1942 through

April 1945, showing the monetary value of the food and the tonnage saved:

	Long Tons	Ship Tons	Dollar Values
1942	57,707	93,579	\$10,647,314
1943	43,081	107,703	7,948,722
1944	219,797	401,796	40,553,964
1945	26,240	65,600	4,841,449
Total	346,825	668,678	\$63,991,449

In other words, the United Kingdom furnished 776,888,000 pounds of food for the ration of United States soldiers.¹⁵

Without procurement from the British the food served American troops in the United Kingdom and later on the Continent would have been deficient in perishable components. Fresh food was served the United States troops who were based in Ireland early in 1942. There is evidence, however, that the Americans were anything but pleased with the British diet, which was prepared for the most part by British cooks. In a memorandum to Colonel W. H. Middleswart on 17 March 1942, Captain F. E. Mackintosh spoke most disparagingly of British food. The flavor of broad beans was so strong as to need thick sauce to disguise it. The green beans were coarse. British cabbage was a necessary evil. Never crisp and never headed, it was "a watery and tasteless mess." The celery was "tough and earthy." The rhubarb was coarse. The lettuce was "tough in fibre" and "limp in disposition." All the mushrooms had to be peeled. The vegetables that the captain did not criticize were broccoli, brussels sprouts, carrots, cauliflower, cucumbers, kale, onions, peas, parsnips, potatoes, rhubarb, tomatoes, and water cress. In expressing his opinion of vegetable marrow, he relied upon the following quotation from Irvin S. Cobb's *Eating in Two or Three Languages*:

From the vegetable marrow you derive no nourishment, and certainly you derive no exercise; for being a soft, weak, spiritless thing, it offers no resistance whatever, and it looks a good deal like a streak of solidified fog and tastes like the place where an indisposed carrot spent the night.¹⁶

Shortly after the establishment of the European Theater of Operations, however, the Commanding General of the Northern Ireland Base Command wrote in happier vein. Fresh meat, he said, had been provided locally for one meal a day 6 days a week, and frozen meat had been used on the other day. Vegetables in season had been procured in

Northern Ireland. Fresh milk, which had to be boiled, was used only in hospitals. Arrangements were being made, however, to procure grade A milk and have it pasteurized. A small amount of fresh fish had been available. All other items in the menu were coming from the United States.¹⁷

The first conference between representatives of the British War Office and the Office of the Chief Quartermaster dealt at considerable length with the procurement of perishables. Then were made tentative agreements that served as the basis for future negotiations. At this conference the British said that many fresh fruits and vegetables would be available through NAAFI. The availability of potatoes, however, in sufficient quantities seemed doubtful.¹⁸

Nevertheless, the Ministry of Agriculture was thrown into a state of near panic later in the summer upon hearing that a large shipment of potatoes had reached England. It seemed that American potatoes might bring in a disease that would be communicated to English and Irish potatoes. Consequently, on 10 August 1942 the Ministry of Food dispatched a letter to the Chief of Subsistence requesting that shipments be discontinued and that potatoes grown in the United Kingdom be accepted. Moreover, they insisted that the potatoes from the United States be delivered to a factory for immediate treatment. On 11 August an abject apology went forth from the Ministry of Food. Would the Chief of Subsistence please disregard the letter of the day before? The Ministry of Food had just learned that the potatoes were "in fact dehydrated and in cans."¹⁹

Subsequently, all went well in the field of potatoes. The United States continued to ship the dehydrated variety without offending the Ministries, and the British supplied fresh potatoes—203,219 long tons, or 455,210,560 pounds, between June 1942 and March 1945.²⁰

The British furnished fresh fruits and vegetables in quantities startlingly large but not always large enough to satisfy the needs of United States troops. On 3 December 1942 the Subsistence Division stated that the 1943 requirements of fresh fruits and vegetables would be 196,200,000 pounds²¹—an estimate that was considerably increased as larger troop strength was anticipated. Fearing that not all requirements could be met in the United Kingdom, the Commanding General, SOS, suggested on 4 January 1943 that vegetables be procured from the Irish Free State for import to England. He had

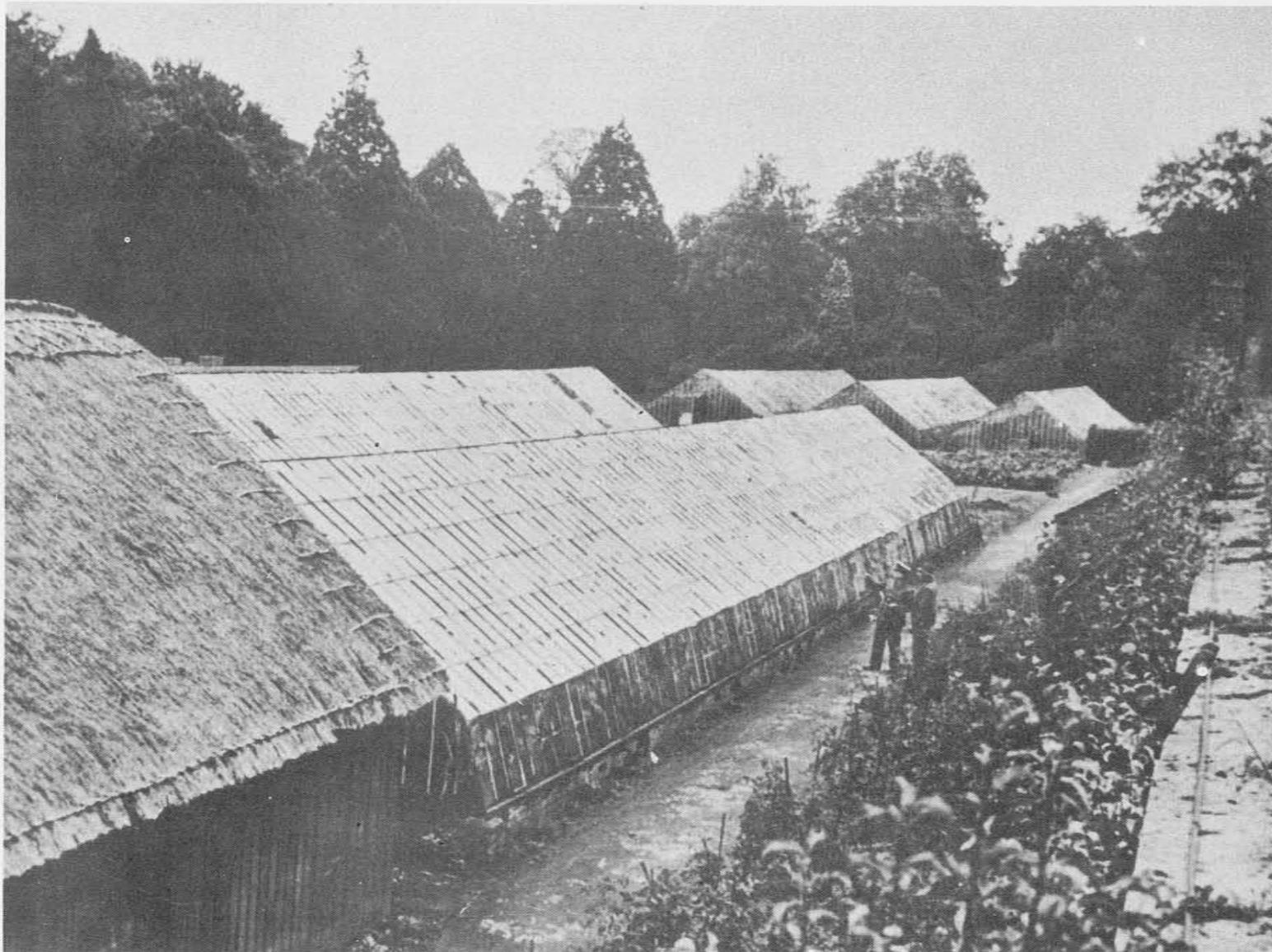


Figure 1.—British Greenhouses Supply Fruits and Vegetables for United States Army.

found that 6,000 acres could be made available for growing vegetables that would be used by United States troops. Because of the transportation difficulties, however, he recommended that only root-type vegetables be grown. On 13 January, in submitting revised requirements for the last 7 months of 1943, he restated his recommendation. But the Ministry of Food notified the Chief of the Procurement Division that fresh fruits and vegetables could be supplied from the United Kingdom. On 10 March 1943 the General Purchasing Agent reopened the question. Again the Ministry of Food notified the Chief of the Subsistence Division that the British could fill all requirements. When on 22 July 1943 it was found that the British had not lived up to their agreements, the Chief of the Subsistence Division again recommended that the acreage in the Irish Free State be used for growing vegetables that would be shipped to England for United States troops.²² Without the help of neighbors in the Irish Free State, the Ministry of Food was able to supply to the United States Army 592,584,000 pounds of fresh fruits and vegetables between June 1942 and April 1945.²³

The procurement of meat also came up for discussion at the conference of 19 June 1942. A few days later the Chief Quartermaster informed the Quartermaster General that ham, bacon, and frozen boneless beef would be required from the United States but that other types of meat would be procurable in the United Kingdom.²⁴ Though lamb and mutton were furnished without replacement, the British asked that fresh pork be returned.²⁵ United States troops preferred other varieties of meat; yet the 6,619,200 pounds of lamb procured from the British was a valuable addition to their diet.²⁶

In the summer and fall of 1942 the United States exchanged beef for pork. This practice led to a study upon which a report was made on 14 November 1942. The purpose of the study was to determine the wisdom of exchanging United States boneless beef for United Kingdom frozen pork loins. In its report, the Subsistence Division stated both sides of the question. Frozen beef could be kept in storage 9 months after it reached the United Kingdom. On 1 November 1942, 18,600,000 pounds of frozen boneless beef was on hand. Though an additional 16,200,000 pounds would be required by 1 August 1943, PEMBARK had been directed to discontinue shipment. The British beef, which came from Argentina, was inadequate to meet British

requirements. If the United States beef was held in storage, it ran a chance of spoilage through defrosting. If United States troops continued to obtain pork from the British, ship's tonnage would be released and the beef given in exchange would run no risk of spoiling in the storage plants. On the other hand, if United States troop strength increased, more beef would be needed. Because standards in the United States had been lowered, the stock already in the United Kingdom was of better quality than that which would be sent in future shipments. Consequently, the study ended with the recommendation that the United States supply of all frozen boneless beef be conserved and that the exchange of beef for pork be discontinued.²⁷

The procurement of dairy products was also discussed at the initial conference of 19 June 1942. Representatives of the Office of the Chief Quartermaster let it be known at once that margarine was not wanted.²⁸ On 27 July 1942 the General Purchasing Agent notified the Ministry of Food that 3,000,000 pounds of butter would be needed each month and that the United States Army would be glad to get all the fresh milk available if it was pasteurized.²⁹ The British could not fill the butter requirement and could not comply with the stipulation that milk be pasteurized according to standards prescribed by the Office of the Chief Surgeon. Therefore, butter and evaporated milk were requisitioned from the United States.³⁰ Supplementary quantities of evaporated milk, however, were procured from Northern Ireland.³¹ Because of the limited supply of fresh milk in the United Kingdom, United States troops received no ice cream for Thanksgiving and Christmas dinners in 1942, the manufacture and sale of ice cream having been prohibited during winter months.³² Cheese to the amount of 396,480 pounds and evaporated milk to the amount of 8,093,120 pounds were procured in the United Kingdom.³³ Fresh eggs for hospitals and for Air Corps combat crews on operational status were supplied by the British. The requirements for these uses were 146,242 dozen for 1943 and 302,527 dozen for 1944.³⁴ Toward meeting these requirements the British furnished, between June 1942 and 1 March 1945, 786,240 pounds of fresh eggs.³⁵

PROCUREMENT ON THE CONTINENT

Procurement of fresh fruits and vegetables by purchasing and contracting officers of the Advance Section of the Communications

Zone began in July 1944.³⁶ Procurement was small during the first 2 months because of the limited area of activity. Only quantities declared surplus by local authorities were considered for purchase. Later in the year final arrangements were made for procurement of fruits and vegetables on a national basis.

An agreement was reached at meetings held in October between representatives of the Office of the Chief Quartermaster and of the *Ministere de Ravitaillement* (Ministry of Supply).³⁷ Briefly, the central French Government would determine the quantities considered surplus in each region on the basis of reports from their regional delegates. Requirements for all American forces on the Continent would be submitted by the Office of the Chief Quartermaster upon the basis of requests from base sections and field installations (see vol. I, ch. 4).

Fruits and Vegetables

From the beginning of Continental procurement in July to the adoption of the National Agreement in October, 11,052 long tons, or 24,756,480 pounds, of fruits and vegetables were obtained from the French. By 1 March 1945 the total had risen to 50,000 long tons. The 12 major commodities procured included apples, beets, brussels sprouts, cabbage, carrots, cauliflower, greens, onions, potatoes, and turnips.³⁸

Transportation and inspection were the chief problems. To overcome the problem of transportation the Chief Quartermaster authorized French producers an issue of gasoline, allowing them to bring their own goods to the truckheads.³⁹ A partial solution to the inspection problem, particularly in regard to quality of sacking, was found in November 1944. Potatoes were shipped loose from the Brittany Base Section to Normandy, where they were sacked. This gave the Normandy Base Section some control over the return of the sacks. Repair of sacks was also instituted. In the Loire Section, 5,000 sacks were repaired every 10 days. Toward the end of the year repair activities were concentrated in the Loire Section and production was increased to 210,000 monthly.⁴⁰ In all, by 1 April 1945, 30,000 long tons, or 112,020,160 pounds, of fresh fruit and vegetables were procured from French sources.⁴¹

Salt

In December 1944 two rather special problems were added to the picture, the procure-

ment of salt and of yeast. Because the procurement of yeast has been covered in chapter 5, only the question of salt will be discussed here. As early as 21 August 1944 the Subsistence Division had requested that action be taken to procure 1,000 pounds of salt monthly for freezing purposes.⁴² It continued to press the matter during the next 2 months, and on 23 September the Procurement Division was forced to reply that all salt in the Paris region was being used by the French. If transportation was available, however, salt would be obtained in Nancy or along the Mediterranean coast.⁴³ On 30 October 1944 spot demand for 1,000 tons of freezing salt was placed on the French.⁴⁴ A few days later, the Chief Quartermaster submitted to the General Purchasing Agent a program for 2,160,000 pounds of salt monthly.⁴⁵ The next day he placed an emergency request for 25 tons. The French at first refused to accept it but finally agreed to release the salt when the Chief Quartermaster promised to make replacement in kind.⁴⁶

In the meantime the General Purchasing Agent had located vast quantities of salt in Nancy. By 31 October 1,000 tons had been released. On 5 November, the French were requested to make 1,000 tons available monthly to March 1945.⁴⁷

Procurement in Spain

Also in December arrangements were made for the procurement of 10,000 tons of fresh tomatoes from Spain.⁴⁸ Payment at the rate of 12 cents a pound was made by United States purchase orders to cover each shipment received at Cherbourg. The procurement of onions, oranges, and lemons from Spain and Portugal was also investigated. At the beginning of 1945 the Chief Quartermaster estimated that 54,500 long tons of perishable items would be delivered from the Iberian Peninsula during the year.⁴⁹

Between 1 July 1944 and 30 April 1945 procurement arrangements were made with every possible Continental source. As the armies moved through Belgium, Holland, and Luxembourg, army and base section purchasing and contracting officers laid the groundwork for the vast quartermaster procurement program. By the end of hostilities, 215,808,320 pounds of subsistence, with a monetary value of \$7,185,158, had been obtained.⁵⁰



Figure 2.—Fresh Vegetables on the Streets of Paris.

REQUISITIONS UPON THE UNITED STATES

The subsistence program of the Quartermaster Service as set up in 1942 had a two-fold objective: the feeding of troops based in the United Kingdom and the building of reserves for Continental operations. The problem of feeding a great expeditionary force thousands of miles from the home base was made more complex by fluctuating estimates of the number of troops anticipated and the success of German submarine warfare, which resulted in the sinking of supplies. It is surprising not that policies changed, but that changes were not more numerous.

Procedures

The War Department published on 22 January 1942 a general plan for supply of over-sea commands, which provided that class I supplies were to be shipped on an automatic basis and that the over-sea department, theater, and separate base commanders were to report shortages and excesses of subsistence.⁵¹ As republished on 28 April 1942, the plan had undergone changes only in terminology. It was not until 10 October 1942 that a new plan was issued. Though port and over-sea commanders were given greater authority, the automatic supply of subsistence was retained.⁵² Using his new authority, Major General Lee sent a cablegram to the New York port directing that the automatic shipment of perishable and nonperishable components of class I supplies be discontinued temporarily because the majority of the components were on hand in sufficient quantities.⁵³ The port replied that automatic supply of perishable and nonperishable subsistence would be discontinued immediately.⁵⁴

On 1 August 1942 the War Department had instituted the policy of shipping with all troops a 14-day supply of rations.⁵⁵ Thus cargo space had been saved and prompt delivery assured. On 5 November 1942 Brigadier General Littlejohn, then serving as Acting Chief of Staff, SOS, ETOUSA, stated that, with the exception of the 14-day ration accompanying troops to the European Theater of Operations, no automatic shipments were to be made to the theater until further notice. Automatic shipment would be reinstated as soon as stocks were balanced.⁵⁶

Requisitions were consolidated by supply services before they were sent to PEM-BARK.⁵⁷ Computations of subsistence requirements were based upon OQMG Menu No. 1 and continued to be prepared under the assumption that no automatic supplies would be shipped.⁵⁸ The following supplies, however, accompanied troops leaving the United States: a 10-day supply of B rations and enough C and D rations to provide for troops while they were being moved to their destinations. The services prepared programmed requirements of items to be procured locally and submitted them to the General Purchasing Agent, who passed them on to the British War Office. These covered periods from 1 to 2 years in length. Interim requirements, however, could be submitted between the dates fixed for programmed requirements. A separate requisition on the New York port was prepared for each class of supply, and items of the same priority were grouped. If, because of its size or importance, a shipment should be sent by more than one vessel, the order was broken down into several requisitions.⁵⁹

In April 1943 Brigadier General W. M. Goodman, Commanding General, NYPE, clarified the procedure by which requisitions were edited. In addition to the table of allowance and maintenance requirements, other basic factors entering into the editing of requisitions were the troop strength of the theater, quantities in the United Kingdom and afloat, and approved quantities in process of shipment.

The following procedure was used in editing subsistence requisitions: The troop strength was obtained and averaged for the requisition period. The amount consumed by these troops was figured from the date of the last inventory to the end of the period covered by the requisition. To this amount was added the amount necessary to maintain the prescribed stock level. From this sum were deducted the amount afloat or in process of shipment and the amount on hand at the last inventory. The remainder represented the amount to be shipped provided it did not exceed the amount requisitioned.⁶⁰

By early summer 1943, when victory in North Africa had made possible the refocusing of attention upon building up supplies in the United Kingdom for invasion of the Continent from the north, stock piles of food had mounted in the United Kingdom. On 21

June 1943 the following quantities of subsistence had been requisitioned:

ITEMS	POUNDS
Special Hospital Items	7,427,849
Beverages	38,582,236
Canned Vegetables	58,002,495
Dried and Dehydrated Vegetables	49,521,613
Canned Fruits	32,846,848
Dried Fruits	7,391,838
Meat and Fish	12,460,659
Spreads	5,429,957
Dairy Products	43,556,410
Miscellaneous	6,994,798
Condiments	7,492,705
Cereals	34,162
Baking Supplies	2,985,812
Perishables	99,076,279
Emergency Rations	3,135,841
Total ⁶¹	374,939,502

On 25 August 1943 the Chief of the Storage and Distribution Division was able to report that 527,347,520 pounds of subsistence had been distributed from shipside to United States Army depots in the United Kingdom.⁶²

As D-day approached and BOLERO planning came to be based on an increasing number of troops, the Office of the Chief Quartermaster feared that the prescribed levels of supply would not be maintained. Of the 85,059,000 operational rations that would be needed by 1 July 1944, 80,680,000 were on hand or afloat on 4 April 1944 and the remaining 4,379,000 would be delivered by the end of July. Special hospital rations and ration accessory convenience (RAC) kits on hand or en route averaged about 90 percent of the required number.⁶³ Shortage of A ration components, however, occasioned considerable concern. On 9 May 1944 the Chief of the Subsistence Division reported that the level stood at 22 days and that unless all the 129 items of the A ration were received every 15 days, stocks would remain far below the 30-day minimum.⁶⁴

The Chief of the Plans and Training Division made on the 14th of May a report that was far from optimistic. Shipments known to be on the way, he said, would not correct the unbalanced condition of the A ration. The present tonnage allocations were light. A postponement of D-day, therefore, could create a critical situation. Stocks of B rations, however, were adequate through D-plus-48-day. The supply of C rations was low. Priority had been requested for 3,250,000 C rations on the April-May lift. These, accord-

ing to PEMBARK, would arrive the latter part of June. The supply of D rations and the supply of 10-in-1 rations were satisfactory, the former through D-plus-34-day and the latter through D-plus-43-day. With regard to RAC kits, the margin was narrow from D-plus-50-day through D-plus-90-day. The number of heat units on hand was 3,000,000 short of the quantity required for D-day.⁶⁵

The method by which supplies were requisitioned continued to be discussed seriously long after the Continental operation was under way. "A simpler, more direct approach to the problem of getting supply from the New York Port of Embarkation must be found," Major General Littlejohn wrote Major General Gregory on 12 July 1944. The ETO type A menu No. 9 he knew to be the most satisfactory that had been developed in the European Theater. Because some of its components had not been readily available, NYPE had made substitutions. Consequently, the meals served the troops bore little resemblance to the original menu, and there had been much confusion in stock accounting.

Convinced that alternations should be carefully planned, the Chief Quartermaster proposed a course of action that would remedy the situation then existing. He would send The Quartermaster General a permanent requisitioning menu to be known as basic type A menu and a similar basic type A hospital menu with the request that he be informed as to the availability of the components listed. Requisitions on the basic type A menu would be computed monthly and sent 120 days in advance of the time the supplies were needed. This plan would enable NYPE to edit requirements month by month. In order that he might print and issue menus backed up by stocks in depots, he wanted prompt information concerning any changes that had to be made in his requisitions. All editing, he said, should be based on changes in troop strength and on nothing else. If substitutions were necessary, he wanted to be informed immediately by cablegram. The letter ended with this forthright statement: "Only with information, well in advance, of what items and what quantities are going to be shipped by the New York Port can this office conduct the feeding of troops on long-term principles and insure that the soldier is fed in accordance with high standards of nutrition, variety and palatability."⁶⁶

On 25 September 1944 the Chief Quartermaster directed the chiefs of divisions in his office to make a thorough study of requisitions. The need for some items had increased and the need for other items had decreased. In order that shipping space might be saved, new requisitions must be planned, from which nonessential items had been eliminated. In the case of class I supplies, requirements must be computed by items and not by balanced rations. This procedure was then necessary because 63,212,285 pounds of unbalanced B rations were on hand in the theater and because 22,312 ship tons of unbalanced nonperishable components were due in the United Kingdom during November.⁶⁷ On 5 December 1944 the Chief Quartermaster directed the United Kingdom Base to continue computing requirements by items and not by balanced rations through the requisitions for supplies covering March and April requirements.⁶⁸

Though the volume of food shipped from the United States was great and though the loss factor was low, the expeditionary force could not have been adequately fed if local procurement had not been successful. The number of United States troops to be fed in the European Theater of Operations had climbed from 102,681 at the beginning of 1943 to 2,714,645 at the end of 1944.⁶⁹ A combined requisitioning and procurement program enabled the Quartermaster Service to provide each soldier 6 pounds of nourishing food a day and to feed approximately 3,000,000 liberated people, Allied personnel, and prisoners of war on the Continent. The Chief of the Procurement Division reported that between 1 July 1942 and 31 December 1945 the Quartermaster Service received approximately 11,375,000,000 pounds of subsistence.

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- ²² Memorandum, Chief, Subsistence Division, to CQM, 22 July 1943.
- ²³ See note 20, *supra*.
- ²⁴ Memorandum, CQM to QMG, 22 June 1942.
- ²⁵ Memorandum, Chief, Procurement Division, to Chief, Subsistence Division, 31 July 1942.
- ²⁶ See note 20, *supra*.
- ²⁷ Memorandum, Chief, Subsistence Division, to OCQM, 14 November 1942.
- ²⁸ Minutes of meeting attended by representatives of British War Office and OCQM, 19 June 1942.
- ²⁹ Letter, GPA to MOF, 27 July 1942.
- ³⁰ Letter, MOF to Area Commodity Officers in port areas, 30 July 1942.
- ³¹ Telegram, MOF to Chief, Procurement Division, 10 September 1942; and letter, MOF to DCQM, 20 October 1942.
- ³² Letter, MOF to Chief, Procurement Division, 11 September 1942.
- ³³ See note 20, *supra*.
- ³⁴ Memorandum, Chief, Procurement Division, to MOF, 24 August 1943.
- ³⁵ See note 20, *supra*.
- ³⁶ Memorandum, Chief, Subsistence Division, to CQM, 20 February 1945.
- ³⁷ Memorandum, 1st Lt. Rothschild to Chief, Procurement Division, 4 October 1944.
- ³⁸ See note 20, *supra*.
- ³⁹ Letter, DCQM to QM, Channel Base Section, 19 December 1944.
- ⁴⁰ Letter, DCQM to QM, Loire Section, 8 November 1944.
- ⁴¹ See note 20, *supra*.
- ⁴² Memorandum, Chief, Subsistence Division, to Chief, Procurement Division, 21 August 1944.
- ⁴³ Memorandum, Chief, Procurement Division, to Chief, Subsistence Division, 23 September 1944.
- ⁴⁴ QMP 52, 30 October 1944.
- ⁴⁵ Memorandum, DCQM to Chief, Procurement Division, 9 November 1944.

- 46 Letter, French Ministry of Food to Chief, Procurement Division, 27 November 1944.
- 47 Memorandum, Chief, Procurement Division, to CQM, April 1945.
- 48 Letter, CQM to Atlantida S. S., 6 Plaza Canalejus, Madrid, 18 January 1945.
- 49 See note 20, *supra*.
- 50 See note 20, *supra*.
- 51 Letter, AG 400 (1-17-42), 22 January 1942.
- 52 Memorandum AG W 700 (10-8-42), 10 October 1942.
- 53 Cablegram SA 1153, CG, SOS, ETOUSA, to PEMBARK, 13 October 1942.
- 54 Cablegram, NYO 276, PEMBARK to USSOS, 19 October 1942.
- 55 Letter, AG 400 MS-SPOP-M, 1 August 1942.
- 56 Memorandum, Acting Chief of Staff, SOS, ETOUSA, to The Adjutant General, War Department, *et al.*, 5 November 1942.
- 57 Memorandum, CG, SOS, ETOUSA, to Chiefs of Services *et al.*, 24 November 1942.
- 58 Memorandum, CG, SOS, ETOUSA, to CG, PEMBARK, 22 February 1943.
- 59 Memorandum, CG, SOS, ETOUSA, to Chiefs of Services, *et al.*, 22 February 1943.
- 60 Editing Procedure for Requisitions from United Kingdom, CG, NYPE, 9 April 1943.
- 61 Memorandum, Chief, Subsistence Division, to CQM, 21 June 1943.
- 62 Memorandum, Chief, Storage and Distribution Division, to Chief, Progress Division, 25 August 1943.
- 63 Status Report, Operational Rations for Delivery to United Kingdom, 4 April 1944.
- 64 Memorandum, Chief, Subsistence Division, to CQM, 9 May 1944.
- 65 Memorandum, Chief, Plans and Training Division, to CQM, 14 May 1944.
- 66 Letter, CQM to QMG, 12 July 1944.
- 67 Memorandum, CQM to Chiefs of Divisions, 25 September 1944.
- 68 Memorandum, CQM to QM, United Kingdom Base, 5 December 1944.
- 69 Troop Strength records in OCQM.

CHAPTER 3

STORING AND DISTRIBUTING THE SUPPLIES

The success of the European campaign was dependent upon the procurement of adequate space for storing subsistence supplies in the United Kingdom and on the Continent and upon the development of a distribution program that would assure the prompt delivery of balanced rations during the waiting period in the United Kingdom and during the Continental operation.

STORAGE IN THE UNITED KINGDOM

Early calculations of the amount of space required for maintaining United States troops on foreign soil were based upon experiences of World War I. For the American Expeditionary Forces of 1917 and 1918 it had been found that 69 percent of the storage space should be closed and 31 percent open.

Procurement of Space

Upon the basis of this former experience, the Office of the Chief Quartermaster estimated that the square footage necessary to store a 1-day supply of food for one man was as follows:

Class	Closed	Open	Refrigerated	Total
A	.0556	.0415	.0264	.1235
B	.0329	.0493	--	.0822
C	--	.0320	--	.0320
D	.0030	--	--	.0030
K	.0110	--	--	.0110 ^a

On 9 June 1942, 1 day after the European Theater of Operations was established, Brigadier General Robert M. Littlejohn notified G-4, SOS, ETOUSA, that his first estimate of the total space that would be required eventually included 1,200,000 square feet of storage space for nonperishable subsistence and 1,200,000 square feet for perishable subsistence.² Using estimated troop strength figures and the ROUNDUP figure that appeared in early BOLERO planning, he was soon able to give estimates of the amount of space required on specific dates. On the 16th of June he calculated that for storage of food 631,566 square feet would be required by 30 September and 281,252 additional square feet by 31 March.³

Though calculations continued to be based in general upon World War I experience, they

had to be adapted to changed conditions. The first edition of the BOLERO Key Plan, 31 May 1942, having called for 1,049,000 men by the beginning of ROUNDUP,⁴ the Chief Quartermaster wrote the Commanding General, SOS, ETOUSA, on 14 July 1942 that 8,972,100 gross square feet of storage space would be required to store a 90-day supply of A, B, C, D, and K rations for 1,000,000 men and that 1,593,840 gross square feet of space would be required to store a 30-day supply of B, C, D, and K rations for 600,000 men.⁵ On 27 July 1942 the Quartermaster Service learned that the British War Office would be able to provide the covered storage immediately needed.⁶ The Office of the Chief Quartermaster reported on 15 September that the class I items were stocked in eight general depots and five quartermaster depots.⁷ On 23 April 1943 it was estimated that 17,700,000 square feet of space would be needed. Storage to the amount of 11,006,000 square feet had been assigned at that time, 3,400,000 square feet of which was then in use.⁸

The per man per day estimate of space requirements was adjusted as time went on. The World War I figure of .1235 square feet for class A ration storage had been changed by 17 March 1943 to .06812 square feet⁹ and by 1 November 1942 to .06425 square feet.¹⁰ Improved methods of packaging food and the higher caloric content of food account for the decrease of storage space requirements.

On 31 January 1944 an inventory of subsistence showed that 59,537,000 rations, exclusive of A rations for current consumption, were stored in the United Kingdom. By D-day the amount of subsistence stored in the United Kingdom had more than doubled.¹¹ The stock piles of subsistence that sustained troops in the United Kingdom and during the successful drive from the Normandy coast to Berlin had been stored in 19 general depots and 11 quartermaster depots, which the British had made available to the Quartermaster Service.

Perishable Subsistence

For the perishable components of the A ration, cold storage and cool storage had to be provided. Two days before Brigadier General Littlejohn reached the United Kingdom, the Quartermaster Section, USAFBI, had con-

ferred with the Ministry of Food regarding the storage of perishables. Because stocks were accumulating rapidly for the use of the British Army, the Ministry feared that empty space would be difficult to find and requested the Americans to hold only a small reserve until the end of October, when space to accommodate approximately 5,000 tons would be available. The Quartermaster Section estimated that storage would ultimately be required for a maximum stock of 25,000 tons. The British were not sure that so large a stock could be accommodated.¹² The September requirements, however, could be reasonably assured if specific notice was given a few weeks before the shipments were expected.¹³

On 19 June 1942, shortly after the establishment of the European Theater of Operations, representatives from the British War Office and SOS, ETOUSA, held an important conference. The British then agreed to furnish cold storage space, which would be under the control of the Ministry of Food. Rooms, however, would be set aside for United States supplies. The British requested an estimate of United States requirements and were told informally that chilled storage would be needed for bacon and ham and for a small amount of cheese and that cold storage would be needed for pork loins, boneless beef, and frozen chickens. In the near future the cold storage adviser to the Office of the Chief Quartermaster would reach London and work out all details.¹⁴

Representatives of the Ministry of Food and the Office of the Chief Quartermaster met at Colwyn Bay on the 29th and 30th of June. At that time the British definitely agreed to make available space for 4,000 tons by 1 October 1942 and space for 20,000 tons by 1 March 1943.¹⁵ A letter from the Ministry of Food to the Office of the Chief Quartermaster confirmed arrangements to accommodate United States cold stores. Space for boneless beef and butter would be made available as follows:

July	2,600,000 pounds
August	5,500,000 pounds
September	9,600,000 pounds

The British gave the comforting assurance that space would increase month by month and that 30,000,000 pounds of boneless beef and 6,000,000 pounds of butter could be accommodated by March 1943.¹⁶

Meanwhile, the Chief of the Subsistence Division had conferred at length with representatives from the British War Office. On

1 July 1942 he wrote optimistically to the Chief Quartermaster. Apparently the British would be able to provide ample facilities for cold stores. They had agreed to make space available for 4,000 tons by 1 October 1942 and for 20,000 tons by 1 April 1943. Yet there was some question as to the possibility of getting locations near the places where United States troops would be billeted.¹⁷ A memorandum from the Chief of the Procurement Division to the General Purchasing Agent described the tonnage that had been promised up to the 1st of March as cold storage space to be held at 14° to 16° F. Though very little cool space had been offered, it was thought that very little would be needed.¹⁸ Within 2 weeks the British increased to 5,500 tons the amount of refrigerated space that would be available by 1 October and promised an increase by March to 17,000 tons instead of 20,000 tons formerly agreed upon.¹⁹

The United States Army, moreover, was to defray no expenses incidental to the handling of cold stores. Because there had been some misunderstanding in Northern Ireland, the Chief of the Subsistence Division at the request of the British War Office wrote USANIF that outstanding bills and charges connected with future transactions would be paid by the British.²⁰

During July 1942 SOS, ETOUSA, and the British War Office were concentrating upon building up stock piles in the United Kingdom preparatory to invasion of the Continent, which at that time was scheduled to take place in 1943. The second edition of the BOLERO Key Plan, which was published on 25 July 1942, increased the number of troops to be based in the United Kingdom from 1,049,000 to 1,147,000 and presented in greater detail plans for supplying troops first in the United Kingdom and later on the Continent.²¹ Immediately the Office of the Chief Quartermaster formulated an operational plan for handling perishables. The British had made definite cold storage commitments as follows:

1 October 1942	5,500 long tons
1 January 1943	11,000 long tons
1 April 1943	17,000 long tons

The Ministry of Food was requested to increase the tonnage to 11,000 tons by 1 October 1942 and to 17,000 by 1 January 1943.²²

On 4 August 1942 Brigadier General Littlejohn wrote the Ministry of Food that the United States forces would require a definite amount of space immediately and that the space should be increased periodically until

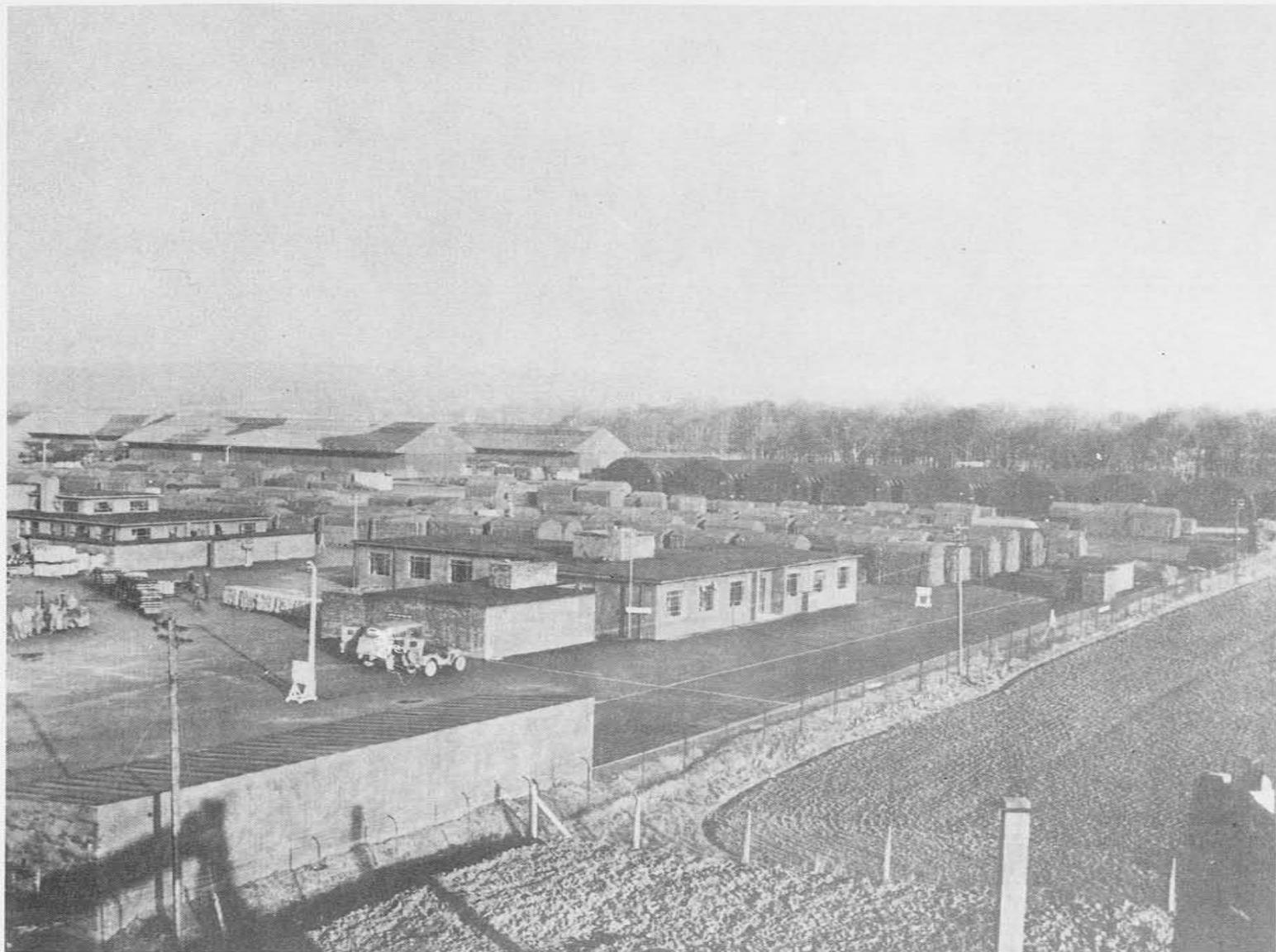


Figure 3.—A Quatermaster Depot in England.

1 April 1943. With the letter he submitted a breakdown of requirements (see app. I).²³

Immediately upon receipt of the cold storage requirements, the Ministry of Food wrote that several areas in England were limited in capacity and made the following request: "It would be appreciated if you could agree to reduce your requirements in these areas and accommodate a percentage of your reserves in the London area." All stocks could be accommodated, though there might be difficulty during peak periods. Accordingly, the Ministry of Food asked that officers be requested to take out of refrigerated storage such items as hams and bacon, which could be kept in ordinary warehouses.²⁴

On 8 August 1942 the Ministry of Food notified the Chief Quartermaster that cold storage space had been definitely set aside for use of the United States Army and enclosed a table giving anticipated requirements from September 1942 to March 1943 (see app. II).²⁵

Procedures for Handling Cold Stores

The Ministry of Food set down on 5 August 1942 the procedure to be followed in the handling of cold stores. The Meat Importers National Defense Associates, Limited, (MIN-DAL), would take charge of all consignments of frozen meat, offal, sausage, and poultry. The Service Agents, an organization of truckers operating under the Transportation Division of the Ministry of Supply, would haul the supplies from docks to storage plants and from storage plants to distributing points. When a shipment arrived, the Service Agents, upon instructions from port and depot commanders, would deliver it to designated cold stores. The Milk Products Division, Ministry of Food, would move United States Army butter and cheese. All United States supplies would be stored separate from British supplies. The temperature of the cold storage rooms would be from 14° to 16° F. The cold storage officers at the ports would make arrangements for the movement of all other supplies shipped in refrigerated tonnage. The Ministry of Food would try to send advanced notices of arrivals. Because advanced notices would not always be possible, the cold storage officers should keep in touch with port commanders. They would be responsible for letting the port food movement officer know whether insulated vehicles or ice would be required and for notifying cold storage plants when shipments would be

delivered. All charges would be rendered to the Ministry of Food.²⁶

The Office of the Chief Quartermaster issued on 17 August 1942 its plan for supervision of United States Army supplies in cold storage. According to the plan, the Ministry of Food would control from ship to storage all perishable supplies sent to England for the United States Army and would control the storage of these perishables in plants in the United Kingdom. The Service Agents would draw perishables from storage on requisition from supply depots and transport them to points from which distribution would be made to United States troops. Each depot commanding officer would keep an accurate record of the movement of perishables into storage plants and of their withdrawal and issue.²⁷

As time went on, procedures were subjected to refinements and further clarifications. The commanding officers of United States Army depots would be accountable for supplies that had been placed in cold stores. The Ministry of Food would assume responsibility for losses and shortages incurred while stocks were being transported to cold stores and while they were being delivered from cold stores to depots. If United States Army transportation was used for delivery, the Ministry of Food would be relieved of all responsibility. Perishable components would be stored and credited to the account of the United States Army and would be withdrawn from the cold store on order of commissioned representatives of United States Army depots. On order of the commanding officer of a depot, the Service Agents would withdraw and deliver supplies. If United States Army transportation was used, the procedure was the same. Accurate stock records were to be kept; daily and weekly reports were to be made; and requisitions were to be sent at least 72 hours before the time that delivery was requested. The Office of the Chief Quartermaster would see that veterinary inspection was provided at the depots. It was recommended that the cold store managers be asked to make arrangements for the withdrawal of supplies at any hour of the day or night.²⁸ The procedure as first set up called for inventories of perishable supplies in cold storage. On 12 September 1942, however, this practice was discontinued.²⁹

Increased Space Requirements

The third edition of the BOLERO Key Plan, which was published on 11 November

1942, 3 days after the United States forces landed in North Africa, sought to assure the build-up of supplies essential to invasion of the Continent. Nevertheless, the necessity for supplying North Africa decreased the emphasis upon BOLERO planning. The Chief Quartermaster continued, however, to provide for the storage of the perishable components of the A ration. As early as 3 September 1942 he had procured storage space for beef and butter as follows: at two plants in Liverpool, two in Bristol, two in London, two in Cheltenham, and one each in Cardiff, Derby, Stratford-on-Avon, Bedford, Newbury, Oxford, and Exeter. These plants would provide storage space by 1 November 1942 for 13,000 pounds of beef and 2,000 pounds of butter and by 1 January 1943 for 17,200 pounds of beef and 2,800 pounds of butter.³⁰ On 12 September 1942 the Chief of the Subsistence Division was able to report that a total of 35 cold storage plants had been made available in the United Kingdom for storing ground beef, steaks, and roasts, stewing and boiling beef, pork, lamb, mutton, hams, and bacon. The additional plants were located at Burton-upon-Trent, Kettering, Ashchurch, London, Thatcham, Taunton, Cheltenham, Bristol, Liverpool, and Barry.³¹ On 13 January 1943 the Office of the Chief Quartermaster submitted to the Ministry of Food the following cold storage requirement for 1943: 138,535 tons, of which 48,340 were to be for the Southern Base Section, 27,020 for the Eastern Base Section, and 63,175 for the Western Base Section.³²

After the Casablanca Conference in January 1943, at which new plans were made for the invasion of the Continent, greater emphasis was placed upon BOLERO. During the spring and early summer of 1943 the Ministry of Food made additional cold storage space available for United States stocks. By 7 July 1943 tentative arrangements had been made for the period ending 1 April 1944.³³

The fourth edition of the BOLERO Key Plan, which was published on 12 July 1943, raised the estimate of ROUNDUP troop strength to 1,340,000.³⁴ Immediately the Subsistence Division, taking stock of available facilities, sent to the Chief of the Progress Division the following breakdown of cold storage space available and in use from March through December 1943. By the end of the year space for 24,860 long tons, or 55,686,400 pounds, would be reserved in the United Kingdom (see app. III).³⁵

The refrigeration plan published by the Subsistence Division on 9 August 1943 re-

flected the thinking that caused the conferees who met at Quebec on 24 August 1943 to suggest a still higher troop strength. The plan provided for the issue of three-fourths pound of perishable subsistence each day to 1,443,000 men and called for cold storage space to the amount of 29,000 tons, or 64,960,000 pounds. The British, however, had allocated space for 35,835 tons, a margin of 6,835 tons. The space was divided among the base sections as follows:

Base Section	Long Tons Storage	Troop Capacity	BOLERO Troop Strength
Western	10,475	521,000	401,000
Southern	14,640	729,000	643,000
Eastern	4,920	245,000	368,000
Central	5,800	289,000	31,000
	35,835	1,784,000	1,443,000 ³⁶

It was on 30 September 1943 that BOLERO planners accepted 1,446,000 as the troop strength figure for ROUNDUP.³⁷ A report from the Chief of the Subsistence Division to the Chief Quartermaster, dated 8 October 1943, showed that the acquisition of cold storage space was well in excess of immediate requirements (see app. IV).³⁸ As BOLERO developed, there were changes in cold storage requirements. The Office of the Chief Quartermaster published on 13 November 1943 its 1944 plan for refrigeration in the United Kingdom. The Ministry of Food had guaranteed through 18 April 1944 cold storage space for 36,084 tons, sufficient to provide 1,500,000 troops. The plan gave the breakdown by base sections from 1 January to 30 April 1944 (see app. V).³⁹ On 4 December 1943 the Chief of the Subsistence Division submitted to the Ministry of Food a report of available cold storage space (see app. VI).⁴⁰

As D-day drew near, minor revisions were made in cold storage estimates. On 17 March 1944, when it was definite that the invasion of the Continent would take place early in June, a new allotment of cold storage space was made to the base sections (see app. VII).⁴¹

Clearly enough, cold storage space sufficient to assure the issue of perishable foods to troops engaged in the Continental operation had been made available in the United Kingdom. The next problem centered about transporting perishables to the Continent and storing them there.

Problems

Although many difficulties arose in connection with the storing of perishables for the vast number of troops stationed in the

REFRIGERATION PLAN
14 SEPTEMBER 1943

SECRET

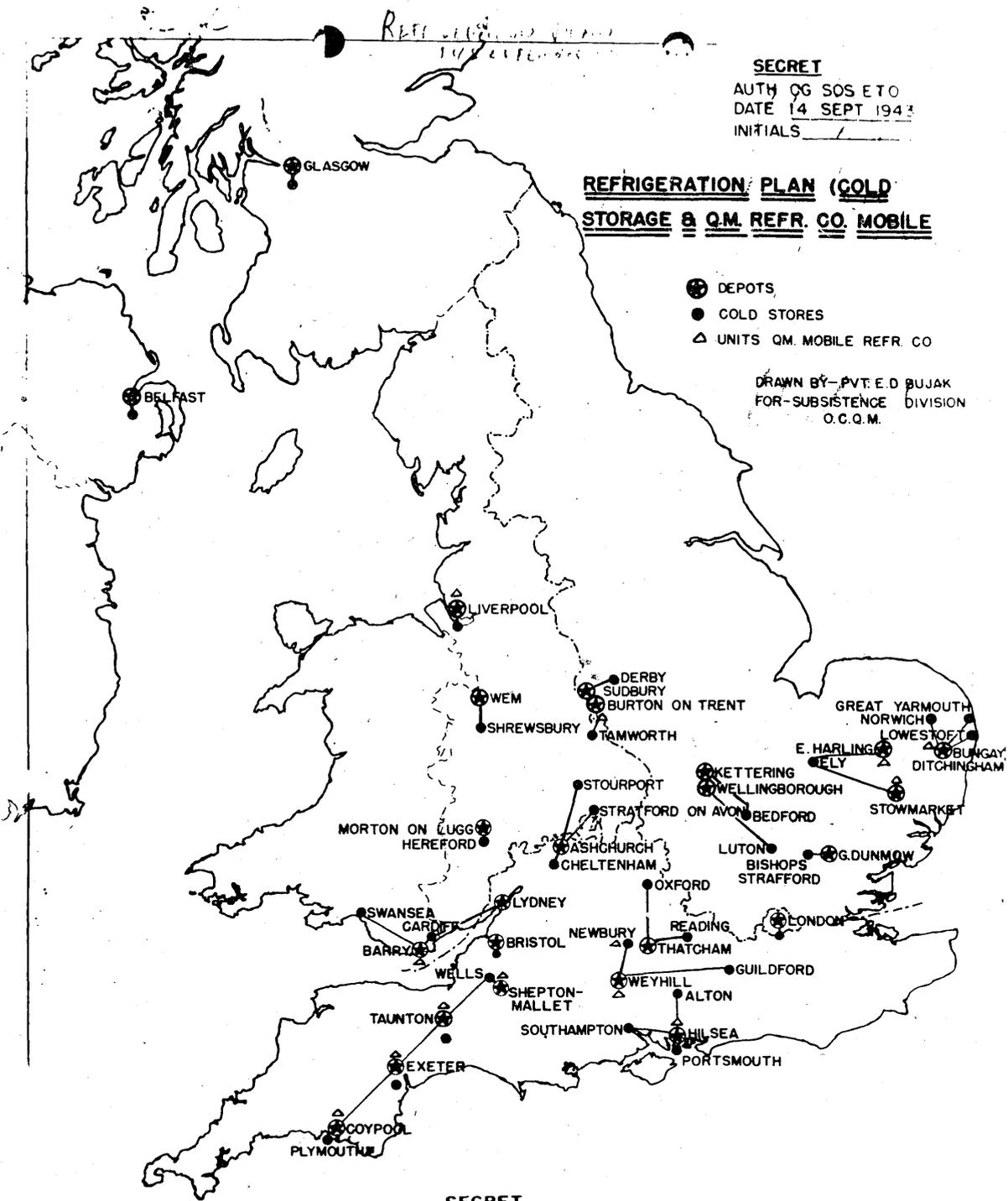
AUTH CG SOS ETO
DATE 14 SEPT 1943

INITIALS _____

REFRIGERATION PLAN (GOLD)
STORAGE & Q.M. REFR. CO. MOBILE

- ⊙ DEPOTS
- GOLD STORES
- △ UNITS QM. MOBILE REFR. CO.

DRAWN BY—PVT. E.D. BUJAK
FOR—SUBSISTENCE DIVISION
O.C.M.



SECRET

REVISED
17 NOVEMBER 1943

Figure 4.—Refrigeration Plan, 14 September 1943.

United Kingdom and with the building of stock piles from which to draw supplies during the Continental operation, all were eventually surmounted.

Investigation showed the condition of cold storage plants not always satisfactory. Sometimes supplies were not arranged so that the oldest could be removed first. Sometimes British and American stocks were stored together and not in separate rooms as had been specified in the initial agreement. Facilities were not always adequate for rapid handling. The arrangement of the supplies now and then was such as to preclude air space. More often refrigerated food was transported from ship to plant in hot cars and kept in transit 6 days or longer.⁴²

In an effort to conform to American standards and procedures the British appointed as liaison officer "a man of high standing who could deal particularly with transport and storage problems. . . and assist generally on any matters which arose and which affected the Ministry of Food." The officer was sent to Cheltenham early in September 1942. Two weeks after his assignment the Ministry of Food requested that he be provided with a separate room where he and his secretary could work comfortably. It seemed wise to have him placed in the block with the Subsistence Division.⁴³

The British and Americans were not always able to understand each other. For example, a difficulty arose that the Americans found both amusing and irritating. While ships were being unloaded, the British crane operators would take half an hour for tea and leave the United States Army stevedores sitting around waiting for them. Such minor problems as this were aired at a conference held on 1 October 1942. It was then decided that the crux of the problem was that the British and Americans scarcely knew each other. Efforts must be made to bring the two groups together. The British crane operators were to have their tea, of course, but relief operators were to be employed so that the work would not be halted. A committee composed of British and American officers planned to be present when the next ship reached Liverpool in order to observe the methods used in unloading.⁴⁴

In some instances the temperatures maintained in the storage plants were not considered to be low enough to keep food in perfect condition. Replying to an inquiry from the Subsistence Division as to what could be done, the Ministry of Food said that with a

few exceptions the cold stores in England were designed for a temperature of 15° F. and that lower temperatures could not be maintained, particularly in warm weather. The British insisted that the temperatures had been determined after consultation with the Department of Scientific and Industrial Research and were considered to be adequate. The meat should remain in good condition up to 8 months, and the butter up to 9 months. In case the United States Army should find that certain shipments had to be held in cold storage longer than the time limit for their good keeping, it was suggested that arrangements be made for the Ministry of Food to take the stocks and issue fresh supplies when required.⁴⁵

Depots reported from time to time that they had difficulty getting perishables moved promptly into cold stores and that information as to the arrival of shipments had not always been given sufficiently in advance. In addition, large shipments had come unannounced on holidays when labor was not available. It was recommended, therefore, that ports report twice a day instead of once and that all shipments sent between noon Friday and Saturday evening be packed with a double quantity of ice. It was further recommended that efforts be made to prevent the arrival of shipments on Saturdays and Sundays.⁴⁶

Nevertheless, the cooperation between the British and the Americans was on the whole harmonious and effective. On 3 May 1944 Major General Littlejohn, after carefully analyzing the reports of overages and shortages, commended the Ministry of Food for the excellent supervision that had been maintained over the United States Army cold store stocks.⁴⁷

STORAGE ON THE CONTINENT

The OVERLORD plan for providing refrigerated storage space on the Continent was published on 10 March 1944.⁴⁸ Earlier plans had been based on the use of quartermaster mobile refrigeration companies for both storage and distribution of perishables.

Static Storage

As early as 12 October 1943 the Chief of the Supply Branch was convinced that the need for static storage would be great. Informing the Chief Quartermaster that no provision had been made for the construction of static refrigeration on the Continent and that mobile refrigeration would provide suf-

ficient capacity for only the early stages, he recommended that the Engineer Service be informed of quartermaster cold storage requirements.⁴⁹ Consequently, the Chief Quartermaster submitted the following requirements:

Day	Long Tons	Cubic Feet
D+ 90	5,940	445,500
D+120	12,555	941,625
D+150	16,785	1,258,875
D+180	20,430	1,532,250
D+210	32,520	2,439,000
D+240	40,200	3,015,000 ⁵⁰

The type of refrigeration desired for this construction was the sectional 20-by-100-foot static unit.⁵¹ In reply on 23 November the Chief Engineer, calling attention to the shortage of engineer construction personnel and the length of time required to erect these static units, suggested that both the sectional and prefabricated types of refrigeration unit be used. Because the installations were in a category for which facilities were not available, any reduction was welcome. The Chief Engineer also recommended that the responsibility of his service "be limited to initial erection of prefabricated units and that moving to and erection at subsequent locations be accomplished by Quartermaster troops."⁵² On 23 November 1943 the Quartermaster Service recommended that 120 units be requisitioned from the United States.⁵³ The Chief Quartermaster did not agree that he should be responsible for moving prefabricated units after the initial construction.⁵⁴

The Chief of Operations, SOS, ETOUSA, was notified on 7 December 1943 that the refrigerated storage requirements through D-plus-240-day had been reduced to 36,204 long tons. Because cold storage space would be made available after D-plus-180-day by the rehabilitation of existing facilities, the Quartermaster Service did not believe it would be necessary to provide for the total requirements by shipping units from the United States. The 20,430-long-ton requirement for D-plus-180-day represented the amount for which shipments should be made. On 27 December 1943 the Chief Engineer stated that 170 prefabricated units would be erected on the Continent by D-plus-240-day. Of the 36 units to be ready by D-plus-90-day, 24 would be used for new construction and 12 for rehabilitation; by D-plus-240-day 113 would be used for new construction and 57 for rehabilitation.⁵⁵

In February 1944 and again in April Brigadier General Frank S. Ross, Chief of Transportation, SOS, ETOUSA, recommended that

the shipment of perishable supplies by ocean-going refrigeration vessels direct to the Continent be instituted early in the operation. The Chief Quartermaster replied at first that adequate storage facilities to accept cargo from ocean-going reefers would not be available before D-plus-90-day and possibly not before D-plus-150-day.⁵⁶ But on 6 April, after discussions with the Office of the Chief Engineer, the Chief Quartermaster replied that direct shipment could begin as early as D-plus-60-day. It seemed more likely, however, that during the first months of the operation the static units would be the principal refrigeration facilities. Because it had been proved during combat in other theaters that perishable foods should be added to the ration as quickly as possible after the assault stages and because it was necessary to prepare for any lack of storage space on the Continent before D-plus-120-day, the Chief Quartermaster requested the Transportation Service to consider the possibility of increasing the amount of coastal tonnage, of making barge shipments from the United Kingdom, and of using refrigerated rail cars, road vans, and barges for supplementary storage.⁵⁷

Responsibilities for the supply of perishables were fixed at a meeting of representatives from OCQM, OCE, and OCOT on 18 April 1944. The issue of perishables on the Continent would begin about D-plus-30-day. At first shipments would be made from the United Kingdom; but as ports and storage facilities were developed, shipments in larger quantities would be made from the United States. The total storage requirement through D-plus-240-day was reestablished at 44,430 long tons, indicating a return to the earlier 1943 estimate rather than a restatement of the reduction that had been reported in December.⁵⁸ These requirements were submitted to G-4 on 25 April, with the recommendation that the Engineer Service modify construction plans accordingly.⁵⁹ The Chief Engineer replied on 12 May that changes in the project could not be made until after D-plus-90-day.⁶⁰

Since it was now evident that deficiencies in cold storage space would exist until D-plus-90-day, the Chief Quartermaster informed the Chief of Transportation on 14 May that increased use of Transportation Service facilities was necessary. On 27 May 1944 the Chief Quartermaster notified G-4 that because the Transportation Service had not provided additional storage space and because the Engineer Service had not been able to meet storage demands, a deficit would exist

at D-plus-90-day. This situation would be remedied by D-plus-240-day, but in the meantime intermediate planning based on new requirements was essential.⁶¹

The quartermaster plan for operations during the first 90 days of invasion had been published on 28 May. On D-plus-30-day, when perishables were first to be issued, 385 long tons of space were to be available at Cherbourg. By D-plus-40-day, 1,070 long tons would be required, and warehouses were to be operating in Cherbourg, Saint-Lo, and Saint-Malo. By D-plus-60-day an additional warehouse was to be established at Rennes, raising the total to 7,950 tons; and by D-plus-90-day, 10,450 long tons of space would be available because of the additional warehouses to be opened at Brest and Laval.⁶² The responsibilities for supply, storage, and distribution of perishables were substantially the same as those established at the 18 April meeting. The Transportation Service would provide transportation of perishables within the Communications Zone to the capacity of the normal rail system. Transportation in the Communications Zone and to army areas in excess of rail capacities would be handled by quartermaster mobile refrigeration companies. The Engineer Service would construct, rehabilitate, and maintain refrigerated warehouses. The Quartermaster Service would receive, store, and issue perishables at refrigerated warehouses and wet ice plants.⁶³ On 13 June 1944, 1 week after D-day, G-4, FECZ, reported that "due to the critical shortage of lift, men, and material in the Engineer Service," requirements for refrigerated space through D-plus-90-day had been reduced to 6,300 tons.⁶⁴

During the Normandy Campaign

During the 60-day period between 15 July and 15 September an attempt was made to change the menu of the troops from the B ration, augmented by a few perishable components, to the pure A ration.

On 20 August 1944 Major General Littlejohn wrote the Commanding General, Communications Zone, that the American soldier required a diet containing fresh meat and other perishables and said that plans were being developed to provide the A ration to 85 percent of the troops in France by 1 November 1944.⁶⁵ On 23 August he expressed the desire to provide 1 pound of fresh meat and dairy products per man per day by February 1945. Based on the projected troop build-up, 24,581 long tons of meat and butter

would be required for 1,380,000 troops on 1 November, and 40,969 long tons would be required for 2,300,000 troops at the end of February 1945. Because more space was required to store perishables than to ship them, the total cold storage space need through 28 February was set as 61,453 long tons. This new estimate was an increase of more than 38 percent over the 44,430-long-ton figure established in April. The monthly breakdown was calculated as follows:

Date	Troop Strength	Meat & But-ter Required	Cold Storage Space Re-quired
30 September	1,150,000	8,086	12,129
31 October	1,380,000	24,581	36,871
30 November	1,610,000	28,678	43,017
31 December	1,840,000	32,775	49,162
31 January	2,070,000	36,872	55,308
28 February	2,300,000	40,969	61,453 ⁶⁶

The Engineer Service had agreed to furnish 35,020 long tons against this revised requirement, leaving a deficit of 26,433 long tons. Monthly construction and rehabilitation commitments compared to requirements showed the following deficits:

Date	Total Reha-bilitation and Construc-tion	Monthly Requirements	Monthly Deficits
September	6,120	12,129	6,009
October	12,580	36,871	24,291
November	17,000	43,071	26,071
December	20,400	49,162	28,762
January	31,450	55,308	23,858
February	35,020	61,453	26,433 ⁶⁷

These deficits were expected to increase if the Germans destroyed French cold storage plants or if new construction continued behind schedule. The Chief Quartermaster estimated that no more than 15,000 to 30,000 tons of properly located space would be rehabilitated from French facilities; but even if the maximum was made available, the deficit still had to be met by new construction.⁶⁸

Pre-invasion plans for the provision of cold storage space on the Continent failed to materialize during the first 90 days of the liberation.⁶⁹ By 23 July, D-plus-47-day, 900 tons had been rehabilitated in Cherbourg, Isigny, and Les Vey.⁷⁰ Aside from 490 tons rehabilitated in Rennes and Angers by 27 August, no other construction had been made. Additional space had been located in Saint-Lo, Cerences, and Le Mans. Although demolition and destruction of the plants had been slight, experience had proved that the lack of power and equipment would delay operations for possibly 30 to 60 days. The Quartermaster Service had been able to meet the August requirements by using as a float-

ing warehouse a 3,000-ton reefer, lent by the British Ministry of War Transport. On 27 August, the only new construction had been the transformation of caves at Cherbourg.⁷¹

The development of these caves as refrigerated storage units grew out of the request early in August 1944 by Colonel John B. Franks, Quartermaster, ADSEC, for 5,050 long tons of space in Cherbourg.⁷² On 11 August this requirement was reduced to 4,000 tons; but since the ultimate requirements at the port would total 8,000 to 10,000 tons, construction was to exceed the amount of the initial request.⁷³ In reply, on 18 August, the Chief Engineer proposed that three caves of a former French naval arsenal, then used as a Signal Corps depot, be converted to provide the required cold storage space.⁷⁴ Following the approval of the project by the Quartermaster Service on 23 August, work proceeded slowly until 9 September. Then, because of the importance of Cherbourg as the cornerstone in the supply of perishables to the advancing armies, the Chief Quartermaster informed G-4 that "construction of refrigerated storage at Cherbourg . . . must be completed by 25 September."⁷⁵

On 23 September, 1 month after the program was begun, the Chief of the Subsistence Division reported that the caves would not be completed until 20 November.⁷⁶ On 20 October the Chief Engineer wrote the Chief Quartermaster:

It is regretted that the project for providing cold storage facilities in certain caves in the Cherbourg area has progressed in such an unsatisfactory manner, even though the work has been given the highest priority. Provision of the refrigeration equipment has been the controlling factor. At the time the project was initiated it appeared from records that sufficient equipment was immediately available but loss of essential items and the general damage suffered during delivery over the beaches resulted in only a portion of the original shipments being available for installation. As a consequence the project has been delayed far beyond our original estimate. . . . Based on present equipment delivery schedules it is estimated that the tunnels will be in operation by the first week in December.⁷⁷

The Chief Quartermaster replied on 20 November that, because of the delay and a foreseeable change in the unloading point for perishables to Le Havre and Antwerp,

two tunnels would be adequate to meet the anticipated needs for Cherbourg.⁷⁸ The caves were completed and put into operation as the armies checked the Belgian Bulge and began the march toward Berlin.

During the Battle for France

After the break-through at Saint-Lo, the battle for Normandy became the battle for France. On 28 August the First Army swung through liberated Paris and by the end of September was regrouping on the banks of the Meuse for the drive to Aachen and the Siegfried Line. The Third Army, which in August swept down to Verdun from Brittany, settled along the Moselle River on the road to Saarbrücken in the industrial area of Germany.⁷⁹

On 23 September the Chief Engineer asked the Chief Quartermaster to let him know how much refrigerated space would be required by 1 February 1945 and how much of this would be required at Metz.⁸⁰ The Quartermaster Service had anticipated this demand, for on 13 September the Deputy Chief Quartermaster had notified the Chief Engineer that 5,000 tons of cold storage would be required at Metz by the end of the month.⁸¹ In reply to the request for the full requirement through January 1945, the Chief of the Subsistence Division stated that he could not accurately determine the amount of space that the Engineer Service would be called upon to provide. The provision of refrigerated space bore a direct relation to the location and movement of troops. The supply of perishables was not determined by the total tonnage available but by the ability to place cold stores where they were most needed. Rehabilitation operations in Normandy had been hampered by German destruction of suitable warehouses in the paths of advance. After the break-through at Saint-Lo and the advance into central France, the rapid movement of the armies had so reduced the enemy's opportunity to destroy locations that the recovery of cold storage space had been satisfactory.⁸²

During the Battle for Germany

Because storage space had been inadequate during the assault period, the goal of providing perishables to 60 percent of the troops in September had not been attained. Consequently, to meet the November target, the Chief Quartermaster called for the provision of the A ration to 70 percent of the troops during October.⁸³



Figure 5.—Cold Storage Plant at Rennes.

On 4 September the Second Canadian Army entered Antwerp, one of the greatest ports in Europe, and on 8 September entered Le Havre. Though it was some time before either port could be put into full operation, the Quartermaster Service requested on 12 October that the Chief Engineer requisition 16,000 long tons of space in the Channel ports.⁵⁴ The Chief Engineer replied on 3 December that this matter had not yet been cleared with the British Twenty-first Army Group controlling the areas and that allotments of space had been made.⁵⁵ On 6 December the Chief of Transportation reported that the British were using the greater portion of available space at Rouen, leaving a balance of 300 to 400 tons against American requirements. No action had been taken to provide space at Brussels, and, because of construction difficulties, the requirement at Antwerp would have to be reduced.⁵⁶ The Chief Quartermaster reported on 12 December that against requirements at the Channel ports, the Quartermaster Service had received only 350 tons at Rouen and 4,150 tons at Antwerp.⁵⁷

Based on the assumption that by 1 January all quartermaster supplies would be discharged through the three major ports of Cherbourg, Le Havre, and Antwerp, a supply and storage plan was published on 1 December 1944 by the Office of the Chief Quartermaster.⁵⁸ Antwerp would be used to supply perishable foods to the First and Ninth Armies through the cold storage plants in Brussels, Namur, and Liege, and to the Fifteenth Army through plants in Luxembourg. Le Havre would be used to supply the Third Army through the cold store at Homecourt and to supply ADSEC, the Channel, Seine, and Oise Base Sections through the cold stores at Metz, Paris, Reims, Rouen, and Charleroi. Cherbourg would supply the Normandy and Brittany Base Sections through the cold stores at Rennes, Redon, Dreux, Le Mans, and Angers.⁵⁹

By 20 January a total cold storage capacity of 23,615 long tons, including the amounts requested along the Channel ports, had been made available.⁶⁰ This left a deficit of more than 37,800 long tons of space. It was only through the increased use of distribution facilities available to the Chief Quartermaster that this lack of construction was overcome.

DISTRIBUTION IN THE UNITED KINGDOM

Immediately after the European Theater of Operations was established, G-4 requested

the Chief Quartermaster to send to ETOUSA a plan of supply. In the broad outline submitted on 17 July 1942, Brigadier General Littlejohn set forth procedures for the distribution of subsistence. In the many months that followed, these underwent few important changes. Though all other supplies were to be issued upon request, rations were to be issued on ration returns, which as far as possible were to be consolidated on a divisional or suitable unit basis.⁶¹

On 31 July 1942 the Office of the Chief Quartermaster issued another tentative supply plan, which dealt in detail with the distribution of subsistence. According to this plan, commanding officers of quartermaster depots and quartermaster supply officers of general depots would consult with the field commanders for the purpose of determining the largest unit to which subsistence might be distributed. Issues to subordinate units would be discouraged but might be made if they were in the interest of efficiency. Except in emergencies unit commanders were to submit consolidated ration returns 48 hours in advance of the time that rations were to be delivered. Proper stock levels were to be maintained in the depots. If American stock was not available, the depot commanders were to obtain British stock. Adequate and prompt issue of subsistence was implicit in the plan.⁶²

The quartermaster supply plan that appeared on 27 July 1943 as Annex A to SOS, ETOUSA, Administrative Order No. 2 incorporated the objectives and procedures set forth in the earlier plan.⁶³ These were restated in the Supply and Evacuating Regulations published by ETOUSA in April 1944. Normally subsistence would be issued three times a week and only in emergencies on Saturdays and Sundays. Base section commanders would inform unit commanders as to the depot from which supplies were to be drawn. Commanding officers of units would confer with quartermaster supply officers of general depots or commanding officers of quartermaster depots and agree upon a plan. Frequency of issue would be based upon the unit's storage facilities, the proximity of a subsistence depot, and the quantities of items on hand in depots. Many units arriving in the United Kingdom would first be issued British-American rations. When they were changed over to the American rations, arrangements were to be made jointly by the commanding officers of British and American base sections. United States base section commanders, however, decided when the units

would be issued the American rations and the depot from which subsistence would be drawn. Depot commanders and supply officers determined the frequency of issue. The basis of issue to troops and to hospitals was the field ration A menu. Distribution procedures are described in volume I, chapter 5.

DISTRIBUTION ON THE CONTINENT

Procedures governing distribution on the Continent, though carefully planned before D-day, were subjected to such changes as were made necessary by unpredictable tactical situations.

Establishment of Procedures

The general supply procedures for the assault period had been set by the Commanding General, European Theater, in May 1944 (see vol. I, ch. 4). Rations were distributed to armies on the basis of a daily telegram submitted by the army quartermaster to an ADSEC regulating station.⁵⁴ The First Army sent its first daily telegram on 10 August 1944, and the Third Army sent its first daily telegram 5 days later. By mid-August the main body of the Communications Zone headquarters arrived in France. Hence, at the end of the month, the Chief Quartermaster found it necessary to establish a clear and definite subsistence supply policy (see app. VIII).

Rations for all troops on the Continent would continue to be supplied on the basis of the daily telegram. This was merely a consolidated strength report prepared by the army quartermaster for army troops and by ADSEC for Communications Zone and other non-army troops. Upon receipt of the daily telegram the regulating station would make arrangements to move the supplies from the depot that had been designated by ADSEC. Rations in accordance with the ADSEC daily telegram would be supplied by base depots on the basis of a 10-day current requirement program. ADSEC was to submit this program three times each month to cover the supplementary needs of army troops and the full requirements for Communications Zone and other personnel. Requirements were to be estimated for all types of subsistence and were to include heat units and ration accessory kits. After the Office of the Chief Quartermaster approved a program, the procedure was identical with that governing the drawing of supplies after the receipt of the daily telegram. In addition, as a precaution against the daily telegram's not being received on

time, each base depot commander was authorized to make an emergency shipment of 1 day's requirements.⁵⁵ Once established, this procedure remained in operation, with a few modifications, throughout the European campaign.

Procedures after Saint-Lo

The rapid advance across France after the Saint-Lo break-through in July resulted in the depletion of operational rations. Consequently, on 7 September 1944 the Chief Quartermaster directed an increased use of B rations. Stating that distribution problems had occurred in the past because quartermasters sometimes shipped large quantities of a single item on the assumption that a later truckload or carload would balance the supply, Major General Littlejohn directed that initial distribution would be made by comparatively small but completely balanced blocks. Similarly, field quartermasters should fill requisitions with small, balanced units. Large requisitions would be broken down into 20 truckloads, approximately 60,000 rations, or into 20 carloads, approximately 100,000 balanced rations.⁵⁶ An illustration of the breakdown necessary to balance shipments appears as appendix IX.

Late in September, at the same time that the last survivors of the ill-fated Arnhem airborne attack were straggling back to Allied lines and a second paratroop landing was striking at Nijmegen Bridge, the Chief Quartermaster announced the first of the modified procedures for the movement of subsistence on the Continent. Keyed to meet the program for providing the A ration to 80 percent of the troops, the new policies indicated separate channels for the supply of armies, ADSEC, and Communications Zone base sections. The daily telegram and the 10-day requirement programs were retained. Although the supply of base sections followed a pattern substantially the same as that of the other two elements, each base section commander was to arrange for his own daily telegram and tonnage allocation through the G-4 of his own command. When G-4, Communications Zone, allocated rail capacity to the Office of the Chief Quartermaster, each base section quartermaster would be notified of the tonnage to be shipped that day. If the space was not sufficient to meet daily requirements, each base section quartermaster would arrange for truck transportation to move supplies from the depot to his command.⁵⁷

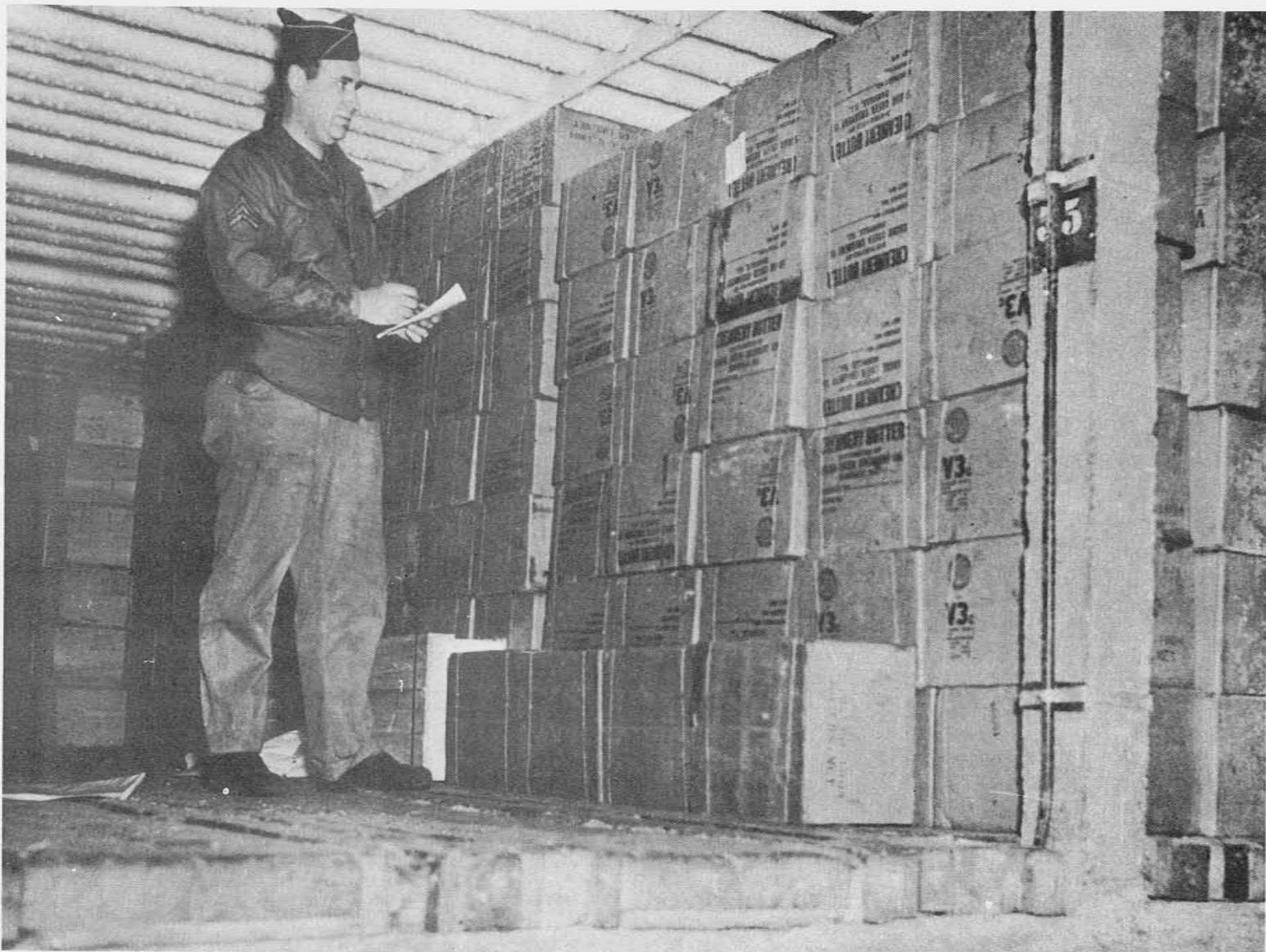


Figure 6.—Fresh Butter in Antwerp Cold Stores.



Figure 7.—Turkeys Arriving at Liege for Christmas Dinner 1944.

Procedures during the Battle for Germany

In mid-November 1944, with the capture of Metz by the Third Army, the fall of Belfort to the French First Army, and the beginnings of the massive offensive on the west bank of the Rhine, steady and uninterrupted supply was essential. The Chief Quartermaster noted that after the daily telegram had been instituted, the armies had requisitioned more subsistence than they actually needed for consumption or reserves. The reason was obvious. During the extremely mobile periods, when the most important commodities had been ammunition and gasoline, daily requests for subsistence had been kept to the minimum. During the more stable periods the requests had been padded so that food might be held for the days when other supplies again would be given precedence. Actually, it was not until the offensive came to a halt on the German frontier that the armies could take accurate stock of what they needed. Then ADSEC, the regulating stations, and the Office of the Chief Quartermaster were flooded with requests for all classes of supply. Transportation had always been an unknown but critical factor, and it became even more so with a supply line stretching halfway across the European Continent. In November, when preparations for crossing the Rhine got under way, the Chief Quartermaster, to expedite supply, decentralize responsibility, and assure equitable distribution of all commodities, established a system of credits for the armies, ADSEC, and base sections (see vol. I, ch. 5).

In practice, the Office of the Chief Quartermaster set up credits against which the armies could draw supplies. These credits were sent to supplying depots each month. They were flexible, however, and could be increased by the depot commander or base section quartermaster on the request of the army quartermasters.⁹⁹

In theory, the armies were given a checking account against the funds of the Office of the Chief Quartermaster. These checks, or credits, for rations were redeemable at the depot from which the army normally drew supplies. Unlike a commercial account, however, the unused portions of the credit were not held over until the next period but were canceled. On the other hand, if the credit was too small to meet the army requirements, the depot commander could make an additional issue. The armies had the option of transporting the rations from depots in their own trucks or of including the request on the daily tele-

gram, in which case it would be distributed by Transportation Service facilities.

This plan proved extremely effective because it gave the Chief Quartermaster control over virtually all subsistence items on the Continent, reduced the amounts of excess shipments made against the daily telegram, and enabled depots to build up adequate reserves.⁹⁹

Expansion of the Daily Telegram

The Chief Quartermaster made the second major modification of the daily telegram on 5 December 1944 immediately after he had published the quartermaster supply and storage plan that made maximum use of Antwerp (see vol. I, ch. 5).

Army quartermasters were instructed to include the following data in addition to the other information usually contained in the daily telegram:

- a. Number of rations desired and percentage of each type.
- b. Number of ration augmentations.
- c. Food required for Red Cross and Civil Affairs.
- d. Strengths being used.
- e. Consignee and exact desired location.
- f. Estimated gross tonnage.

Army quartermasters were also informed that every 10 days the ADSEC quartermaster was to be sent an itemized inventory of army stocks, from which the Office of the Chief Quartermaster would make the monthly credits.¹⁰⁰

On 9 February 1945, in accordance with the new supply procedures, the Chief Quartermaster directed that requests for rations in excess of the actual strength contained in the daily telegram be justified by the army quartermasters.¹⁰¹

The Final Standing Operating Procedure

Standing Operating Procedure No. 7 was published on 19 March 1945. This document provided that all classes of supplies shipped by water would be discharged entirely into base depots near the ports, that supplies required for issue would be moved from base to filler depots, and that thereafter advance depots, which were limited to a 10-day stock, would supply themselves by requisitioning from filler depots the items and quantities required to support the armies.¹⁰² In theory, the entire contents of a commodity-loaded ship would be stored at Antwerp; moved to Charleroi; and then, on requisition, moved

to Liege or Verdun to meet army needs. In practice, the huge tonnage and special characteristics of subsistence shipments forced a compromise with the principles of this procedure. The balancing of rations began in the New York port. If ships had been discharged at ports and cargoes bulk-stored in base depots, port depots would have had to rehandle entire cargoes in order to fill requisitions with balanced rations. For this reason food arriving at Continental ports was moved directly to inland depots. Since rations had to be forced through a limited number of ports at a rate far beyond the receiving, classifying, and reshipping capacities of a normal base depot, port depots merely absorbed portions of quayside backlogs.¹⁰³

That advance depots must requisition rations and subsistence from designated base or filler depots was a principle to which the Chief Quartermaster demanded strict conformity. This system was a radical departure from the long established policy of automatic subsistence supply within a theater of operations. The final modifications of the Continental subsistence supply procedures were made in April and June 1945. On 11 April 1945 the Chief Quartermaster stated that if the supplies to meet the daily telegram were not available at the usual issuing depot, an extract of the unfilled portions of the requisition must be sent to a depot of the next echelon of supply. If the supplies were not available there, the Office of the Chief Quartermaster would direct shipment from one of the base depots within the communications zone. All subsistence from the rear would be commodity-loaded in order that reconsignment might be expedited and shipment might be direct from issuing depot to army area.¹⁰⁴

Instructions published on 15 June provided for the supply of the communications zone within the pattern of existing procedures. Subsistence for noncombat military personnel would be supplied on the basis of ration returns made on dates determined by the base section commander. Subsistence for all nonmilitary groups that were fed by ADSEC and the armies would be included in the daily telegram with a complete justification for each group to be served. The menus developed by the Office of the Chief Quartermaster were to be used as a basis for determining requirements for these groups (see ch. 4).¹⁰⁵

Delivery of Supplies

The distribution of subsistence on the Continent had but one aim—the supply of a balanced ration to the American forces engaged in the liberation of Europe. During the years of preparation and build-up in the United Kingdom a diet had been developed in conformance with American standards of nutrition. The efforts to deliver the proper quantities of the necessary components at the right places and the right times—the battle of the balanced ration—is the story to be traced here.

The distribution of the balanced ration on the Continent actually began on 8 February 1944, when the Theater Commander confirmed the plan for prestowing ships at the New York Port of Embarkation.¹⁰⁶ These ships first anchored off the beaches about D-plus-3-day. Each prestowed ship carried 12 or 13 blocks of supplies. Five to eight of these blocks contained subsistence, and the others were given over to Engineer Corps and Signal Corps supplies. Each of the subsistence blocks weighed approximately 500 long tons and contained enough food for 21,000 men for 10 days. At first these blocks were made up entirely of operational rations, but later they contained gradually increasing quantities of balanced B rations.¹⁰⁷ A breakdown of the two types of blocks appears in appendix X.

About D-plus-40-day commodity-loaded ships began to make their appearance in Continental waters. These vessels also were loaded at the New York port and contained 2,500,000 balanced B rations and 500,000 operational rations each. Because these ships carried only subsistence, the port of entry and the inland destination of their cargoes were subject to the direction of the Chief Quartermaster. Throughout the European campaign the entire ration distribution program was entirely dependent upon these balanced shiploads of rations.

On the Beaches

Ration shipments during the assault period were received behind OMAHA and UTAH beaches at dumps that had been established by engineer special brigades. As the armies pushed ahead, the dumps were moved to a beach maintenance area about 5 miles inland. On D-plus-7-day these beach maintenance dumps passed from control of the Corps of Engineers to the First Army quartermaster.¹⁰⁸ On D-plus-9-day a class I truckhead was opened in the Foret de Cerisy, and on D-

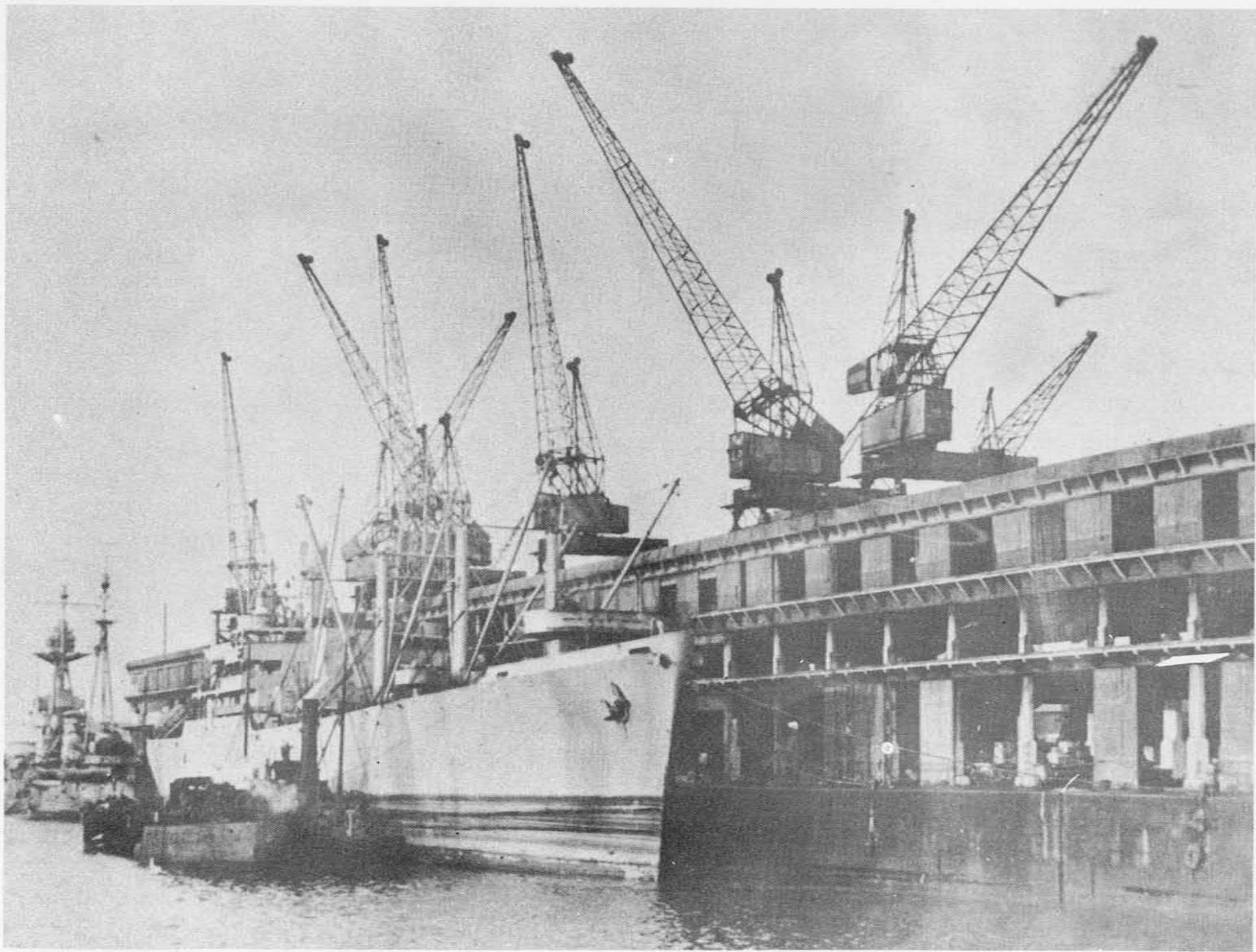


Figure 8.—A Prestowed Ship Arrives at Cherbourg.

plus-11-day another was opened at Isigny. ADSEC representatives arrived on D-plus-15-day to lay plans for assuming control of First Army installations. By 15 July 1944 all ration dumps on UTAH beach were under ADSEC jurisdiction. During the month additional distribution points were opened in the areas that the First Army liberated as it moved toward Saint-Lo. By 20 July ADSEC was issuing more than 675,000 rations daily. During the first week in August 1944 ADSEC took over the OMAHA beach dumps, giving the Communications Zone full responsibility for subsistence supply on the Continent.¹⁰⁹

The B ration was issued to the First Army on D-plus-32-day.¹¹⁰ By 17 July 1944, 9 days later, when ADSEC took over the OMAHA dumps, 4,807,024 B rations had been consumed.¹¹¹ Meanwhile, on 18 July, 10 days after the first issue of B rations, Colonel John B. Franks, Quartermaster of ADSEC, reported that contrary to OVERLORD plans, which had contemplated the issue of the 10-in-1 ration to only 50 percent of the troops through D-plus-30-day, the 10-in-1 ration was actually being fed to 85 percent of the troops when the issue of B rations began. Because requisitions on the New York port had been based upon the 5 percent estimate, a shortage of the 10-in-1 rations developed. To offset this shortage it was necessary to increase the issue of the B ration to 75 percent of the troops until 3 August 1944. To put this program into effect Colonel Franks stated that during the next 15 days all incoming rations would flow into the principal storage areas adjacent to the beaches and to the ports of Cherbourg and Isigny. Then, on ration returns submitted by the armies 2 days before the supplies were drawn, they would be shipped inland to 12 distribution points or truckheads.¹¹²

During the Fluid Period

Experiences in the South Pacific and North African theaters had proved two things decisively: that operational rations were satisfactory for only brief periods of time, and that combat troops needed a balanced ration.¹¹³ Consequently, early in September 1944 the Chief Quartermaster directed field quartermasters to break down supplies for subsistence requisitions into "bricks" of balanced items.¹¹⁴ This policy applied to every movement of subsistence on or to the Continent. The Chief Quartermaster was determined that the balancing of the ration would continue from the moment supplies were landed at the port. On 15 September 1944

the quartermaster of the United Kingdom Base Section pointed out that each day 80,000 balanced B rations were being shipped to Brittany. "Rations for the first day's menu had been shipped on the first day," he said. "Another 80,000 rations for the second day's menu had been shipped on the second day, and so forth."¹¹⁵

In spite of all planning, the problem of keeping balanced rations behind armies thrusting ahead at the rate of 50 miles a day was getting out of hand. Ships loaded with unbalanced rations were coming from the United States more frequently. This meant that canned vegetables were going to one port, and fruit and flour to another. The only solution to this problem appeared to be interdepot shipments, which were virtually impossible because of the critical transportation problem. Hence, on 29 September 1944 the Chief of the Subsistence Division informed the Chief Quartermaster that he needed a concentration point far forward in which unbalanced items shipped from the rear could be married.¹¹⁶

In less than a month two concentration points were operating east of the Seine River. On 2 October 1944 the Deputy Chief Quartermaster reported that G-4 had approved the use of the Paris depot for this purpose.¹¹⁷ On 12 October he announced that another such depot would be established at Sommesous.¹¹⁸ The Deputy Chief Quartermaster concluded the memorandum to the quartermaster of the Brittany Base Section by stating that the practice of transporting the entire contents of one ship to a single depot would continue. As further insurance of proper balancing, four commodity-loaded trains would run daily between the two depots and Morlaix, the Brittany port. This was in addition to the 400-ton daily train already running between Paris and the Normandy ports.

During the Static Period

By the end of October the entire supply picture had changed. The First and Third Armies had been consolidated into the Twelfth Army Group. The armies were now fighting along the frontiers of Germany, far to the east of the ports of entry and the well developed supply depots. The Canadians of Field Marshal Sir Bernard Law Montgomery's Twenty-first Army Group were closing in on Antwerp in order to secure for the Allies docking, unloading, and storage facilities. A general offensive was mounting all

along the front aimed at breaking through the Siegfried Line and carrying Allied forces to the banks of the Rhine. In order to have stock piles in position for this drive and for the coming assault on the Rhine, in order to exploit to the fullest the advantage of holding Antwerp, the Chief Quartermaster began the establishment of two vast intermediate depots at Liege and Verdun.

On 30 October the Office of the Chief Quartermaster published the first consolidated quartermaster supply and storage plan. The normal flow of all nonperishable subsistence would be as follows:

Port	Depot	Destination
Brittany ports	Verdun	ADSEC Third Army
	Brittany depots	Brittany Base Section
		Loire Section
Normandy ports	Liege	ADSEC First Army Ninth Army
	Verdun	ADSEC Third Army
		Cherbourg
	Paris	Seine Section Oise Section
	Le Havre	Liege
Antwerp	Liege	ADSEC First Army Ninth Army
	Verdun	ADSEC Third Army ¹¹⁹

On 1 November 1944 the movement of the daily trains from Brittany and Normandy to Paris was abandoned. The Chief Quartermaster directed that the six trains run directly to Verdun.¹²⁰ The Chief Quartermaster notified G-4 on 6 November that, if the armies were to be supplied from Liege and Verdun by the end of the month, the depots would have to be stocked immediately.¹²¹

On 15 November 1944 G-4 discontinued the allocation of trains to carry the subsistence requested in the daily telegram. Instead, the Quartermaster Service had been allocated 10 priority-1 trains to make the daily run from Normandy. The Chief Quartermaster directed the quartermaster of the Normandy Base Section to use 6 or 7 of these trains for bulk shipments of commodity-loaded rations from Cherbourg to Liege and Verdun. The other 3 or 4 were to move from OMAHA and UTAH beaches. One of the trains from the beaches was to supply the Seine and Oise Sections; the others were to be used by the

intermediate depots for the supply of the armies.¹²²

The Chief of the Subsistence Division reported that by 15 November 1944, 2,066,198 rations were being issued daily.¹²³ By 23 November, less than a week before Liege and Verdun began issuing, approximately 7,500,000 balanced B rations were on hand in the two depots.¹²⁴

During the Battle for Germany

Coincident with the beginning of supply operations from Liege and Verdun, the Chief Quartermaster published on 1 December 1944 the second of the supply and storage plans. The general flow of nonperishable food was to follow the basic pattern outlined in the October plan. From Cherbourg the rations would be moved to the Normandy and Brittany Base Sections for consumption there; from Le Havre they would move to the Channel Base Section and Paris for consumption in the Channel Base Section and the Oise and Seine Sections and to Liege and Verdun, where they would be joined by shipments from Antwerp, for consumption by the armies and ADSEC.¹²⁵ This flow of supplies represented the first stage of "supply in depth," a system that the Chief Quartermaster perfected by January 1945. Based upon its principles, the quartermaster supply and storage plan of 20 January 1945 was published. The main purpose of this plan was to give each base section a subsistence reserve for its troop strength equal to the total theater level of 45 days. The ultimate location of the theater reserve was to be as follows:

Antwerp	1 percent	Paris	4 percent
Liege	14 percent	Le Havre	4 percent
Charleroi	20 percent	Rennes	5 percent
Verdun	13 percent	Cherbourg	5 percent
Reims	9 percent	En route	
Unloading and on wheels		to theater	5 percent ¹²⁶
	20 percent		

From the port of Cherbourg nonperishable items would flow to the depots at Cherbourg and Rennes to supply the Normandy and Brittany Base Sections. From Le Havre they would be moved to the depots at Rouen, Reims, and Paris to supply the Channel Base Section and the Seine and Oise Sections. From Antwerp they would flow to Reims, Charleroi, Verdun, and Liege for support of the Channel Base Section and the Oise Section, ADSEC, and the armies. The Paris depot, in addition to its mission of supplying the Seine Section, would hold a portion of the Verdun reserve and make shipments to the



Figure 9.—Antwerp, the Allies' Greatest Port of Entry onto the Continent.

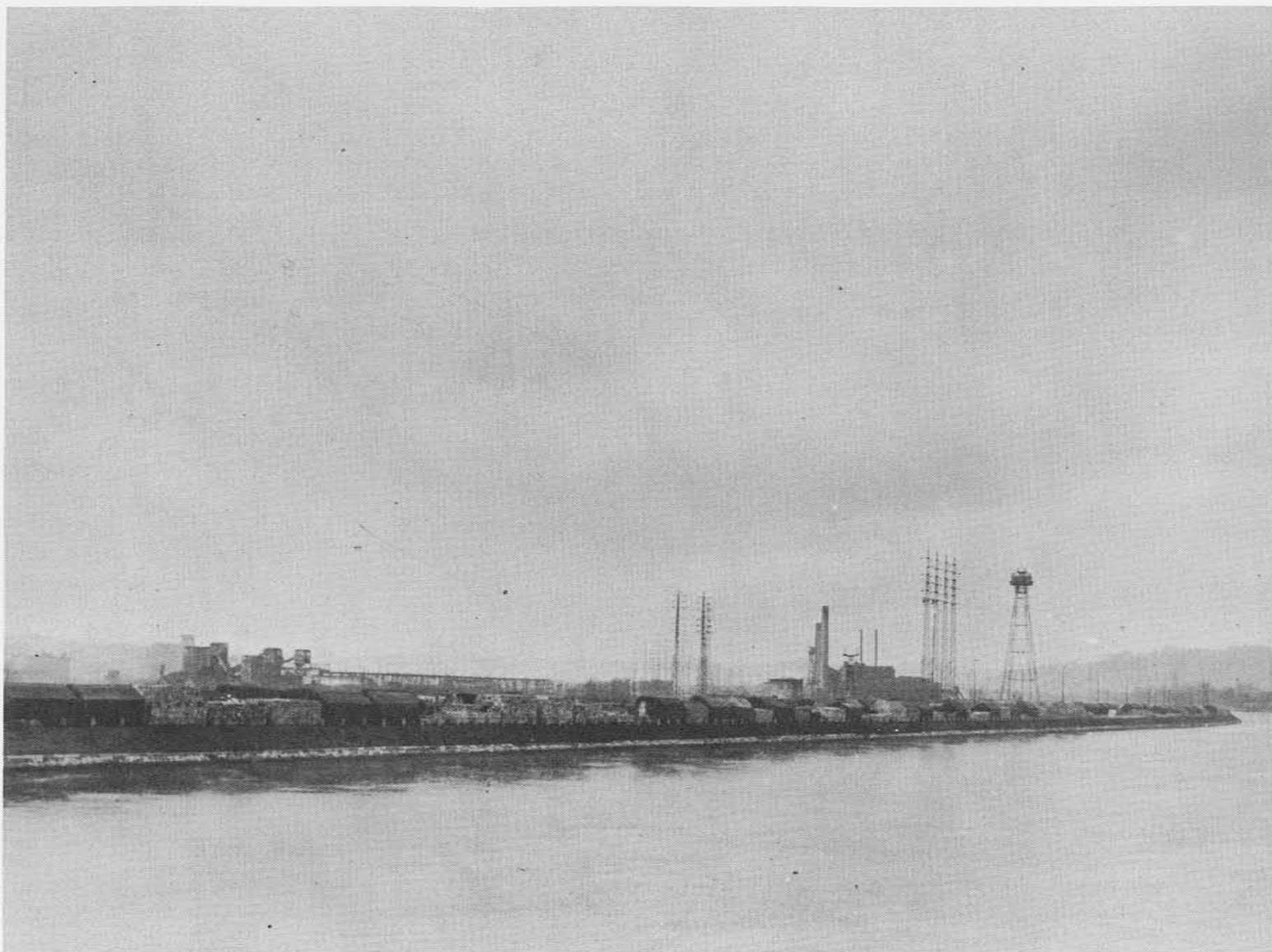


Figure 10.—Rations Line the Banks of the Meuse River at Liege.



Figure 11.—The Heart of the Liege Depot.



Figure 12.—Rations for the Armies Unloaded at Verdun.

Third Army. Charleroi, in addition to its mission of supplying the Channel Base Section, would hold a portion of the Liege reserve and make shipment to the First, Ninth, and Fifteenth Armies.¹²⁷

The new plan of distribution and the full use of Antwerp, which began late in December, brought about an increase in the amount of subsistence landed on the Continent. A comparison of two 10-day periods shows that 41,385 long tons were discharged between 22 and 31 December 1944 and 74,314 long tons between 1 and 10 January 1945, an increase of 32,929 long tons.¹²⁸

In the off-loading and inland movement plans, which the Chief Quartermaster formulated on 28 December 1944, it was estimated that the following long tons of subsistence would be available at ports during January:

Port	To Be		Total
	Discharged	On Hand	
Cherbourg	48,000	32,000	80,000
Le Havre	30,000	17,000	47,000
Rouen-Ghent	36,000	4,000	40,000
Antwerp	150,000	50,000	200,000
	264,000	103,000	367,000 ¹²⁹

To carry out this program, the Chief Quartermaster recommended that 11,300 long tons of subsistence be moved daily from all ports.¹³⁰ On 31 January 1945 the Chief of the Storage and Distribution Division gave an indication of how closely this plan was carried out: subsistence discharged on the Continent during the month totaled 263,538 tons. At the beginning of February 1945, as the armies liberated Colmar, entered Germany through Luxembourg, and raced toward the Rhine, the Office of the Chief Quartermaster reported that there were 36 Liberty ships from the United States in Continental waters containing 216,000 long tons of subsistence.¹³¹ On 22 February 1945, while the Allied offensive was mounting against Cologne and Dusseldorf, the Chief Quartermaster submitted to G-4 the following ration status:

Balanced A rations on hand	34,340,000
Balanced B rations on hand	2,610,000
Balanced C rations on hand	6,430,006
Balanced K rations on hand	8,247,383
Balanced 10-in-1 rations on hand	24,299,740
Total	75,927,129 ¹³²

On 10 March 1945, just 3 days after the First Army captured the Remagen Bridge, 86,284,000 rations were on hand.¹³³

Perishable Subsistence

Although the first subsistence plan for Continental operations, formulated by the Chief Quartermaster on 12 October 1943, provided for the initial shipment of perishable items to France on D-plus-45-day, the Deputy Chief Quartermaster informed the Chief of Transportation on 25 January 1944 that plans had been altered to begin shipment about D-plus-30-day.¹³⁴ For the next 5 months planning for the movement of perishable subsistence to the Continent was overshadowed by planning for the storage of this subsistence when it arrived in France. It was clear in May 1944 that a shortage in cold storage space would exist at D-plus-90-day because of the Engineer Service's inability to meet demands. Major General Littlejohn asked to what extent the distribution facilities of the Transportation Service could be used to offset this shortage and how many reefer ships would be available during each 30-day period.¹³⁵ The Chief of Transportation replied that he could give additional help in distributing perishables on the Continent but could do nothing to assist in their storage. The War Department, he said, had agreed to send one reefer of 1,900-long-ton capacity by D-plus-30-day and one of 800-long-ton capacity by D-plus-40-day, both of which would dock in United Kingdom ports. To tranship both British and American supplies to the Continent the British had allotted three coasters each of 500-ton capacity. Half of their tonnage, 750 long tons, would be given to the Quartermaster Service.¹³⁶ On 30 May 1944, a week before D-day, coaster reefer tonnage available was barely enough to meet D-plus-90-day requirements. The Deputy Chief Quartermaster, therefore, recommended that an additional 10,000 to 15,000 tons of perishable items be requisitioned for shipment direct from the United States.¹³⁷

The Chief Quartermaster informed the Quartermaster of the Forward Echelon, Communications Zone, on 13 June 1944 that the supply of perishables to the Continent during the first 60-day period (D-plus-30-day to D-plus-90-day) would be accomplished in two periods: the first from 6 July to 5 August; the second from 6 August to 4 September. For 40 percent of the total troops to be served perishable items, requirements for the first of these 30-day periods were 5,184 long tons. The supplies would be delivered regularly in small lots. For movement from the United Kingdom, the Transportation Service had arranged for two of the British coastal reefers to increase their

deliveries to 1,000 long tons per week. These two ships, with the addition of a newly acquired vessel of 1,800 tons capable of making two trips a month, would be sufficient to move the first 30-day requirements. For 50 percent of the troops to be served perishable items, requirements for the second 30-day period were 13,500 long tons. Supplies during this period would be carried by commodity-loaded reefers from the United States, discharged preferably on the Continent. In any event, two reefers, one of 4,150 ship tons and another of 8,750 ship tons, would be available in European waters. Thus, although the total requirements for the entire 60-day period were 18,693 long tons, the Quartermaster Service planned to deliver 25,452 long tons from both the United Kingdom and the United States by D-plus-90-day.¹³⁸

The plans for OVERLORD had provided that the number of troops receiving the perishable ration would rise from 40 percent on D-plus-30-day to 100 percent on D-plus-240-day. The periods of increases were estimated as follows:

Period	Percentage of Troops
D-plus- 30 to D-plus- 60	40
D-plus- 61 to D-plus- 90	50
D-plus- 91 to D-plus-120	60
D-plus-121 to D-plus-150	70
D-plus-151 to D-plus-180	85
D-plus-181 to D-plus-210	90
D-plus-211 to D-plus-240	100 ¹³⁹

In August 1944 it was estimated that this program would require the following shipments of perishable subsistence from the United States to the Continent:

Month	Long Tons
August	5,500
September	11,600
October	17,517
November	36,083
December	28,900
January	29,900
February	28,500 ¹⁴⁰

The B ration was first issued on D-plus-32-day. A week later the Chief Quartermaster announced the plan for changing the diet of the troops from the B to the A ration. This plan was never put into full operation, for 10 days later the First Army broke through at Saint-Lo and began its drive across France to the German frontier. Large quantities of bulky supplies could not be advanced rapidly enough to keep pace with the Army's advance. Throughout the campaign, until the

front became relatively stabilized again at the German border, the troops had to be fed almost entirely on operational rations. Thus the goal of furnishing the A ration to 40 percent of the troops by D-plus-60-day was not realized.

Shipment of Perishables

The Chief Quartermaster re-emphasized his conviction that shipments had to be direct to the Continent if the program was to be successful. This question had been a point of issue with the War Department since the early months of 1944. On 10 February 1944 the Chief of Transportation asked the Chief Quartermaster when he thought direct shipments could begin.¹⁴¹ The Chief Quartermaster replied on 29 February that, because of the apparent lack of sufficient cold storage space, direct shipments would not be possible before D-plus-90-day or, perhaps, even D-plus-150-day.¹⁴² Several days later the Chief of Transportation pointed out that it would not be possible to tranship more than 150 tons of perishable items a day from the United Kingdom and recommended that the Chief Quartermaster initiate action to get direct shipment to the Continent as soon as possible.¹⁴³ After consultation with the Chief Engineer, the Acting Chief Quartermaster replied on 6 April 1944 that direct shipment could begin about D-plus-60-day.¹⁴⁴ Throughout the next 6 months the War Department and the New York port continued to oppose direct shipments to the Continent because the shortage of refrigerated storage and handling facilities on the Continent necessitated holding supplies aboard ships instead of discharging them at once. The prompt turnaround of fast reefers was of the utmost importance, stated the New York port.¹⁴⁵ On 16 August the Chief of the Subsistence Division, United Kingdom Base, notified the Deputy Chief Quartermaster of the problems caused by adherence to this policy. He wrote as follows:

The NY 82, *Great Republic*, 4,400 tons, has been in United Kingdom waters now about 10 days. Before she arrived we requested her immediate diversion to the Far Shore, for which destination she was originally manifested and scheduled. There is some question in the minds of the Transportation people whether this ship should go to the Far Shore or be discharged here. Upon receipt of the first cable from Washington, that she had been held in United Kingdom waters for five days and must be unloaded im-



Figure 13.—Rations Stocked in a Depot on the West Bank of the Rhine.

mediately, it caused Transportation to freeze her in United Kingdom waters.

In the meantime, we have been trying to keep the Far Shore supplied by three small reefers. We have pointed out previously that these three reefers are not capable of handling the job alone, and as proof of this, there have been no perishable supplies to unload on the Far Shore within the past four days.

Someone should be made to realize that the three coasters cannot do the job alone, and that one ship from the States will have to go to the Far Shore occasionally to fill in the gap, while the three small coasters catch up again.¹⁴⁶

On 30 August 1944, less than a week after the American armies marched through Paris, the Chief Quartermaster again requested that the War Department approve the Continental unloading of reefers.¹⁴⁷ The New York port reported on 25 September that the Chief of Transportation had no objection to the direct discharge of large reefers on the Continent, but that the small ships should continue to unload only in United Kingdom ports.¹⁴⁸ Even with this concurrence, however, it was not until 4 October 1944 that the War Department granted the European Theater authority to discharge large reefers in France.¹⁴⁹

The efforts of the Chief Quartermaster to obtain approval for the use of refrigeration ships as supplementary cold storage space ran side by side with the problem of Continental shipments. The proposal was first made on 18 April 1944 at a conference between representatives of the Office of the Chief Quartermaster and the Office of the Chief of Transportation. Transportation Service officials had not agreed; so the Chief Quartermaster requested on 18 May 1944 that the decision be reconsidered.¹⁵⁰ In reply on 22 May 1944 the Chief of Transportation said again that the use of reefers for floating storage was not feasible.¹⁵¹ On 27 August 1944 the Chief Quartermaster informed Lieutenant General Lee of the cold storage shortages that existed on the Continent. "The sole solution to this problem," Major General Littlejohn stated, "is to ship all except fast reefers to the Continent and retard their turn around for approximately 10 days."¹⁵² Three days later the Chief Quartermaster requested the War Department to authorize Continental shipments. If slow reefers were used for floating storage, he argued, fast reefers could be turned around more rapidly.¹⁵³ The New

York port replied on 13 September that the total amount of monthly shipments from the United States depended upon the prompt discharge and return of all reefer ships from the European Theater.¹⁵⁴ With the possibility of obtaining floating storage closed, the Office of the Chief Quartermaster redoubled its efforts to acquire storage space on the Continent and to speed the discharge of reefers.

Expansion of the Perishable Ration Program

The Chief Quartermaster had intended to provide perishable foods to 60 percent of the troops in France by October 1944. In spite of his efforts, however, September inventories showed that barely half of the 1,350,000 troops had received perishable items. On 8 September 1944, he wrote as follows to the New York port:

The war has not gone according to plan. Operations progressed by D-plus-90 to an extent equal to the original D-plus-330 estimates. Troops have, of necessity, lived almost entirely on operational rations. Shipments of perishables to these troops has been impossible in anything like the quantities planned. Transportation has, of necessity, been diverted temporarily to higher priority cargoes because of the long hauls required to supply the Armies. Original plans for construction and rehabilitation of cold stores have given way to more important operational constructions of roads, bridges, etc. The phasing of construction materials and machinery have not followed the original plans. They are consequently inadequate to support a D-plus-330 situation. Further such construction would have been useless in a swift moving operation as the troops would have moved on from the supply area before the construction was completed.

This office long foresaw these possibilities and discussed on numerous occasions with your office and the Office of the Chief of Transportation, ASF, the necessity for using reefers as floating storage. The effect of not appreciating this necessity and the refusal of the War Department to permit continental discharge of ocean-going reefers has resulted in perishables not being available for unloading when they could and should have been issued.¹⁵⁵

The Chief Quartermaster, therefore, thought it advisable to reduce September

shipments of perishable commodities from the New York port by 25 percent.¹⁵⁰ On 18 September NYPE was instructed to reschedule deliveries as follows:

October	5,000 long tons
November	37,485 long tons
December	36,732 long tons
January	43,972 long tons
February	30,893 long tons ¹⁵⁷

Although these requirements showed a decrease of almost 12,500 long tons for October from the figure established in August, the following comparison between the two estimates showed a general increase in the requirements of supplies to be shipped from the United States:

	August Estimate	September Estimate
August	5,500 long tons	—
September	11,600 long tons	—
October	17,517 long tons	5,000 long tons
November	36,083 long tons	37,485 long tons
December	28,900 long tons	36,732 long tons
January	29,900 long tons	43,972 long tons
February	28,500 long tons	30,893 long tons

The reasons for this increase in shipping requirements are evident from the following comparison between the two estimates of supplies to be consumed:

	August Estimate	September Estimate
August	5,500 long tons	—
September	7,400 long tons	14,645 long tons
October	16,500 long tons	23,233 long tons
November	23,000 long tons	30,745 long tons
December	26,100 long tons	36,732 long tons
January	28,500 long tons	43,972 long tons
February	28,500 long tons	30,693 long tons ¹⁵⁸

Because perishable rations had not been provided to the troops during August and September, the supplies that had been accumulated would be adequate to meet requirements through October. Then, because of the increased troop strengths after November and the planned graduated increase in issues through the remainder of the year, requirements and deliveries exceeded the earlier estimate.

The New York port replied that there was no need to reduce requirements, because it had only 10 reefer ships available for the European Theater. With a 6-week turn-around for fast reefers and a 7-week turn-around for slower ships, 22,000 long tons of perishable items was the maximum that could be shipped each month.¹⁵⁹

In an effort to increase shipments from the United States, the Office of the Chief

Quartermaster outlined a better use of existing facilities.¹⁶⁰ Toward the end of the month the Chief Quartermaster suggested nonrefrigerated shipments of such perishable commodities as oversea ham and bacon. He was informed by NYPE on 1 October that the possibilities had been investigated and that initial shipments in limited quantities would be made during October. The shipment of other perishable items—cervelat and cheese, for example—in nonrefrigerated dry cargo space was being developed to relieve the burden on reefer ship space.¹⁶¹

If the Chief Quartermaster was to meet the schedule for providing the perishable ration to 80 percent of the troops by the end of October, daily off-loadings of 1,000 long tons would be necessary. The details of the requirements for October and November were outlined as follows:

October			Daily Consumption (Long Tons)
	Troop Strength	Percent on A Ration	
Forward Units:			
Armies	885,000	75	311
ADSEC	150,000	90	63
Seine Section	125,000	95	56
Daily Requirement for 12-day level			371
Rear Units:			
Normandy and)			
Brittany Base)			
Sections and)	500,000	95	222
Loire Section)			
Total Daily Consumption			1,023

November			Daily Consumption (Long tons)
	Troop Strength	Percent on A ration	
Forward Units:			
Armies	1,085,000	75	411
ADSEC	150,000	90	73
Seine Section	125,000	95	67
Daily Requirement for 15-day level			250
Rear Units:			
Normandy &)			
Brittany)	300,000	95	157
Base Sections)			
and Loire)			
Section)			
Daily Requirement for 10-day level			47
Total Daily Consumption			1,005 ¹⁶²

The success of this program depended upon changing the general plan of distribution. A daily train carrying 400 tons of perishable food had been set up on the run between Cherbourg and Paris by mid-September.¹⁶³ At Paris the rations were balanced, then shipped forward to the cold store at Namur for the First Army and to the cold store at Homecourt for the Third Army. By October, however, it was evident that the accelerated program would require another 400-ton train to run directly from Cherbourg to the depots at Namur and Homecourt. To put this plan in motion, more than 900 reefer rail cars were needed; 265 were on hand.¹⁶⁴

Reefer Rail Cars

According to the OVERLORD plan of April 1944, 30 American rail reefers would be on the Continent by 25 July 1944.¹⁶⁵ Actually, none were received until mid-August, when 37 were delivered.¹⁶⁶ On 27 August the Chief Quartermaster informed the Commanding General, Communications Zone, that 195 rail reefers would be needed to distribute perishable products on the Continent. These, he said, would be made up of the 37 already on hand, of 153 awaiting shipment in the United Kingdom, and of 5 refrigerated French cars that had been uncovered in liberated territory.¹⁶⁷ Consequently, during the next 2 months the Chief Quartermaster made continued requests to have the 153 cars shipped from the United Kingdom.¹⁶⁸

By 1 September 1944 the American armies had swept through Paris and were driving toward the German frontier. The space for transporting the reefer cars from the United Kingdom could not be used at the expense of ammunition, tanks, oil, and other items of tactical importance. It was obvious, therefore, that the rail reefers could not be shipped until the advance halted and conditions became more nearly stable. When the advance finally did stop at the German border, the need for reefer cars became even more acute. Stocks of operational rations had become so depleted that a change to the A ration was necessary. Perishable food had to be moved rapidly from ports to railheads near the front.

When it became apparent that the American rail cars would not be shipped for an indefinite period, the Office of the Chief Quartermaster began negotiations to procure additional cars from the French. The Quartermaster Service had acquired 25 French rail cars, 5 refrigerated and 20 insulated, as early as 1 August 1944.¹⁶⁹ During the next 2 months as the armies pushed ahead, an addi-

tional 240 were located and unofficially borrowed from the French.¹⁷⁰ The director of the French national railway service had announced on 31 August 1944 that approximately 3,500 refrigerated and insulated cars had been available in France before the war. He estimated that about half had been lost or ruined during the German occupation, but that about 1,500 could be located.¹⁷¹ Hence, on 21 September 1944, when it became necessary to use 840 cars on the Cherbourg run in order to provide the perishable ration to the armies, the earlier estimate of 195 cars was revised and the Chief of the Subsistence Division asked that 900 cars be procured from the French. Of this number, 280 would be on the rails between Cherbourg and Paris, 280 between Cherbourg and Namur and Homecourt, 280 loading at Cherbourg and 60 held in reserve for emergencies.¹⁷² Replying on 26 September, the Chief of the Procurement Division said that the transfer of the 265 cars already taken over had been legalized and that 100 cars would be turned over in a few days. By arrangement with the French Government, representatives of the Office of the Chief Quartermaster were to search all France for the 1,500 cars. If these could be found, 750 would be turned over to the Transportation Service.¹⁷³ In spite of repeated demands from the Chief Quartermaster during the next 2 months, only 509 rail reefers were in operation at the end of 1944.¹⁷⁴

Although the number of cars was never adequate, this shortage was largely overcome by new methods and techniques. Improvements in transportation schedules enabled the Chief Quartermaster to make better use of the reefer cars available to him. More attention to the tie-in of reefer schedules with other timetables and better methods of unloading sped their turn-around. The success of the provision procurement program in France helped also to relieve the overburdened reefers. As more and more fresh fruits and vegetables were obtained close at hand, fewer shipments of these commodities were required from abroad. Finally, an unexpected development nearly saved the day when it was discovered that mobile reefer vans could very nearly fulfill the function of reefer rail cars.

Reefer Vans

The fullest use of mobile reefer vans was made in an attempt to offset the lack of reefer rail cars. Thirty vans were attached to each quartermaster mobile refrigeration company.

Early in the campaign, the Chief Quartermaster had estimated that seven such companies would be adequate.¹⁷⁵ By the beginning of September there were only five on the Continent, three assigned to the Communications Zone, and one to each of the armies. Three more were in England, the last of which was not scheduled to sail until December. On 4 September the Chief of the Subsistence Division requested that they be shipped across immediately.¹⁷⁶ The Chief of the Personnel Division replied that they would arrive by the end of the month.¹⁷⁷

According to original plans, reefer vans were to be used only for short trips to deliver perishable items from cold stores to distribution points because tests under non-combat conditions had indicated that their range of maximum efficiency was no more than 75 miles.¹⁷⁸ These plans were not adhered to, however. Cold storage, which was to have been dispersed, became concentrated in port areas. As a result reefer vans were being pressed into service for long-distance hauls. The Quartermaster of the Third Army reported on 26 August that the vans supplying the Third Army were making a round trip of more than 800 miles between Cherbourg and distribution points near Paris.¹⁷⁹ When continued use of the vans on long hauls proved that they were capable of maintaining long-range operations, it became clear that they were too valuable to waste on short-distance hauls. Therefore, on 18 December the Chief of the Storage and Distribution Division announced that, in order to release all refrigerated vans for distance runs, open, nonrefrigerated trucks would be used on the short-distance runs, such as the Le Havre-Paris and the Antwerp-Namur hauls.¹⁸⁰

The effectiveness of this program to supplement rail transportation with reefer vans was summed up at the end of the year 1944 in a report by the Chief of the Subsistence Division. Following is a comparison of the tonnages carried by van and by rail car:

Month	Mobile Refrigerated Vans	Rail Refrigerated Cars
July	1,400 long tons	0 long tons
August	5,260 long tons	0 long tons
September	7,870 long tons	2,400 long tons
October	5,900 long tons	9,700 long tons
November	6,500 long tons	11,000 long tons
December (through 16th)	6,000 long tons	9,000 long tons
	Total 32,930 long tons	32,100 long tons¹⁸¹

Progress at the End of the Campaign

A report of October operations showed that 15,625 long tons of perishable items had been off-loaded during the month. A total of 29 trains had carried 9,723 long tons to the Paris depot and army railheads.¹⁸² The first of the consolidated quartermaster supply and storage plans provided that the normal flow of all perishable subsistence would be as follows:

Port	Cold Stores	Depot	Destination
Cherbourg		Verdun	ADSEC Third Army
		Paris	Seine Section Oise Section
		Cherbourg	Normandy Base Section Brittany Base Section Loire Section
Le Havre		Verdun	ADSEC Third Army
		Liege	ADSEC First Army Ninth Army
		Paris	Seine Section Oise Section
		Le Havre and Rouen	Channel Base Section
Antwerp		Verdun	ADSEC Third Army
		Liege	ADSEC First Army Ninth Army
		Antwerp and Brussels	Channel Base Section ¹⁸³

When preparations for the massive offensive on the west bank of the Rhine began in mid-November, the Chief Quartermaster directed that the supply of the Third Army from Verdun begin about 25 November and that the supply of the First and Ninth Armies begin from Liege approximately 2 days later.¹⁸⁴ On 1 December 1944, therefore, the general flow of perishable supplies had altered to the following picture:

Port	Cold Stores	Depot	Destination
Cherbourg			Normandy Base Section Brittany Base Section
		Paris	Seine Section Oise Section

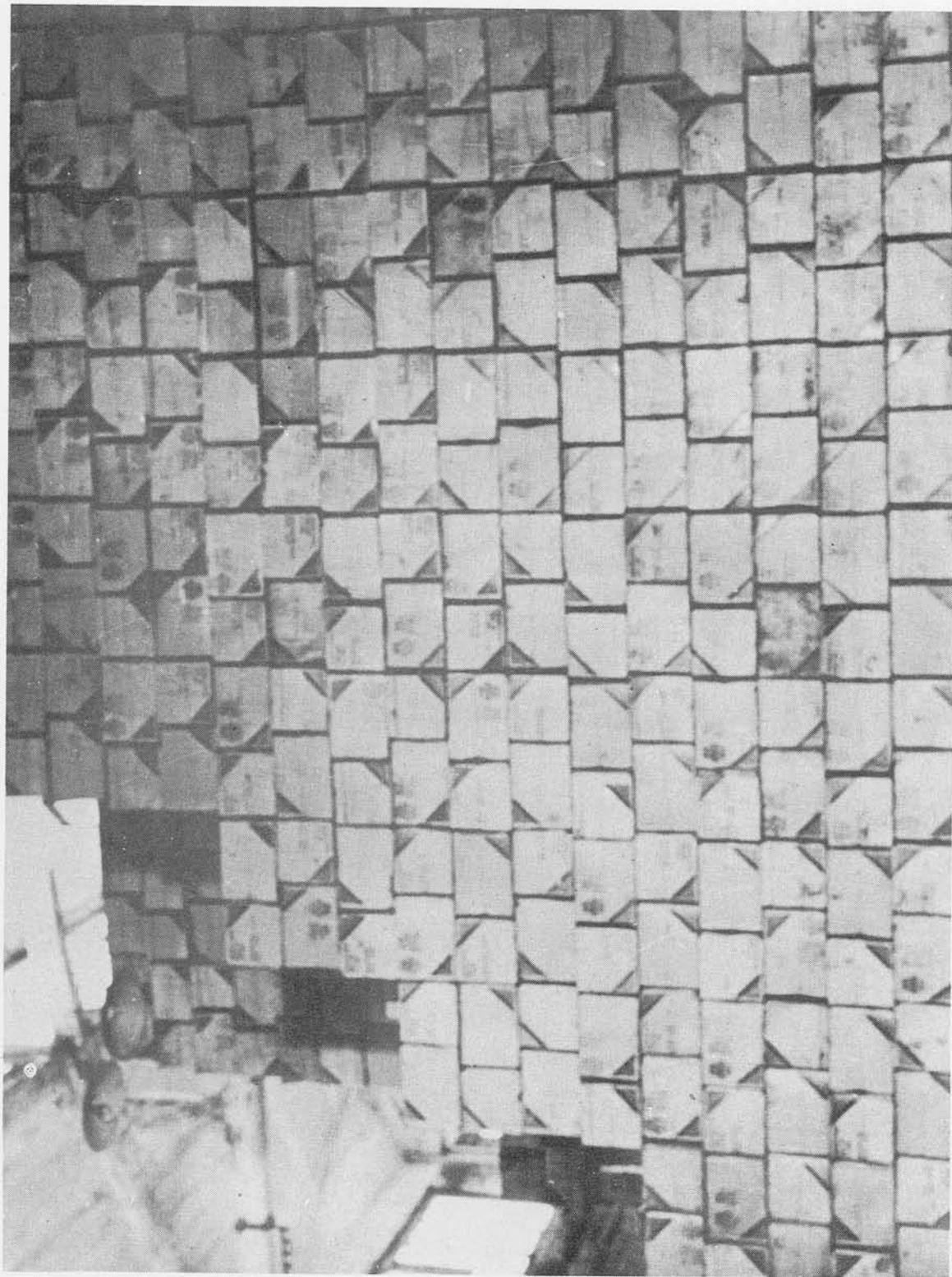


Figure 14.—Food in a Continent Warehouse Reaches from Floor to Ceiling.

Port Cold Stores	Depot	Destination
	Homecourt	ADSEC Third Army Fifteenth Army
Le Havre and Rouen		Channel Base Section
	Paris	Seine Section Oise Section
	Homecourt	ADSEC Third Army Fifteenth Army
Antwerp and Brussels	Liege and Namur	ADSEC First Army Ninth Army ^{15a}

With the introduction of the principle of "supply in depth," the flow of perishables underwent a final revision in January 1945 as follows:

Port Cold Stores	Depot	Destination
Cherbourg		Normandy Base Section
	Le Mans and Dreux	Brittany Base Section
	Rennes and Redon	Brittany Base Section
	Paris	Seine Section Oise Section Fifteenth Army
Le Havre and Rouen		Channel Base Section
	Paris	Seine Section Oise Section Fifteenth Army
	Homecourt	ADSEC Third Army
Antwerp and Brussels		Channel Base Section
	Liege and Namur	ADSEC First Army Ninth Army ^{15a}

On 22 December the Chief of the Subsistence Division informed the Chief Quartermaster of the general perishable subsistence situation. The Office of The Quartermaster General had approved the shipment of ham and bacon in nonrefrigerated space. Thus the burdens on cold storage space, reefer ships, reefer rail cars, and reefer vans were reduced, and the Chief Quartermaster's objective in proposing the policy was attained. Though he had not achieved his goal of issuing perishable rations to all United States

troops in the European Theater of Operations, more than 90 percent were receiving perishable rations by the end of 1944.¹⁵⁷ On 15 May 1945, 1 week after VE-day, 784,317 long tons of all types of subsistence, or 1,756,-870,080 pounds, was on hand in the European Theater.¹⁵⁸ This tonnage represented enough food to maintain the entire theater for approximately 90 days.

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- 45 Letter, MOF to Chief, Subsistence Division, 15 March 1943.
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- 50 Memorandum, DCQM to OCE, 12 October 1943; and *ibid.*, 30 October 1943.
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- 52 Memorandum, Construction and Quartersing Division, OCE, to CQM, 23 November 1943.
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- 55 Memorandum, Construction and Quartersing Division, OCE, to OCQM, 27 December 1943.
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- 57 Memorandum, CQM to COT, 6 April 1944.
- 58 Minutes of Meeting of Representatives OCQM, OCOT, and OCE, 18 April 1944.
- 59 Memorandum, OCQM to OCE, 25 April 1944.
- 60 Memorandum, OCE to G-4, 12 May 1944.
- 61 Memorandum, OCQM to G-4, 27 May 1944.
- 62 The Class I Plan for an Operation on the Continent, OCQM, 28 May 1944.
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- 64 Memorandum, G-4, FECZ, to QM, FECZ, 13 June 1944.
- 65 Letter, CQM to CG, Com Z, 20 August 1944.
- 66 Memorandum, CQM to G-4, Com Z, 23 August 1944.
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- 69 Memorandum, Chief, Perishables Branch, to Chief, Subsistence Division, 14 August 1944.
- 70 Plan for Distribution of Perishable Meats and Dairy Products, QM, ADSEC, 23 July 1944.
- 71 See note 67, *supra*.
- 72 Memorandum, DCQM to OCE, 20 November 1944.
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- 74 Memorandum, Chief, Construction and Quartersing Division, to G-4, 18 August 1944.
- 75 Memorandum, DCQM to G-4, 23 August 1944; and memorandum, OCQM to G-4, 9 Sept. 1944.
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- 80 Memorandum, OCE to G-4, 23 September 1944.
- 81 Memorandum, OCQM to OCE, 13 September 1944.
- 82 Memorandum, Chief, Subsistence Division, to Chief, Military Planning Division, 24 September 1944.
- 83 Letter, CQM to CG, NYPE, 16 September 1944.
- 84 Memorandum, DCQM to OCE, 12 October 1944.
- 85 Memorandum, OCE to DCQM, 3 December 1944.
- 86 Memorandum, OCOT to OCQM, 6 December 1944.
- 87 Memorandum, OCQM to OCOT, 12 December 1944.
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- 90 Memorandum, Chief, Subsistence Division, to CQM, 20 January 1945.
- 91 Memorandum, CQM to G-4, SOS, ETOUSA, 17 June 1942.
- 92 Quartermaster Supply Plan, OCQM, 31 July 1942.
- 93 Administrative Order No. 2, Annex A, Hq, SOS, ETOUSA, 27 July 1943.
- 94 SOP No. 7, ETO, 12 May 1944.
- 95 Circular Letter No. 15, OCQM, 28 August 1944.
- 96 Circular Letter No. 43, OCQM, 7 September 1944.
- 97 Circular Letter No. 57, OCQM, 25 September 1944.
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- 110 *First United States Army Report of Operations, 20 October 1943—1 August 1944, annex 14, (undated), p. 223.*
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- 112 Current Quartermaster Class I Problems and Plans, ADSEC, 18 July 1944.
- 113 Memorandum, Chief, Subsistence Division, to CQM, 5 September 1944; and memorandum, Chief, Subsistence Division, to CQM, 29 September 1944.
- 114 Cablegram, QM, ADSEC, to OCQM, 9 September 1944.
- 115 Memorandum, QM, UK Base, to Chief, Subsistence Division, 15 September 1944.
- 116 Memorandum, Chief, Subsistence Division, to CQM, 29 September 1944.
- 117 Memorandum, DCQM to Chief, Field Service Division, 2 October 1944.
- 118 Memorandum, DCQM to QM, Brittany Base Section, 12 October 1944.
- 119 Overall Quartermaster Supply and Storage Plan, OCQM, 30 October 1944.
- 120 Memorandum, CQM to QM, ADSEC, 1 November 1944.
- 121 Memorandum, CQM to G-4, 6 November 1944.
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- 123 Memorandum, Chief, Subsistence Division, to Chief, Military Planning Division, 25 November 1944.
- 124 Memorandum, Chief, Storage and Distribution Division, to Chief, Subsistence Division, 23 November 1944.
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- 126 Overall Quartermaster Supply and Storage Plan, OCQM, 20 January 1945.
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- 128 Report, Storage and Distribution Division, OCQM, 10 January 1945.
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- 131 Memorandum, Chief, Storage and Distribution Division, to CQM, March 1945.
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- 134 Memorandum, DCQM to COT, 25 January 1944.
- 135 Memorandum, CQM to COT, 14 May 1944.
- 136 Memorandum, COT to CQM, 27 May 1944.
- 137 Memorandum, ADCQM to DCQM, 30 May 1944.
- 138 Memorandum, CQM to QM, FECZ, 13 June 1944.
- 139 The Class I Plan for an Operation on the Continent, OCQM, 27 December 1943.
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- 141 Memorandum, COT to CQM, 10 February 1944.
- 142 Memorandum, CQM to COT, 29 February 1944.
- 143 Memorandum, COT to CQM, (?) March 1944.
- 144 Memorandum, Acting CQM to COT, 6 April 1944.
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- 146 Memorandum, Chief, Subsistence Division, to DCQM, 61 August 1944.
- 147 Cablegram J-13612, Com Z, ETOUSA, to AGWAR, 30 August 1944.
- 148 Letter, Col. Ira K. Evans to CQM, 25 September 1944.
- 149 Cablegram WARX 40945, AGWAR to ETOUSA, 4 October 1944.
- 150 Letter, CQM to COT, 19 May 1944.
- 151 Letter, COT to CQM, 22 May 1944.
- 152 Memorandum, CQM to CG, Com Z, ETOUSA, 27 August 1944.
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- 154 Cablegram SPTAAX-41426, NYPE to ETOUSA, 13 September 1944.
- 155 Letter, CQM to CG, NYPE, 8 September 1944.
- 156 Letter, CQM to NYPE, 3 September 1944.
- 157 Cablegram 47813, Hq, Com Z, to NYPE, 18 September 1944.
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- 170 Memorandum, Chief, Subsistence Division, to Chief, Storage and Distribution Division, 23 September 1944.
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- 172 Memorandum, Chief, Subsistence Division, to Chief, Procurement Division, 21 September 1944.
- 173 Memorandum, Chief, Procurement Division, to Chief, Subsistence Division, 26 September 1944.
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- 177 Memorandum, Chief, Personnel Division, to Chief, Subsistence Division, 5 September 1944.
- 178 See note 167, *supra*.

- 179 Letter, QM, Third Army, to OCQM, 26 August 1944.
- 180 Memorandum, Chief, Storage and Distribution Division, to Chief, Subsistence Division, 18 December 1944.
- 181 Memorandum, Chief, Subsistence Division, to DCQM, 20 December 1944.
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CHAPTER 4

THE ETO RATION

In May 1945, as the American armies were sweeping across Germany in the final stages of the liberation of Europe, the Quartermaster Service in the ETO was providing balanced, nutritious meals, including fresh meat and dairy products, to more than 3,000,000 soldiers. Another 3,000,000 prisoners of war, liberated Allied prisoners of war, French military forces, and similar groups were also being fed by the Quartermaster Service on the basis of carefully developed menus.

This achievement of feeding 6,000,000 people daily over extended supply lines was built on the solid foundation of 3 years of experience, research, and organization in the United Kingdom and on the Continent. A month after Brigadier General Robert M. Littlejohn had established the Office of the Chief Quartermaster, an American ration was being fed to 9,000 troops in England and to the small contingent of American troops in Northern Ireland. From these humble beginnings in the summer of 1942, there was developed the ETO type A field ration, believed to be the best of its kind in the world.

THE BRITISH RATION

The first contingent of American troops to sail for Europe after our declaration of war against Germany consisted of 4,058 officers and men of the 34th Division, who reached Northern Ireland on 26 January, only 18 days after notice of their estimated time of arrival had been received in England. The planned arrival of subsistence in advance of the troops did not materialize. "There was not a single pound of quartermaster supplies of any character in England when the 34th Division arrived."¹ Therefore, this first group was given the regular British ration through the cooperation of the British authorities. On 16 February 1942 a circular was issued by the United States Army Forces in the British Isles (USAFBI) establishing an American ration (see app. XI).² Actual serving of this ration was not possible, however, until sufficient class I supplies had been received, a depot system established, and balanced stocks built up.

THE BRITISH-AMERICAN RATION

Meanwhile, dissatisfaction with the British ration had led to adoption of a British-American ration, the British ration modified to meet the needs and tastes of American soldiers. The main reasons for American dislike of the British ration were its high proportion of starches, tea, and mutton; its low proportion of meat, coffee, and salad; and the lack of variety in fruits and vegetables. On 2 February 1942, as the first step in modification of the British ration, the bread allowance was reduced; and jam, dried fruit, and sugar were made items of issue. A month later the meat ration was changed to one issue of mutton, one of pork, and five issues of beef weekly. Cooking fat was made an item of issue in April; but in May, because of the critical food situation in Britain, fat was eliminated from the ration and the issue of boneless beef was reduced from 10 to 7½ ounces.³ The British-American ration, however, continued to exceed the British ration, since Prime Minister Churchill, then in Washington, cabled the War Office to make available food requested by the Americans.⁴

An early British-American ration provided 13 ounces of meat, 10 ounces of bread, and 1¾ ounces of coffee, with the possibility of substituting additional coffee for the tea ration of 1/7 ounce. The ration also included 16 ounces of potatoes, 8 ounces of fresh vegetables, and 3 ounces of cooking fat.⁵ Through the cooperation of NAAFI fresh vegetables and other items were added to the ration. In July coffee was substituted for cocoa and tea to an increasing extent; 6 ounces of vegetables replaced an equal amount of potatoes; and more desirable types of meat were substituted for offal.⁶ A comparison of British, British-American, and American field rations appears as appendix XII.

To meet the problem of troops engaged in hard labor, a 15-percent increase in the British-American ration was authorized for troops performing hard labor for 10 hours a day, 6 days a week. This particularly affected port battalions and engineer construction battalions.⁷ After troops had been placed on the American ration, this increase was canceled. Fourteen months later supplementary

rations of bread, potatoes, and lard were authorized for troops engaged in hard labor.⁹

PLANS FOR AN AMERICAN RATION

Meanwhile, vigorous efforts were being made to establish a functioning depot system and to build up a high enough level of supply so that once the change to the American ration had been made, there would be no need to fall back on the British. In the early days the British had expected that the United States Army in the United Kingdom would continue to be served from British army depots and that one organization, the Ministry of Food, would handle all food imports, with the Royal Army Service Corps distributing rations to both British and American army units. Although this plan had some advantages, the United States Army felt that it was essential to build up its own depot system and control its own subsistence.

The British Minister of Food opposed this policy and wrote as follows to the Chief Quartermaster: "In early discussion my officials were greatly encouraged by the helpful attitude adopted by the United States Army authorities. Now, however, we are disturbed to learn that the United States authorities intend establishing depots into which their imported foods will be sent. I understand also that they intend to import separately a large number of items in their diet. Meat, bacon, preserves, cheese, sugar, and a number of other items feature in the list and these could in my view be more economically provided out of our own supplies of these commodities. As I understand, the arrangements for separate import and establishment of separate depots are proceeding."¹⁰ Although the question of maintaining a separate depot system was settled soon thereafter in favor of the American position, local procurement of food and separate imports, rather than reliance on British lend-lease imports, were not finally decided upon until mid-September.¹⁰

DEVELOPING THE AMERICAN RATION

With the question of separate procurement of subsistence settled, it was possible to proceed with the change from the British-American to the American ration. The first American ration for United States forces in the United Kingdom, published as Circular No. 8, USAFBI, in February 1942, was revised in May by Circular No. 28.¹¹ The revised ration reduced the issue of potatoes from 10 to 8 ounces, flour from 4 to 3 ounces, bread from

8 to 7 ounces, and sugar from 5 to 4 ounces. Substitutes for the 10 ounces of beef in the ration were also generally decreased: lamb, mutton, veal, pork, and offal from 10 to 7 ounces; canned beef and fish from 8 to 5.6 ounces. There were other corresponding reductions. A comparative analysis of the American and the British-American rations shows the following differences between the nutritive values of the two rations:

	American Ration 1942	ETO Ration in May 1942	British-American Ration
Calories	4,500		4,100
Protein	125 gm.		133 gm.
Calcium	0.83		0.69 gm.
Vitamin A*	5,600 I. U.		7,000 I. U.
Thiamin	no data		no data
Riboflavin	no data		no data
Niacin	no data		no data
Ascorbic Acid	50 mg.		88 mg. ¹²

*Vitamin A, in all references within this chapter, consists of true A with one-half carotene value.

In accordance with the revised ration a menu was issued on 28 July.¹³ Since it was impossible to place all troops in England on the American ration at the same time, it was decided to supply first all troops within a 40-mile radius of the Kettering depot, which had been taken over by the United States forces. The new ration was issued initially at Kettering on 31 July, for consumption on 1 August.¹⁴

Issues of the American ration continued to expand throughout August and September, and by October a concerted drive was started to include the remaining groups of American troops still being fed the British-American ration. The Office of the Chief Quartermaster on 10 October asked the base section quartermasters to report thereafter twice monthly the number of troops on the American ration, the number of troops on the British-American ration (together with the reasons therefor), and the probable dates when the latter would be placed on the American ration.¹⁵

The first report of the important Southern Base Section showed that 49,852 troops were receiving the American ration on 15 October, while 16,717 were still on the British-American ration.¹⁶ Of the group on the British-American ration 14,993 would be placed on the American ration by 1 November, while no date had been set for the remaining 1,724 troops, because they either were too far from depots or were messing with the British. The Western Base Section had 12,840 on the American ration on 15 October and approxi-

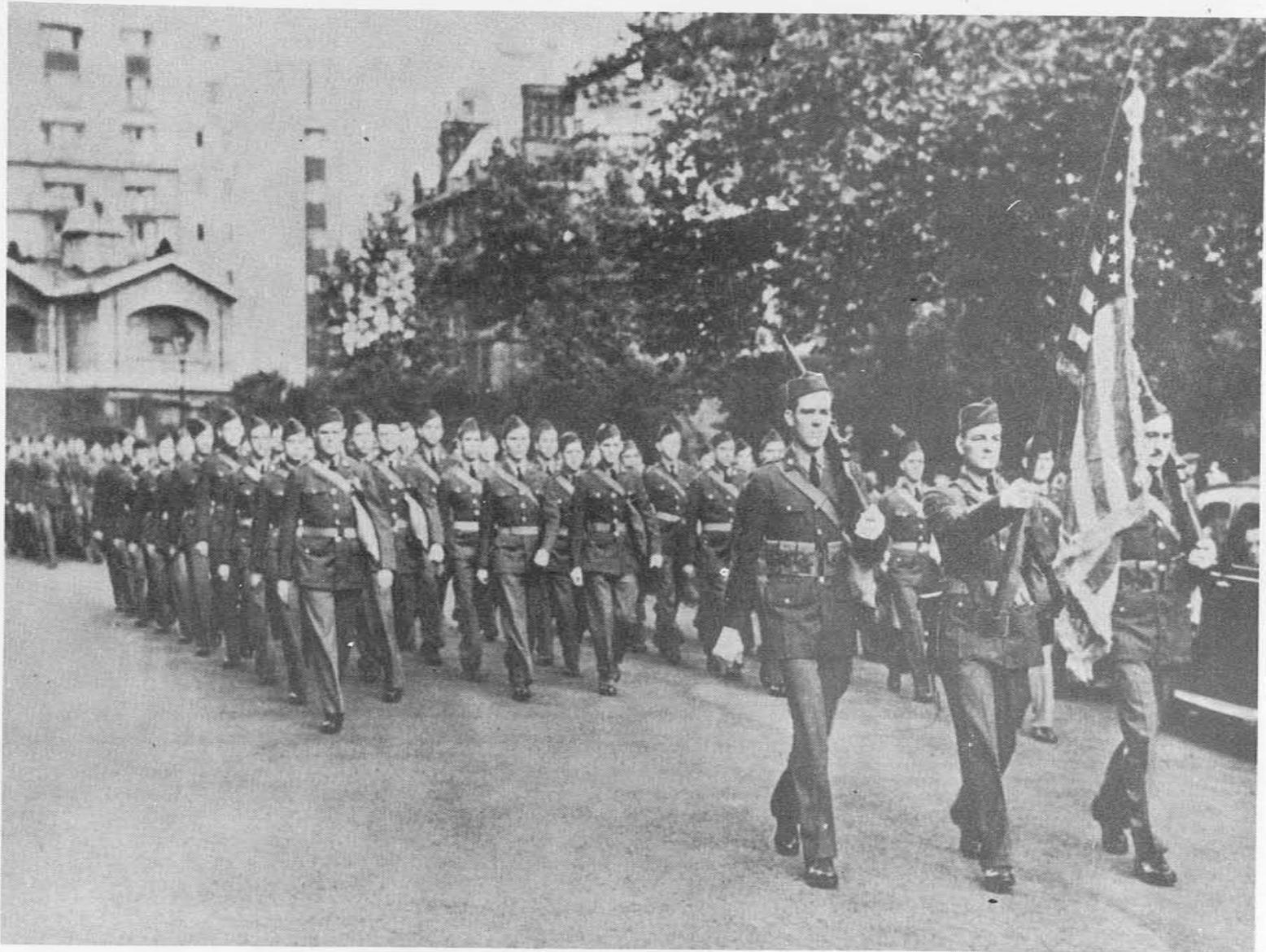


Figure 15.—First Contingent of American Forces Arriving in the United Kingdom, 26 January 1942.

mately 1,794 on the British-American ration.¹⁷ By 30 November, however, a consolidated report for all base sections showed only 633 troops, chiefly special cases, still on the British-American ration.¹⁸

On 15 September 1942 the Chief Surgeon completed the first of a long series of studies of the American ration. This study analyzed the nutritive value of the 28 July menu as follows:

Calories	4,835
Protein	149 gm.
Calcium	0.78 gm.
Vitamin A	8,125 I. U.
Thiamin	3.6 mg. (1.8 after cooking loss)
Riboflavin	2.6 mg.
Niacin	30.0 mg.
Ascorbic Acid	79.0 mg. (40.0 after cooking loss) ¹⁹

The Chief Surgeon reported that the ration was adequate and supplied sufficient quantities of nutriments to maintain the health of the troops. The intake of calcium was on the border line, however, and an increased issue of milk or milk products was recommended to correct this deficiency. It was also suggested that necessary substitutions of certain classes of vegetables be made on a nutritional basis. Other changes were suggested to prevent waste and to increase the palatability and nutritional value of food. Chief among these were an increase in the butter ration from .03 pound to .09 pound per man per day, substitution of fresh for dehydrated cabbage and potatoes, increased use of tomatoes and evaporated milk, and decreased amounts of bread and potatoes per meal.²⁰

These recommendations were concurred in by the Office of the Chief Quartermaster, which stated on 25 September that it had already taken steps to effect some of the changes. An increase in the butter ration to .09 pound per man per day was being arranged, together with a 12-percent increase in the milk ration, and a reduction in the bread ration from .6 pound to .5 pound per man per day.²¹

As experience increased in American messes, it became clear that wastage of food was occurring and that messing standards were not very high. A survey was therefore initiated jointly by the Chief Quartermaster and the Chief Surgeon to inspect American messes and recommend changes. Major Charles G. Herman, the quartermaster representative on the survey, submitted a report to the Chief Quartermaster early in December. He believed that the ration as revised was ade-

quate in nutrition and amount but that the bread component was excessive. Other causes of waste were overissue of rations because of anticipated troop strength, which did not materialize, and overissues to individuals in the messing line. Depots for the most part were not attempting to control overissues by reducing subsequent issues or revealing overages.²²

After completion of the survey in the Eastern Base Section early in December, it was concluded that a clear pattern had been revealed of factors contributing to abuses of rations and ration issues. Work was started on a new ration circular, and a new menu was issued immediately, reducing the issues of bread, bacon, and lamb. As a basis for preventing overissues, plans were also laid at this time for units to report items on hand in their storerooms. This idea later developed into OCQM Form No. 4, a ration return that provided for the reporting of excess stocks.²³ Other steps taken immediately included reprinting and circulating publications dealing with the proper preparation of food, obtaining from the United States the services of an expert in the use and maintenance of the M-1937 field range, reducing the amounts of food clearly shown to be above troop requirements, returning excess stores accumulated by units, and revising the courses in messing at the American School Center to emphasize food conservation and proper operation and maintenance of British equipment.²⁴

A research group of nutritional specialists was also established to inspect and instruct mess personnel in methods of conservation, proper use and care of equipment, and full use of available means to prepare pleasing meals. With the assistance of these specialists, plans were made in January 1943 for the establishment of an enlarged mess advisory service and a subsistence research laboratory (see ch. 8).

REVISING THE AMERICAN RATION

The most important step in the effort to reduce waste was the proposal of a new ration, which was to be so constructed that improper substitutions due to ignorance would be minimized. A comparison of this proposed new ETO ration with the ration previously established by Circular No. 28, USAFBI, shows that the total meat ration was reduced from 15 ounces to 12.15 ounces; bacon from 2 ounces to 1 ounce; and pork from 4 ounces to 2.25 ounces. Bread was also reduced from 7 ounces to 6 ounces. New classes

of food were set up; instead of all fruits or vegetables being placed in one general category, such classes were set up as "Vegetables (leafy, green, and yellow)," which could not be replaced by substitutes from "Other Vegetables" not having the same nutritive or vitamin value. Tomatoes and citrus fruits were also classed together because of their similar vitamin content, though tomatoes are usually considered a vegetable.²⁵

While the Office of the Chief Quartermaster was developing this ETO ration, the Office of The Quartermaster General was developing Expeditionary Force Menu No. 1 for tropical and temperate areas.²⁶ This menu was used in the European Theater of Operations only as a guide. The differences between this ration and the ETO ration that was proposed in January 1943 by the Office of the Chief Quartermaster were apparent rather than real. What seemed to be decreased quantities in the proposed ration merely took into account losses that occurred in the preparation of canned or dehydrated meats, fruits, and vegetables. The proposed ETO ration also had a greater safety factor with regard to thiamin and riboflavin than the OQMG ration. The low ascorbic acid content of the OQMG ration, caused by the use of dehydrated vegetables, was offset by the inclusion of lemon crystals for beverages, but the crystals would be used in the desired quantities only in a hot climate.²⁷ The new ETO ration that the Office of the Chief Quartermaster proposed corrected the nutritive deficiencies of the OQMG ration by including increased amounts of calcium, ascorbic acid, and riboflavin. It also eliminated the excess calories contained in the earlier ETO ration prescribed by Circular No. 28.

The proposed ETO ration, in the form approved by the Theater Commander, was issued as Circular No. 13, to take effect on 1 March 1943. Compulsory submission of the revised OCQM Form No. 4 was also ordered in the circular.²⁸ The new ration represented a great advance in the proper feeding of troops in the European Theater and furnished the basis for the ultimate ETO field ration A.

Immediately after the appearance of Circular No. 13, the first menu under the new ration was issued. Section I of the menu contained a series of ration notes, which explained the availability of the Mess Advisory Service and stressed the importance of reporting excess subsistence stocks on OCQM Form No. 4. Deviation from components and

quantities in the issue charts would be made "only in emergencies and then only by substitution of items by food groups as shown in substitution charts." Particularly emphasized was the use of the lemon crystals in order to maintain the necessary ascorbic acid level.²⁹

The analysis of the nutritional values of this ration is as follows:

Calories	4,046
Protein	no data
Calcium	0.90 gm.
Vitamin A	11,000 I. U.
Thiamin	3.4 mg.
Riboflavin	2.9 mg.
Niacin	no data
Ascorbic Acid	111 mg. ³⁰

A nutritional analysis compared this ration with minimum levels set by the National Research Council, with World War I rations, British, and British-American rations, and former ETO rations (see app. XIII). The analysis showed that the new ETO menu was safely above National Research Council standards for a very active man, with the exception of a 0.2-milligram deficiency in riboflavin not considered to be significant. The quantities of vitamin A, thiamin, and riboflavin were about the same as those of World War I; those of ascorbic acid and calcium were greater. These quantities were also about the same as those in the current United States A ration except for a larger calcium content in the United States ration, chiefly because the United States was able to supply 17.3 ounces of milk products compared to the ETO's 7.5 ounces. The ETO ration contained 4,046 calories compared to 4,217 in the United States ration. As might be expected, the ETO ration rated well above the British Home Service ration and was also more nutritious than the British-American ration.³¹

Brigadier General Littlejohn, in submitting this comparative chart to the Office of The Quartermaster General, pointed out that the approximately 4,000 calories supplied in the ETO ration was less than the number furnished by current menus in the United States and that such margins as might result in eventual wastage had been eliminated. The Chief Quartermaster continued:

The particular advantage of the ETO ration as it has been developed in this theater is that, without compromising the nutritious standards of the National Research Council, it has accomplished the highly important purpose of conserv-



Figure 16.—Feeding Soldiers in the Marshaling Area.

ing production capacity, strategic materials (e.g., tin) and shipping space from the United States by making fullest use of the food reserves of the United Kingdom.³²

Menus were revised periodically to take into account seasonal availability of perishables, stock rotation requirements, and alteration of basic OQMG menus.³³

In August 1943 it was decided that the basic ration established in Circular No. 13 should be revised once again. Principal changes proposed were an increase in the frozen boneless beef ration from 4.9 to 5.9 ounces, a slight increase in sausage, and a reduction in miscellaneous meats, leaving the total meat ration at the 12.15 ounces set in Circular No. 13. The allowance of milk products would be raised from 7.5 to 8 ounces through the addition of whole powdered milk. Bread would be raised from 6 to 8 ounces because of the increasing acceptance of National Wheatmeal flour and the baking of a larger proportion of army bread by the Army's own bakeries.³⁴

These proposals were further revised in the course of discussion during the following 2 months.³⁵ General agreement on a final draft was reached in mid-November, and the new ration was published on 21 November 1943. In the new ration, as finally developed, the major changes proposed in August were retained. The butter ration, however, was held at 1 ounce and other fats at .75 ounce, and bread was raised from 6 to 7.5 ounces. The coffee ration was raised from 1.1 to 1.28 ounces, restoring a previous cut because of the increased availability of coffee. The proposed increase in powdered milk was retained.³⁶

An analysis of the new ETO ration was made by the Office of the Chief Surgeon. The ration was shown to have the following content:

Calories	4,050
Protein	135 gm.
Calcium	1.04 gm.
Vitamin A	9,862 I. U.
Thiamin	3.96 mg.
Riboflavin	2.97 mg.
Niacin	33 mg.
Ascorbic Acid	134 mg. ³⁷

In comparison with the ration contained in Circular No. 13, the new ration showed increases in ascorbic acid, thiamin, riboflavin, and calcium, while total calories remained at

about 4,050. There was a decrease in the vitamin A content of the ration—from 11,000 to 9,862 International Units.

In October and November 1943 the ETO ration was studied by an observer from the United States, Colonel Paul E. Howe, Chief of the Nutrition Branch of the Surgeon General's office. Colonel Howe's final report, as approved by the Chief Surgeon of the European Theater of Operations, expressed general satisfaction with the ETO rationing system:

The general plan of rationing adopted for the ETO is fundamentally sound and superior to any ration in use in other theaters or armies. The hospital ration has proven satisfactory. The plan of the rations assures the issues of an adequate dietary with the least possibility of impairment through substitution of articles by inexperienced or by ill-informed supply personnel.³⁸

THE ETO B RATION

At this time the ETO B ration was also undergoing revision. This ration, not an operational ration though frequently so classified, was composed entirely of nonperishable items but was otherwise similar to the A ration. Intended for situations in which perishable items would not be available, it was not used during the United Kingdom period. Even during the Continental operation, the situation developed in such a manner that most troops either used operational rations or received at least the more important elements of the A ration—fresh meat and dairy products, oranges, fresh white bread, and roasted and ground coffee (see ch. 3).

The OQMG Expeditionary Force Menu No. 1, dated 1 June 1942, furnished the basis for the ETO B ration.³⁹ On 10 September 1942 the Office of the Chief Quartermaster published menus and issue charts for the B ration in the ETO.⁴⁰

An analysis made by the Office of the Chief Surgeon showed this ration to have the following content:

Calories	3,760
Protein	122 gm.
Calcium	0.78 gm.
Vitamin A	13,550 I. U.
Thiamin	1.7 mg.
Riboflavin	2.3 mg.
Niacin	no data
Ascorbic acid	52 mg. ⁴¹

A revised B ration menu, issued in March 1943, was analyzed later in the year by the Office of the Chief Surgeon. The analysis follows:

Calories	3,570
Protein	120 gm.
Calcium	0.90 gm.
Vitamin A	4,370 I. U.
Thiamin	2.2 mg.
Riboflavin	2.2 mg.
Niacin	23 mg.
Ascorbic acid	106 mg. ⁴³

On learning of the low caloric value of the B ration of March 1943, Brigadier General Littlejohn immediately ordered another menu prepared in accordance with theater policy that rations should be kept at the 4,000-calorie level. He pointed out that British tests had shown 3,800 calories to be absolutely essential for field service.⁴³ In accordance with this order, a new B menu was prepared with a caloric value of 3,875, which compared favorably with the 4,000-calorie A menu since there were fewer losses incident to preparation of items on the B menu.⁴⁴

The following analysis was made of the ETO B ration as revised by the Office of The Quartermaster General on 1 October 1943:

Calories	3,875
Protein	128 gm.
Calcium	0.97 gm.
Vitamin A	4,830 I. U.
Thiamin	2.4 mg.
Riboflavin	2.5 mg.
Niacin	24 mg.
Ascorbic acid	109 mg. ⁴⁵

Since OQMG Expeditionary Force Menu No. 1 served as the basis for procuring and requisitioning nonperishable items by overseas theaters, all ETO menus were necessarily limited by its deficiencies. As the Continental operation approached, with less procurement of subsistence expected in the United Kingdom, it became increasingly important to insure the adequacy and palatability of the B ration components. Therefore, Major General Littlejohn proposed a thoroughgoing revision of OQMG Menu No. 1. He pointed out that the meat and vegetable hash and the meat and vegetable stew in the C ration had never been popular. Yet soldiers who had been on C rations for fairly long periods found, on being shifted to B rations, that they were receiving the same unpopular types of meat. This resulted in loss of appetite and hence in nutritional deficiency. In addition, the amount of thiamin provided in

the ration was insufficient to offset cooking losses.⁴⁶

In June 1944 Major General E. B. Gregory, The Quartermaster General, approved changes to the B ration along the suggested lines. Meat and vegetable hash and chili con carne were eliminated, and the meat and vegetable stew was modified to make it less like the C ration stew. The thiamin value of the ration was raised slightly by adding canned ham and pork, but it was denied that there was great loss of thiamin in cooking.⁴⁷

RATIONS IN THE MARSHALING AREAS

During the same period elaborate preparations were being made for feeding troops in the marshaling areas just prior to the invasion. Cooks and bakers, as well as mess officers and mess sergeants, received special training when they were assigned to the marshaling areas. Mess halls were kept spotlessly clean and were subject to frequent inspection by representatives of the Chief Quartermaster and the Chief Surgeon. When troops arrived in the marshaling areas in April, May, and June 1944, a gigantic mess machine was ready to provide every soldier with generous amounts of the best food that could be obtained.

Four different daily menus were served to troops waiting in the marshaling areas (see app. XIV).⁴⁸ Thus the menu served on the first day was not repeated until the fifth day. Every possible factor was taken into consideration in the preparation of these menus. For example, foods were not served if they were hard to digest or might induce seasickness. Whenever possible, those foods that had proved most popular with the armed forces were given preference.

The rationing system in the marshaling areas had to be flexible in order to meet all situations. The Rangers, because of their rugged training and constant exercise, were given double rations. In order to reduce airsickness, gas-forming foods—such as cabbage, brussels sprouts, and beans—were not fed to paratroopers. In one staging camp it was found that most of the men slept through breakfast and ate twice as much at dinner. This camp was given extra rations for dinner. As a result of such careful planning, men who passed through the marshaling areas did not complain about the quantity or quality of food.



Figure 17.—The Last Meal before the Channel Crossing.

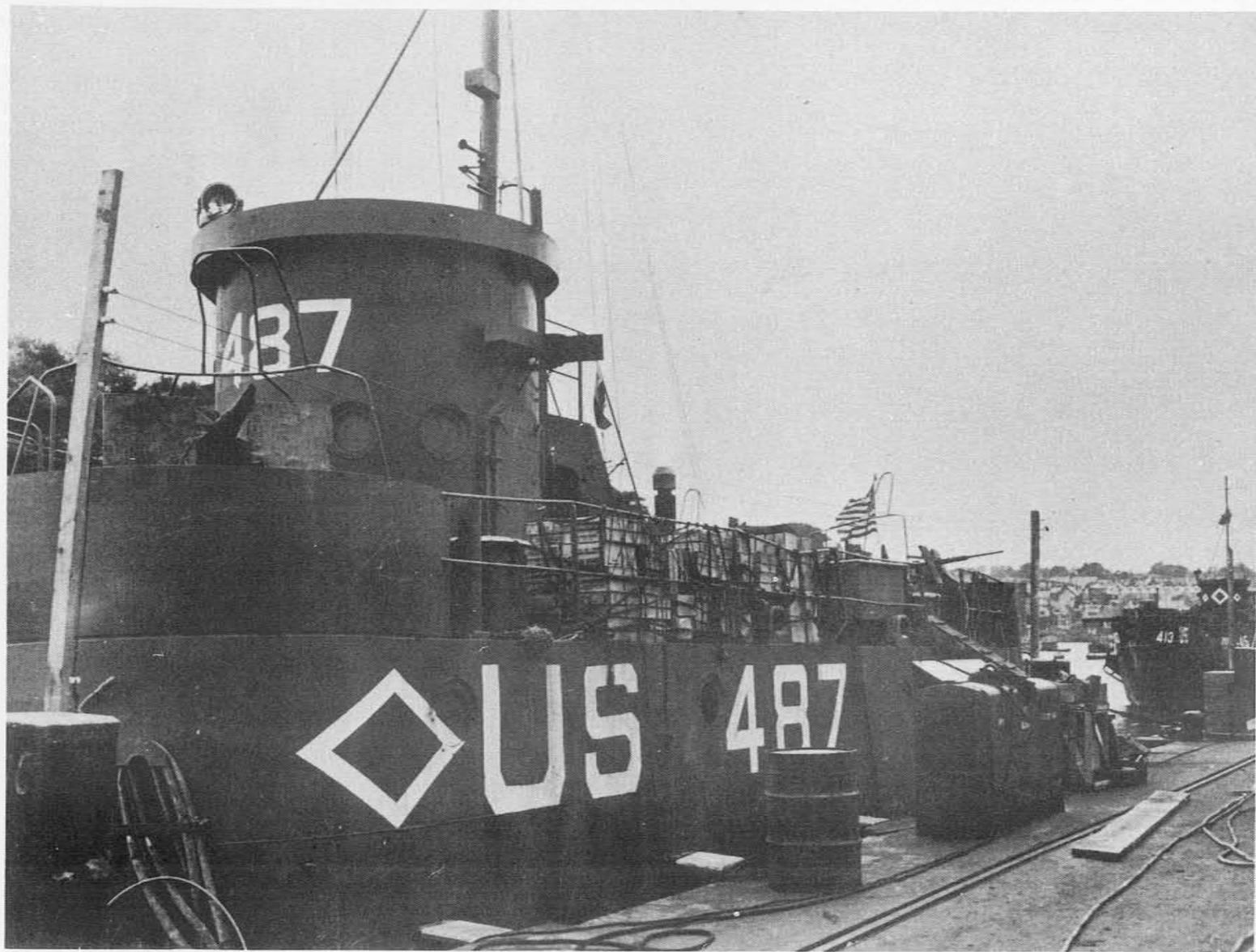


Figure 18.—Sea Passage Ration Loaded for Channel Crossing.

THE SEA PASSAGE RATION

The OVERLORD plan anticipated that troops taking part in the invasion might remain on board ship 1 to 3 days before the Channel crossing. To feed these men, crowded aboard ships of various sizes, the Office of the Chief Quartermaster prescribed which rations were to be served as the sea passage rations. Distribution was based primarily on the size and the messing facilities of the troop-carrying ship. Large vessels, such as transports and attack cargo ships, served the A ration; LST's served a modified B ration; smaller landing craft issued the 10-in-1 ration; all carried a reserve of C and K rations (see app. XV).⁴⁹

THE RATION ON THE CONTINENT

From November 1943 until late in 1944 the basic ETO A ration as prescribed in Circular No. 85 was used unchanged. The tremendous increases in troop strength that took place during this period served as a further test of the adequacy and palatability of the ration.

Although periodic changes in menus occurred, a new ration was not published until 12 September 1944 (see app. XVI).⁵⁰ This was the final ETO ration. A later analysis traced the evolution of the A ration from 1942 to 1945. According to this analysis, the new ration contained the following nutritive values:

Calories	4,050
Protein	135 gm.
Calcium	1.04 gm.
Vitamin A	9,862 I. U.
Thiamin	3.96 mg.
Riboflavin	3.0 mg.
Niacin	33 mg.
Ascorbic acid	134 mg. ⁵¹

There were no changes in the nutritive values of this ration from those established by Circular No. 85, except a slight increase in riboflavin. Certain alterations were made, however, in the table of substitutions. For example, corned beef, which previously could be substituted for boneless beef in the ratio of 1.14 pounds to 1 pound of beef, was given a new ratio of 0.9 pound to 1 pound of beef. A similar reduction was made in the proportion of canned fish. Specific substitute values were given for each type of canned and dehydrated vegetable to replace the general values established for all fruits and vegetables in Circular No. 85. Finally, a slight increase was made in the butter ration—from

1 to 1.12 ounces.⁵² The monthly menus that followed were based on the new A ration.⁵³

THE HOSPITAL RATION

The need of special rations for hospitals was recognized early. In the provisions of Circular No. 28, which was published in May 1942, hospitals were authorized to receive the field ration A plus a credit of 1 shilling per patient per day to supplement the ration.⁵⁴ Originally the credit could be used only at United States army quartermaster sources, but a later amendment permitted procurement from any source whatever.⁵⁵ Even with no restrictions upon sources of supply, this method proved unsatisfactory. It was unstandardized, for the additional items desired might be available for local procurement by one hospital but not by another. Moreover, even trained dietitians did not always select the best items with which to supplement the A ration.⁵⁶ The extra money allowance was abandoned, therefore, and replaced by a special hospital ration.

This special hospital ration was published on 11 February 1943 in Circular No. 13 together with the new standard A ration. Based on the new A ration, the hospital ration incorporated many modifications: it had less meat, though more fowl; it had more milk, more fruit and fruit juices, but considerably less potatoes and grain products. Special items were included, such as canned boned chicken, pureed vegetables, and a daily allotment of 8 fresh eggs per 100 patients.⁵⁷

A revision of Circular No. 13, drafted in August, proposed the following changes in the hospital ration: that the meat component be made equal to the meat component in the field ration; that the amounts of leafy, green, and yellow vegetables be made equal to the amounts in the field ration; and that potatoes be raised from 4 to 8 ounces.⁵⁸ Most of these suggestions were incorporated in Administrative Circular No. 85 of 21 November 1943, which published the new field ration.⁵⁹

From time to time further changes were made. Starchy foods were decreased, and fruit juices and evaporated milk were increased. Distinctive items, such as strained fruits and vegetables, malted milk, and canned soups, were included for liquid, soft, and convalescent diets.⁶⁰ The special hospital ration proved far superior to the money allowance in providing hospital patients with the special foods that they required. It re-

sulted also in less waste, for the inclusion of special hospital items was more than offset by the reduction in items of the basic field ration.

The OVERLORD plan attempted to anticipate all special ration needs that might arise when the armies went into action on the Continent. For feeding litter casualties the Chief Quartermaster prescribed the use of the 5-in-1 ration supplemented with grapefruit juice, tomato juice, and evaporated milk.⁶¹ This ration proved satisfactory in the early stages of the operation. However, as the armies outdistanced their tactical schedule, they also drew ahead of the supply program. According to original plans, ambulatory and litter cases were to be evacuated to the United Kingdom for hospitalization. As the distance lengthened, however, between the front lines and the medical centers in Britain, the majority of these casualties were hospitalized in the rear areas. For this reason a hospital ration supplement had to be adopted for the Continent.⁶² As soon as hospital trains began to operate in France, the Office of the Chief Quartermaster published a special menu. The hospital supplement and the hospital train menu appear as appendix XVII.

RATIONS FOR NATIONAL GROUPS

On 26 April 1945 the Chief Quartermaster stated that, instead of the 4,766,974 persons for whom food had been requisitioned, he was actually feeding more than 6,000,000 people each day.⁶³ In addition to 3,732,282 American and Allied military and civilian personnel receiving the ETO and hospital rations, 2,504,586 other people were being fed: French and Moslem troops, displaced persons, liberated Russian prisoners of war, enemy prisoners of war, national civilian employees, and Italian and Slavic service units.⁶⁴

Prisoners of War

According to the terms of the Geneva Convention, "subsistence for prisoners of war will be issued on the basis of the type A ration . . . and shall be equal in quantity and quality to that of troops in base camps."⁶⁵ With some doubt as to the intention of these provisions, the European Theater of Operations developed its own policy. Waste frequently resulted if the American ration was fed to prisoners with strongly developed national tastes. Whenever catering to these tastes would effect a saving, the A ration was altered to suit the preferences of the captives. The types of supplies available for local pro-

curement also affected the menus of prisoners. So did American public opinion. As reports of malnutrition among Allied prisoners in Germany began to reach the United States, an outcry went up against enemy prisoners' and American soldiers' being fed the same ration. The prisoner of war subsistence policy that eventually evolved as a result of these influences had two basic objectives: to feed prisoners the quantity of food required to maintain health and to select types of food and rates of issue according to the national tastes and standards of the captives.⁶⁶ Thus the spirit of the Geneva Convention, if not the letter, was followed.

The first large group of prisoners of war encountered in the European Theater were the Italians taken in North Africa. Transported to England, they were formed into service companies. Here the question of national taste arose. After repeated requests from the Provost Marshal and the Chief Surgeon, the Chief Quartermaster developed an Italian service company menu in which the amounts of spaghetti and macaroni were increased and the amounts of the less desired meats and vegetables were decreased. After a year of trial, augmentation, and revision, this menu was published in its final form in August 1944 (see app. XVIII).

Large numbers of German prisoners first began to appear in England after the fall of Bizerte and Tunis in May 1943. In their diet they required larger quantities of bread and potatoes in the place of more particularly American components. Based upon the ETO A ration of February 1943, the first standard prisoner of war menus were published by the Office of the Chief Quartermaster on 9 August 1943 (see app. XIX).

A moderate flow of enemy prisoners from France to England for evacuation to the United States had been anticipated and a program for their subsistence had been included in OVERLORD plans. As the operation developed, two errors in the advance planning became evident. Instead of the estimated 61,000 prisoners by D-plus-90-day, 170,000 were captured; instead of being evacuated to England, virtually all were held in France.⁶⁷ The reasons for retaining this large number on the Continent were twofold: shipping space was too critical to be used for the transportation of enemies; and prisoners of war were needed as laborers. Therefore the supply policy underwent complete revision, and the responsibility for subsisting prisoners of war



Figure 19.—Soldier Enjoying the Balanced Ration.

was shifted from the United States and England to the Continent.

During the first 6 months of the Continental operation, feeding prisoners of war was not a great problem. The number of captives was not large, and unbalanced stocks of American rations, augmented by captured enemy subsistence, offered a satisfactory solution. In 1945, however, the world food shortage and the excessively large numbers of Germans captured during the final sweep across the Reich caused the problem to assume sizable proportions.

Foreseeing the demand that would arise, Major General Littlejohn informed The Quartermaster General, on Christmas Day 1944, that he would use any unbalanced stocks of food available in the United States to meet the growing needs of prisoners of war.⁶⁸ The Quartermaster General replied on 8 January 1945 that canned meats, dehydrated soups, and alimentary pastes would be made available.⁶⁹

Developments during the next 3 months intensified the problem. Because of the shortage of food in the United States, General Eisenhower was directed to furnish for each group of foreign nationals being fed on the Continent a basic ration that would utilize local resources to the maximum.⁷⁰ In spite of the information that had been given to the Chief Quartermaster, the supply of canned meats was critical and the War Department directed that substitutions be made.⁷¹ Consequently, on 13 March the Chief Quartermaster requested that rice, spaghetti, macaroni, dried beans, and dried eggs replace the dehydrated potatoes and canned meats that had been requisitioned for prisoners of war.⁷²

Special Ration Scales

The Chief Quartermaster submitted to the War Department on 17 March 1945 the ration scales that had been established for national groups. The type I ration scale, the basic ETO ration, would continue to be fed to all United States military and civilian personnel and all British civilian and military personnel attached to SHAEF and to half of the Allied repatriated prisoners of war. The type II ration scale would be used to feed all liberated manpower, civilian labor, Italian service units, prisoners of war, and the remaining Allied repatriates.⁷³ (See app. XX.) The War Department replied on 20 March that the supply of subsistence could not be met on these scales and requested a further breakdown for each category.⁷⁴

Replying to The Quartermaster General on 21 March 1945, Major General Littlejohn argued that strict compliance with these instructions would result in the preparation of some eight separate requisitions.⁷⁵ Because it was more practical for the supplies to be received in bulk on the Continent and then broken down rather than received in earmarked shipments, he recommended that the present policy be continued.⁷⁶

Requisitions for June 1945 had been based upon the type II scale and, the Chief Quartermaster was informed on 25 March, would be filled on that basis. However, "it should be understood" stated NYPE, "that . . . these are interim measures only and do not supersede War Department requirements for separate menus for separate groups."⁷⁷ Consequently, by the end of the month seven separate menus had been developed, one each for prisoners of war, Continental civilian employees, Russian nationals, Italian service units, Allied military forces, and two for the French Expeditionary Corps—one for French troops and one for Moslem troops. In the establishment of these rations, careful consideration had been given to the caloric and vitamin content of each ration as compared with the American field ration A and the American special hospital ration (see app. XXI).

The caloric content of the prisoner of war ration was agreed upon by the Chief Quartermaster and The Quartermaster General on 10 April 1945. This decision settled a question that had long been a point of discussion. In March the Supreme Commander had instructed the Chief Quartermaster to develop a ration containing 3,400 calories.⁷⁸ Simultaneously the Office of The Quartermaster General had published a ration for prisoners of War.⁷⁹ Upon its receipt, the Chief Quartermaster had notified Lieutenant General Gregory that it contained almost 400 calories more than the 3,400 calories prescribed by the Supreme Commander. Because it contained not only relatively high allowances of items in short supply on the Continent but also canned meats, which were critically scarce throughout the world, the Chief Quartermaster requested that it be reviewed.⁸⁰

Meanwhile, in answer to the War Department request for separate group rations, the Office of the Chief Quartermaster had developed a prisoner of war ration, which gave consideration to the supply situation on the Continent and to the national tastes and standards of the enemy. For these reasons, Major General Littlejohn asked that it be

approved by the War Department.⁵¹ This approval was granted in the April agreement, which set the caloric content of the ration at 3,400 calories and established rates of issue for each of the components.⁵² A table of issues appears as appendix XXII. By 21 April 1945 the Quartermaster Service was feeding 1,425,831 prisoners of war, approximately twice the number upon which requisitions had been based.⁵³

According to the Geneva Convention, prisoners might choose to work or to remain idle, but those who worked would receive 80 cents a day.⁵⁴ In order to obtain necessary labor, an added incentive was offered in the form of augmented rations for prisoners who worked. In January 1943 the National Research Council had prescribed a diet of 2,500 calories for a man in a sedentary occupation and a diet of 2,900 to 3,000 calories for a man performing moderately active work. Guided by these figures, the Chief Quartermaster now recommended that the caloric value of the ration be reduced for each type of prisoner.⁵⁵ On 26 April 1945 Supreme Headquarters established a ration of 2,900 calories for working prisoners of war and a ration of 2,200 calories for nonworking prisoners of war.⁵⁶

Moslems

The arrival of the Second French Armored Division in Great Britain during the early months of 1944 introduced the first special problem in feeding an ally. This organization included several companies of Moslems whose religion forbade the eating of pork. As long as these troops remained in Great Britain, the problem was easily solved by substituting lamb and mutton in their ration. Plans for providing operational rations for their landing in Normandy presented a new difficulty because all three meals of the K ration and one of the C ration contained pork. The Chief Quartermaster overcame this difficulty a few weeks before D-day by adopting the policy of issuing complete C rations to the French division with the understanding that the meals containing pork would be held by the French troops and that the meals containing vegetable stew would be reserved for the Moslem troops.⁵⁷

When the assault period was over, the problem of providing food for the Moslem units was simplified by the Ramsey-Massigli Agreement. Negotiated in the North African Theater, where the question had first arisen,

this agreement was approved by the War Department in May 1944.⁵⁸ Based upon its provisions, Moslem menus were published by the Office of the Chief Quartermaster on 15 July 1944 (see app. XXIII).

Though minor changes were made in the Moslem ration during the course of the operation, the caloric content of 3,250 calories was retained until The Quartermaster General increased the caloric value to approximately 3,700 calories on 10 April 1945.⁵⁹ By arrangement with the French Provisional Government, however, the additional food was to be provided from French sources.⁶⁰

French Troops

The problem of feeding French troops did not gain prominence in the headquarters of the Communications Zone until the Southern Line of Communications and the Sixth Army Group, which contained the French First Army, were absorbed by the European Theater in November 1944. In general those French troops that fought with the American forces were supplied in the same manner as the Moslem troops. As in the case of the Moslem ration, the difference between the 3,250 calories prescribed by the Chief Quartermaster and the 3,700 calories prescribed by the War Department was supplied from French sources. By VE-day the French and Moslem troops who were being fed by the Quartermaster Service totaled almost 500,000.⁶¹ (See app. XXIII)

Allied Civilian Laborers

After the armies broke out of Normandy, civilian labor became an important factor. Manpower of several nationalities became available as France, Belgium, Holland, and Luxembourg were cleared of German forces. To meet the food needs of Allied personnel, special menus were prepared and authorized (see app. XXIV). All these menus had common characteristics: they all contained approximately 3,400 calories; they reflected national food preferences as far as possible; they offered the light breakfasts and heavy dinners of European diets; and they were all based upon the relative availability of components.⁶²

War Dogs

The war dogs that played an important part in guard duty and combat were issued a ration as carefully planned and as skillfully

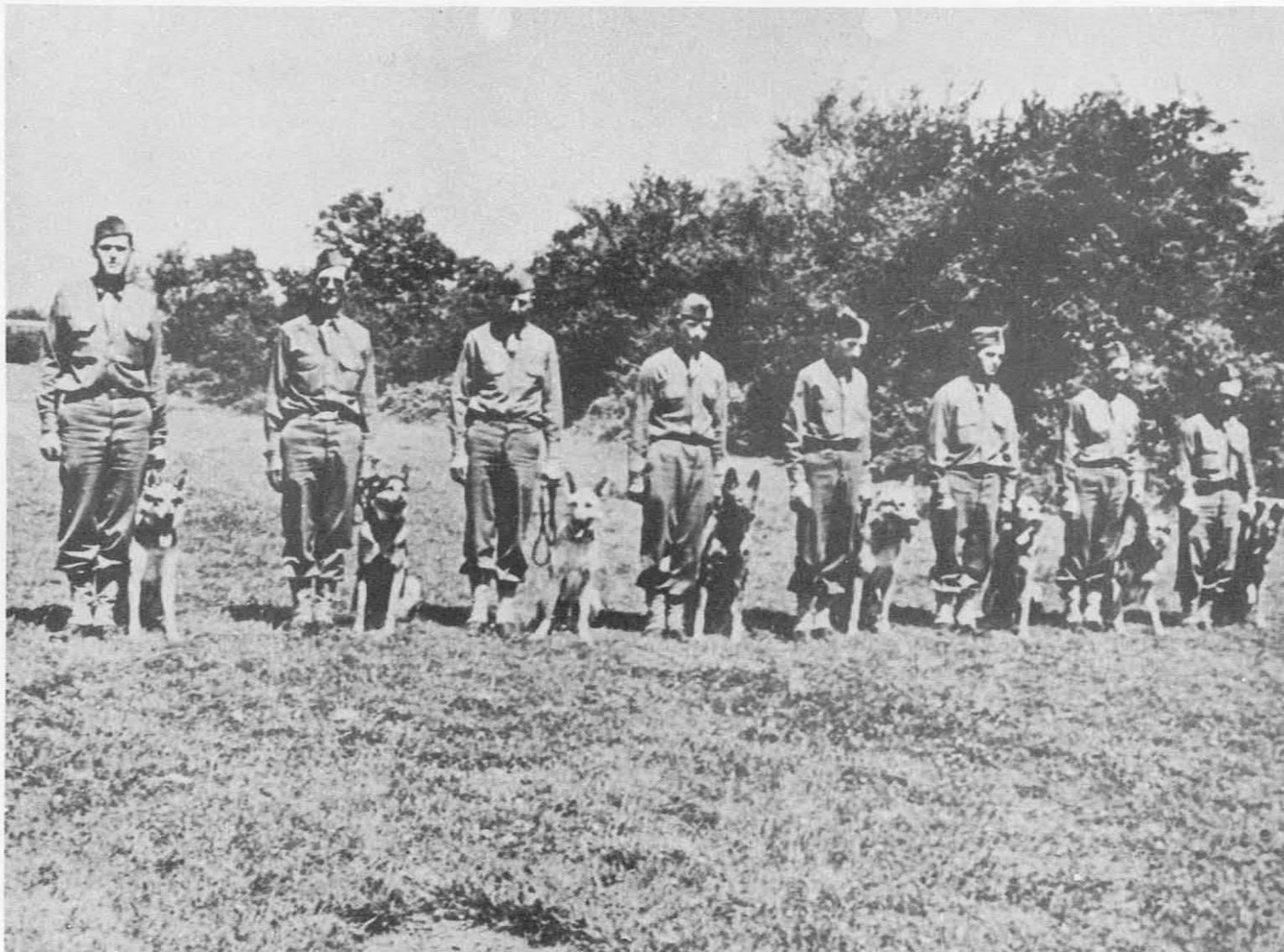


Figure 20.—Well-fed Members of the K-9 Corps Ready for a Morning Workout.

balanced as that issued United States soldiers in uniform. The Quartermaster Corps was charged not only with training the members of the K-9 Corps but with feeding them. The ration published by the Office of the Chief Quartermaster on 23 November 1943 explains in large measure the superior performance of the war dogs in the European Theater of Operations (see app. XXV).

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CHAPTER 5

BREAD

"Soldiers first, bakers second, and always excellent bakers." These words of Major General Robert M. Littlejohn, Chief Quartermaster of the European Theater of Operations, were more than a maxim; they signified a definite and skillfully developed plan that resulted in feeding American troops nutritious and palatable bread. One of the few foods served three times daily, bread represented 11 percent of the total ration fed to soldiers in the European Theater, approximately one-half pound per man daily.

During World War I a massive mechanical bakery had been established at Is-sur-Tille, the principal American Expeditionary Forces regulating station in Europe. At the time of the Armistice this bakery was actually producing 470,000 pounds of bread daily, serving approximately one-half of the American combat forces in France. Bread for the remaining combat forces and the entire Services of Supply was supplied by 59 field bakeries.¹

However, in the planning of bakery operations for World War II it was realized at an early date that the tactical employment of American combat forces in mechanized warfare would require the use of large, mobile units in concentrated areas. Such a condition demanded that bakery companies supporting these forces have a mobility equal to the armies that they served.

MOBILE BAKERIES

The Chief Quartermaster, immediately after his arrival in the United Kingdom, became interested in the highly productive mobile bakeries operated by the British Army. He found these units to be superior to those manufactured in the United States. A table giving a comparison of British and American mobile bakeries appears as appendix XXVI.

First Negotiations with the British

On 2 July 1942 Brigadier General Littlejohn made a formal request to the British Government for the procurement of 15 British-type mobile bakeries, 4 to be delivered as soon as possible, the others by December 1942.² The British War Office replied on 17 July 1942 that arrangements were being made for the production of the bakeries. Production would be at the rate of

4 or 5 a month for the 4-month period beginning November 1942. Meanwhile 4 British units were to be transferred to the American troops during August.³

On 24 July the British War Office summarized for the Chief Quartermaster the bakery facilities that would be available to the American troops in Great Britain. The 4 mobile bakeries to be transferred to the United States during August had a total capacity of 84,000 pounds. These units, together with a static bakery at Cheltenham, would supply the United States forces with 114,000 pounds of bread daily. Moreover, a bakery at Shrewton, having a capacity of 18,000 pounds of bread daily, had been requisitioned for American use and would be available by the end of September. It was understood that another bakery at Brislington, having a capacity of 20,000 pounds, would be turned over to the United States Army in late September or early October. This would give the American troops a daily bread production of 152,000 pounds. Upon the withdrawal of the British staff and troops from Tidworth, facilities for the production of an additional 60,000 pounds would be made available. This amount, with an additional 100,000 pounds that could be realized from civilian contractors and the 231,000 pounds to be obtained from the other 11 bakeries already ordered, represented the total production that the British could make available — 543,000 pounds daily.⁴

Early Deliveries

However, on 18 November 1942 the British War Office revised the delivery schedule for the remaining 11 field bakeries. This revision had been necessitated by production difficulties that had beset British manufacturers. The new and slower schedule called for completion of delivery by the end of March 1943.⁵

On 2 January 1943 Colonel Robert F. Carter, Chief of the Subsistence Division, pointed out that of the four bakery companies received from the British, two had been shipped to North Africa, one was in production at Kettering, and one had been sent to the American School Center at Shrivenham. Plans for the disposition of the other bakeries

indicated that the eight promised before the end of February could be added to the one already in operation, giving a total production of 180,000 pounds of bread daily, enough for approximately 360,000 troops.⁶ During the following month, bread requirements were estimated at 500,000 pounds daily. Of this amount, 230,000 pounds was to be supplied by the Royal Army Service Corps, and 270,000 pounds was to come from British mobile bakeries operated by United States Army personnel.⁷

On 10 February 1943 Brigadier Richardson of the British War Office reported as follows on the production capacity that had been offered to the United States forces:

Tidworth Bakery (operated by British personnel) -- 60,000 pounds daily
 Brislington Bakery (about to be taken over) ----- 40,000 pounds daily
 Shrewton Bakery (not yet taken over) ----- 18,000 pounds daily
 Cheltenham Bakery (not yet taken over) ----- 30,000 pounds daily

Only eight British mobile bakeries had been delivered at that time. These had a daily production capacity of 168,000 pounds. The seven other bakeries were to be handed over by June 1943. The potential capacity offered by the British was thereby established at 316,000 pounds daily.⁸

In a memorandum to the Chief Quartermaster on 16 February 1943, the Chief of the Subsistence Division said that he needed 12 additional bakeries for reserve and training purposes and that he intended to use Brislington and Tidworth, supplemented by civilian bakeries, to supply an anticipated 200,000 troops.⁹ On 4 March 1943 the Chief Quartermaster, in accordance with the views expressed by Colonel R. F. Carter, Chief of the Subsistence Division, submitted to the British War Office a request for these 12 additional mobile units.¹⁰ On 20 March 1943 the Subsistence Division prepared a resume of the status of mobile bakeries. This resume indicated that the remaining 7 of the 15 bakeries originally promised were scheduled for delivery by June 1943 and that the 12 additional bakeries requested on 4 March would be delivered by September 1943.¹¹ During the following month, the British War Office informed the Chief Quartermaster that instructions had been issued for the release of 2 more mobile bakeries.¹² Writing to the British War Office on 5 May 1943, Colonel Michael H. Zwicker, Chief of the Procurement Divi-

sion, requested information as to the delivery schedule of the requisitioned British mobile bakeries.¹³ The British War Office replied that units had been delivered as follows:

October 1942 ----- 4 units
 December 1942 ----- 2 units
 February 1943 ----- 2 units
 April 1943 ----- 2 units

Two more units were to be delivered during May 1943, and the remaining 3 during June.¹⁴

Increased Requirements

For the carrying out of a plan outlined by the Office of the Chief Quartermaster on 12 May 1943, 12½ quartermaster bakery companies would be required. Each of these companies was to have a productive capacity of 20,000 pounds daily or approximately 40,000 rations. Supply during the static phase in the United Kingdom was set at 559,000 pounds of bread daily for a troop strength of 1,118,000 men. Of this total, 360,000 pounds was to be supplied by United States Army bakery companies; the remaining 199,000 pounds was to come from the Royal Army Service Corps. During the operational phase on the Continent bread was to be provided by 7½ quartermaster mobile bakery companies. The total production of these companies was to be 300,000 pounds daily, or 600,000 rations. During this same period 3½ quartermaster bakery companies were to provide the United Kingdom with 140,000 pounds daily, or 280,000 rations. A reserve of 1½ bakery companies was to be used when possible enemy action interfered with the Royal Army Service Corps supply.¹⁵

On 18 June 1943 the British War Office informed Colonel Zwicker that 4 more of the required bakeries could be delivered, 2 on or about the 25th of June and 2 in mid-July.¹⁶ On 30 June 1943 Colonel Zwicker reminded the British War Office of the 4 March 1943 request for 12 additional mobile bakeries and asked that 2 be delivered in June, 2 in July, 4 in August, and 4 in September.¹⁷

By July 1943 the British War Office began to feel the effect of the influx of United States Army personnel on British bread production. It was the understanding of the British War Office that the troop build-up in the United Kingdom was to be from 180,700 at the end of June 1943 to 1,345,000 by April 1944. In order to meet the requirements for troops in Great Britain in June 1943, the British had supplied the United States Army



Figure 21.—Trailers from British Mobile Bakeries.

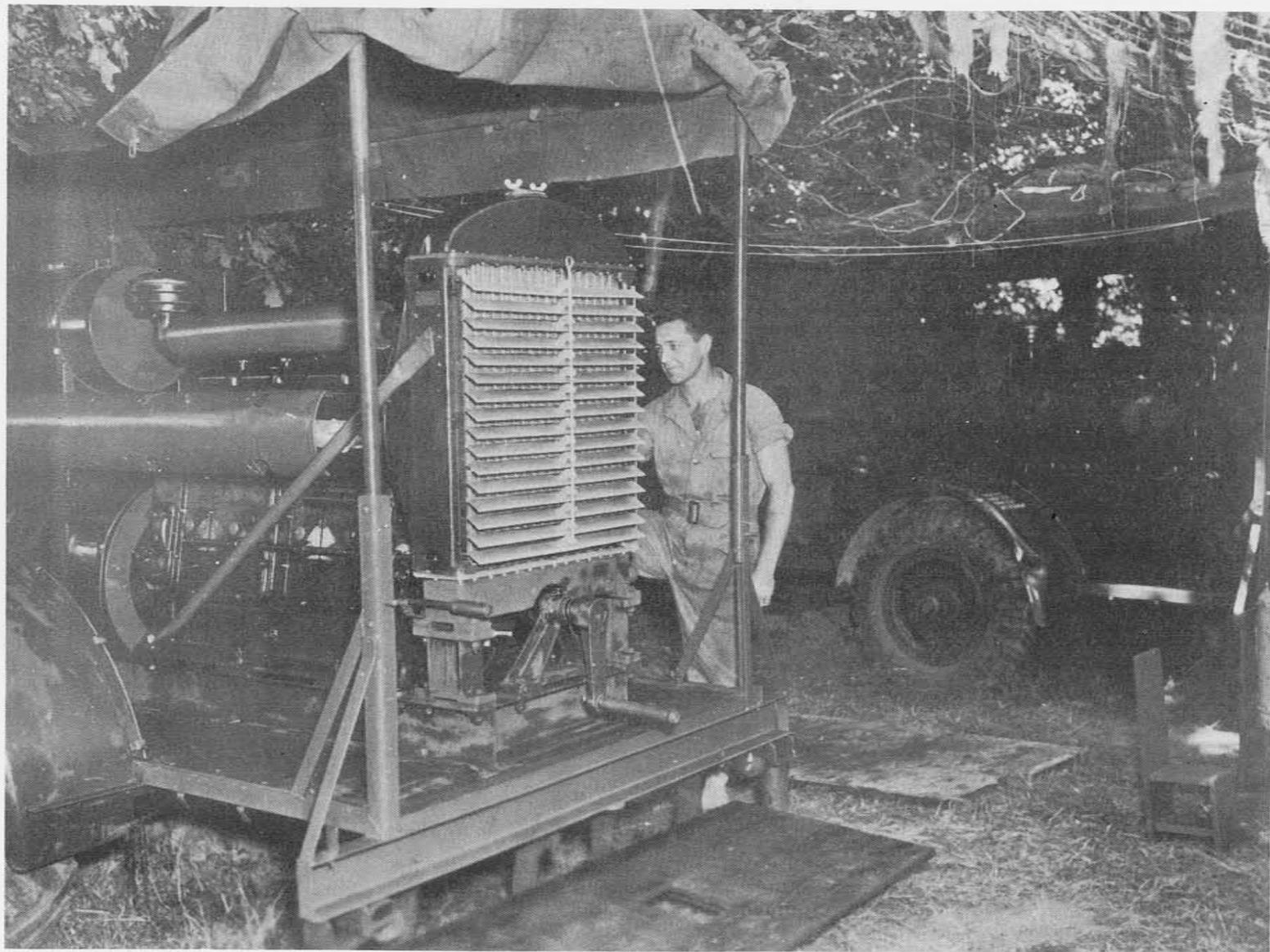


Figure 22.—Diesel Generator, British Mobile Bakery.

with 15 mobile bakeries and were to deliver 12 other bakeries as soon as they were available. Of the mobile bakeries that had been delivered to the Quartermaster Service, 3 were in North Africa, 1 was in production, 1 was being used for training, and the other 10 were in storage for Continental operations. Major General Kerr, Director of Supplies and Transport for the British War Office, pointed out that because civilian bakeries in the United Kingdom were short of operating personnel, because the British military bakeries were operating at maximum capacity to meet Royal Army demands, and because United States Army personnel would not be available before October 1943 in sufficient strength to man even 9 of the mobile bakeries, it appeared doubtful that the British could meet American Army requirements.¹⁸

Two days later the Chief of the Subsistence Division made a similar review of the bakery plan of operations. The requirements during the static phase in the United Kingdom had been increased to 721,500 pounds of bread daily. The British were to supply 81,510 pounds of this requirement, and United States mobile units were to supply the rest. Demands on the Royal Army Service Corps would vary in accordance with the influx of United States troops and quartermaster bakery personnel. For the operations on the Continent 32 quartermaster mobile bakery companies would be required. Troops remaining in the United Kingdom were to be supplied bread by the British Army. The 32 mobile companies were to be activated in the European Theater from 16 quartermaster bakery companies. During the transitional period bread requirements in excess of the production of United States Army bakeries were to be furnished by the Royal Army Service Corps.

The Chief of the Subsistence Division also recommended that pressure be exerted to acquire additional British mobile bakeries with the understanding that other quartermaster bakery companies would arrive in the United Kingdom at the earliest practicable date to produce bread for United States troops.¹⁹

Therefore, on 21 July 1943 the Deputy Chief Quartermaster, in a memorandum to the Chief of the Procurement Division, requested that an order be placed with the British War Office for 10 additional mobile bakeries.²⁰ Nearly 2 months passed before the order was accepted by the British.²¹ Dur-

ing this interval the quartermaster bakery plan for BOLERO had been promulgated. This plan had recommended that American demands on the British be reduced to the minimum. Nevertheless, the Deputy Chief Quartermaster stated on 22 September 1943 that a requisition was being sent to the British War Office for 35 additional bakery units.²²

Later Deliveries

Of the 27 mobile bakeries that had been requested from the British for delivery by the end of September 1943, 19 had been delivered by 31 July 1943, and the others were to be delivered during September and October. Of the 19 delivered, 3 had been sent to North Africa and 16 kept in Europe.²³

On 15 October 1943 the Chief Quartermaster was able to report that, in addition to the bakeries in operation at Kettering and Northern Ireland, new mobile bakeries had been placed in operation at Shepton Mallet and Coypool. The average daily production for the week ending 23 September had been 32,000 pounds or 64,000 rations. Brigadier General Littlejohn estimated that by 1 January 1944, unless there was an interruption in the flow of 13 mobile bakery companies scheduled for arrival during October and November, daily production would be 400,000 pounds of bread or 800,000 rations.²⁴ A status report of 27 December 1943 showed that the Quartermaster Service, operating 13 mobile bakery companies, had produced a weekly total of 1,051,953 pounds of bread.²⁵ The status of bakery equipment improved greatly during the fall of 1943. By 21 January 1944 there were 29 British mobile units on hand in the United Kingdom. Of the 40 still on order, 10 were scheduled to be delivered in February and 5 more each month from March through August, giving a total of 69 for use in OVERLORD. For the first phase of the operation 32 would be required; for the second phase 23; and the remaining 14 would be held in reserve to replace combat losses.²⁶

PLANS FOR INVASION

The Bakery Branch of the Subsistence Division completed its revised bakery plan for OVERLORD on 26 January 1944. The mission of the plan for the first period, United Kingdom operations, was the provision of bread rations for 1,280,000 troops who were to be in the United Kingdom before D-day. It was estimated that by March the bread re-

quirement would be 721,500 pounds daily. Quartermaster mobile bakeries were to provide 640,000 pounds of this requirement, the remaining 81,500 pounds to be supplied by the Royal Army Service Corps. During the second period bread rations were to be supplied to United States forces on the Continent from D-plus-15-day through D-plus-240-day. In order to meet this objective, 23 mobile bakery companies were necessary. These, in addition to the 32 required for United Kingdom production, put the total number needed at 55. Of the required 23, 18 were to be on hand by D-plus-240-day.²⁷

The Class I Plan for an Operation on the Continent was published in March 1944. This plan contained provisions propounded in previous plans and tabulations prepared earlier in the month. Bakery operations on the Continent would begin on or about D-plus-15-day. At that time six bakery companies would supply 144,000 men, or approximately 40 percent of the troops, with white bread through D-plus-30-day.²⁸ The Quartermaster Annex to the Communications Zone Administrative Plan for OVERLORD, published on 15 May 1944, however, estimated that bakeries would not begin operations in the Communications Zone until approximately D-plus-35-day.²⁹

Before D-day the Quartermaster Service was self-sustaining. During the week immediately preceding D-day American bakery companies produced 476,901 pounds of bread, approximately 60 percent of the 870,578 pounds realized daily from both American and British facilities operated by United States forces. Through the use of British mobile bakeries, quartermaster bakery companies, operating with half the manpower believed in 1942 to be necessary, had produced more than 45,000,000 pounds of bread by D-day. The use of British equipment meant more than a saving of manpower; it meant also a saving of more than 2,000,000 gallons of fuel.³⁰

CONTINENTAL OPERATIONS

On 6 June 1944 the invasion of the Continent became a reality. By 1 July, D-plus-25-day, American troops in Europe were receiving freshly baked white bread. The 3029th Quartermaster Bakery Company began operations at 2345 on that day and within 24 hours had supplied 31,500 pounds of bread to hospital patients. On 2 July the 3028th Quartermaster Bakery Company began operations and within 24 hours had delivered

29,000 pounds of bread to First Army truck-heads. That day the Chief of the Bakery Branch arrived on the Continent to supervise the reconstruction of a captured static bakery in Cherbourg. The captured bakery began production for the American forces between the 9th and 16th of July. Operated by French laborers, the bakery within 5 days was turning out 20,000 pounds of bread daily. From D-plus-35-day to D-plus-90-day it produced 1,000,000 pounds of bread.³¹

Referring to the first two bakery companies, the Advance Section, Communications Zone, stated on 14 July 1944 that the daily production of each of these companies had reached 27,500 pounds. Two other bakery companies had arrived on 13 July, giving the Quartermaster Service a distribution network covering Sainte Mere Eglise, Saint Sauveur-le-Vicomte, and Cherbourg.³²

On 18 July 1944 Colonel John B. Franks, Quartermaster, ADSEC, submitted to the Chief Quartermaster a summary of class I problems and plans. He showed in this report that 7 mobile companies had arrived and that 2 other companies were expected on the 20th. These, with the company operating the static plant at Cherbourg, gave the armies and ADSEC 10 units. The normal full bread ration had been established at 42.5 pounds per 100 men. Though none of these units had reached capacity production, reports from several bakeries indicated that the 27,500-pound daily production quotas for this period would be realized. All units arriving after the 20th of July were to be assigned to the Communications Zone. The total estimated capacity of the units that were expected to be in operation by D-plus-90-day was 645,000 pounds per day. This was thought sufficient to meet the requirements of the anticipated troop strength.³³ Restating this situation in the ADSEC Quartermaster Plan for Operations in France of 23 July 1944, Colonel Franks showed that conformity to the proposed schedule was essential because fresh bread would be issued to all troops regardless of the type of rations.³⁴

According to a First Army report, by 1 August 1944, 7 companies had produced 2,882,655 pounds of bread since the beginning of operations.³⁵ By 10 October 1944, when the battle line extended from Hulsen in Belgium to Nancy and the Belfort Gap, 38 quartermaster bakery companies were producing bread for American troops pushing their way toward Germany. Twelve of these bakeries were operating from 3 to 10 miles behind the



Figure 23.—British Mobile Bakery in the Field.



Figure 24.—Camouflaged British Mobile Bakery in the Field.

front line. In rear sections 7 more, including 1 static bakery at Cherbourg, were so placed that they were able to provide bread not only to Communications Zone troops but to incoming American troops in the various assembly areas. In addition, 19 other mobile bakery companies, which were spread out from Morlaix in the Brittany Base Section throughout the central territory of France, were meeting all the demands for bread made by the American forces operating in those areas. During the month of September the 38 mobile companies and the plant at Cherbourg furnished 55,000,000 bread rations to the advancing United States forces. The ration allowance at that time was 6.32 ounces of bread per man daily.³⁶

In many instances, however, the uninterrupted supply of bread was made difficult by the lack of supplies near the operational location. Many of the bakery companies had to return to Cherbourg for bags, flour, sugar, salt, yeast, and other necessities. One bakery company handled approximately 27 tons of supplies each day and required approximately 2,000 gallons of water. Nevertheless, the daily supply of bread to the more than 3,000,000 troops taking part in the Continental liberation was maintained from the first day of bakery operations on the Normandy beaches through the drive that carried American troops to Berlin.

FLOUR

In June 1942, when the first large contingent of United States forces landed in Great Britain, the British population, civilian and military, was being supplied bread made from a flour called "National Wheatmeal." This flour, which had become a wartime necessity, was composed of 45 percent soft United Kingdom wheat, 45 percent Canadian wheat, 8 percent barley, and 2 percent oats.

National Wheatmeal Flour for United States Troops

British authorities felt at this time that the English population would not look with favor upon the importation of white flour to serve American troops. On this point American authorities agreed. Shortly after the establishment of the Office of the Chief Quartermaster, SOS, ETOUSA, the Chief of the Subsistence Division expressed the fear that the importation of white flour would cause a degree of animosity between the two allies. He further explained that from a health

standpoint the bread made from National Wheatmeal flour was superior to bread made from white flour.³⁷

Major General John C. H. Lee, Commanding General, SOS, ETOUSA, reiterated these comments on 13 August 1942. "The British population and the British Army," he wrote, "are required to eat National Wheatmeal bread. They would not look with favor upon our use of bread from imported white flour. In order to take advantage of local static bakeries in areas where our troops are to be located, National Wheatmeal bread must necessarily be supplied. Mobile bakeries now arranged for in certain areas, may use either white or National Wheatmeal flour to produce bread. It is not desired to privilege one group by furnishing them bread made with the white flour, while others are required to consume bread made from National Wheatmeal flour. From the standpoint of the nutritional and health aspects, bread produced from National Wheatmeal flour is superior to white bread."³⁸

Lord Fred Woolton of the Ministry of Food, in a letter to Major General Lee on 5 September 1942, said that National Wheatmeal flour had been introduced in the United Kingdom in order to save shipping space, warehousing, labor, and transportation. He also expressed the hope that the American forces would adopt this flour.³⁹ Major General Lee replied that United States forces in the United Kingdom would not use white flour.⁴⁰ Subsequently Circular Letter No. 18, 9 September 1942, contained this order.⁴¹

Exchange of Flours

On 15 September 1942 the Chief Quartermaster and the Chiefs of the Procurement and Subsistence Divisions conferred with representatives of the Ministry of Food. The British expressed the opinion that the shipment from the United States of bulk wheat instead of packed flour would save about 20 percent in ship tonnage and about 5 days in the loading and unloading of a 6,000- to 7,000-ton vessel. The conferees reached the following agreement:

- a. Bulk wheat was to be shipped instead of sacked flour.
- b. Decision as to whether American or Canadian wheat was to be shipped was to be made by representatives of the War Department and members of the British Food Mission in Washington, D. C.

- c. The amount of wheat to be shipped would be equivalent to the amount of National Wheatmeal flour drawn for the use of the United States Army forces in the United Kingdom, quantities to be determined on the basis of troop strength.
- d. If a decision was reached to ship American wheat, the type and grade would be No. 1 spring wheat, as it was necessary to blend this type with the soft wheat of local production.
- e. Wheat was to be made available to the Ministry of Food at American ports.
- f. Shipment of wheat was to be made by the British Ministry of Food within their wheat program.⁴²

After another conference, held at Colwyn Bay on 23 November 1942, the Quartermaster Service sent the Ministry of Food an estimate of additional items required through 1943. The total bread requirement was placed at 68,698,000 pounds.⁴³

On 9 December 1942 the Ministry of Food informed the Office of the Chief Quartermaster that the rate of exchange for flour had been set at 107.4 pounds of National Wheatmeal flour for 100 pounds of American white flour.⁴⁴ The Office of the Chief Quartermaster on 15 December 1942 confirmed this rate of exchange.⁴⁵

Requirements

On 4 January 1943 the Chief Quartermaster submitted to the Ministry of Food a report entitled Estimated Requirements for Subsistence to be Procured in the United Kingdom 1 January 1943 through 31 December 1943. The total requirement for National Wheatmeal flour for consumption within the United Kingdom was placed at 68,062,769 pounds. This requirement was then broken down into quarters. A reserve of 6,242,099 pounds was also established. The total white flour requirement for TORCH was set at 7,400,000 pounds, all to be delivered during the first quarter of the year.⁴⁶

Writing to the Chief Quartermaster on 21 January 1943, the General Purchasing Agent requested that arrangements be made for the direct transportation of white flour from the United States to North Africa.⁴⁷ The Deputy Chief Quartermaster replied that the New York Port of Embarkation was being instructed to send directly to North Africa all

flour needed for TORCH and that plans had been made to use only National Wheatmeal flour in the United Kingdom.⁴⁸

On 20 March 1943 the Chief of the Procurement Division stated that 81,704,866 pounds of National Wheatmeal flour were on order for 1943 and that 7,400,000 pounds of white flour also had been ordered, with an additional 30,904,000 pounds to be ordered later.⁴⁹

On 22 June 1943 the Chief of the Subsistence Division informed the Chief Quartermaster that the 1942 net saving through local procurement amounted to 25,792 ship tons and that the saving during the first 5 months of 1943 was 17,730 ship tons. The total weight of items procured from the British was calculated at 31,829,203 pounds for 1942 and 21,277,568 pounds for 1943. Of this weight, National Wheatmeal flour totaled 11,038,836 pounds in 1942 and 3,181,632 pounds in 1943. During 1942, 12,116,295 pounds of white flour had been turned over to the British in exchange for National Wheatmeal flour and an additional 6,500,295 pounds of white flour had been turned over to the British during the early months of 1943.⁵⁰

On 28 July 1943 representatives of the Office of the Ministry of Food agreed in conference that stock piles of white flour would be built up in the United Kingdom for use by the American Army in Continental operations. Bread produced in the United Kingdom, however, by United States Army bakeries was to be made from a blend of two-thirds National Wheatmeal and one-third American white flour.⁵¹

Improvement of the Product

On 5 August 1943 the Chief Quartermaster, in an effort to improve the quality and palatability of bread issued to United States troops, asked The Quartermaster General if it would be possible to mill a straight flour from whole wheat.⁵² In his reply on 11 August The Quartermaster General said that the limited facilities in the United States for milling whole wheat flour and the poor storing qualities of this flour made its use in the European Theater impracticable.⁵³

In the meantime, the blend of two-thirds National Wheatmeal flour and one-third white flour was proving satisfactory, and the bakery at Kettering was producing a National Wheatmeal bread superior to the bread supplied by the Royal Army Service Corps.⁵⁴ By adding more salt, shortening, and sugar to the ingredients used by the British, United



Figure 25.—A Quartermaster Bakery on the Continent.



Figure 26.—Flour for Troops on the Continent.



Figure 27.—The Bread That Helped Win the War.

States Army bakers were producing a loaf similar in texture to the British loaf but more expanded and less tough.⁵⁵ On 10 September 1943 the Chief Quartermaster expressed the belief that the British had no objection to the improvement in the bread supplied to the American troops so long as the color remained dark.⁵⁶

End of Controversy

The flour controversy ended on 15 October 1943. That day the Chief Quartermaster informed Major General Lee that the Ministry of Food had agreed to eliminate all oats and barley from National Wheatmeal bread and to provide full requirements of National Wheatmeal flour for United States troops in the United Kingdom through 31 December 1944. Brigadier General Littlejohn then recommended that the policy of supplying bread made from National Wheatmeal flour to United States forces in the United Kingdom be continued, that white bread be served at the last meal before embarkation for the Continent, and that only white bread be supplied troops engaged in Continental operations.⁵⁷

YEAST

Months before D-day Major General Littlejohn realized that he could not depend entirely upon shipments of yeast from the United States for the making of the bread needed during the Continental operation. Therefore, he made inquiry as to the availability of yeast in the United Kingdom and learned that the British could provide only Arkady (yeast food). In order to conserve the limited amount of yeast on hand, he reduced the yeast in the baking formula from the 1 percent prescribed by The Quartermaster General to .75 percent and thus saved 263,900 pounds of dry yeast, enough to produce 50,666,000 pounds of bread.⁵⁸

Negotiations for procuring fresh yeast from the French were begun 29 August 1944. At first the Minister of Food insisted that in all France only two small plants in Paris were manufacturing yeast and gave the lack of coal and electricity as the explanation.⁵⁹ The Chief of the Subsistence Division was unwilling to accept *no* for an answer. It was not true, he said, that the French could not spare a little yeast. He believed the total United States Army requirement to be not more than one percent of the amount that the French were producing. "You would not fail

in this mission," he wrote the Chief of the Procurement Division, "if all the bread you have at your mess and all the bread provided for the French by the American Army was suddenly stopped."⁶⁰

His insistence brought results. By 29 November two manufacturers at Lille were delivering a total of 2 tons of yeast a day for the making of American bread. They said, however, that they could not continue production unless lumber was provided for the operation of the plant.⁶¹ Consequently, arrangements were promptly made for the release of the lumber.⁶²

As time went on, much more than fuel had to be provided the manufacturers of yeast. In the early spring of 1945 the French Ministry of Supply accepted the American demand for 3,200 kilograms (approximately 7,000 pounds) of yeast per day from 24 March to 31 October on the condition that 1,000 tons of coal be supplied a factory in Paris, that 1,000 tons of sugar be given in exchange for 1,650 tons of molasses used in the yeast, and that waxed or waterproofed paper and crating wood be supplied. The French would provide oils and chemical products but, if a shortage occurred, would expect help from the United States. The Ministry of Supply hoped, moreover, to be able by 15 April 1945 to increase the daily allocation from 7,000 pounds to 12,000 pounds. This amount, with the yeast then being procured from Belgium, would meet the United States requirements.⁶³

Belgian manufacturers began the latter part of March to make weekly deliveries of 24,200 kilograms of yeast. The United States Army was obligated, however, to furnish for every kilogram of yeast 1.17 kilograms of sugar, 0.02 kilograms of lard, and 1.67 kilograms of coal.⁶⁴ By 30 September 1945 the Quartermaster Service had procured 203,275.6 pounds of yeast from France and 551,875 pounds from Belgium.⁶⁵

"ALWAYS EXCELLENT BAKERS"

So it came about that United States soldiers were supplied palatable bread fresh from the oven. The achievement was brought about by planning, training, ingenuity, and determination to leave nothing to chance. The excellence of the bakers contributed to the excellence of the soldiers.

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- ⁶³ Memorandum, Chief, Procurement Division, to Chief, Subsistence Division, 15 March 1945.
- ⁶⁴ Memorandum, Chief, Belgian Branch, Procurement Division, to Chief, Procurement Division, 15 March 1945.
- ⁶⁵ Report of Deliveries, GPA, 30 September 1945.