CHAPTER II

Supply and Maintenance

ALTHOUGH stiff enemy resistance, heavy casualties, and an exposed right flank were the primary factors considered in arriving at the decision to suspend offensive operations at the beginning of November, of equal importance was the serious supply situation which confronted Fifth Army at that time. Four divisions of combat troops of II Corps were being supplied almost entirely over one road, Highway 65. From the major supply points in the Arno Valley trucks ground their way slowly up the steep grades and around the curves for nearly 50 miles to reach the forward elements. Overcrowding of this road, a gradual break-down in the supply line due to the overworking of the trucks without allowing time for drivers to perform proper maintenance, and an almost acute shortage of artillery ammunition in the dumps behind the lines were facts which confronted General Clark late in October. Torrential rains, which drenched the mountains and the valleys, turning unpaved roads into almost impassable quagmires, helped him to make the decision to call a halt.

Engineers strove valiantly to combat these obstacles raised by nature. Often they were on the losing end; slowly, however, they began to make headway in their struggles. While the process of defeating the mountains was a long one, after more than 2 months of strenuous effort improvements could be seen. Construction of revetments and the installation of scores of culverts began to produce results in a decreasing number of slides and wash-outs. The first snowfall of the season covered the higher mountains on 11 November; on 15 November 2 inches of snow and rain deluged the Apennines, and the real winter had arrived. The use of chains on vehicles, constant work by snowplows, and almost never-ending hand labor by thousands of soldiers and civilians kept the roads open. Not only did the roads remain passable, but they were greatly improved. Up Highway 65 a steady stream of equip-

ment, food, and clothing moved forward over Futa Pass and into the hands of the combat troops. Depleted stocks were refilled, and reserves slowly began to be accumulated.

A. *THE CHAIN OF SUPPLY*

See Map No. 3

In the mountains beyond the Gothic Line standard cargo trucks could go only short distances off the main roads. From the cargo truckheads jeeps crawled and splashed in low gear, low range, along narrow, twisting trails to the foot of the higher peaks. Beyond these jeep trails it was necessary for mules and men to pack food and ammunition on to the fighting elements. The rains and subsequent flooding of many of the ordinarily small streams complicated the problem. Units were cut off by raging torrents, frequently for several days at a time, and were forced to resort to many expedients to keep themselves supplied. Rubber boats were used in some instances to ferry supplies across the streams; at times the current was too swift for such frail craft, and aerial tramways were rigged along which buckets containing food and arms were pulled. Occasionally ammunition trailers were dragged through the stream beds by means of winches. This process was slow, and often precious ammunition was washed away; a few men were drowned in these hazardous operations.

The lines of trucks from quartermaster, transportation, and combat units moving equipment forward to the end of the roads were the last link in the long chain of supply from the United States. Surface convoys delivered the supplies to Peninsular Base Section (PBS) at either Naples or Leghorn, from which points it was the responsibility of PBS and the Transportation Corps to deposit them in Army dumps, located 50 to 75 miles from Leghorn. In practice, however, transportation units under control of Fifth Army often were required to augment the base section vehicles. Railroad repairs made it possible to eliminate about half the truckage distance soon after the first of the year. Items delivered in Naples were shipped by rail to the north.

Throughout its entire operations in Italy Fifth Army had more varied supply and service functions and responsibilities than had ever been considered the task of a field army before the war began. It was unique among American armies in this respect, and many lessons learned here were put to good advantage in other theaters. Ordnance items, for instance, could be completely rebuilt at a huge shop established in midwinter in former civilian automobile factories and dubbed "Willow Run."

Supplies for Fifth Army unload at Leghorn . . . painted by Staff Sergeant Ludwig Mactarian

Highway 65 winds past Loiano and out into the Po Valley . . . painted by Captain Edward A. Reep

Articles of clothing were manufactured or repaired by civilians working under contract to the Army quartermaster. The volume of signal traffic handled both by Army and its subdivisions reached a high peak, switchboards at Army headquarters alone averaging 19,000 calls per day.

Practically the entire needs of Fifth Army had to be supplied by shipments from home or by field expedients developed by all echelons, since there were few resources in Italy which could be exploited. The Arno Valley contained more necessities than had been encountered in southern Italy, but they were confined mostly to such items as could be made by hand and to limited amounts of fresh fruit and vegetables. Civilian manpower, however, proved valuable. A trip along the main supply routes of the Army or a visit to some of the installations revealed a mechanical army, highly specialized, greatly skilled, and at the same time a flexible unit. All this was accomplished despite the position at the end of a supply line approximately 5,000 miles long, with forward elements in the rough Italian Apennine Mountains in the dead of winter.

B. *WINTERIZING THE ARMY*

Long before the decision was made to postpone large-scale offensive operations until better weather conditions could be expected in the spring, extensive steps had been taken to prepare the command for winter in the mountains. The Winter Line campaign of 1943–44 was fought by Fifth Army troops in a mixture of cold rain and snow; the next winter's battles occurred in much the same type of terrain and in colder weather with more snow and less rain. But in contrast to the situation of the previous year, the Army was incomparably better prepared for the bad climate. The weather caused little suffering and sickness such as had handicapped the troops around Mignano and along the Garigliano; the improved conditions were indicated by medical reports of the health of the command during the winter of 1944–45. (*See Annex No. 2C1.*) Infectious hepatitis, or jaundice, proved to be the most persistent and difficult disease to combat. The rate increased in the fall months, reaching 88 per 1,000 men per year in November and hitting a high of 161 in December. Strict enforcement of mess and latrine sanitation measures was advanced to control the disease. Respiratory diseases, however, were remarkably low. The rate in January 1945 was 130 per 1,000 men per year compared to the rate of 200 for the Army in the United States in the same month computed over a 15-year period.

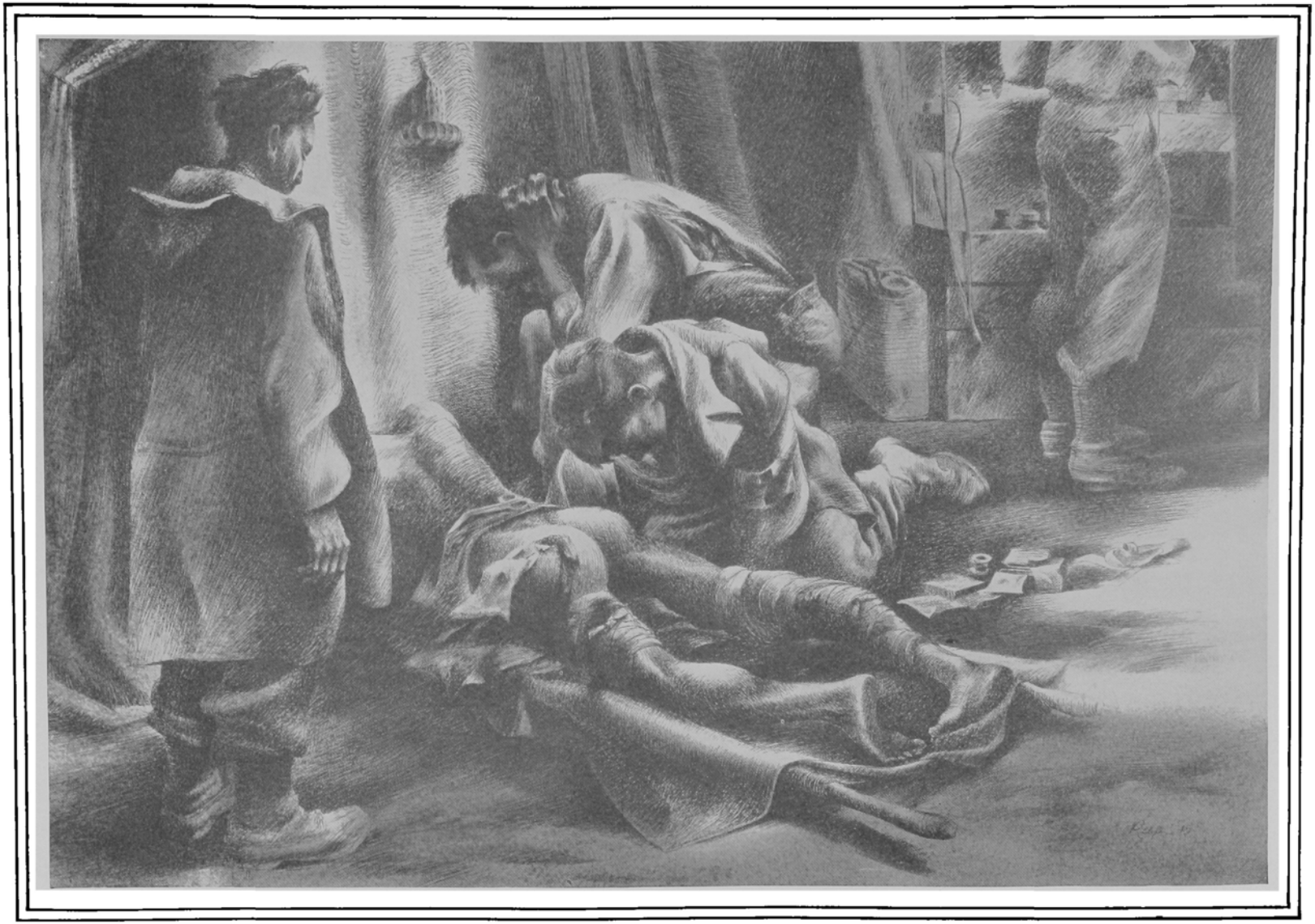
New and improved types of clothing were largely responsible for the better conditions. A substantial proportion of the required clothing was on hand at the be-

ginning of winter. The first issues were made on 2 November, although it was not until almost 3 months later that all units were completely equipped with shoepacs, the most critical item in the prevention of the trench foot epidemic which caused thousands of nonbattle casualties in the Winter Line. As late as 27 January the supply of shoepacs was 8,900 short; men not supplied with shoepacs were equipped with rubber overshoes, which were a satisfactory substitute for issue to service troops. By the end of the first week of February the shoepac shortage had been made up, and receipt of additional heavy socks made it possible to increase the allowance of this item to six pairs per man. Concurrent with the issuance of the shoepacs went instructions for care of the feet, which included a daily rubbing to restore circulation and frequent change of socks so that a dry pair was always worn. Troops in the line were provided with regular exchange of clean socks "issued with the rations," and this program resulted in a constant decrease in the incidence of the affliction. In the week of 13–20 January in the type of wet weather and during the time of year when trench foot might reasonably be expected to increase, only 60 cases were reported throughout the entire Army; although never very high, the rate during the winter dropped consistently each month. As of 31 January a total of 1,200 trench foot cases had been reported. This figure stood at 3,046 on 31 January 1944 and included only 5 divisions as against 6 in 1945.

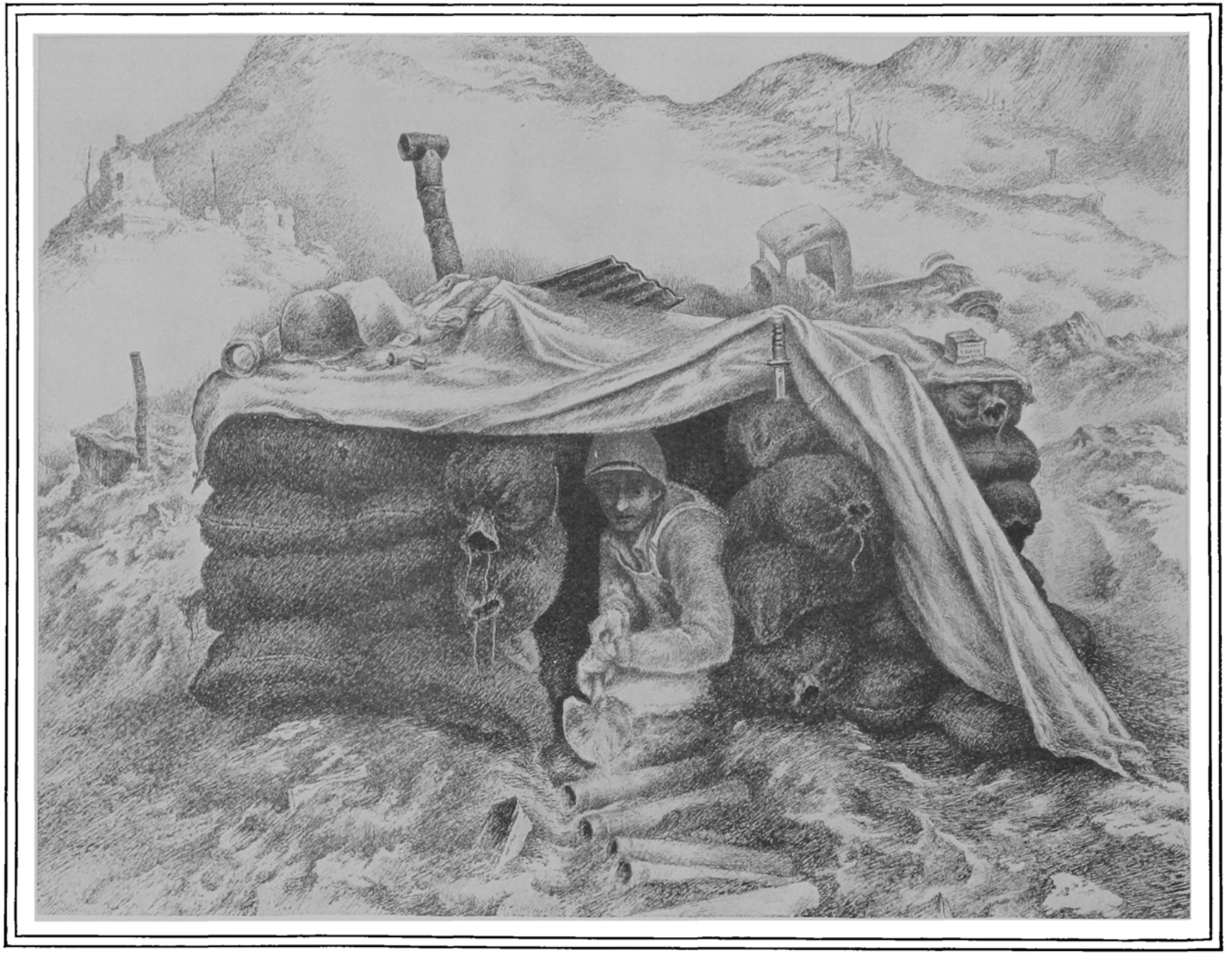
Improved outer clothing and sleeping bags also were distributed, based on the newly adopted principle of using layers of loose clothing rather than heavy, tight coats to combat the cold. Fur-lined caps were available for front-line troops, though not in sufficient quantities to make a complete issue. Combat trousers and new cold weather trousers, which were heavily lined with wool, completed the winter uniform. All these new outer garments were water repellent and were designed to keep out moisture while at the same time allowing damp perspiration to pass through to the outside. The standard army blankets were augmented by sleeping bags made of similar wool material, which could be inserted into a heavy canvas outer cover.

Tactical clothing also was necessary due to the snow conditions. Since no regular winter camouflage equipment was available, the Army quartermaster contracted with civilian concerns to manufacture several thousand long white jackets and hoods to enable front-line patrols to blend into the snowy landscapes. Camouflage was also extended to installations. Mesh nets were taken down and artillery pieces and many other objects received a coat of white gasoline-soluble paint. Twenty thousand simple crampons to aid troops in climbing over the icy mountains also were procured locally. Over 5,000 pairs of ice creepers were received for issue to the 10th Mountain Division.

Winterization of living quarters was carried out on a large scale. Wherever possible buildings were utilized, although the men in extreme forward positions usu-



Christmas at a first-aid station near Livergnano . . . painted by Captain Edward A. Reep



A winter home in the Idice River Valley (85th Division) . . . painted by Sergeant Harry A. Davis

ally were forced to remain in foxholes which they protected from the elements as best they could. Troops in support and reserve positions, however, dug themselves in, constructing walls and roofs from empty shell cases, food containers, and other materials. Pyramidal tents equipped with stoves were set up for use of reserve elements. Evacuation hospitals, some of which necessarily were located in the highest part of the mountains where they could be within the desired distance of the forward elements, were completely winterized. Hundreds of floors and side walls for tents were constructed; for operating rooms and other important functions Nissen huts and prefabricated buildings replaced the tentage. Procurement of fuel for Army stoves became a major enterprise. Many stoves were equipped to burn gasoline or fuel oil; others consumed lignite bricks, produced for the most part in Sardinia; wood was used less frequently because of its scarcity. An average day's issue in midwinter included 236.5 tons of lignite and 26.1 tons of wood.

C. *OPERATING THE ROADS*

Fifth Army was responsible for administration and operations in all the territory north of the Arno River with the exception of a small area in the vicinity of Pisa, including the city, which was controlled by PBS. On the east flank the Army rear boundary line ran a short distance south of the river and included a zone 5 miles deep south of Florence in which many Army dumps were located. The line struck the river again 6 miles southeast of Pontassieve, then followed it north to the point where Highway 67 left the valley and struck into the mountains. Restoring the roads in this large section to good condition and keeping them usable was the task of the engineers. By late fall most of the major highways in the Arno Valley itself had been fairly well repaired, and throughout the winter months a program of replacement of Bailey bridges with semipermanent structures over the entire Army area was carried on. Late in March Army engineer units assumed responsibility for many roads which had been maintained by corps engineers in order to allow the latter to be concentrated farther forward to support the spring offensive.

During the first 3 days of November heavy rains raised the Arno to flood stage and greatly damaged the area occupied by the 38th Evacuation Hospital just east of Pisa. The water reached a depth of between 4 and 6 feet, necessitating the removal of 495 patients to safety. Much hospital equipment was lost. Highway 1–1, the super-highway "Autostrada" connecting Florence, Pistoia, and Lucca and entering Highway 1 north of Pisa, was covered by high water several times in November and December. In the latter month the construction of retaining walls and steel floodgates in the vicinity of the Signa Bailey bridge over the Arno reduced future

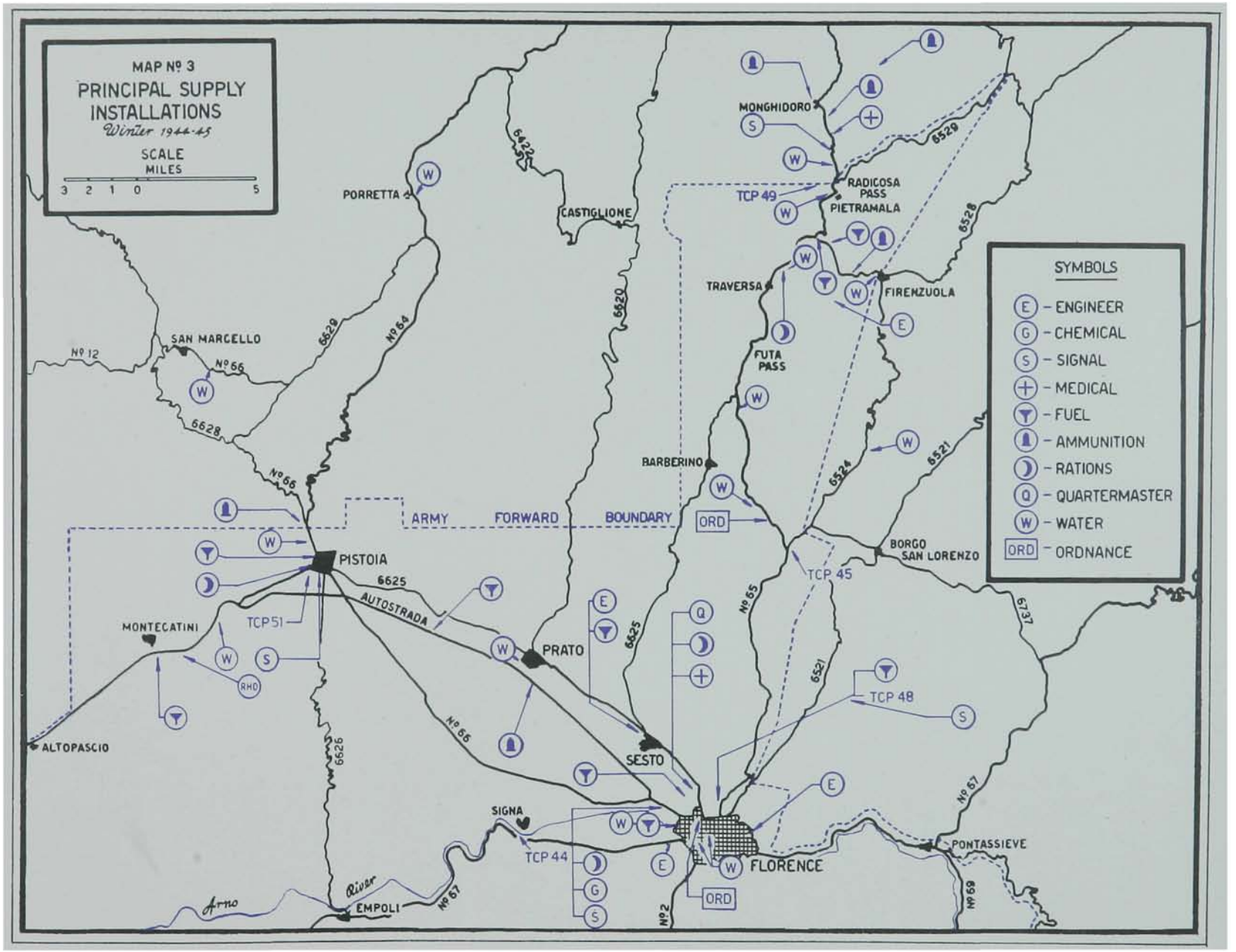
danger from floods. For 3 days during the early November rains the "Victory" Bailey bridge in Florence, carrying traffic from Highways 2 and 67 across the river, was closed when the water rose nearly to the bridge deck and reached the highest level in recent years.

High water in the mountain streams threatened many of the minor roads and trails many times, although the main supply route of Highway 65 was kept open continuously. Fall and early winter weather was more severe than usual. At times infantrymen, artillerymen, and other troops were pressed into service to help the engineers in this struggle. More than 3,000 Italian civilians were also employed by engineer units for manual labor on the roads. Forward infantry organizations took charge of maintaining the small lateral roads used to reach their scattered forces. On Highway 6629 along the Reno River and west of Highway 64 the traffic was detoured onto a railroad bed from which the ties and rails were removed. Railroad tunnels here also were utilized. Rain, snow, and the constant pounding by thousands of chain-equipped vehicles caused great damage to the roads. North of Futa Pass the pavement on Highway 65 virtually disappeared.

Poor weather in winter was made up for by an exceptionally early spring. The spring thaw, which normally could be expected late in March, came in mid-February, and many of the mountains were bare of snow by the 20th. This condition made it possible to carry out more rapid repair and rehabilitation of the road system. Crews were kept busy with asphalt patching materials on the highway south of the pass, and gradually worked their way up to the north side. Their efforts of necessity were confined to the times when the highway was dry, but the long period of good weather allowed them to make great progress. On 2 March the Autostrada was opened for its entire length when repairs were completed on the section between Prato and Pistoia, thus aiding the rear lateral Army supply system.

Replacement of temporary and Bailey bridges proceeded rapidly. In November Army engineers built 15 semipermanent bridges, totaling 1,290 feet in length, and also installed 22 two-way and 48 one-way culverts. The next month's work included erection of 9 additional bridges, 905 feet in length, and laying of 28 additional culverts. Further progress in the bridge line continued. At the beginning of February 19 Baileys were in the process of being replaced. Army engineers were operating quarries to obtain rocks for roads and fills, and three civilian sawmills had been put back in production of lumber for Army use. Hillsides were logged off to provide timber for the bridges. Plans were developed for the ultimate use of the less battered and more direct Highway 64 as the main supply route once the troops succeeded in breaking out onto the plains of the Po Valley.

Rigid control of transportation and traffic over the crowded mountain roads was vitally necessary if proper supply was to be made, tactical movements carried out,


MAP Nº 3
PRINCIPAL SUPPLY INSTALLATIONS
Winter 1944-45
SCALE
MILES
3 2 1 0 5
SYMBOLS
E – ENGINEER
G – CHEMICAL
S – SIGNAL
– MEDICAL
– FUEL
– AMMUNITION
– RATIONS
Q – QUARTERMASTER
W – WATER
ORD – ORDNANCE
ARMY FORWARD BOUNDARY
PISTOIA
PRATO
SESTO
FLORENCE
MONTECATINI
ALTOPASCIO
SAN MARCELLO
PORRETTA
CASTIGLIONE
MONGHIDORO
RADICOSA PASS
PIETRAMALA
TRAVERSA
FIRENZUOLA
FUTA PASS
BARBERINO
BORGO SAN LORENZO
PONTASSIEVE
SIGNA
EMPOLI
AUTOSTRADA
TCP 44
TCP 45
TCP 48
TCP 49
TCP 51
RHD
ORD
Arno River
6422
6525
6528
6529
6625
6626
6628
6737
Nº 2
Nº 12
Nº 64
Nº 65
Nº 66
Nº 67
Nº 69

and transport itself conserved. To accomplish this result six traffic control posts (TCP's) were set up, three on Highway 65, two on Highway 67, and one on the Arno Valley east-west Highway 66. Road movement approval was required for all convoys of 10 or more vehicles, vehicles more than 40 feet long, all those over 8 feet wide, and any incapable of a sustained minimum speed of 15 miles per hour. In the average month of January the movement control division of the Army transportation section scheduled 1,059 convoys with a total of 18,059 vehicles. Highway 65 was capable of handling 400 vehicles each way every hour past a given point. The traffic control posts also served as a check on unnecessary or unauthorized use of Government vehicles. Spot checks were made at various other points by military police to enforce the conservation of transportation.

The TCP's were used as the framework for a system of road patrol to insure the flow of traffic even during extreme snow conditions. Additional "snow posts" were established between the various normal control points, making a total of 16; at each of these a trouble shooting unit, which included wreckers, snowplows, first aid facilities, and emergency rations and fuel supplies, was stationed. The crews of these posts were charged with aiding stranded vehicles and throughout the winter months averaged 35 to 50 "rescues" per week. When snow did not cover the highways the snow fighting equipment remained on a stand-by basis while the wreckers patrolled the road and operated a towing service. Four snow stations were closed 1 March, and the remainder functioned primarily as recovery posts. All were finally shut down on 15 March. Large rotary snowplows were augmented by graders, bulldozers, and snow plow attachments which were fitted to 2½-ton trucks. Engineers of some combat divisions improvised similar plow attachments for jeeps. Sand dumps were located along the highway in the higher elevations ready to be spread to provide traction when ice covered the roads, as it often did whenever the temperatures rose above the freezing point and then dropped. Military police operated "chain points" where vehicles going into the mountains were stopped and beyond which the use of chains was mandatory. At these posts, the locations of which were changed according to road conditions, vehicles coming out of the mountains removed chains to avoid unnecessary wear on the roads and tires. Corps commanders were charged with responsibility for determining the line beyond which lights must be extinguished and only blackout driving lights used. On Highway 65 the light line was a short distance north of Radicosa Pass. Despite all these precautions, some loss of equipment was suffered due to accidents, but traffic was never halted for long; at no time were serious road closures threatened.

The strain on motor transportation was greatly eased during the latter part of January when railroad facilities between Leghorn and Montecatini were restored, and supplies discharged at the port were shipped by train to the railhead at Monte-

catini, which could handle 3,000 tons daily. Work continued on repairs to allow opening of the line farther east to Pistoia and Florence, where yards with much greater capacity and located closer to the highway supply routes were available. The Campo di Marte yards in Florence were large enough to accommodate a flow of 5,000 tons of freight each day. Total tonnage handled by rail and truck transport preceding the opening of the Florence yards averaged between 20,000 and 25,000 tons weekly. German destruction of the ¾-mile long Serra Valle tunnel about 5 miles west of Pistoia delayed the opening of this line to Florence until April, for a 135-foot break in the center of the tunnel and another 286 feet long near one entrance had to be cleared before the tracks could be used.

In February work was begun on the line along the south bank of the Arno connecting Florence and Leghorn. This job, which involved bridging the river, was completed on 27 March, 2 weeks after the Florence yards were restored and 34 days ahead of schedule. The Montecatini railhead was then closed, but the Pistoia yards did not open until the north bank line was completed. Work was also started on the Prato—Bologna railroad, and by mid-March the line had been restored as far as was possible due to the tactical situation. Repairs were completed up to the north entrance of the famous 11.5-mile long Tunnel of the Apennines, the second longest tunnel in Europe. Two railheads were contemplated, one at Grizzana, a short distance north of the tunnel, and the other at Vado, a station 12 miles south of Bologna. It was hoped the former would be ready by 15 May.

Five additional Italian pack mule companies were organized to improve the supply system in the mountains, making available 15 such units with a strength of approximately 3,875 animals. Two hundred cargo sleds of 1-ton capacity each were obtained from British stocks, and 100 ski litters were manufactured locally. These litters and sleds proved valuable on well packed trails but were of no great use in deep snow. The new small cargo carrier, the full-tracked "Weasel," received in quantity shortly after the first of the year, proved of great value in negotiating the snowy, mountainous terrain.

Working alongside the engineers throughout the winter were signal corps linemen engaged in expanding and improving communications. Many new lines were strung; hookups were made to the Italian state underground cable system. Circuits linked all units of the Army, and in preparation for the spring offensive an 8-mile line containing eight open wire circuits was started in February from Filigare on Highway 65 near Monghidoro to the village of Lagaro on Highway 6620. Enemy artillery fire in early March prevented the construction of the last 2 miles of this line. Completion of the system toward Vergato on Highway 64 would provide the Army the most flexible communications possible until the fall of Bologna.