WAR DEPARTMENT TECHNICAL MANUAL
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HANDBOOK ON
GERMAN
MILITARY FORCES

WAR DEPARTMENT • 15 MARCH 1945

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CHAPTER VI

SUPPLY, EVACUATION, AND MOVEMENTS

Section I. HIGHER ORGANIZATION OF SUPPLY

1. Government Direction of Production

Economic production in Germany is highly centralized and under complete governmental control. The Ministry for Armament and War Production (Reichsministerium für Rüstung und Kriegsproduktion) under Albert Speer controls production of war material and ammunition; the Ministry for Economic Affairs (Reichswirtschaftsministerium) controls all other industrial production; the Ministry for Food and Agriculture (Reichsministerium für Ernährung und Landwirtschaft) controls food production. Among them these three ministries control production of the supplies for the German Armed Forces and, within the limitations imposed upon Germany by the insufficiency of her natural resources and the effects of the Allied advances and bombings, they are able to gear the production to the needs of the war machine.

2. Estimate of Needs and Placing of Orders

These are essentially General Staff functions, since they involve present and future operations and capabilities. On the basis of High Command directives, the detailed estimates of the number or quantity of each article of supply are worked out by the technical branches concerned; they must be adjusted to the industrial, labor, and raw material potentialities of the nation.

The three branches of the Armed Forces and the Waffen-SS establish their procurement policies on an interservice basis and coordinate the use of railways, canals, and roads for military traffic. In addition, for a number of particularly critical items, the Armed Forces High Command has created special depots which are at its exclusive disposal (Verfügungsdepots).

Within the Armed Forces the lines of distinction between the Armed Forces High Command and the Army High Command are not always clearly drawn as far as procurement is concerned. The Army being by far the largest branch of service, the Army High Command (OKH) may in certain cases act for the Armed Forces High Command (OKW). In addition, the Army procures a proportion of the material used by the Waffen-SS. The bulk of this material is transferred to the Waffen-SS through Army channels of supply and not through the system of depots maintained by the SS High Command.

3. The Army

The Army High Command (OKH) has the direct responsibility for a well functioning army supply system. Its wartime supply functions are divided into two distinct phases. The first phase, centering in the Zone of the Interior, is supervised by the Chief of Army Equipment and Commander of the Replacement Army (Chef der Heeresrüstung und Befehlshaber des Ersatzheeres) who organizes the procurement of supplies, their storage in suitably placed depots, and their distribution to home and field units. It is his duty to interpret high command directives on an over-all nationwide basis. He determines what proportion of supplies is essential for use by garrison and training units, what amount can be sent to the front, and which areas are in the best position to issue supplies. The second phase, the Field Army (Heeres) supply system, is controlled by the Chief of Field Army Supply and Administration (Generalquartiermeister or Gen. Qu) who administers the sending of requisitions to depots established by the Chief of Army Equipment and the receipt, storage, and distribution of supplies in the field.
Section II. SYSTEM OF SUPPLY: WITHIN GERMANY

1. Production, Acceptance, and Distribution of Equipment* and Ammunition

a. Design and Development. This is primarily the responsibility of the Army Ordnance Office (Heereswaffenamt). In particular, its Weapons and Equipment Manufacture Group (Amtgruppe für Industrielle Rüstung) includes ten sections dealing with the main categories of equipment and known as armament sections one to ten (Waffenrüstungsabteilungen 1-10). The Ordnance Office also has a Research Branch (Forschungsabteilung) and a Development and Testing Branch (Amtgruppe für Entwicklung und Prüfung). In addition, the Ordnance officer coordinates the activities of numerous army-owned and semi-private research institutes and experimental stations throughout the country. Suggestions for design and development are also received from all the technical branches of the Army.

b. Production. On the production side the Ministry for Armament and War Production has, through its regional Armament Inspectorates, a decisive influence on the selection of firms, coordination of armament orders with other orders, labor questions, and scheduling and supervision of production.

c. Acceptance. The testing of weapons, equipment, and ammunition, and their acceptance at the armament factory is the responsibility of the Army Acceptance Organization (Heeresabnahmenweise), which is a branch of the Army High Command/Army Ordnance Office (OKH/Heereswaffenamt). There is one Acceptance Inspector (Abnahmeinspeisent) in each corps area who acts through acceptance commissions located at the factories.

d. Distribution of Equipment and Ammunition to Army Units. After acceptance at the factories, the flow of equipment and ammunition to field and home units may take a number of routes:

- By way of equipment and ammunition depots.
- By way of equipment parks.
- Direct from the factory.
- Through SS depots.
- Through special Armed Forces High Command (OKW) depots.

*The term "equipment" refers to the group of materials handled by equipment depots and equipment parks, in contrast to the individual equipment (Ausrüstung des Mannes) and clothing handled by clothing depots.

2. Main Army Equipment and Ammunition Depot Organization

a. Organization. The agencies responsible for most of the storage, issue, and repair of equipment and for the storage, issue, and salvaging of ammunition belong to a separate branch of the Army, the Ordnance Branch (Feldzeugwesen). The branch is headed by the Chief Army Ordnance Officer (Feldzeugmeister), who works through his staff, the Ordnance Inspectorate (Feldzeuginspektion) in the General Army Office (Allgemeines Heeresamt). From the Ordnance Inspectorate the chain of command leads through three regional commands, called Ordnance Groups (Feldzeuggruppen), with headquarters in Berlin, Kassel, and Munich, to the Ordnance Headquarters (Feldzeugkommandos) which are at the level of the corps areas but not affiliated with the latter. There is one Ordnance Headquarters in each corps area, where it controls a varying number of equipment and ammunition depots. The Ordnance Headquarters is the lowest controlling agency for the storage and issue of equipment and ammunition, and it is important to note that below this level equipment and ammunition are handled by two separate types of depots. The Ordnance Headquarters is designated by the number of the corps area. It and the depots it controls are not, however, part of the corps area organization, although the auditing of their books is done by the Corps Area Administration.

In addition to the Ordnance Headquarters designated by the corps area numbers, there exist an Ordnance Headquarters XXX, which is in charge of a great number of subterranean ammunition depots in central Germany, and a special Tank Ordnance Headquarters (Panzers-Feldzeugkommando), created in 1943 in order to centralize the supply of all types of armored fighting vehicles and their spare parts throughout Germany.

b. Equipment Depots. Army Equipment Depots (Heereszeugämter or HZa) and Army Branch Equipment Depots (Heeresnebenzeugämter or HNZa), controlled by the Ordnance Headquarters, handle weapons, tanks, tank spare parts, motor transport, assault boats, radio apparatus, anti-gas equipment, bridge materials, special clothing, concrete mixers, and manuals, as well as many other articles. They do not furnish ammunition, fuel, rations, clothing (other than special types), medical and veterinary equipment, horses, or most types of individual equipment.
Figure 1.—Supply of equipment and ammunition.
Although the depots normally handle a great variety of items, they sometimes concentrate upon particular types. For example, air reconnaissance has revealed large concentrations of motor transport at the Chemnitz HZa and large artillery stores at the Berlin-Spandau HZa. It is known, however, that these centers also hold large stores of equipment which cannot be seen from the air. When depots specialize in only one type of equipment, they have their specialties incorporated into their names. This group includes the Army Tank Equipment Depot (Heerespanzerzeugamt or HPZa) at Magdeburg-Königsborn; the Army Branch Tank Equipment Depots (Heerespanzer-, nebeneinander or HPNzA) at Frankfurt an der Oder, Naumburg, Bielefeld, Breslau, Oppeln, Kassel, Altenbrakow, and Olmütz; the Army Signal Equipment Depot (Heereszeugamtsnachrichten or HZaNachr) at Berlin-Schöneberg; and the Army Branch Signal Equipment Depot (Heeres- nebeneinanderzeugnachrichten or HNzANachr) at Wien-Strebersdorf (Vienna).

In addition to their storage functions, the HZa and HNZa adjust and test newly arrived materials and repair damaged equipment. Several of the HNZa are engaged almost entirely in repair functions, and most equipment depots maintain ordnance, signal, and engineer equipment servicing sections for inspecting newly manufactured equipment and repairing damaged equipment. Specialization in items repaired may occur: thus the tank equipment depots repair tanks and armored vehicles which have been so badly damaged that they cannot be repaired in the field.

The equipment depots are staffed by officers and noncommissioned officers of the Ordnance Branch who control the workers, usually civilians or soldiers serving a prison sentence.

An Army Equipment Depot is divided into two parts: the storage depot (Lager) and the workshop (Werkstatt). The storage depot is subdivided in departments (Bezirke), each of which specializes in one type of equipment. Depending on the type of equipment handled, the workshop will have separate sections like an arms workshop (Waffen- Werkstatt), an optical instruments workshop (Optische-Werkstatt), etc.

The Army Equipment Branch Depot is organized along the same lines as the Army Equipment Depot.

Associated with equipment depots are the Armed Forces depots attached to motor transport manufacturers. The main function of these is to facilitate transfer of vehicles from factories to equipment depots.

As the number of HZa is relatively limited and as they are perhaps the largest supply depots within Germany, they have been heavily bombed by Allied air forces. Despite much damage, the HZa have shown great recuperative powers. The importance of many HZa, however, has diminished, while that of the HNZa has increased through the dispersion of stores among the smaller supply centers.

List of known Army Equipment Depots
(branch depots not included):

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<tr>
<th>Corps Area</th>
<th>Installation</th>
<th>Location</th>
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<td>HZa</td>
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<td>XXI</td>
<td>HZa</td>
<td>Posen</td>
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c. AMMUNITION DEPOTS. Army Ammunition Depots (Heeresmunitionsehalten or HMa) and Army Ammunition Branch Depots (Heeresmunitionsehalten or HMNa) are the main German centers for the storage and issue of ammunition. Frequently they concentrate upon particular types of ammunition; for example, the HMa at Münsterlager, Celle, Dessau, Augsburg, and Neu-Ulm are probably principal centers for the storage of chemical warfare ammunition.
Figure 2.—MUNCHEN MAIN EQUIPMENT DEPOT (HZA)
Photographed early in 1943 after a bombing. Chief features are four very large standard equipment buildings (averaging 500' x 150') typical of Main Equipment Depots; 21 smaller standard equipment buildings (about 270' x 70'); a gun park containing about 300 guns; and about 55 miscellaneous buildings in the depot area.
In addition to storing and issuing ammunition, the HMa and HMNa participate in its production by assembling and filling shells and by manufacturing fuzes and other accessories.

Like the equipment depots, the ammunition depots are staffed by personnel of the Ordnance Branch. Employees include civilians, soldiers, prisoners of war, and large numbers of foreign laborers. An HMa usually has the following departments:

- Administration
- Manufacture (filling and packing of shells)
- Shipping
- Personnel administration
- Motor pool

Because of the large number of well distributed ammunition depots, many of them underground, Allied air attacks have not interfered materially with their functioning. But the increased number of foreign laborers employed by these depots undoubtedly has lowered their productivity.

**d. Area of Distribution.** Generally a depot is allocated a definite geographical distribution area. The depot may be the exclusive German distributor of a particular item, or it may be merely the exclusive distributor within an allotted area. Thus the Ulm HZa distributes types of engineer equipment to all areas, while it issues Czech small arms to less than half of the corps areas. In addition, a depot may be assigned to a particular army for the supply of materiel replacements and the repair of its damaged materiel.

3. Corps Area Equipment Park Organization

**a. General.** The corps area parks complement the equipment depots in the handling of motor transport, engineer equipment, and anti-gas equipment, and form the principal centers for the distribution of horses, veterinary equipment, and medical equipment. Requisitions for repairs reach the parks from both home and field units. Primarily, a park is responsible for servicing its allotted area; usually it also is charged with the supply and maintenance of designated units of the Field Army.

**b. Motor Transport Parks.** The Home Motor Transport Parks (Heimatkraftfahrparke or HKP) received damaged or impounded vehicles such as motorcycles, trucks, and staff cars, but do not handle tanks and armored vehicles, or any newly manufactured vehicles. There are several such parks in each corps area, controlled by the Home Motor Maintenance District Headquarters (Heimatkraftfahrbezirk) of the corps area.

Most of the vehicles repaired belong to the Wehrmacht and the SS; but vehicles from semimilitary and civilian agencies are also repaired. The HKP vary widely as to the number of vehicles repaired daily and the average number held. At Berlin, where there are three HKP, each may hold as many as 1,000 vehicles and repair 30 daily. Most HKP, however, hold 60 to 100 vehicles and have a daily repair average of probably less than ten vehicles. Since many of the vehicles received are damaged beyond repair and must be scrapped or cannibalized, the daily repair averages are not as inefficient as may appear upon initial glance.

A typical HKP includes a reception point where vehicle defects are inspected, a large number of workshops, and final inspection points where vehicles are either dispatched to units or sent back for further repair. Frequently there are branch administrative offices (Zweigstellen) and workshops located as far as 40 miles from the Main Office (Hauptstelle). The number of HKP in a corps area varies greatly: at one time Corps Area VI was known to have nine HKP, while Corps Area V had only four.

Supplies of spare parts and tires are procured from Central Spare Parts Depots (Zentraler- satzteillager or ZEL) and Tire Depots (Reifenzentrallager) which are controlled by the HKP, or direct from factories.

**c. Medical Parks.** The Berlin Main Medical Park (Hauptsanitätspark) and the Corps Area Medical Parks (Wehrkreissanitätsparke)—one per corps area—receive all types of surgical apparatus, drugs, bandages, and dispensing equipment from factories and hold them for distribution to hospitals within their corps areas and to Medical Collecting Parks (Sammlungsanitätsparke). The latter are subsidiaries of the Corps Area Medical Parks and serve as collecting points for medical supplies to the field forces. In certain cases the Main Medical Park and Corps Area Medical Parks may deliver their supplies direct to the field forces.

The Main Medical Park in Berlin occupies a special position as it holds critical drugs and hospital supplies for distribution to Corps Area Medical Parks and Medical Collecting Parks. In addition it tests newly developed pharmaceutical preparations and medical equipment and furnishes the Corps Area Medical Parks with "standard" samples of medical equipment. The Main Medical Park is subordinate to the Chief Army Medi-
cal Inspector, and the Corps Area Medical Parks are subordinate to the Corps Area Surgeons; there is thus no chain of command leading from the Main Medical Park to the Corps Area Medical Parks.

There is also a group of Medical Booty Collecting Points (Sanitätsbestesammelstellen) that are centers for the collection of captured medical equipment. This is sorted and tested prior to shipment to the medical parks for distribution.

Although the medical parks participate in the repair of damaged medical equipment, it is very likely that much of the recovery work is done by the manufacturers.

d. VETERINARY PARKS. Veterinary supplies are procured through veterinary parks. The Army Main Veterinary Park (Heeres Haupt veterinärparke) is directly subordinate to the Veterinary Inspector. It is the central procurement agency for veterinary equipment. Upon orders from the Veterinary Inspector the Army Main Veterinary Park will supply the Home Veterinary Parks (Heimat veterinärparke) with veterinary equipment either directly or by ordering it for these parks from commercial manufacturers. Horse-shoeing equipment is always ordered from civilian factories.

The Home Veterinary Parks, numbering one in each corps area, and the Army Main Veterinary Park receive veterinary equipment such as shoeing equipment and veterinary medicines from the manufacturers and issue it to units and horse hospitals, besides repairing and salvaging damaged veterinary equipment received from units.

e. HORSE PARKS. Young horses purchased by the Army are sent to Army Remount Depots (Heeresremontämter) for their maintenance and training until they are suited for field use. They are then delivered direct to corps area riding schools, to home units, or to Home Horse Parks (Heimats pferdeparke) which forward horses to Field Army units.

As the occupied territories formerly furnished most of the horse replacements for the German Army, their loss will greatly aggravate the already noticeable animal shortage at a time when the German Army is becoming increasingly dependent on horse transportation.

f. OTHER PARKS. A sizeable number of Home Engineer Parks (Heimatpionierparke) have been reported functioning within the corps areas, supplying home and field units with engineer equipment. In addition, there are at least five special Home Fortress Engineer Parks (Heimat festungspionierparke), which supply fortress engineer units; a number of Home Railway Engineer Parks (Heimat eisenbahnpionierparke); and a few Gas Defense Equipment Parks (Gasschutz gerateparke).

4. Clothing and Individual Equipment* Supply Organization

a. PROCUREMENT AND ADMINISTRATION. Procurement of raw materials is the special function of the Armed Forces Clothing and Equipment Procurement Office (Wehrmachtbeschaffungsamt Bekleidung und Ausrüstung) at Berlin. The raw materials are then issued to the clothing depots of the three branches of the Armed Forces and the SS which manufacture, store, and issue clothing and various items of individual equipment. In addition, damaged, captured, or impounded clothing may be sent to the clothing depots for repair and reissue.

In the Army the highest administrative echelon is a section in the staff of the General Army Office (Allgemeines Heeresamt/Stab/Bekleidung) which issues all directives on clothing and equipment. It controls the work of the Army Clothing Depots (Heeresbekleidungsämter or HBA). Within each corps area the supply of clothing is directed by Section E (Sachgebiet E) of the Corps Area Administration (Wehrkreisverwaltung). Thus for all practical purposes the normal Army Clothing Depot is subject to a dual control.

b. CLOTHING DEPOTS. One or more Army Clothing Depots are generally found in each corps area. These HBA receive raw materials from which they manufacture clothing, insignia, shoes, tents, canteens, blankets, and other items of individual equipment. They exercise control over Testing and Repair Sections (Verwaltungsund Instandsetzungabteilungen), which repair damaged clothing, and Army Clothing Dumps and Branch Dumps (Heeresbekleidungs lager und Nebenlager), which assist in the forwarding of clothing to the field forces.

Specialized types of clothing depots include Collecting Points for Winter Clothing (Sammelstellen für Winterbekleidung), Army Clothing Repair Workshops (Heeresbekleidungs instandsetzungswerkstätten) which presumably do not handle newly manufactured clothing, and Clothing Processing Centers (Durchschleusungsstel-

* Ausrüstung des Mannes. See note on page 2.
len) which are believed to be centers to which reinforcements requiring refitting are routed before their departure for the front. In addition, rations depots may store and issue clothing for certain areas.

c. Area of Distribution. The HBA issues clothing and individual equipment to units within its assigned territorial area. Many HBA are also responsible for the supply of particular armies in the field; to facilitate the transfer of clothing to field units, issues may be made to Army Clothing Dumps and Branch Dumps which in turn issue clothing and individual equipment to field units.

5. Rations Supply Organization

a. General. The German Army depends for its transportation to a large extent on horse-drawn vehicles; forage is therefore considered to be of equal importance to human rations, and the supply of both is handled by the same agencies. In the following description of the supply organization the term rations includes forage as well.

b. Procurement and Administration. The over-all planning of rations and the laying down of policies for the procurement and organization of supplies is done for all branches of the Armed Forces at the Rations and Procurement Group (Amtgruppe Verpflegung und Beschaffung) of the Army High Command/Administration Office (OKH/Heeresversorgungsamt). At the same time the Rations and Procurement Group directs the supply of rations to the Field Army and to the Replacement Army. Regional control of supply is exercised by Section C (Sachgebiet C) of the Corps Area Administration.

Although all rations depots procure a proportion of their supplies direct from local producers, they draw most of them from the Higher Rations Stores (Ersatzverpflegungsmagazine or EVM) to which they are subordinate. In procuring rations for distribution, the EVM purchases food from all parts of the corps area in which it is located and prepares for the exchange of goods with other corps areas. In many instances procurement of a particular rations component, such as flour or fodder, may be delegated to one of the depots subsidiary to the EVM.

c. Rations Depots. While in peacetime the troops purchased their rations mostly through commercial channels and only bread and forage were procured from the Army bakeries and rations depots, in wartime the supply of rations from Army depots has become the rule. To fulfill this task, the Higher Rations Stores or EVM were formed at the outbreak of war from many of the already existent Army Rations Main Depots (Heeresverpflegungshauptämter) or (HV-HA).

The most important type of rations depot is the EVM. The EVM control Army Rations Main Depots (HVHA) which in turn control Army Rations Depots (Heeresverpflegungämter or HVA) and Army Garrison Rations Depots (Heeresstandortverwaltung Verpflegungsabteilungen). Although the number of such installations in a corps area varies, one corps area is known to have two EVM, three HVHA, nine HVA and at least 12 Army Garrison Ration Depots. There are probably 40 EVM in Germany, 36 of which are listed below.

The echelon of the depot generally determines its size and stock. Each EVM is expected to maintain stock sufficient for one month's rations for 300,000 men; this would amount to over 10,000 tons of food. An HVHA retains food reserves of perhaps 3,000 tons, while an HVA usually stocks several hundred tons. An EVM almost invariably has a bakery and good rail facilities; lower echelon depots may lack bakeries and may have only road connections.

The rule as to size of depots is not inflexible. A large share of the stores normally retained by the EVM may be divided among HVHA and HVA for additional protection from air raids and to facilitate the loading of rations trains. In other instances, Army Garrison Rations Depots handle more stores than HVHA or HVA of the same corps area due to abnormal troop concentrations in their particular garrison areas.

While specialization is not typical of the rations depots, since both human and animal rations are found in all types, a limited number of HVHA and HVA tend to have concentrated stores of a particular rations component. As an example, one HVHA, now captured, maintained a reserve of thousands of tons of oats in addition to its stores of troop rations. In certain farming districts Fodder Collecting Points (Rauhfuttersamnstellen) specialize in the collection and storage of forage.
Figure 3.—Supply of rations.
List of known Higher Rations Stores (EVM):

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<thead>
<tr>
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<th>Location</th>
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<td>Prag</td>
</tr>
</tbody>
</table>

6. Fuels and Lubricants Supply Organization

a. General. Because of the critical condition of German fuel supply, the collection and distribution of fuel have largely been retained by the Ministry of Economic Affairs through its Central Petroleum Office. Both the Central Petroleum Office and the Armed Forces High Command exercise authority over the WIFO (Economic Research Company), which is the organization responsible for the administration of depots supplying fuel to the armed forces.

b. Procurement. The Ministry of Economic Affairs, in collaboration with the Armed Forces High Command, establishes the proportional allotment of fuel to the Armed Forces and to civilian users. The refineries, producers, and importers then are directed to ship supplies either to the WIFO Depots or to air force, naval or commercial storage depots.

c. Types of Depots. The main WIFO depots controlled by the Central Petroleum Office consist of Main Strategic Depots (Zentralhauptspeicher), which are usually underground, and of Main Transit Depots (Zentralumschlaglager), which store supplies for transshipment. In addition to supplying the largest share of fuel received by army fuel depots, these depots handle a portion of the fuel used by the Air Force and Navy. The Main Strategic Depots have storage capacities ranging into hundreds of thousands of tons of oil. For this reason the Allied air forces have bombed them with great consistency. The importance of the Main Transit Depots has decreased since the cutting off of Rumanian petroleum imports.

The smaller WIFO depots, controlled by the Armed Forces High Command, consist of Army High Command Fuel Supply Depots (OKH...
Nachschubtanklager) and subsidiary Army Fuel Supply Depots (Heeresnachschubtanklager). These depots are directed solely to the supply of Army units. Very likely, commercial storage depots situated in the Theater of Operations have been converted into WIFO depots of this sort.

Not controlled by WIFO are the depots situated near the producing plants (Marschtanklager or Fuel Replacement Depots) which send fuel supplies to the depots mentioned above as well as direct to the Field Army.

7. Waffen-SS Supply Organization

a. Relation to Army Supply. While the Waffen-SS is generally self-sufficient in its Zone of the Interior supply, it depends upon the Chief of Army Equipment for most of its tanks, self-propelled guns, and other heavy equipment and for the repair of many of its vehicles. Indeed, Waffen-SS units have a higher priority on heavy equipment than do army units. To what extent the SS reciprocates by supplying army units has not been determined.

b. SS Depots. Of the SS depot centers, Oranienburg is the most important as it contains the Main SS Equipment Depot (SS-Zugamt), the SS Central Distribution Center (SS-Zentralzulassungstelle), the SS Signal Equipment Depot (SS-Nachrichtenzeugamt), and an SS Motor Transport Depot (SS-Kraftfahrzeugdepot). Other important SS depot centers are Berlin, Dachau, and Prague. Since the SS depots supply the other branches of the SS as well as the Waffen-SS with rations, clothing, and certain types of equipment, they cannot be considered as purely military depots.

8. Transportation

All military transportation by rail or on inland waterways comes under the direction of the Chief of Transportation (Chef des Transportwesens) at the High Command of the Armed Forces (OKW). He works through a chain of transportation headquarters which are usually subordinate to the Army but act for the whole of the Armed Forces. The activities of the transportation headquarters cover the occupied territories as well as Germany.

The Transportation Headquarters (Transportkommandanten) are regional liaison offices of the Armed Forces with the German State Railways (Deutsche Reichsbahn) and the authorities controlling the transportation on inland waterways. The Transportation Headquarters are located at the seat of a Railway Directorate (Reichsbahndirektion) and control the area of one or more Railway Directorates.

The Transportation Headquarters are the basic units through which all military agencies must deal if they require rail or water transportation for units, freight, or casualties. The Transportation Headquarters make the transportation facilities available and issue orders as to how and when they are to be used.

The staff of the Transportation Headquarters is organized into:

Section Ia: Troop movements for the Armed Forces
Auxiliaries of the Armed Forces
Transportation of prisoners of war

Section Ib: Freight for the Armed Forces
Armanent goods
Armed Forces travel

Section IVb: Hospital and convalescent trains

Subordinate to the transportation headquarters are railway station headquarters (Bahnhoftkommandanten) and officers stationed at inland harbors (Hafennachfehre). These headquarters and officers are stationed there for the maintenance of order and as liaison officers with the local railway and harbor officials.

Section III. SYSTEM OF SUPPLY OF THE FIELD ARMY

1. General

The supply system of the Field Army is simple and flexible. Its main objective during combat is to replace all supplies used during one day of combat by the beginning of the next day. Rules and regulations are not mandatory; much discretion therefore remains with the supply officers who are encouraged to move supplies as far forward as possible without reloading, to salvage all usable material, and to limit expenditure of supplies as far as possible.

2. Staff Control

a. Supply Directives. The commanders of Field Army units conduct supply within their commands in accordance with directives laid down by the Army High Command. For this purpose their general staffs are provided with staff officers, analogous to our G-4's, who are called Ib and
who are responsible for all matters of transport and supply. When the Ib, acting in the name of his commander, issues supply directives, their execution usually falls to the following:

1. Arms and Equipment Section (W and WuG).
2. Intendance Section (IVa or Intendantur), dealing with rations, clothing, and pay.
3. Medical Section (IVb).
4. Veterinary Section (IVc).
5. Motor Transport Section (V).
6. Supply Troop Commander (Kommandeur der Nachschubtruppen), commanding the organic or attached supply troops.

b. STAFF OFFICERS AND DUTIES. The staff officers concerned with supply in the Field Army and their duties are as follows:

1. At Field Army headquarters, the Chief of Field Army Supply and Administration (General Quartermaster) is directly responsible to the Chief of Staff of the Field Army and constantly is kept informed of the supply situation of the various armies. One of his main functions is forwarding the requirements of the armies to the Chief of Army Equipment. He regulates the evacuation of prisoners and wounded, and the use of communications in the theater of operations. Large stocks of materials, including captured materials and mobile supply trains, are under his control. Important repair centers are also maintained under his control.

2. At army group headquarters, the Army Group Ib intervenes only when a critical situation requires action, since army groups are not in the normal chain of supply. Normally his most important function is the supervision of security units which safeguard supplies in the communications zones. Units attached to an army group are supplied through the army in whose area they are located.

3. At army headquarters, the Army Ib (Oberquartiermeister) administers the collation and forwarding of requisitions, the receipt of supplies from Zone of the Interior depots, the distribution of supplies to lower echelons, and the maintenance of important dumps and repair centers.

4. At corps headquarters, the Corps Ib (Quartiermeister), who always has been a link in the chain of requisitioning, recently has been assigned a role in the chain of supply, although the larger proportion of supplies still pass direct from army dumps to divisions. In addition to handling the supply of organic corps troops, the Corps Ib supervises the distribution of supplies from corps dumps to lower echelons.

5. At division headquarters, the Division Ib makes his requisition to the Corps Ib on the basis of requisitions and reports from the troop units. He controls the division services of supply and provides a systematic supply of reserves of all kinds for the troops. Like the Army Ib, he is in the normal chain of supply.

3. Requisitioning and Procurement
a. REQUISITIONING. (1) The normal channel of requisitioning is from troop units through regiment, division, and corps to army.

(2) An army generally sends requisitions for ammunition, fuel, motor transport, horses, weapons, spare parts, and most other types of equipment to the Field Army, while requisitions for rations, clothing, medical equipment, and veterinary equipment go direct to home depots assigned to the army. While these are the usual channels, many variations are known to occur. For instance, an army may send a requisition for certain special weapons and chemical warfare equipment directly to the Chief of Army Equipment, or an army may send a rations requisition to the Field Army in addition to forwarding the requisition to a home depot.

(3) Requisitions arriving at the Field Army usually are forwarded to the Chief of Army Equipment, who passes them down to a designated home depot. In some cases, however, the Field Army may send requisitions directly to a home depot without routing them through the Chief of Army Equipment.

(4) A requisition may be filled at any level by the echelon which has the necessary supplies available in its storage centers.

b. PROCUREMENT. Requisitioning is supplemented by two methods of field procurement: living off the land and the use of captured material.

(1) Living off the land may be accomplished either by local purchase or by outright confiscation of local supplies. Such procedure seldom is sufficient to supply all the requirements of units. In some areas, nevertheless, it has considerably lessened the German supply problem, as in Italy where much food, clothing, ammunition, and equipment is locally procured.

(2) The employment of captured matériel has always been a favored practice in the German Army. In the offensive beginning in December
1944, directed against the Americans holding the St. Vith-Bastogne area, the Germans apparently expected to keep their tanks operating by the seizure of American fuel dumps. The German soldiers frequently were clothed with American uniforms and operated with liberal amounts of captured Czech, British, French, and Russian, as well as American weapons and equipment.

4. Principal Installations

a. Rearward of Railheads. (1) Collecting stations (Sammelbahnhöfe). Shipments of less than a rail carload are sent to these stations and combined into carloads and train shipments before being routed to the railhead.

(2) Forwarding stations (Weiterleitungstationen). Rail shipments that are not unit-loaded for one organization may be forwarded to the army through one of these stations.

(3) Distributing stations (Verteilbahnhöfe). When a large number of units are dependent upon a single railroad for their supply, a distributing station may be set up to regulate the dispatch of supplies to the proper railhead or unloading point; apparently the combined functions of the collecting, forwarding, and distributing stations approach the functions of the U. S. regulating station.

(4) Supply collecting areas (Nachschubsammelgebiete). Reserves of ammunition, fuel, and rations are kept loaded in trains in these areas subject to disposition by the Chief of Field Army Administration and Supply.

(5) Field Army parks, bases, and depots (Heeres Parke, Stützpunkte, und Lager). Primarily concerned with the maintenance, repair, and forwarding of vehicles, including tanks and armored vehicles, these Field Army installations may be located well to the rear of the railheads.

(6) Army parks (Armee Parke). Some of the army equipment parks may be located to the rear of the army railheads.

b. Railheads (Kopfbahnhöfe). Railheads are located as far forward as possible. While this generally results in army (Armee) railheads, each of which supplies a number of divisions or a corps (in the latter case the railhead may be called a corps railhead), a division railhead for each division is established whenever possible. On the Western Front, depending on the nature of the terrain and the effectiveness of Allied bombings, the railhead is found from 10 to 50 miles—usually about 25 miles—from the front. This is a great improvement over the conditions that existed in the early stages of the Russian campaign, when German railheads were on an average from 90 to 120 miles behind the front troops.

c. Forward of Railheads. (1) Army parks and dumps (Armee Parke und Lager). Army fuel, rations, and ammunition dumps are almost invariably forward of army railheads, while army equipment parks generally are in the vicinity of the railheads.

(2) Corps dumps (Korps Lager). If army installations are far to the rear, corps dumps may be set up between army and division; in such cases the corps dumps function as advanced army dumps distributing to divisions.

(3) Division dumps (Divisions Lager). The dump system may be pushed forward even into the division area, but this is the exception rather than the rule.

(4) Distributing points (Auslieferstellen). These are maintained by divisions and possibly other echelons in their areas for the distribution of rations, fuel, and ammunition. While stores are not generally retained at these points, small accumulations may occur.

(5) Collecting points (Sammelstellen). Although called collecting points, these centers, which are maintained by army and division, serve as supply points for new and repaired equipment as well as collecting points for damaged and captured equipment.

(6) Reloading points (Umschlagstelien). When long road movements are involved, reloading points may be set up by army or corps to facilitate supply movements.

(7) Supply points. Units lower than divisions have points analogous to collecting and distributing points.

5. Distribution of Supplies to Field Units

a. General Scheme of Distribution. (1) Supplies are transported by rail from home depots to army railheads where they are picked up by army supply columns and transported to army dumps and parks. Division supply columns receive rations, fuel, and ammunition at army dumps, and equipment at army parks. They carry the rations, fuel, and ammunition to division distributing points, and the equipment to division collecting points. At these points, supplies are transferred to battalion supply columns and carried to battalion or company supply points where the supplies are turned over to the troops.
(2) While this is the usual flow of supplies, it may be modified in a number of ways, most of which are shown in Figure 2. Operational conditions are the cause of most modifications of the usual system of distribution. Hence, if the army and divisions are short of trucks or gasoline, columns from units as low as companies may be forced to go as far as 20 miles to receive supplies from army railheads and dumps; if the lower echelons lack means of transportation, army supply columns may be used to bring supplies to the troops; if Allied strafing is expected, supply movements may be limited to the hours of darkness; if units are stationed in the near vicinity of army dumps, they may draw their supplies direct from the dumps.

b. Distribution of Rations. Normally home rations depots ship supplies direct to Army Rations Dumps (Armeevorratstauschstellen). A number of such dumps may be set up, each with stores of less than 100 tons. In some cases, these dumps have been known to store small amounts of clothing, individual equipment, and office equipment. As they are not permanent installations, they may move from time to time. Forward army dumps sometimes are controlled by corps and called Corps Rations Dumps (Korpsvorratstauschstellen); in such cases, the corps dumps supply the division and corps troops, while army dumps supply units and individual detachments attached to army headquarters, and form a permanent organization for the support of future military operations. Rations supply within the division is handled through a rations distributing point (Vorratstauschstellen). Supplies are received at this point and are distributed to division units. Usually livestock is sent to field butchery platoons for dressing, and flour to field bakeries for bread production.

(1) A butchery platoon can process the following number of animals per day:

40 beef cattle = equal to 40,000 meat rations.
80 pigs = equal to 24,000 meat rations.
240 sheep = equal to 19,000 meat rations.

(2) A field bakery company can produce between 15,000 and 19,200 bread rations, according to the weather and the time of the year. After passing through the rations supply points of the division units, the supplies finally reach field kitchens and troops. Field kitchens of two types are found: large, with a capacity for supplying 125 to 225 men; and small, with a capacity for supplying 60 to 125 men.

c. Distribution of Ammunition. The home ammunition depots forward supplies to the Army Ammunition Dumps (Armeeamunitionsdepots) which usually store from 3,000 to 6,000 tons. Any forward army dumps taken over by corps are called Corps Ammunition Dumps (Korpsamunitionsdepots). From these dumps, the ammunition is taken to Division Ammunition Distributing Points (Divisionssammlungdepots). One or more well camouflaged distributing points are established, located out of the effective range of Allied artillery and, if possible, on terrain protected from tank attacks. Ordinarily artillery ammunition and infantry ammunition are handled by different distributing points so as to facilitate the loading and unloading of supplies. In some cases Division Ammunition Dumps (Divisionssammlungdepots) are set up in the division area, especially if the front lines have been stabilized. From the divisions, ammunition is sent to infantry and artillery ammunition supply points maintained by regiments, battalions, and companies. As German regulations permit the setting up of temporary ammunition dumps at these points, small reserves may be present only a few miles behind the front lines.

Unused ammunition, empty shell cases, packing cases, and faulty ammunition must be returned by the troops to army dumps from where they are sent to the home areas. The rapid return of this material is considered as important as ammunition supply.

d. Distribution of Fuels and Lubricants. Fuel from home fuel depots or from Field Army mobile reserves is directed to the railheads. Sometimes the fuel is kept loaded in tanker trains (Eisenbahnlastwagen) near the railhead and transferred from these directly to fuel columns, but preferably it is laid down in 20- and 200-liter containers in Army Fuel Dumps (Armeebetriebssammlungdepots) forward of the railhead. From these dumps the fuel is taken forward to Division Fuel Distributing Points (Divisionssammlungdepots) or, in the case of some motorized and armored divisions, to Division Fuel Dumps (Divisionssammlungdepots). Fuel is forwarded from the division area to lower echelon supply points and to fuel points that are set aside for the use of single vehicles (Tankstellen für Einzelsammlungdepots). The latter may also be supplied from the army fuel stores.

e. Distribution of Clothing and Individual Equipment. Stores are dispatched from the Zone of the Interior to the field rations dumps
Figure 4—Flow of supplies.
and to field equipment parks and collecting points, from which the stores are distributed to units.

f. DISTRIBUTION OF EQUIPMENT. (1) Equipment is handled by parks of two different categories: the Heeres, or Field Army type, and the Armee, or army type. Although performing functions analogous to those of the Zone of the Interior Home (Heimat) and Corps Area (Wehrkreis) Equipment Parks, the field parks have a number of distinct characteristics. They are concerned only with military vehicles. Furthermore, they are dependent upon Zone of the Interior depots, parks, and factories for fifth echelon maintenance. Lastly, the field parks are responsible for the storage of reserve equipment as well as the distribution of new and repaired equipment.

(2) The most numerous Heeres type park is the Field Army Motor Transport Park (Heeres-kraftfahrpark or HeKP). Unlike the Home Motor Transport Park, the HeKP normally does all repairs itself, without farming vehicles out to workshops, with the already existing repair facilities which it customarily takes over. Usually a number of HeKP are established in each army group area. Each HeKP may hold a reserve of about 200 new vehicles in addition to vehicles arriving from home equipment parks and depots, and damaged vehicles coming from Army Motor Transport Parks (Armee-kraftfahrparke or AKP). In conjunction with army parks, the HeKP establish and maintain gasoline stations at certain selected points, usually along important roads. Not ascertained are the functions of reported Motor Transport Repair Parks (Kraftfahrstandsetzungsparks) and Winterization Parks (Winterlager) which may be specialized HeKP or HeKP branches.

(3) Perhaps even more important than the Field Army Motor Transport Parks are the Field Army Tank Parking or Bases (Stützpunkte). These presumably are established on the basis of one per army group. Their importance is increased by the fact that armies do not ordinarily maintain fixed installations for the repair of tanks, although armies may have semi-permanent tank workshops. The tank bases are reception or control centers from which tanks are dispatched to workshops in the near vicinity for repairs, or returned to home depots and factories for fifth echelon maintenance.

(4) Also under Field Army control are Spare Parts Depots (Ersatzteillager), Tire Depots (Reifenlager), Track Depots (Gleiskettenlager), Tank Spare Parts Depots (Panzersatzteillager), Armored Car Spare Parts Depots (Panzerspähwageneratzteillager), and Tractor Spare Parts Depots (Zugkraftwageneratzteillager). The Depots furnish supplies to maintenance sections, workshop units, army parks, and Field Army parks.

(5) Army Parks (Armee parke) are primarily for repairs but they also are supposed to maintain a reserve of between 5 and 10 per cent of the arms and equipment of the army, and to forward equipment either directly or through collecting points to units. An army has the following parks:

(a) Infantry Park, for infantry weapons and trucks.
(b) Artillery Park, for artillery weapons and trucks.
(c) Anti-gas Equipment Park, for gas masks, decontamination suits, anti-gas clothing, and smoke equipment.
(d) Engineer Stores Park, for engineer materials.
(e) Signal Park, for radio and telephone materials.
(f) Motor Transport Park, for vehicles and spare parts.
(g) Army Equipment Park, for harness, horse carts, cooks equipment, and general items.
(h) Medical Park, for medical equipment.
(i) Veterinary Park, for veterinary equipment.
(j) Horse Park, for riding and draft horses.

(6) When equipment is forwarded from army to division, it passes either directly from the army parks to Division Equipment Collecting Points (Divisionsgerätesammelstellen) or through an Army Equipment Collecting Point (Armee-gerätesammelstelle) to the division. In turn the division directs the equipment to the supply points maintained by its units. Equipment repaired by field maintenance sections and workshop units may be returned directly or through any of the collecting or supply points to the troops; because the procedure is greatly variant, Figure 6 pictures this latter flow as only direct to the troops.

6. Supply Movement

a. RAILROAD SUPPLY TRAINS. (1) Standard supply trains. German logistical manuals outline the use of standard rations, ammunition, and fuel supply trains with a maximum net load of 450 metric tons (or approximately 500 short tons)
on a standard gauge (4 feet 8½ inches) railway. The textbook theory has generally been followed out in practice, although in some cases two or more locomotives have been sighted pulling unusually long fuel trains, and in some areas standard rations trains seldom are used. Standard equipment supply trains, with great variations in net loading weights, also are employed. In most cases, however, equipment of all kinds is loaded on the same train.

(2) Rations supply trains (Verpflegungszüge), with an average of 40 cars per train may be composed as follows:

(a) Iron rations: 300,000 full and 300,000 half iron rations, totalling 442 metric tons.

(b) Full rations with fodder: 180,000 human and 40,000 animal rations, amounting to 454 metric tons. These may be loaded into three parts, each containing 3 days' supplies for 20,000 men and 4,000 animals.

(c) Full human rations with no bread but only baking materials: 300,000 rations, totaling 450 metric tons.

(d) Flour train (Mehlzug): 833,000 rations, amounting to 450 metric tons.

(e) Oat train (Haferzug): 90,000 rations, totaling 450 metric tons.

(f) Animal trains (Viehzüge): 360 cattle weighing 180 metric tons, 1,200 pigs weighing 120 metric tons, or 1,800 sheep weighing 72 metric tons.

(3) Ammunition supply trains (Munitionszüge), with an average of 30 cars per train, are of three types:

(a) Unit-loaded trains, loaded according to the proportion of different types of ammunition needed by a particular division.

(b) Caliber unit trains, in which each car is loaded with approximately 15 metric tons (16½ short tons) of ammunition of a specific caliber.

(c) Single caliber unit trains, in which all cars are loaded with ammunition of the same caliber.

(4) Fuel supply trains (Betriebsstoffzüge) of two types are used:

(a) 20 gasoline tank cars, holding between 340 cubic meters (around 89,800 gallons) and 440 cubic meters (around 116,200 gallons) of fuel.

(b) 25 cars, holding gasoline in 200-liter (53-gallon) and 20-liter (5-gallon) cans and carrying 400 cubic meters (105,600 gallons) of gasoline, and five cars with oil, engine oil, gear oil, paraffin, and (in winter) anti-freeze barrels and cans.

(5) Horse supply trains (Pferdersatzzüge) consist of 55 cars, each holding eight riding or light draft horses per car or 440 horses per train; six heavy draft horses per car or 330 horses per train; or four very heavy horses per car or 220 horses per train.

(6) Signals and engineer construction materials trains (Baustoffzüge) average 40 cars, of which 39 are open cars, with a net tonnage of about 820 metric tons (900 short tons).

(7) Tank trains carrying up to 25 medium tanks or up to 8 heavy tanks have also been reported. The average number of cars per tank train is about 33, with widely varying net loads.

(8) Mixed equipment trains are very frequent and may contain from 25 to 60 cars with a total net tonnage of up to 850 metric tons.

b. Road Supply Columns and Trains. There are four types of road supply columns in the German Army:

(1) Motorized columns (Kraftwagenkolonnen) are, in general, employed on good roads. They can cover up to 125 miles per day. They are organized into very large, large, and small motor transport columns with a capacity of 120 metric tons, 60 tons, and 30 tons respectively for the transportation of supplies other than fuel. In addition, mountain divisions may have a special 10-ton capacity column. Fuel generally is transported in motorized fuel columns of two types—heavy columns with a minimum load of 50 cubic meters of fuel, and light columns with a minimum of 25 cubic meters. Motor transport columns are designated with reference to their employment as Field Army, army, corps, or division motor truck columns.

(2) Animal-drawn columns (Fahrkolonnen) normally have capacities of 30 or 17 metric tons, and mountain animal-drawn columns 15 metric tons. In general, they are equipped with one-team wagons; in cavalry units two-team wagons are used. According to German training instructions, well cared for and trained horses can cover 12 to 15 miles per day and under favorable conditions up to 20 miles, with a day of rest following. If oxen are employed, the rate of movement is slower. The Germans have been relying more and more upon animal-drawn columns for the movement of their supplies.

(3) Pack trains (Tragierkolonnen), generally consisting of 40 mules or horses each, usually are employed in mountainous terrain. A pack train can carry up to 5 tons, but its capacity and speed
are dependent on the trails and grade. Even in level country, pack trains usually march more slowly than foot troops.

(4) Mountain carrier units (Gebirgsträgerereinheiten) consist of mountain carrier battalions and companies whose men are employed in terrain where not even pack animals can be used effectively. Each man can carry between 45 and 75 pounds of materiel on his back.

### SUPPLY COLUMNS AND TRAINS

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(metric tons)</td>
<td>(short tons)</td>
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<tr>
<td>Very Large Motorized Column</td>
<td>120</td>
</tr>
<tr>
<td>Large Motorized Column</td>
<td>60</td>
</tr>
<tr>
<td>Small Motorized Column</td>
<td>30</td>
</tr>
<tr>
<td>Large Animal-Drawn Column</td>
<td>30</td>
</tr>
<tr>
<td>Small Animal-Drawn Column</td>
<td>17</td>
</tr>
<tr>
<td>Mountain Animal-Drawn Column</td>
<td>15</td>
</tr>
<tr>
<td>Mountain Motorized Column</td>
<td>10</td>
</tr>
<tr>
<td>Pack Train</td>
<td>5</td>
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</table>

<table>
<thead>
<tr>
<th>Minimum Amount</th>
<th>Minimum Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>(cubic meters)</td>
<td>(gallons)</td>
</tr>
<tr>
<td>Large Motorized Fuel Column</td>
<td>50</td>
</tr>
<tr>
<td>Small Motorized Fuel Column</td>
<td>25</td>
</tr>
</tbody>
</table>

c. Supply Roads. Whenever possible a supply road is designated for each self-contained unit such as a division. In general, the main route of advance of the unit is designated as its supply road. This principal route may be called a Rollbahn, or rolling road, to distinguish it from any secondary supply roads. When the main supply route is used for troop movements as well as for supply purposes, it generally will be called a Durchgangsstrasse, or through road. Great importance is attached to the upkeep of these routes and the placing of gasoline stations (Tankstellen) at strategic points close by the routes.

### Section IV. MAINTENANCE REQUIREMENTS

1. Total Requirements

a. Variables Involved. The determination of the over-all requirements necessary to maintain German troops presents a number of difficulties. This is best shown by a review of the German supply expenditures in Russia in 1941. Armored divisions averaged some 30 tons daily when inactive and about 700 tons a day when engaged in heavy fighting; infantry divisions required 80 tons a day when inactive and some 1,100 tons during a day of heavy fighting. When engaged in defensive, mopping-up, or minor offensive activities, the divisions required supplies in amounts somewhere between the two extremes. By far the most important variable in this campaign was the amount of ammunition expended; requirements of fuel and equipment also varied considerably, while rations and clothing consumption remained relatively static. Expenditures depended upon the nature of the action involved, the types of units engaged, the zone of action, the season of the year, the amount of materiel available for consumption, and the facility with which supply movements could be made.

b. Estimates of Total Requirements.

When the variables evident in the 1941 Russian campaign have become relatively constant, as is the case at present, the German supply requirements can be estimated with some degree of accuracy. Under present conditions the average total supply requirements per German soldier are estimated to vary as follows:

<table>
<thead>
<tr>
<th>Character of fighting</th>
<th>Total pounds per man per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactivity</td>
<td>5-10</td>
</tr>
<tr>
<td>Mopping-up</td>
<td>15-20</td>
</tr>
<tr>
<td>Defensive fighting (but not against a major Allied push)</td>
<td>20-25</td>
</tr>
<tr>
<td>Heavy defensive</td>
<td>25-50</td>
</tr>
<tr>
<td>Offensive fighting</td>
<td>25-50</td>
</tr>
</tbody>
</table>

2. Rations

a. Human Rations Scales. The daily ration quantity (Portionsatz) is the amount of food consumed by one man for one day. It consists of three meals, the noon meal amounting to one-half of the total, the evening meal to one-third, and the next morning’s breakfast to one-sixth. The Armed Forces High Command has laid down an over-all plan specifying the maximum amount of any ration item that may be served. The amount depends upon two factors: the duty class of the man receiving the ration, and the component class of the particular item being served.

There are four main types of rations served to troops. Ration I (Verpflegungssatz I) is for troops committed to combat, for those that are recuperating from combat, and for troops stationed in Norway north of 66° N. Lat. Ration II is for occupation and line-of-communication troops. Ration III is for garrison troops within Germany. Ration IV goes to office workers and
### REPRESENTATIVE BREAKDOWN OF MAXIMUM RATION ALLOWANCES
### IN GRAMS PER DAY

<table>
<thead>
<tr>
<th>Item</th>
<th>Component Class</th>
<th>Ration I</th>
<th>Ration II</th>
<th>Ration III</th>
<th>Ration IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rye bread</td>
<td>(a)</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>600</td>
</tr>
<tr>
<td>Fresh meat with bones</td>
<td>(b)</td>
<td>136</td>
<td>107</td>
<td>90</td>
<td>56</td>
</tr>
<tr>
<td>Soybean flour</td>
<td>(b)</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Headless fish</td>
<td>(b)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Fresh vegetables and fruits</td>
<td>(c)</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Potatoes</td>
<td>(c)</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
</tr>
<tr>
<td>Legumes</td>
<td>(c)</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Pudding powder</td>
<td>(d)</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Sweetened condensed skim milk</td>
<td>(d)</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Salt</td>
<td>(e)</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Other seasonings</td>
<td>(e)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Spices</td>
<td>(e)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fats and bread spreads</td>
<td>(f)</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>Coffee</td>
<td>(h)</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Sugar</td>
<td>(i)</td>
<td>40</td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Supplementary allowances</td>
<td>(j)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Maximum Ration in grams:
- Ration I: 1,698
- Ration II: 1,654
- Ration III: 1,622
- Ration IV: 1,483

Total Maximum Ration in lbs:
- Ration I: 3.74
- Ration II: 3.64
- Ration III: 3.57
- Ration IV: 3.26

Wine (in summer) (quarts)      | (j) | .026 | .026 | .026 | .026 |
Cigarettes (pieces)           | (k) | 7    | 6    | 3    | 2    |

nurses within Germany. Hospital cases may fall within any of these classes depending on the seriousness of the cases.

The most important items of the component classes are as follows: (a) bread; (b) meats, soy bean flour, cheese, fish, and eggs; (c) vegetables; (d) puddings and milk; (e) salt, mustard, vinegar, and other seasonings; (f) spices such as pepper, cinnamon, and cloves; (g) butter, lard, marmalades, fats, and bread spreads; (h) coffee and tea; (i) sugar; (j) spirits and wines; (k) tobacco.

Substitute issues may be made within a component class but not among different component classes. Thus the daily maximum allowance of vegetables for a soldier is 60 grams* of dried vegetables, or 1200 grams of kidney beans, or 400 grams of salted vegetables, or equivalent quantities of any of about 30 other substitutes. It is not possible to predict which items will be served on any given day. The following chart, however, sets forth a likely breakdown of these maximum ration allowances.

b. Special Types of Human Rations.

(1) March ration (Marchverpflegung). The march ration is a cold food ration issued for not more than three or four consecutive days to units in transit either on carrier or by foot. It consists of approximately 700 grams of bread, 200 grams of cold meat or cheese, 60 grams of bread spreads, 9 grams of coffee (or 4 grams of tea), 10 grams of sugar, and six cigarettes. Thus it has a total weight of about 980 grams.

(2) Iron ration (Eiserne Portion). An iron ration consists of 250 grams of biscuits, 200 grams of cold meat, 150 of preserved vegetables, 25 of coffee, and 25 of salt. Total weight is 650 grams without packing and 825 grams with packing. An iron half-ration is composed of 250 grams of biscuits and 200 grams of preserved meat; thus its total weight is 450 grams without packing and 535 grams with packing.

(3) Combat Package (Grosskampfpäckchen) and Close Combat Package (Nahkampfpäckchen). The Germans have begun to use these types of rations for troops engaged in combat. They include chocolate bars, fruit bars, candies, cigarettes, and possibly biscuits.

c. Animal Rations. An animal ration is the amount of food consumed by one horse, draft ox, dog, or carrier pigeon for one day. The quantity of an animal ration allowance (Rations-satz) depends on the type of animal, the area in which he is serving, and the content of the ration he is being fed. Horses, for instance, are divided into four groups: draft horses of the heaviest breed, draft horses of heavy breed, saddle-horses and light draft horses, and small horses. On the
Eastern front, draft horses of the heaviest breed receive a maximum ration allowance of 5650 grams of oats, 5300 grams of hay, and 5750 grams of straw (including 1500 grams of bedding straw). The allotments to other horse groups are proportionately less. On fronts other than the Eastern Front, the allotments for all horses are generally smaller. In addition, substitutes such as preserved forage, barley, corn, etc., may change the ration weight. If the horse is being fed an iron ration, he is given a single item such as oats or hay or straw.

d. RATIONS IN THE FIELD. Local stores obtained by purchase or confiscation play a greater part in the supply of rations in the field (Feldportionen for men and Feldrationen for animals) than is the case for any other class of supply. It is part of the German planning principle to live off the land as much as possible and to obtain only the remaining requirements from stocks procured through channels. The Germans fully appreciate the difficulty of employing such methods during periods of combat and do not count upon local stores during operative periods. Usually a normal reserve of about 10 days' rations for each man of an army is maintained within the army. The rations consist of full and iron rations, although the latter may be eaten only upon the receipt of special orders.

Rations carried in an army for each man:

<table>
<thead>
<tr>
<th>Full rations</th>
<th>Iron rations</th>
</tr>
</thead>
<tbody>
<tr>
<td>With the man</td>
<td>1 (half)</td>
</tr>
<tr>
<td>On a combat vehicle</td>
<td>1</td>
</tr>
<tr>
<td>In the field kitchen</td>
<td>1</td>
</tr>
<tr>
<td>In the unit ration train</td>
<td>2</td>
</tr>
<tr>
<td>In the division train</td>
<td>1</td>
</tr>
<tr>
<td>In the army dumps and train</td>
<td>a total of about 3</td>
</tr>
</tbody>
</table>

Ordinarily there are two full and two iron horse rations carried either on the horse or in unit supply columns. Other rations are carried by the army and the division.

For staff planning purposes, the weights of rations are computed by the Germans as follows:

<table>
<thead>
<tr>
<th>Type of Rations</th>
<th>Weight in grams</th>
<th>Weight in pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human rations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard ration with packing</td>
<td>1,500</td>
<td>3.3</td>
</tr>
<tr>
<td>Iron ration with packing</td>
<td>825</td>
<td>1.82</td>
</tr>
<tr>
<td>Iron half-ration with packing</td>
<td>555</td>
<td>1.18</td>
</tr>
<tr>
<td>Horse rations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard ration</td>
<td>10,000</td>
<td>22</td>
</tr>
<tr>
<td>Iron oat ration</td>
<td>5,000</td>
<td>11.</td>
</tr>
<tr>
<td>Iron hay ration</td>
<td>5,000</td>
<td>11.</td>
</tr>
<tr>
<td>Iron straw ration</td>
<td>2,500</td>
<td>5.5</td>
</tr>
</tbody>
</table>

3. Fuels and Lubricants

Distribution of fuel is calculated in the consumption unit (Verbrauchssatz) which is the amount of fuel that will move each vehicle in a formation 100 kilometers or 62 miles. The allowance of consumption units per formation is systematically replaced as it is expended. Under normal conditions it was standard for German formations to maintain three consumption units at army dumps; in addition, armored formations carried four units, reconnaissance elements carried six and a half units, and all other formations carried five units. Because of present fuel shortages, the allowances of consumption units are now determined by the amount of fuel which the General Staff believes is the minimum necessary for the desired tactical uses.

4. Equipment and Clothing

The replacement of equipment and clothing is based upon the allowances authorized for units and individuals in the table of organization (Kriegsstürenachweisung), the table of basic allowances (Kriegsaufrüstungsnachweisung), and the various annexes (Anlagen) to these tables. When the materials allotted under the tables are destroyed, damaged, lost, or worn out, they are repaired or replaced as quickly as possible.

5. Ammunition

a. AMMUNITION ALLOWANCES. The initial issue (erste Ausstattung) of ammunition is the total ammunition carried by a formation in columns, in dumps, and with the troops. The initial issue is systematically replaced as it is expended, on the basis of reports of ammunition remaining on hand sent from the divisions through corps to army, except as operational conditions modify the system. The allowance per formation is based on the number of weapons called for in the table of organization of the unit. Each weapon, in turn, has a number of rounds which is allotted to it as an ammunition quota or unit of issue (Munitionsausstattung). Two units of issue for all weapons of the division are carried within the division, while another unit of issue for all weapons in the army is held on army columns or trains as an army reserve. Thus each army has three ammunition quotas or units of issue for all weapons of the army.

b. AMMUNITION ISSUES. Of the two ammunition units of issue that are found within the division, over one unit is found forward on the
men, with the guns, and as company and battalion reserves, while less than one full unit of issue is retained as a division reserve in division columns and divisions. The exact quantity issued to each man is largely determined by the amount held by the battalion and company as their reserves. The following charts exemplify the units of issue found in infantry and artillery units of an army.

### Ammunition Issues (Rounds) for a Volks Grenadier Division:

<table>
<thead>
<tr>
<th>Weapon</th>
<th>Probable Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Division Reserve</td>
</tr>
<tr>
<td></td>
<td>Forward Issue</td>
</tr>
<tr>
<td>9-mm automatic pistol</td>
<td>18</td>
</tr>
<tr>
<td>9-mm machine pistol</td>
<td>600</td>
</tr>
<tr>
<td>7.92-mm machine pistol</td>
<td>600</td>
</tr>
<tr>
<td>7.92-mm rifle</td>
<td>99</td>
</tr>
<tr>
<td>7.92-mm rifle (for troops other than infantry troops)</td>
<td>25</td>
</tr>
<tr>
<td>7.92-mm semi-auto rifle</td>
<td>159</td>
</tr>
<tr>
<td>Rifle grenade launcher</td>
<td>75</td>
</tr>
<tr>
<td>7.92-mm LMG</td>
<td>3450</td>
</tr>
<tr>
<td>7.92-mm LMG (for arty and AT troops)</td>
<td>1350</td>
</tr>
<tr>
<td>7.92-mm HV MG</td>
<td>6000</td>
</tr>
<tr>
<td>88-mm bazooka</td>
<td>5</td>
</tr>
<tr>
<td>81-mm mortar</td>
<td>150</td>
</tr>
<tr>
<td>120-mm mortar</td>
<td>150</td>
</tr>
<tr>
<td>37-mm AA</td>
<td>1200</td>
</tr>
<tr>
<td>75-mm inf how</td>
<td>192</td>
</tr>
<tr>
<td>75-mm AT (mtz)</td>
<td>150</td>
</tr>
<tr>
<td>75-mm AT (SP)</td>
<td>255</td>
</tr>
<tr>
<td>105-mm gun how</td>
<td>225</td>
</tr>
<tr>
<td>150-mm how</td>
<td>150</td>
</tr>
</tbody>
</table>

* Not included are 75-mm gun and flame thrower.

** AA ammunition reserves are usually kept by army and not by division.

### Units of Issue for Artillery Units:

<table>
<thead>
<tr>
<th>Weapon</th>
<th>Number of Rounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>37-mm AA</td>
<td>1,500</td>
</tr>
<tr>
<td>75-mm AA</td>
<td>300</td>
</tr>
<tr>
<td>88-mm AA</td>
<td>300</td>
</tr>
<tr>
<td>105-mm gun</td>
<td>125</td>
</tr>
<tr>
<td>150-mm how</td>
<td>125</td>
</tr>
<tr>
<td>150-mm gun</td>
<td>75</td>
</tr>
<tr>
<td>210-mm how</td>
<td>50</td>
</tr>
</tbody>
</table>

### Section V. EVACUATION

#### 1. Maintenance and Repair of Equipment

**a. General.** Perhaps the fundamental German principle of repair and maintenance is that equipment should be repaired as far forward as possible.

Practically all the installations that deal with repair and maintenance of equipment also participate in the flow of supplies, both in transferring repaired equipment back to units and in moving newly manufactured equipment to units (see Sections II and III). In the following paragraphs, therefore, they will be treated solely from the point of view of rearward flow.

**b. Motor Transport.** Maintenance of an individual vehicle is the responsibility of the driver and the crew, but for repairs it is sent to one of a number of repair centers. While the procedure that determines which center shall undertake the repair has changed from time to time, it probably is determined by two factors: the number of working hours; and the facilities needed to effect the repair. Thus maintenance (Instandsetzungs) detachments and sections probably carry out repairs requiring less than four working hours with the tools at their disposal, while mobile field workshop (Werkstatt) units carry out repairs requiring less than 12 working hours. If the damage inflicted is too extensive for the facilities of the mobile workshops, the vehicle is sent to an Army Motor Transport Park (AKP) or to a Field Army Motor Transport Park (HeKP). The difference of functions between these two types of installations is not clear; it is likely, however, that the more difficult repair jobs are sent to the HeKP, while the AKP handle repairs that can be completed in less than 24 working hours. The disposition of the vehicle from these centers may be as follows: it may be repaired or scrapped; it may be forwarded to a Home Motor Transport Park (HKP), which is capable of carrying out all types of repairs; or, in the case of an AKP, the vehicle may be forwarded to a HeKP.

While the exact position of collecting points in the rearward movement of damaged vehicles is not certain, it is very likely that whenever possible
vehicles move directly to repair and maintenance centers under their own power without passing through collecting points.

c. Tanks, Armored Vehicles, and Self-Propelled Weapons. Minor repairs to armored vehicles (including tanks, self-propelled weapons, and other armored vehicles) are made by unit mechanics and by mobile tank-workshop units. If the repairs cannot be completed in the division area within three days, the vehicles may be sent to semi-permanent army tank workshops or to Field Army Tank Parks or Bases. When armored vehicles are so badly damaged that they cannot be repaired in the field, they are cannibalized or forwarded to tank equipment depots or factories in the home area. In the latter case the vehicles are no longer under Field Army control and are not returned to the units to which they were originally assigned.

Armored vehicles are repaired on the spot if possible. Otherwise they are moved rearward under their own power. Tank transporters are used only when long movements are contemplated or when vehicles cannot move under their own power.

d. Other Equipment and Clothing. All types of equipment including weapons, signal equipment, bicycles, and clothing are repaired within the division area if possible. If the equipment (other than clothing and individual equipment) requires more specialized attention, it is forwarded either directly or through equipment collecting points or workshop units to one of the army parks. Equipment which cannot be repaired in the field is directed to a home equipment park, depot, or factory. Damaged clothing and individual equipment generally pass from collecting points direct to home clothing depots and dumps. Figure 6, which is largely compiled from German schematics, should be examined for other details of the German repair methods.

2. Evacuation of Installations

With the narrowing of the Zone of the Interior, the Germans have been faced with the problem of what to do with depots that were formerly part of the Zone of the Interior system of supply. Variant courses adopted have been the conversion of the installation into a field installation, the evacuation of the depot to the new Zone of the Interior, and the operation of the depot as though it were still within the Zone of the Interior.
The Collecting Point for the Slightly Wounded administers to casualties whose treatment requires only a few days. When the treatment is completed, the men are returned to combat. If, however, a case has taken a more serious turn, the wounded soldier is evacuated rearward.

(3) From the regimental area casualties may be taken to any of the various types of hospitals (Lazarette) found in the field or at home. Casualty Collecting Points (Krankensammelstellen) usually are set up along the line of evacuation to facilitate the grouping of casualties and their distribution to the rear. These points are generally established at railheads and other traffic centers by ambulance units. They do not handle casualties whose condition will not permit movement. Mobile Field Hospitals (Feldlazarette) serve as way stations for casualties who cannot be moved through the Casualty Collecting Points. They may be operated either by an army or by a division. Wherever possible, the Field Hospital is set up in available permanent buildings. It is equipped to handle any casualty and has a capacity of 200 beds.

(4) Casualties who are physically able to be evacuated after treatment at the Main Dressing Station or the Field Hospital are moved either directly, or via the Casualty Collecting Points, to a Base Hospital (Kriegslazarette) or sometimes to a General Hospital (Reservelazarette).

Base Hospitals are large and relatively permanent installations which may be established by an army or the Field Army well to the rear of the combat zone. These hospitals are of two types: General Base Hospitals (Kriegslazarette), with normal accommodations for 500 cases, for casualties who require up to eight weeks' treatment before being discharged and for those who require a period of convalescence before moved to Reserve Hospitals; and Base Hospitals for Minor Cases (Leichtkrankenkriegslazarette), with accommodations for 1,000 patients, for casualties who need up to four weeks' of treatment or convalescence prior to discharge.

General Hospitals are permanent installations located inside Germany and are supervised by the Chief of Army Equipment; they are dealt with at length in Chapter I.

(5) A man may be pronounced fit for duty by any hospital. If he is in a forward hospital, he will be returned to his unit. If he is in a General Hospital for more than eight weeks, he will be returned to the Replacement Army for reassignment.

c. Transportation Facilities. Hospital trains (Lazarettsziige) can carry between 358 and 386 lying cases or 920 sitting cases.

Standard German ambulances transport four lying cases, or two lying and four sitting cases, or eight sitting cases.

Horse-drawn vehicles, trucks, and hospital planes also may be used in evacuating the wounded.

4. Evacuation of Horses

a. Channels of Evacuation. Sick and wounded horses are marched by foot from the battlefield to a Horse Dressing Station (Pferdeerbandplatz), where emergency cases are treated. They then are marched or transported in horse transport columns to a station set up by the Division Veterinary Company (Veterinärkompanie). This station can be established within a minimum of six hours and can treat 150 cases. If the horses require further treatment, they are moved by horse transport columns to the Army Horse Hospital (Armeeppferdelaazarette) or to the Field Army Horse Hospital (Heeresppferdelaazarette). Such field hospitals can be established within a minimum of 12 hours and can handle 500 sick horses. Horse Collecting Points (Pferdesammelplatz) are formed generally to expedite the evacuation of horses to the rear. Normally there is an Army Horse Collecting Point (Armeepferdelaazarette), intermediate between division and army, and a Division Horse Collecting Point (Divisionspferdelaazarette) at division. Evacuated horses may be moved either directly or through these collecting points to the rear. Horses which require special surgical operations and those not likely to be fit again for army use are moved by rail from the field hospitals to the Zone of the Interior Home Horse Hospitals (Heimatpferdelaazarette).

b. Transportation Facilities. Horse transport trains (Pferdetransportziige) are composed of 55 cars, each carrying six sick or wounded horses, or a total of 350 horses per train. The standard horse transport road column can move 40 sick or wounded horses about 90 miles in one day.

5. Evacuation of Prisoners of War

Guard details drawn from the military police or from the combat unit itself take prisoners to the Division Prisoner of War Collecting Point (Divisionsgefangensammelstelle). The Prisoners of War are next moved to the Army Pris-
oner of War Collecting Point (Armeegefangenen-
sammelstelle), the guard details being drawn from
military police, combat troops, or guard units. The
Prisoners of War are lastly transferred from
the jurisdiction of the Field Army to the Replace-
ment Army Command. This is accomplished when
the Prisoners of War are moved by rail to one
of the Prisoner of War Camps within Germany.
Officers are incarcerated in Officer Prisoner of
War Camps (Offizierlager or Oflag); enlisted
men are confined in Enlisted Men's Prisoner of
War Camps (Mannschafts-Stammlager or Stalag).

Section VI. TROOP MOVEMENTS

1. Introduction

In movements of entire bodies of troops with their
equipment, the space occupied, rather than the
total weight, is the important factor. A very large
proportion of the space is taken up by personnel,
horses, and organic equipment; daily maintenance
requirements that accompany the troops occupy
much less space.

2. Rail Transportation

a. Main Military Routes. German railways
generally are used jointly for military and civilian
traffic, although military trains are given priority.
Perhaps the only instances of railways designated
solely for military uses are found in the combat
zone, either on already existing railways or on
railways constructed by the Army.

Normally double-track standard-gauge (4'8½")
railways have a daily capacity of 30 military trains in
each direction, while single-track standard-gauge railways can move 10 trains a day in each
direction. Air damage can materially decrease
these capacity figures.

b. Standard Troop Trains. The Germans
have found it desirable to use troop trains of a
reasonably constant composition. The standard
trains found in the Balkans, Italy, and Norway
are composed of fewer cars than the base types in
Germany, Denmark, and the Netherlands which
are described below. All types are designed as far
as possible to carry a self-contained unit such as
a company or a battalion. Nonstandard trains
also may be used for troop movements.

K-trains (Kraftfahrzeuge or motor vehicle
trains) average 51 cars per train and carry approx-
imately 250 soldiers, 20 heavy vehicles
(weighting up to 22 short tons per vehicle), and
20 light vehicles, plus other equipment. If lighter
equipment is carried, the number of soldiers can
be increased.

S-trains (Sonderzüge, or special trains) are
made up for the movement of very heavy tanks
and self-propelled guns. The number of men
carried per train averages 125; the number of
cars forming the train is between 30 and 35. An
S-train usually carries from four to six Tiger
tanks or from six to eight Panther tanks, interspersed with lighter equipment.

Sp-trains (Sonderpanzerzüge, or special tank
trains) carry approximately 20 medium tanks to-
gether with personnel and other equipment. The
standard Sp-train is composed of about 33 cars.

I-trains (Infanteriezüge or infantry trains) of
about 55 cars per train hold some 350 officers and
men, 10 light vehicles, 10 heavy vehicles of a
maximum weight of 22 short tons per vehicle, and
70 horses, together with other equipment. If a
minimum of equipment is carried, up to 800
troops can be moved. It is possible that the
I-trains seldom are used by the Germans at
present.

Replacement troop trains with 50 to 60 cars per
train can hold over 2,000 replacements. The use
of this type of train probably has been discon-
tinued.

Figure 7.—German basic standard troop-train types.
c. **Entrainment and Detrainment.** Troop trains generally are formed at railroad stations. The speed with which entraining can be accomplished varies according to the number of units being loaded, the number of stations used, the facilities available at the stations, and the importance attached to speedy loading. Depending on these conditions, loading of a single train can be accomplished within 2 to 12 hours. If all the unit trains can be loaded simultaneously at the entraining stations, an entire division can be loaded within that time. In practice, however, the time taken to assemble trains and troops and the limited number of entraining stations will materially increase the loading time of divisions.

It is estimated that a troop train can be unloaded in about half the time taken to load. Detrainment of infantry units may occur far forward, while armored units usually are detained in rear areas.

d. **Speed of Movements.** The average German movement appears to average from 150 to 200 miles per day for long movements within Germany, and about 60 miles daily in areas near the combat zone.

e. **Train Requirements.** At present the number of trains required to transport an infantry division is about 35 to 40. An armored division needs about twice that number. If a large number of divisions are being moved, additional trains will be necessary for corps and army units.

3. **Road Transportation**

a. **Main Military Routes.** Certain roads have been selected by the High Command to form a system of through routes (*Durchgangsstrassen*) for military traffic in Germany and occupied areas. For the most part the through routes comprise the national highways and *Autobahnen.* In Denmark, however, the through routes more frequently consist of secondary roads than main arteries. Through routes generally run either east and west or north and south. When supply or troop movements are to be made over these roads, all civilian traffic is diverted to other roads.

b. **March Speeds.** (1) The average speeds of division marches in miles per hour are as follows:

<table>
<thead>
<tr>
<th>Type of Unit</th>
<th>By Day</th>
<th>By Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infantry division</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Motorized division</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>Armored division</td>
<td>12</td>
<td>7</td>
</tr>
</tbody>
</table>

(2) The average speeds of march columns in miles per hour are as follows:

- Infantry (long marches)........... 3 miles per hour
- Infantry (short marches)......... 4
- Mounted troops.................. 6
- Cyclists.......................... 8
- Motorcycles and cars............ 22
- Trucks.......................... 22
- Trucks with trailers.......... 16
- Half-track vehicles......... 16
- Tanks.......................... 12

(c) **March Distances.** The infantry division normally can march about 20 miles a day; under adverse weather or road conditions the rate of march may fall to 10 miles a day. The motorized division can maintain an average daily march of between 90 and 150 miles; the armored division from 60 to 90 miles a day. In the near vicinity of the combat zone, road movements without motor transport average 10 to 15 miles a day, while movements by motor transport approximate 30 miles a day.

d. **Road Spaces.** While the road spaces occupied by divisions on the march are not constant, the road spaces of individual units may prove of some value. The following examples are from German sources and do not indicate the intervals maintained between elements:

### INFANTRY DIVISION

(at 5 kilometers or approximately 3 miles per hour.)

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>Yards</th>
<th>Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inf Regt (each of three)</td>
<td>6,234</td>
<td>5,700</td>
</tr>
<tr>
<td>Rcn Bn</td>
<td>3,116</td>
<td>2,850</td>
</tr>
<tr>
<td>AT Bn</td>
<td>2,734</td>
<td>2,500</td>
</tr>
<tr>
<td>Arty Regt</td>
<td>7,382</td>
<td>6,750</td>
</tr>
<tr>
<td>Sig Bn</td>
<td>3,193</td>
<td>2,920</td>
</tr>
<tr>
<td>Engr Bn</td>
<td>2,570</td>
<td>2,350</td>
</tr>
<tr>
<td>Div Serv</td>
<td>4,155</td>
<td>3,800</td>
</tr>
<tr>
<td>Div Hq</td>
<td>1,553</td>
<td>1,420</td>
</tr>
</tbody>
</table>

| Total Inf Div (approx, without intervals between elements) | 43,405 | 39,690 |
| Total converted to miles | 24.7 |
ARMORED DIVISION
(at 20 kilometers or approximately
12 miles per hour.)

\[
\begin{array}{ll}
\text{Yards} & \text{Meters} \\
\text{Tank Regt} & 21,325 \quad 19,500 \\
\text{Pz Gren Regt (each of two)} & 13,145 \quad 12,020 \\
\text{Pz Rcn Bn} & 9,154 \quad 8,370 \\
\text{AT Bn} & 3,888 \quad 3,510 \\
\text{Pz Arty Regt} & 14,458 \quad 13,220 \\
\text{Pz Sig Bn} & 3,762 \quad 3,440 \\
\text{Pz Engr Bn} & 6,365 \quad 5,820 \\
\text{Div Hq} & 11,702 \quad 10,700 \\
\text{Div Hq} & 1,444 \quad 1,320 \\
\text{Others} & 5,468 \quad 5,000 \\
\hline
\text{Total Armd Div (approx.; } & 103,806 \quad 94,920 \\
\text{without intervals between elements)} & \\
\text{Total converted to miles} & 59.0
\end{array}
\]

If distances between the individual units are included, the average length of the infantry division would be about 30 miles (at 3 miles per hour), of the armored division 70 miles (at 12 miles per hour), and of the motorized division 80 miles (at 16 miles per hour).

4. Sea Transportation

a. General. In the sea movements referred to in the following text, the basic shipping measurement is the gross registered ton (G/T), which is 100 cubic feet of the entire enclosed space of a ship.

The Germans use all types of cargo and passenger vessels for the transportation of troops. Generally, the depth of water of the embarkation and debarkation ports determines the size of ship to be used. Thus many of the Baltic ports are limited to cargo ships up to 2,000 G/T. Cargo between Norway and Germany, on the other hand, ordinarily can be carried on much larger vessels.

The average speed of a ship is estimated at 200 nautical miles per day, although fast ships may average much more.

b. Loading and Unloading Times. The time required for the loading of a vessel varies with a number of factors, such as the size of the vessel, the plan of the vessel, the port facilities, and the efficiency with which loading is conducted. The following average loading times are based upon German estimates. They apply for loading during day and night; considerable delays, however, may occur on account of adverse weather conditions.

\[
\begin{array}{ll}
\text{Classification} & \text{Loading Time} \\
100 \text{ men} & 8 \text{ minutes} \\
100 \text{ horses (led over a ramp)} & 1 \text{ hour} \\
100 \text{ horses (lifted by cranes)} & 6 \text{ hours} \\
100 \text{ light motor vehicles (lifted by cranes)} & 6 \text{ hours} \\
\text{Supplies sufficient to load a 2,000 G/T vessel} & 16 \text{ hours}
\end{array}
\]

c. Tonnage Requirements. Among other factors, the amount of tonnage required to transport troops depends upon the type of unit being transported, the efficiency of loading, the types of ships used, and the amount of nonmilitary stowage transported. Hence the following figures give only a general indication of the amount of space which is occupied by items when efficiently loaded.

\[
\begin{array}{ll}
\text{Classification} & \text{Estimated G/T requirement} \\
1 \text{ man} & 2 \\
1 \text{ horse} & 8 \\
1 \text{ light motor vehicle} & 10 \\
1 \text{ truck} & 20 \\
1 \text{ heavy field gun} & 20 \\
1 \text{ medium tank} & 25
\end{array}
\]

It is likely that an infantry division requires between 50,000 and 70,000 gross registered tons for its movement, or a mean average of five or six gross registered tons per man. If loading is inefficient or if light loading is used, the G/T requirements per man will rise considerably. Thus in short movements such as ferry crossing, as much as 15 gross registered tons per man and equipment have been employed.