

FM-E 101-10

WAR DEPARTMENT

**STAFF OFFICERS FIELD
MANUAL**

&

**ENEMY FORCES
ORGANIZATION, TECHNICAL
AND
LOGISTICAL DATA**

October 20, 1942

COL. G. BRYAN CONRAD

FM-E 101-10

**STAFF OFFICERS'
FIELD MANUAL**

**ENEMY FORCES
ORGANIZATION, TECHNICAL, AND
LOGISTICAL DATA**



REGRADED **UNCLASSIFIED** BY

AUTHORITY OF **DOD DIR. 5200.1 R**

BY **RAKERS** ON **011105**

**UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1942**

WAR DEPARTMENT,
WASHINGTON, OCTOBER 1, 1942.

FM-E 101-10, Staff Officers' Field Manual, Enemy Forces, Organization, Technical, and Logistical Data, is published for the information and guidance of all concerned.

This manual is a compilation of *enemy* information and data to be used as a guide for the operations in the field of the general staff or a similar staff group of all units in war.

Much of the data herein are not exact values but represent the best of available information. A constant fluctuation in the value of approximated data should be expected, to conform to the changes which develop in field conditions. In cases where experience has not indicated the limits of variation to be expected, a reasonable factor of safety should be allowed.

When information which will be of value in this manual is gained in the field, it will be forwarded to the Military Intelligence Service, War Department. Revision sheets and added data will be distributed as found necessary.

[A. G. 062.11 (7-11-42).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

DISTRIBUTION

D(15); B(10); R(10); Bn(5).
(For explanation of symbols, see FM 21-6.)

TABLE OF CONTENTS

PART ONE. GERMAN FORCES.

	Paragraphs	Page
CHAPTER 1. Organization.		
SECTION I. Governmental and geographic organization	1-2	2
II. Staff and field force organization	3-5	4
III. Division organizations	6-10	6
IV. Miscellaneous combat units and Air Force	11-17	17
V. Signal, engineer, and chemical units	18-21	22
VI. Characteristics of matériel	22-25	26
CHAPTER 2. Movement.		
SECTION I. Facilities	26-31	33
II. Troop movements	32-34	46
CHAPTER 3. Supply.		
SECTION I. General organization	35-36	50
II. Classes of supply	37	52
III. Supply columns and trains	38-39	52
IV. Service units (army, corps, and division)	40-43	53
V. Rations	44	55
VI. Supply diagrams	45-49	56
VII. Ammunition data	50-52	61

PART TWO. JAPANESE FORCES.

CHAPTER 1. Organization.		
SECTION I. Governmental and geographic organization	53-54	63
II. Type army organization	55	66
III. Division organizations	56-61	67
IV. Air Force and miscellaneous combat units	62-67	71
V. Supply units	68-69	73
VI. Characteristics of matériel	70-74	75
CHAPTER 2. Movement.		
SECTION I. Facilities	75-82	80
II. Troop movements	83-85	91
CHAPTER 3. Supply.		
SECTION I. Organization and responsibility	86-87	105
II. Supply data	88-89	107

PART THREE. ITALIAN FORCES.

CHAPTER 1. Organization.		
SECTION I. Political	90	110
II. Field forces, army and corps	91-92	111
III. Division organizations	93-101	113
IV. Miscellaneous combat units and engineers	102-107	126
V. Air Force	108	129
VI. Black Shirt militia units	109-111	130
VII. Characteristics of matériel	112-116	130
CHAPTER 2. Movement.		
SECTION I. Facilities	117-123	136
II. Troop movements	124-126	141
CHAPTER 3. Supply.		
SECTION I. General data	127	143
II. Supply units	128	144

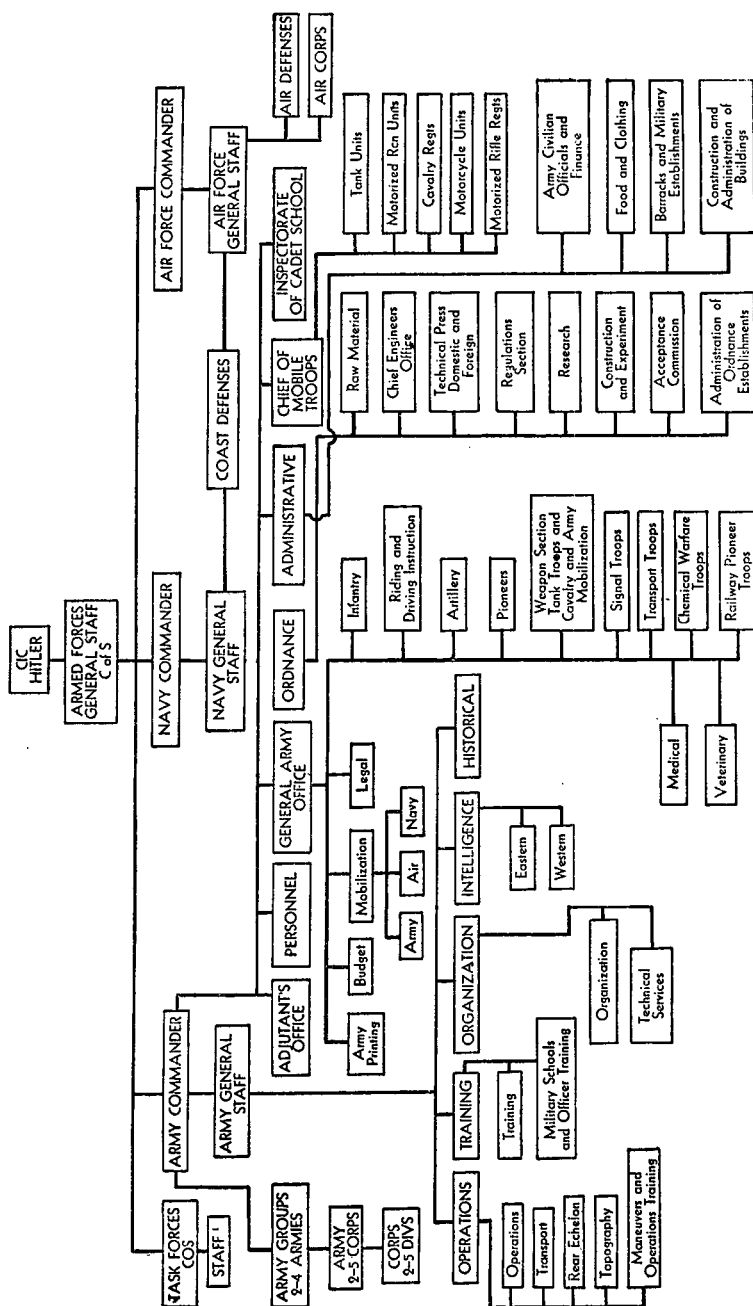
PART FOUR. MISCELLANEOUS DATA.

CHAPTER 1. Uniforms, equipment, and insignia.		
SECTION I. German	129-131	145
II. Italian	132-133	146
III. Japanese	134-135	148
CHAPTER 2. Comparative army ranks	136	151
CHAPTER 3. Comparative measurements.		
SECTION I. Comparative monetary units	137	152
II. Weights and measures	138-139	152
CHAPTER 4. Comparative map symbols for principal field units	140	154

STAFF OFFICERS' FIELD MANUAL
ENEMY FORCES
ORGANIZATION, TECHNICAL, AND LOGISTICAL DATA
PART ONE—GERMAN FORCES
CHAPTER 1
ORGANIZATION

	Paragraphs
SECTION I. Governmental and geographic organization.....	1-2
II. Staff and field force organization.....	3-5
III. Division organizations.....	6-10
IV. Miscellaneous combat units and Air Force.....	11-17
V. Signal, engineer, and chemical units.....	18-21
VI. Characteristics of matériel.....	22-25

SECTION I
GOVERNMENTAL AND GEOGRAPHIC ORGANIZATION
■ 1. GOVERNMENTAL ORGANIZATION.—



1 Staff picked from 3 arms by Task Force CO, after conference with Army, Navy, and Air Force commanders.

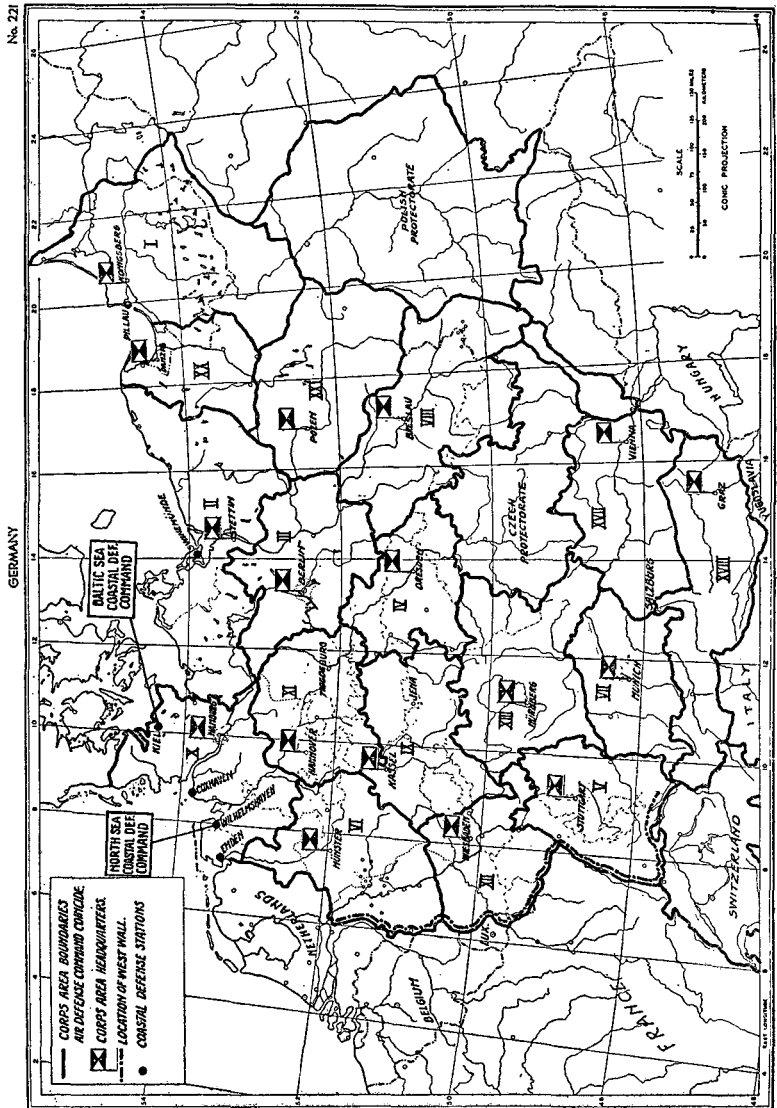
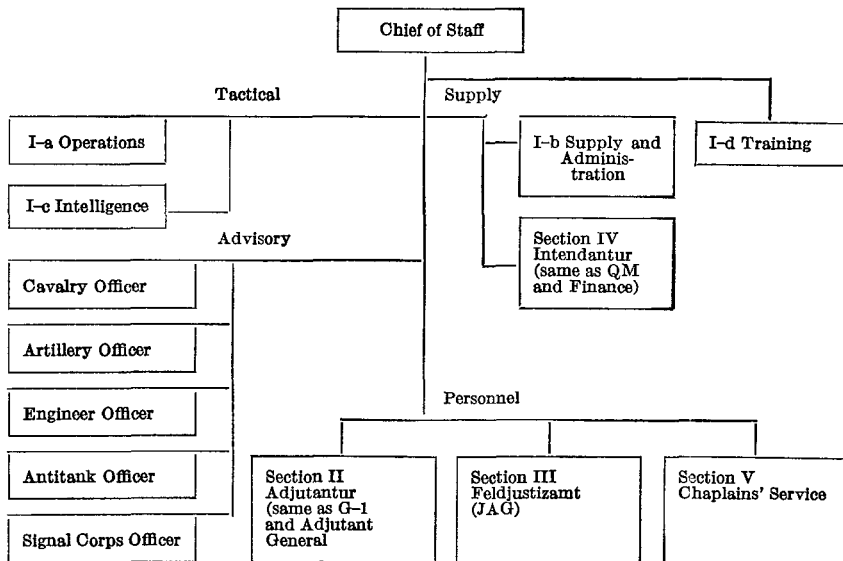


FIGURE 1.—Boundaries of corps areas.

SECTION II
STAFF AND FIELD FORCE
ORGANIZATION

■ 3. STAFF OF UNITS.—*a. Army.*



b. Corps.—Same as army, except advisory officers are engineer, signal corps, and antitank. They command own arm within the corps besides advising corps and division commanders.

c. Division.—(1) Same as army, except that I-a, Operations, serves as Chief of Staff in addition.

(2) Only advisory officer is artillery officer who commands division artillery.

(3) The following officers believed attached to groups of division staff:

(a) *Tactical group:*

Division artillery officer.

Division engineer officer.

Division signal officer.

Antitank battalion commander.

Officer in technical charge of motorized transport.

Air liaison officer.

(b) *Supply group:*

Commander light columns and division train.

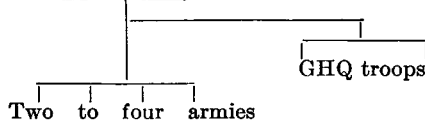
Division provost marshal.

Division postal service officer.

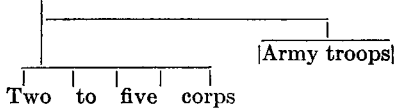
Engineer officer } Supply of material.

Signal officer }

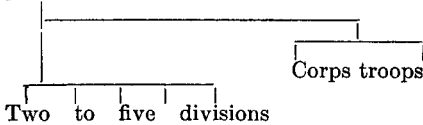
■ 4. ORGANIZATION.—a. Army group.



b. Army.



c. Corps.



■ 5. GHQ TROOPS.—GHQ troops include—

a. *Mobile troops:*

Tank units.

Antitank and heavy antitank units.

b. *Artillery:*

Medium, heavy, and superheavy artillery batteries.

Artillery observation battalions.

Observation balloons.

c. *Engineers:*

Engineer battalions.

Bridge construction battalions.

Bridging columns.

Road construction battalions.

Labor battalions.

d. *Smoke battalions.*

e. *Signal Corps units.*

f. *Miscellaneous:*

Survey (mapping) and meteorological sections, and propaganda companies.

g. *Air force units:*

Army cooperation units.

Air signal units.

b. Table of organization.—

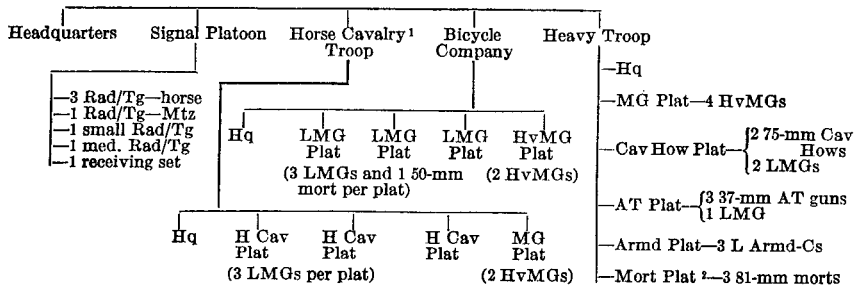
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Unit	Officers	Enlisted men	Machine pistols	LMGs	HeMGs	60-mm mortars	81-mm mortars	7.9-mm AT rifles	80-mm AA-AT guns	60-mm or 37-mm AT guns	76-mm cas hows	76-mm inf hows	150-mm inf hows	105-mm hows	105-mm guns	150-mm hows	Horses	Motorcycles	Motor vehicles	HT vehicles	Notes
Div Hq.....	12	140																			
Div Ron Bn.....	15	560		24	8	3	3			3							20	12	26		
Div Inf.....																	213	30	48	3	
Mtd Inf Plat.....	(1)	(31)										(6)	(2)								
How Co.....	(5)	(185)																			
AT Co.....	(5)	(165)		(4)					(4)	(12)								(22)			
Bn.....	(25)	(813)	(48)	(36)	(12)	(9)	(6)	(9)										(5)			
Regt—total.....	[95]	[2,993]	[144]	[112]	[36]	[27]	[18]	[27]	[4]	[12]		[6]	[2]				[480]	[45]	[80]	[204]	
Total Inf—3 Regts.....	285	8,979	432	336	108	81	54	81	12	36		18	6				1,440	135	240	612	
Div Arty:																					
105-mm Gun How Bn.....				(6)					(6)					(12)			(430)	(2)			
150-mm Gun How Bn.....				(6)					(6)					36	(4)	(8)	(435)	(2)	12	238	
Arty total.....	66	2,615		24					24						4	8	1,785	80	170	238	
AT Bn.....	23	585		18					12	36							52	28	87	19	
Engr Bn.....	26	851		28													188	10			
Div Vet Corps.....	6	228															50	17	109		
Div Med Corps.....	15	463																16	307		
Trains (Supply).....	16	515																			
Div totals.....	492	15,379	432	430	116	84	54	81	48	75	2	18	6	36	4	8	3,804	358	1,122	879	
Attached Mtz AA Bn.....	21	800							36									137	147		

3 Bns 105-mm, 1 Bn
150-mm and 1 Obsn
Bn.

FM-E 101-10

6 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

c. Reconnaissance battalion.—



STRENGTH:

Unknown.

ARMAMENT:

24 LMGs.

8 HvMGs.

3 37-mm AT guns.

3 50-mm Morts.

3 81-mm Morts.

2 75-mm Cav Hows.

¹ Horse Cav Tr may have been replaced by another Bcl Co. Not confirmed.

² Not confirmed.

Diagram illustrating the organizational structure of the 1st Cavalry Division, showing the hierarchy from the Division level down to the Company level, including various units and their sub-units.

```

graph TD
    Div[1st Cavalry Division] --> G1(( ))
    G1 --> SigSec1[Sig Sec]
    G1 --> MtrSec1[Mtr Sec]
    G1 --> MtdInf1[Mtd Inf Plat]
    G1 --> PncrPlat1[Pncr Plat]
    G1 --> InfHow1[Inf How Co]
    G1 --> ATCo1[AT Co]
    
    SigSec1 --> Hq1[Hq]
    MtrSec1 --> Hq1
    MtdInf1 --> Hq1
    PncrPlat1 --> Hq1
    InfHow1 --> Hq1
    ATCo1 --> Hq1
    
    Hq1 --> G2(( ))
    G2 --> SigSec2[Sig Sec]
    G2 --> Plat1[Plat]
    G2 --> Plat2[Plat]
    G2 --> Plat3[Plat]
    G2 --> Plat4[Plat]
    G2 --> Plat5[Plat]
    G2 --> Plat6[Plat]
    
    SigSec2 --> Hq2[Hq]
    Plat1 --> Hq2
    Plat2 --> Hq2
    Plat3 --> Hq2
    Plat4 --> Hq2
    Plat5 --> Hq2
    Plat6 --> Hq2
    
    Hq2 --> G3(( ))
    G3 --> Sec1[Sec]
    G3 --> Sec2[Sec]
    G3 --> Sec3[Sec]
    G3 --> Sec4[Sec]
    G3 --> Sec5[Sec]
    G3 --> Sec6[Sec]
    
    Sec1 --> Hq3[Hq]
    Sec2 --> Hq3
    Sec3 --> Hq3
    Sec4 --> Hq3
    Sec5 --> Hq3
    Sec6 --> Hq3
    
    Hq3 --> G4(( ))
    G4 --> Sec7[Sec]
    G4 --> Sec8[Sec]
    G4 --> Sec9[Sec]
    G4 --> Sec10[Sec]
    G4 --> Sec11[Sec]
    G4 --> Sec12[Sec]
    
    Sec7 --> Hq4[Hq]
    Sec8 --> Hq4
    Sec9 --> Hq4
    Sec10 --> Hq4
    Sec11 --> Hq4
    Sec12 --> Hq4
    
    Hq4 --> G5(( ))
    G5 --> Sec13[Sec]
    G5 --> Sec14[Sec]
    G5 --> Sec15[Sec]
    G5 --> Sec16[Sec]
    G5 --> Sec17[Sec]
    G5 --> Sec18[Sec]
    
    Sec13 --> Hq5[Hq]
    Sec14 --> Hq5
    Sec15 --> Hq5
    Sec16 --> Hq5
    Sec17 --> Hq5
    Sec18 --> Hq5
    
    Hq5 --> G6(( ))
    G6 --> MGPlat1[MG Plat]
    G6 --> MGPlat2[MG Plat]
    G6 --> MGPlat3[MG Plat]
    G6 --> MGPlat4[MG Plat]
    G6 --> MGPlat5[MG Plat]
    G6 --> MGPlat6[MG Plat]
    
    MGPlat1 --> Hq6[Hq]
    MGPlat2 --> Hq6
    MGPlat3 --> Hq6
    MGPlat4 --> Hq6
    MGPlat5 --> Hq6
    MGPlat6 --> Hq6
    
    Hq6 --> G7(( ))
    G7 --> MGPlat7[MG Plat]
    G7 --> MGPlat8[MG Plat]
    G7 --> MGPlat9[MG Plat]
    G7 --> MGPlat10[MG Plat]
    G7 --> MGPlat11[MG Plat]
    G7 --> MGPlat12[MG Plat]
    
    MGPlat7 --> Hq7[Hq]
    MGPlat8 --> Hq7
    MGPlat9 --> Hq7
    MGPlat10 --> Hq7
    MGPlat11 --> Hq7
    MGPlat12 --> Hq7
    
    Hq7 --> G8(( ))
    G8 --> MGPlat13[MG Plat]
    G8 --> MGPlat14[MG Plat]
    G8 --> MGPlat15[MG Plat]
    G8 --> MGPlat16[MG Plat]
    G8 --> MGPlat17[MG Plat]
    G8 --> MGPlat18[MG Plat]
    
    MGPlat13 --> Hq8[Hq]
    MGPlat14 --> Hq8
    MGPlat15 --> Hq8
    MGPlat16 --> Hq8
    MGPlat17 --> Hq8
    MGPlat18 --> Hq8
    
    Hq8 --> G9(( ))
    G9 --> MGPlat19[MG Plat]
    G9 --> MGPlat20[MG Plat]
    G9 --> MGPlat21[MG Plat]
    G9 --> MGPlat22[MG Plat]
    G9 --> MGPlat23[MG Plat]
    G9 --> MGPlat24[MG Plat]
    
    MGPlat19 --> Hq9[Hq]
    MGPlat20 --> Hq9
    MGPlat21 --> Hq9
    MGPlat22 --> Hq9
    MGPlat23 --> Hq9
    MGPlat24 --> Hq9
    
    Hq9 --> G10(( ))
    G10 --> MGPlat25[MG Plat]
    G10 --> MGPlat26[MG Plat]
    G10 --> MGPlat27[MG Plat]
    G10 --> MGPlat28[MG Plat]
    G10 --> MGPlat29[MG Plat]
    G10 --> MGPlat30[MG Plat]
    
    MGPlat25 --> Hq10[Hq]
    MGPlat26 --> Hq10
    MGPlat27 --> Hq10
    MGPlat28 --> Hq10
    MGPlat29 --> Hq10
    MGPlat30 --> Hq10
    
    Hq10 --> G11(( ))
    G11 --> MGPlat31[MG Plat]
    G11 --> MGPlat32[MG Plat]
    G11 --> MGPlat33[MG Plat]
    G11 --> MGPlat34[MG Plat]
    G11 --> MGPlat35[MG Plat]
    G11 --> MGPlat36[MG Plat]
    
    MGPlat31 --> Hq11[Hq]
    MGPlat32 --> Hq11
    MGPlat33 --> Hq11
    MGPlat34 --> Hq11
    MGPlat35 --> Hq11
    MGPlat36 --> Hq11
    
    Hq11 --> G12(( ))
    G12 --> MGPlat37[MG Plat]
    G12 --> MGPlat38[MG Plat]
    G12 --> MGPlat39[MG Plat]
    G12 --> MGPlat40[MG Plat]
    G12 --> MGPlat41[MG Plat]
    G12 --> MGPlat42[MG Plat]
    
    MGPlat37 --> Hq12[Hq]
    MGPlat38 --> Hq12
    MGPlat39 --> Hq12
    MGPlat40 --> Hq12
    MGPlat41 --> Hq12
    MGPlat42 --> Hq12
    
    Hq12 --> G13(( ))
    G13 --> MGPlat43[MG Plat]
    G13 --> MGPlat44[MG Plat]
    G13 --> MGPlat45[MG Plat]
    G13 --> MGPlat46[MG Plat]
    G13 --> MGPlat47[MG Plat]
    G13 --> MGPlat48[MG Plat]
    
    MGPlat43 --> Hq13[Hq]
    MGPlat44 --> Hq13
    MGPlat45 --> Hq13
    MGPlat46 --> Hq13
    MGPlat47 --> Hq13
    MGPlat48 --> Hq13
    
    Hq13 --> G14(( ))
    G14 --> MGPlat49[MG Plat]
    G14 --> MGPlat50[MG Plat]
    G14 --> MGPlat51[MG Plat]
    G14 --> MGPlat52[MG Plat]
    G14 --> MGPlat53[MG Plat]
    G14 --> MGPlat54[MG Plat]
    
    MGPlat49 --> Hq14[Hq]
    MGPlat50 --> Hq14
    MGPlat51 --> Hq14
    MGPlat52 --> Hq14
    MGPlat53 --> Hq14
    MGPlat54 --> Hq14
    
    Hq14 --> G15(( ))
    G15 --> MGPlat55[MG Plat]
    G15 --> MGPlat56[MG Plat]
    G15 --> MGPlat57[MG Plat]
    G15 --> MGPlat58[MG Plat]
    G15 --> MGPlat59[MG Plat]
    G15 --> MGPlat60[MG Plat]
    
    MGPlat55 --> Hq15[Hq]
    MGPlat56 --> Hq15
    MGPlat57 --> Hq15
    MGPlat58 --> Hq15
    MGPlat59 --> Hq15
    MGPlat60 --> Hq15
    
    Hq15 --> G16(( ))
    G16 --> MGPlat61[MG Plat]
    G16 --> MGPlat62[MG Plat]
    G16 --> MGPlat63[MG Plat]
    G16 --> MGPlat64[MG Plat]
    G16 --> MGPlat65[MG Plat]
    G16 --> MGPlat66[MG Plat]
    
    MGPlat61 --> Hq16[Hq]
    MGPlat62 --> Hq16
    MGPlat63 --> Hq16
    MGPlat64 --> Hq16
    MGPlat65 --> Hq16
    MGPlat66 --> Hq16
    
    Hq16 --> G17(( ))
    G17 --> MGPlat67[MG Plat]
    G17 --> MGPlat68[MG Plat]
    G17 --> MGPlat69[MG Plat]
    G17 --> MGPlat70[MG Plat]
    G17 --> MGPlat71[MG Plat]
    G17 --> MGPlat72[MG Plat]
    
    MGPlat67 --> Hq17[Hq]
    MGPlat68 --> Hq17
    MGPlat69 --> Hq17
    MGPlat70 --> Hq17
    MGPlat71 --> Hq17
    MGPlat72 --> Hq17
    
    Hq17 --> G18(( ))
    G18 --> MGPlat73[MG Plat]
    G18 --> MGPlat74[MG Plat]
    G18 --> MGPlat75[MG Plat]
    G18 --> MGPlat76[MG Plat]
    G18 --> MGPlat77[MG Plat]
    G18 --> MGPlat78[MG Plat]
    
    MGPlat73 --> Hq18[Hq]
    MGPlat74 --> Hq18
    MGPlat75 --> Hq18
    MGPlat76 --> Hq18
    MGPlat77 --> Hq18
    MGPlat78 --> Hq18
    
    Hq18 --> G19(( ))
    G19 --> MGPlat79[MG Plat]
    G19 --> MGPlat80[MG Plat]
    G19 --> MGPlat81[MG Plat]
    G19 --> MGPlat82[MG Plat]
    G19 --> MGPlat83[MG Plat]
    G19 --> MGPlat84[MG Plat]
    
    MGPlat79 --> Hq19[Hq]
    MGPlat80 --> Hq19
    MGPlat81 --> Hq19
    MGPlat82 --> Hq19
    MGPlat83 --> Hq19
    MGPlat84 --> Hq19
    
    Hq19 --> G20(( ))
    G20 --> MGPlat85[MG Plat]
    G20 --> MGPlat86[MG Plat]
    G20 --> MGPlat87[MG Plat]
    G20 --> MGPlat88[MG Plat]
    G20 --> MGPlat89[MG Plat]
    G20 --> MGPlat90[MG Plat]
    
    MGPlat85 --> Hq20[Hq]
    MGPlat86 --> Hq20
    MGPlat87 --> Hq20
    MGPlat88 --> Hq20
    MGPlat89 --
```

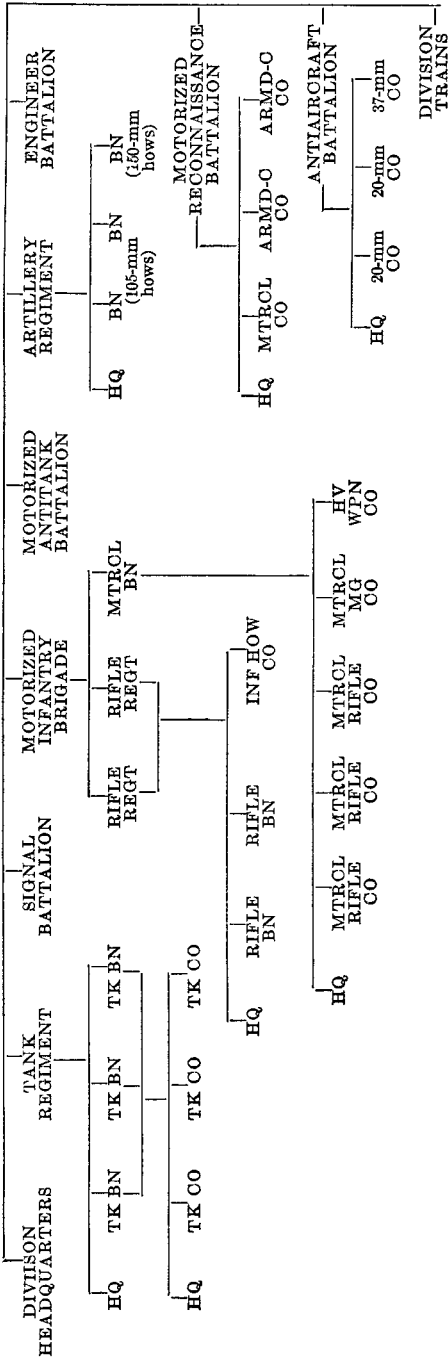
NOTE.—Frontier infantry regiment organized along similar lines.

GERMAN FORCES

b. Table of organization.—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Unit	Officers	Enlisted men	Machine pistols	LMGs	HoMGs	7.9-mm AT rifles	20-mm AA-AT guns	37 or 50-mm guns	50-mm mortars	81-mm mortars	75-mm inf hows	105-mm hows	150-mm hows	Rifles	Pistols	150-mm inf hows	Bicycles	Motorcycles	Notes
Div Hq.				2															
Mtz Ren Bn.				24	25		10	3	3		2								
Inf:				(118)	(36)	(27)		(12)	(27)	(18)	(6)					(2)			
Mtz Regt.				354	108	81		36	81	54	18					6			Some Mtz Divs on Russian front have 2 Regts and 1 Mtrcl Bn. Composition is extremely flexible.
Total Inf—3 Mtz Regts				(6)							(12)								
Art:				(6)															
150-mm How Bn.				(6)															
105-mm How Bn.				(6)															
Total Mtz Art Regt.	89	2,156		18								24	1						
Div AT Bn.	23	595		12				36											
Div AA Bn.							12												
Pioneer Bn.	26	945		28															
Sig Bn.	18	363		4															
Med Bn.																			
Div Tns.																			
Div Totals	14,000		228	442	133	81	22	75	84	54	20	24	12			6			

■ 8. PANZER (ARMORED) DIVISION.—a. Organization.—



GERMAN FORCES

b. Table of organization.—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Unit	Officers	Enlisted men	LMGs	HMGs	50-mm mortars	81-mm mortars	90-mm guns	97 or 90-mm guns	47-mm guns	75-mm inf hows	150-mm inf hows	75-mm hows	76-mm guns	105-mm hows	150-mm hows	Light Pz Kw I	Light Pz Kw II	Light Med Pz Kw III	Med Pz Kw IV	TOTAL Ist-line tks	Armored cars	Motorcycles	Motor vehicles	Notes
Div Hq.....	30	170														5	22	58	102	30	162		25	
Tk Regt.....	80	2,224	12	355			69	102				30				(6)	(19)	(34)	(10)	(54)		179		3 Bns per Regt.
Tk Bn.....				(4)			(21)	(34)				(10)												2 Regts per Brig. 2 Bns per Regt.
Mtz Rifle Brig.....	179	4,939	284	70	45	30	15	15	16	4														
Mtz Rifle Regt.....	(70)	(1,960)	(110)	(28)	(18)	(12)	(6)	(6)	(8)	(2)														
Mtz Bn.....																								
Mtrcl Bn.....	(28)	(947)	(58)	(14)	(9)	(6)	(3)	(3)																2 Bns per Regt.
Div Arty Regt.....			18													24	12							
105-mm How Bn.....				(6)												(12)								
150-mm How Bn.....	(21)	(536)	(6)																					
Sig Bn.....	18	363	17																					
Engr Bn.....	26	849	9																					
Mtz Ren Bn.....		757	74	2	3		48	4																
Mtrcl Co.....	(4)	(152)	(18)	(2)	(3)																			*24 may be Mk. II tks.
Armnd-C Co.....	(5)	(25)	(25)				(24)																	2 Cos per Bn.
Mtz AT Bn.....	23	595	18					12	18															
AA Bn.....	25	625	8				24	9																2 Cos per Bn.
20-mm Co.....																								
37-mm Co.....																								
Div Trains.....	60	1,208	(2)					(9)																
Div Totals:																								
Total Personnel (approx.)—																								
16,466.																								
Total Vehicles for trans.—																								
2,925																								
Total Tanks—201.																								

9. MOUNTAIN DIVISION.—a. Organization.—

9. MOUNTAIN DIVISION.—a. Organization.—



GERMAN FORCES

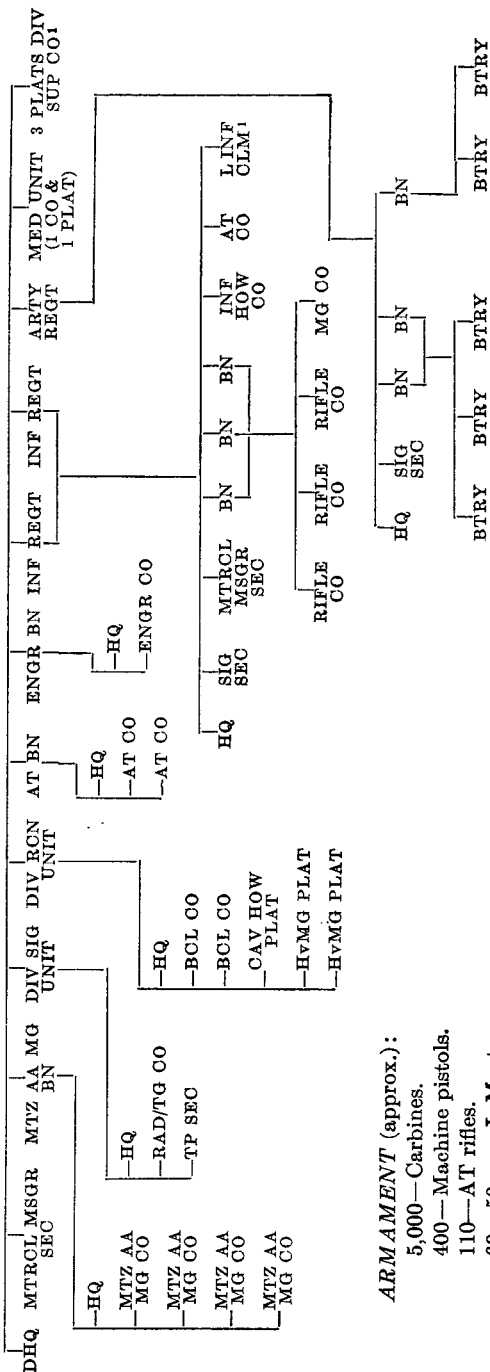
b. Table of organization.—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Unit	Officers	Enlisted men	7.9-mm AT rifles	LMGs	HoMGs	80-mm AT—AA guns	60-mm mortars	81-mm mortars	37 or 50-mm guns	75-mm mtn inf guns	75-mm pack hows	105-mm mtn hows	Animals	Motorcycles	Trucks			Notes
Div Hq.....	200																	Arty Regt is composed of 3 Bns 75-mm mtn guns and 1 Bn 105-mm Hows. Carries trestle-bridge equipment, no pontons.
Mtn Inf:																		
Bn.....	(12) (1,180)		(3)	(35)	(10)					(2)			(370)	(12)	(25)			
Regt—2 Bns.....	(3,500)		(9)	(174)	(42)					(6)								
Total Inf—2 Regts.....	7,000		18	348	84					12								
Mtn Arty Regt:																		
75-mm Mtn Gun Bn.....				(6)							(12)							
105-mm How Bn.....				(6)							36	12						
Total Arty Regt.....	2,245			24														
Div Sig Bn.....	18 | 456																	
Mtn Recon Gp.....	575			24	8	3	3	3	3					23	102			
Mtn AT Bn.....	618			18					30		2							
Engr Bn.....	15 | 420			23														
Mtrcl Bn.....	1,050		3	58	14				3	2								
Med & Vet Units.....	927																	
Div Services.....	901																	
Div Totals.....	14,402		21	500	106	3	66	45	60	14	38	12						

FM-E 101-10

10 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

■ 10. AIR-BORNE DIVISION.—



ARMAMENT (approx.):

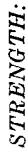
- 5,000—Carbines.
- 400—Machine pistols.
- 110—AT rifles.
- 60—50-mm L. Morts.
- 36—81-mm Morts.
- 8—75-mm Inf Hows.
- 2—75-mm Cav Hows.
- 30—20-mm AA & AT MGs.
- 200—LMGs.
- 60—Hv MGs.
- 30—37-mm AT guns.
- 32—75-mm Mtn Hows.

STRENGTH (approx.):

- O—270.
- EM—7,130.

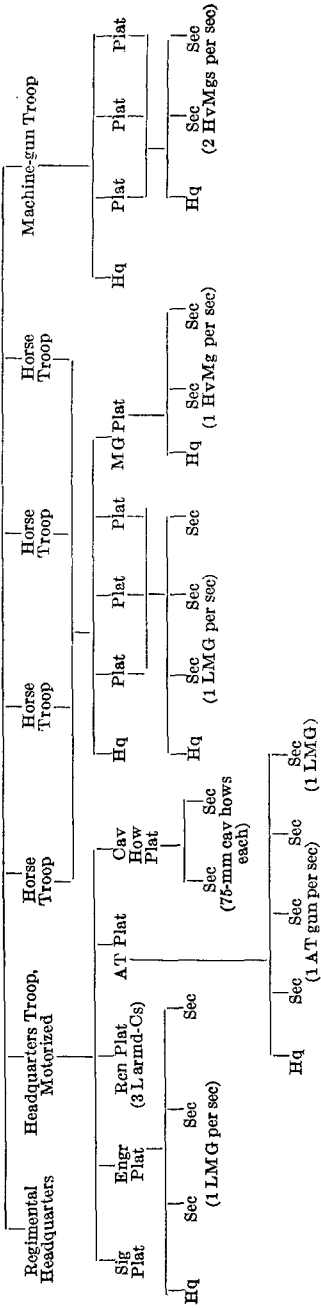
¹ Without vehicles.

■ 11. PARACHUTE REGIMENT.—



Carbines and 7.9 AT rifles.

12. HORSE CAVALRY REGIMENT.—

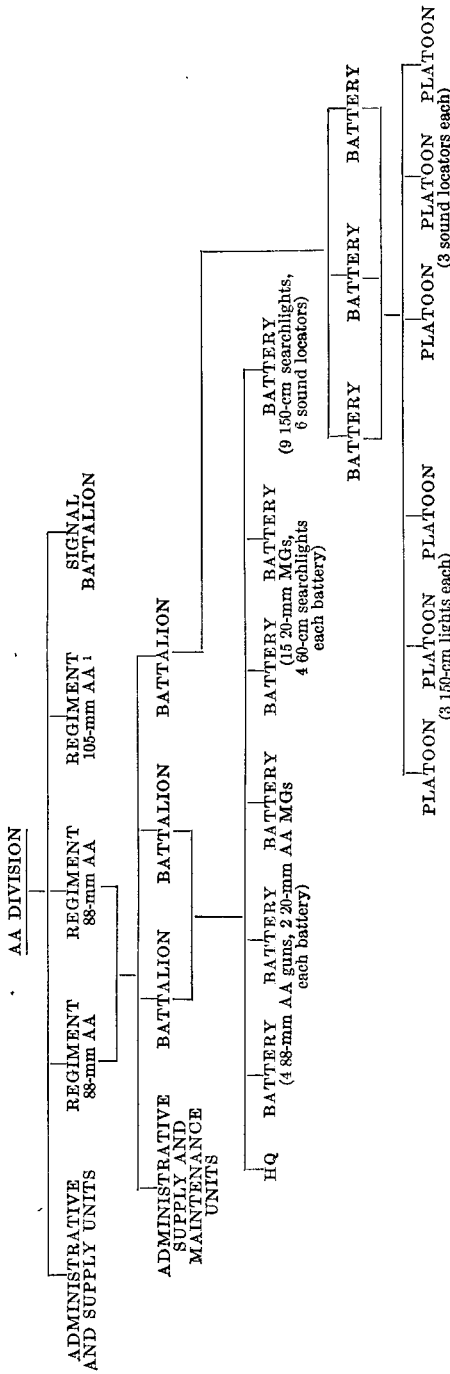


ARMAMENT:

	LMG	HvMG	37-mm	75-mm
Regt.	40	20	3	2
Hq Tr.	4	2	3	2
Horse Tr.	9	2		
MG Tr.		12		

GERMAN FORCES

- 13. ANTIAIRCRAFT TROOPS.—AA Corps is largest unit. At least four were known to exist in 1940. AA Corps consists of two or more AA Divisions plus auxiliary units.

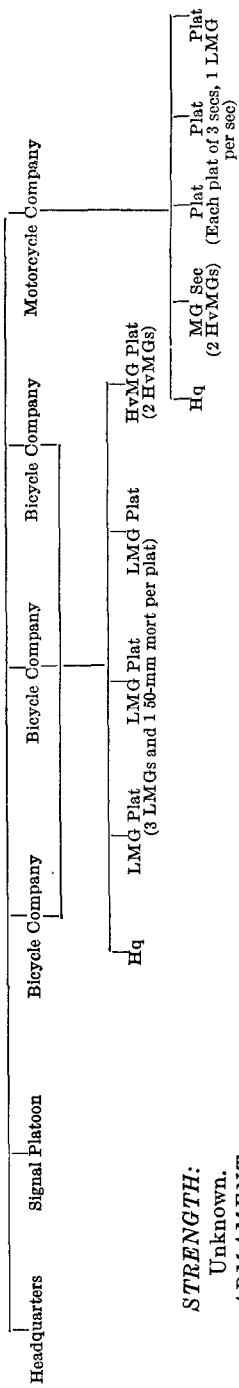


¹ Organization of 105-mm AA Regt is not known, but is believed same as 88-mm.

■ 14. BICYCLE BATTALION.—

FM-E 101-10

14 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES



STRENGTH:
Unknown.
ARMAMENT:
36 LMGs.
8 HvMGs.
9 50-mm Morts.

■ 15. HORSE ARTILLERY BATTALION.—Battalion consists of:

Headquarters.

Signal platoon.

Survey platoon.

Meteorological platoon.

Three batteries.

Two platoons of 2 75-mm guns, 1 LMG, and 1 20-mm MG each.

Two ammunition echelons.

STRENGTH:

O—21.

EM—535.

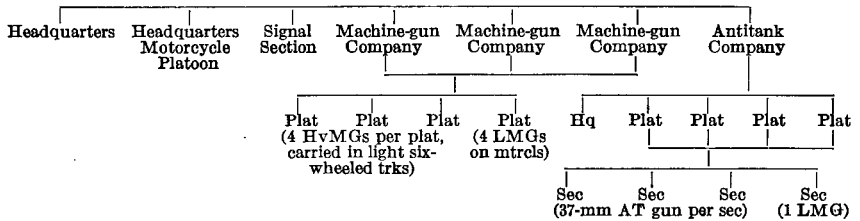
ARMAMENT:

12 75-mm Mtn Hows.

6 LMGs.

6 20-mm AA and AT MGs.

■ 16. MOTORIZED MACHINE-GUN BATTALION.—



STRENGTH:

O—26.

EM—964.

ARMAMENT:

12 37-mm AT guns.

36 HvMGs.

20 LMGs.

FM-E 101-10

17-18 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

17. AIR FORCE UNITS.—a. Organization.—

No. of units involved	Unit	Planes	Personnel		
			Officers	EM Pilots	EM
	AIR FLEET	864-6, 561			
2 or more-----	Air Corps Air Corps	432-2, 187			
2 or more-----	Air Div Air Div	216-729			
2 or more-----	Wg Wg Wg	108-243	56	54	1, 225-1, 450
	Gp Gp Gp	54-81	18	18	400-475
	Sqdn Sqdn Sqdn	18-27	5	6	100-125
	Flt Flt Flt	2-3			

b. Command.—Goering is the supreme commander of all elements of the Air Force. As such he has control of—

All military aviation, to include: procurement of personnel and material, training, and the development of equipment, supply, tactical operations, air defense measures, AA artillery, civilian air defense, etc.

Civil and commercial aviation, and coordination with military aviation.

He is responsible to Hitler alone for all matters pertaining to the Air Force.

Units assigned to duty with the Army or Navy are controlled by an officer responsible to the Army or Navy commander concerned with the operations of such units, and to Goering for equipment and training.

SECTION V

SIGNAL, ENGINEER, AND CHEMICAL UNITS

18. SIGNAL UNITS.—

Unit	O	EM	Remarks
Sig Bn, Inf Div-----	18	456	Hq Gp. Tp Co. Rad Co. L Sig Clm, partly mtz; 67 trks personnel, 35 trks equipment. Tp construction and operation. Rad construction and operation. Rad and Tp intercept. Cipher and interpreter Sec.
Sig Bn, Mtn Inf Div-----			Believed as above but fully motorized.
Sig Bn, Armd Div-----			Hq Gp. Armd Rad Co. Armd Sig Co. L Armd Sig Clm. Rad and Tp operation and maintenance. Command vehicles. Ciphers.
Sig Bn, Corps (Mtz)....	24	757	Hq Gp. 3 Tp Cos. Tp Operating Sec. Rad Co. L Sig Clm.
Sig Bn, Armd Corps....	16	329-406	Hq Gp. Armd Tp Co. Armd Rad Co. L Armd Sig Clm.
Sig Regt, Army-----	69	2100	Hq Gp. 1 Bn (Hq Gp, Tp opr. Co, Rad Co, L Sig Clm). 2 Bns (Hq Gp, Tp Opr. Co, Tp Co, 2 Tp Cons. Cos, L Sig Clm). Communication to Army troops and corps. Additional communication to subordinates as required.
Sig Bn, Mtn Div-----			Believed same as Inf except horse or horse-drawn.
Sig Co, Cav Brig-----	5	201	8 Mtz Tp Subsecs, 2 horse } (Expansion of Cav Brig to Div, 10 Mtz Rad Subsecs, 6 horse } probably Co became expanded to Bn) 1 Cipher Subsec
Sig Sec, Tk Brig-----			2 L Tp Subsecs. Rad and Comd vehicle Secs.

■ 19. ENGINEER UNITS.—

<i>Unit</i>	<i>O</i>	<i>EM</i>	<i>Remarks</i>
Bn, Inf Div.....	26	851	1 per Inf Div.—Hq. Sig Sec. 2 part Mtz Cos, 1 Hv Mtz Co, 1 bridge Clm. 1 tools Prk. 1 Sup Prk. Bridge work most important.
Bn, Mtz Inf Div.....	26	851	1 per Mtz Inf Div.—Hq. Sig Sec. 3 Hv Mtz Cos. 1 bridge Clm. 1 tools Prk. 1 Sup Prk.
Bn, Armd Div.....	30	845	1 per Armd Div.—Hq. 3 L Mtz Cos. 1 Mtz bridge Clm. 1 Sup Prk.
Bn, Mtn Div.....	15	420	1 per Mtn Div.—Hq. Sig Sec. 3 Cos. Carries trestle bridge equipment, but no pontons.
Bn, Cav Div.....			
Bn, GHQ.....	38	1249	Hq. Sig Sec. 3 Hv Mtz Cos. 3 bridge Clms. 1 tool Prk. 1 Sup Prk. Strengths of various units are same as equivalent in an Inf Div.
Part Mtz Co.....	4	186	2 per Inf Div.—Hq. 1 Sup Sec. 3 Plats, each of 3 Secs. 9 LMGS, 4 large and 6 small pneumatic boats. Men march; equipment carried in horse-drawn and motor vehicles. 200 AT mines, 1,750 pounds explosives, 400 yards barbed wire.
Hv Mtz Co.....	4	183	1 per Inf Div. 3 per Mtz Div. 3 per GHQ Bn.—Hq. 1 Sup Sec. 3 Plats, each of 3 Secs. Transported in 9 Trks, each carrying 1 noncom and 16 privates, 300 AT mines, 1 LMG, 1 power-driven saw, picks and shovels; and 3 Trks each carrying 12 men, explosives, ammunition, picks and shovels, 2,200 pounds explosives.
Bridge Clm, Mtz.....	6	184	1 per Inf Div. 1 per Mtz Inf Div. 1 per Armd Div. 3 per GHQ Bn.—Fully mtz. 2 Plats, each equipped with ponton bridge material. 1 Plat with motorboats, outboard motors, and pneumatic boat equipment. "Model B" equipage is carried.
Tool Prk, Mtz.....	2	48	1 per Inf Div. 1 per Mtz Div.—Fully motorized; carries battalion reserve of tools.
Sup Prk, Mtz.....	1	29	1 per Inf Div. 1 per Mtz Div. 1 per Armd Div.—Fully motorized and carries battalion reserve of explosives, ammunition, light tools, wire and smaller Engr stores. 800 AT mines, 4,400 pounds explosives.

FM-E 101-10

20 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

■ 20. CHEMICAL WARFARE.—

	<i>O</i>	<i>EM</i>	<i>Remarks</i>
Chemical Bn.	(approx.) 600		Hq. Sig Sec. 2 Cml Proj Cos. Decontamination Co. 4 cars and 20 trks per Co. Proj Co has 3 100-mm mortars plus candles, cylinders, etc.
Other chemical possi- bilities:			Some tanks in Tk Regt equipped for emission of gas. Mtz Engr Bns believed to have flame throwers, gas sprayers driven by motor pumps, and smoke apparatus.
Chemical agents.			Main agents as listed below, nothing new of importance believed discovered. Possible use of <i>ARSINE</i> . (1) Blister gases. German—"Yellow Cross." Mustard HS. Lewisite I. (2) Choking gases. German—"Green Cross". Phosgene CG. Diphosgene. Chloropicrin PS. (3) Nose gases (toxic smokes). German—"Blue Cross". DA. DC. DM. (4) Tear gases. German—"White Cross". CN. CA. Bromine compounds.
Offensive weapons and equipment.			<i>Aerial spray</i> —Low altitude, mixtures of mustard gas & lewisite, or either alone. <i>Chemical aerial bombs</i> —Highly developed by Germans. 22 lbs—toxic. 110 lbs—mustard, small or large burster for ground or personnel contamination. 550 lbs—mustard, time fuze for action about 300 ft. above ground, covers 6,000 sq. yds. Plain glass bombs or capsules, mustard gas. <i>Projectors</i> — 105-mm and 150-mm artillery shell, mixed with HE. Mortars are equipment of chemical troops. Also possible adaptation of 81-mm mort. Gas grenades. Gas cylinders. Gas mines. Bulk contamination from mobile spray units. Toxic generators, large number captured from French.

■ 21. SMOKE.—

	<i>O</i>	<i>EM</i>	<i>Remarks</i>
Smoke (Bn?) unit.....			Hq. Sig Sec. 3 Smoke Cos. 2 Sec per Co (120 men). 24 vehicles per Co. Eight 81-mm mortars per Co, 24 per unit. 1 Co equipped for decontamination.
Smoke agents.....			Generators and candles—Berger type mixtures. Pressure type—Drums of CSA and compressed air cylinders.
Other smoke units.....			Arty shell—not favored. Armored Force vehicles—smoke-producing apparatus. Engr units—smoke to cover working parties and locations. Aircraft—curtains and screens, using titanium tetrachloride.

SECTION VI
CHARACTERISTICS OF MATÉRIEL

■ 22. INFANTRY AND CAVALRY WEAPONS.—

1	2	3	4	5	6	7	8	9	10	11	12
Weapon and caliber	Weight in firing position (lb.)	Method of operation	Type of feed	Maximum rate of fire (rds. per min.)	Practical rate of fire prolonged (rds. per min.)	Weight per round (lb. or grams)	Maximum range (yd.)	Maximum effective range (yd.)	Effective radius of burst-fragmentation (yd.)	Penetration (thickness, degrees, range)	Remarks
"Karbiner '98 k." Mauser 7.9-mm.	8.58	Manual									
With bayonet	9.83										
"Schmeisser" Mach. Pist.	9.7		20, 25, & 50 Box magazine.	500		185 gr.		200			
25/11 8.9-mm. or 9-mm.				250-320 sust.							
With full mag. 50 rds.	11.0										
"Steyr-Solothurn S. 1-100". 9-mm. (mach. pist.).	9.2		30 rd. Box magazine.			200 gr.					
With bayonet	9.9										
"Pistole 08" (Luger) 9-mm.	1.87	Recoil, semi-automatic.	8 rd. magazine.								
"Dreyse LMG 13." 7.9-mm.		Air-cooled, recoil, auto, and semiauto.	25 rd. magazine.		150						Normally bipod mount, tripod for A.A.
With mounting	26		zincs.								*Claimed.
"Knorr-Bremse" 7.9-mm.	22		25 rd. magazine.	500-2,000*	150-200						
			zinc.		*110-120		*2,200				
			(Metal belt of 10 strips 25 rds. each.)								
MG-34 (dual-purpose) 7.9-mm.		Air-cooled.	Bands on drum for A.A.	800.							*Bipod or tripod, latter also for A.A.
Without mount	15½				300-350		3,300				LMG refers to bipod mount, HvMG to tripod.

GERMAN FORCES

Trench Mortar, light, 50-mm.	31	Manual, muzzle load, trigger fire. Direct laying.	60		1½ lbs.	500	350	24	HE and smoke.
81-mm:									
Mortar, L 15	68.2	Muzzle load, by trigger, or by percussion.	}						
Mount	61.6								
Base Plate	55.0					5,000			Also smoke.
Sight	2.2								
81-mm Mortar, S Gr W 34	125	Muzzle load, by trigger, or by percussion.			HE 14.3 lbs.	65-2,070			
75-mm Inf How.—LMW 18		Breech	20		HE 14½	3,900		20	
75-mm Close Support Inf How. L 13.		Breech	20		HE 10.	5,600			
					HE 14	4,200			
150-mm Hv Inf How—S Inf G33.	3,300	Breech			4 80	6,000			
47-mm Self-Propelled AT Gun.					AP 3.75			{60-30-650}	Armor protection.
75-mm Self-Propelled Assault Gun.						9,000		{80-10-200}	Armor protection.
25-mm Self-Propelled AT Gun (mtd on converted Pz Kw II).	18,000				20-25 AP 11.3 ounces		300	{50-N-400}	Road speed 24 mph. Cross country 16 mph. Penetrate 50 mm/100 yds/30°.
37-mm AT Gun		Breech						{32-22-400}	
50-mm AT Gun (without mount).	650				{AP 1.68	4,400	400	{33-N-650}	Penetrate 25 mm/700 yds/30°.
Grenade—PH 39					HE 1.37		600	{43-N-330}	Penetrate 60 mm/400 yds/30°.
	1.33	Manual			AP 4.55				4½ sec. fuze delay action.
Grenade—M 24	1.25	Manual			1.33				5½ sec. fuze delay action.
20-mm AA/AT MG					1.25		300		Penetrate 22 mm/500 yds/norm.

There are also antitank rifles of 7.9-mm, 12-mm, 13-mm, and 15-mm calibers, effective against light armor at varying ranges up to 300 yards.

■ 23. ARMORED VEHICLES—*a. Tanks.*—

1	2	3	4	5	6	7	8	9	10	11	12 Dimensions (in.)			13	14	15
Type of vehicle	Weight (tons gross)	Armament	Main armor	Crew	Maxi- mum speed on roads (mph)	Span- ning capac- ity (ft.)	Slope climb (de- grees)	Safe ford depth (in.)	Verti- cal ob- stacle (in.)	Radius of ac- tion (miles)	H	L	W	Belly clear- (in.)	Commu- nication	Notes
Lt Tr—Polish	2.5	2 7.9 Hotchk. or 1 20-mm A.T.	10-mm.	2	28	5'	45	20	16	85	54	102	72	12	Flag	
Lt Pz Kw I—German	5.7	2 LMGs	14-mm.	2	32	4'7"	45	24		95	68	156	77	12	Rad/Tg.	
Lt T. N.—H. P.—Czech.	8.5-10	1 37-mm 2 HvMGs	25-mm.	3-4	53	6'5"	40-45	16	32	125	88	182	81	16	Rad/Tp. Flag Lamp	
Lt Pz Kw II—German	9	1 20-mm 1 LMG	15-mm.	3	28	4'11"	45	32	23	125	66	178	72		Rad/Tg.	
Lt Med A. H. IV—Czech.	10	1 37-mm 1 MG	24-mm.	3	53	6'7"	40-45	31	24	93	87	198	79	14	Rad/Tp. Lights	
Lt Med L/T3—Czech.	11.5	1 37-mm 2 LMGs	25-mm.	3	22	6'6"	40	31	31	70	94	194	90		Rad/Tp. Lamp	1 MG coaxial (37-mm).
Lt Med C. K. D. V. 8H— Czech.	16.5	1 47-mm 2 HvMGs	36-mm.	4	27	7'6"	41	39	39	77	92	210	90	18	Flag Rad/Tg.	1 MG coaxial (47-mm).
Lt Med Pz Kw III— German.	18-20	1 37-mm 2 LMGs	30-mm.	3-4	28			35			90	197	90		Rad/Tp.	1 MG coaxial (37-mm).
Med Pz Kw IV—German.	22	1 75-mm 2 LMGs	43-mm.	5	31			42			102	204	87		Rad/Tg.	1 MG coaxial (75-mm).
Hv Pz Kw V—German	36	1 75-mm 1 37-mm 3 LMGs	60-mm.	7-8	20	11'6"		40	55	75-85	120	300	103		Rad/Tp.	37-mm and 75-mm are coaxial. Uncon- firmed.
Hv Pz Kw VI—German	45	1 105-mm 1 37-mm 3 LMGs	75-mm.	7-8	20	11'6"		40	55	75-85	120	300	103		Rad/Tg. Rad/Tp	Unconfirmed.

GERMAN FORCES

b. Armored-car units.—

1 Type of vehicle	2 Weight (tons — gross)	3 Armament	4 Main armor	5 Crew	6 Maximum speed on roads (mph)	7 Radius of ac- tion	8 Wheels x drive	9 Com- muni- cation	10 Fuel capa- city (gal.)	11 Belly capa- city (sq. ft.)	12 Dimensions (in.)			13 Notes
											H	L	W	
L Ren Car.....	1.7	1 LMG....	10-mm..	2-3	40-50	175	4 x 2	Flag....	---	18	63	120	66	Sd. Kfz 222 has Rad/Tp and 1 13-mm HvMG, 1 LMG.
L Tatra 30.....	2.5	2 LMGs..	14-mm..	3	37	155	6 x 4	Flag....	---	23	78	156	58	
L Horch 36 Sd. Kfz 221-2-3.....	4-7	1 20-mm.. 1 LMG	8-mm.. Visors/ 15-mm	3	30	155	4 x 4	Rad/Tg..	---	7 3/4	71 1/2	187	75 1/2	
Med-ASP 6.....	6.4	1 20-mm.. 1 LMG	14-mm..	4	50	200-240	6 x 4	Rad/Tg..	---	---	96-	197	90-	
Med-ADKZ, Mk. I and Mk. II.....	7	1 AT gun. 1 MG	14.5-mm.	3	40	---	---	Flag....	---	---	108	---	108	Very quiet—hydraulic drive.
Med-PA II or PA XXIV.....	8	5 LMGs..	?	5	---	---	4 x 4	Rad/Tg..	---	12	97	240	86	
Med-PA IV.....	8.7	1 20-mm.. 2 LMGs	14-mm..	5	35	---	4 x 4	Flag....	---	20	106	235	81	
Heavy-8-wheeled.....	9-10	1 20-mm.. 1 LMG	30-mm..	4-5	53	250	8 x 8	Flag....	---	20	108	210	96	
Heavy-ADGZ.....	11.5-12	2 HvMGs. 2 LMGs	18-mm..	7-12	50	186	8 x 8	Rad/Tg..	---	12	109	234	85	

■ 24. FIELD ARTILLERY AND ANTI-AIRCRAFT ARTILLERY.—a. Field Artillery.—

1 Weapon—type and caliber	2 Weight of piece, traveling position with normal load exclusive of personnel (lb. approx.)	3 Piece transport	4 Weight of prime mover with normal load (lb. approx.)	5 Normal overall width, traveling position		6 Time to emplacement or change from firing to traveling	7 Transverse	8 Normal rate of fire (rds. per min.)		9 Maximum effective range (yd.)	10 Approximate weight of ammunition	11 Unit of fire (rds. per piece)	12 Rate of march		13 Notes
				Piece	Prime mover			Short bursts	Prolonged				Roads	Cross-country	
75-mm field gun.....															
105-mm howitzer.....										12,000	31.79				
105-mm gun.....										19,700	35				
150-mm howitzer.....										16,400	95.7				
150-mm gun.....										25,000	113.5				
210-mm gun.....															
240-mm gun.....															
240-mm howitzer.....										18,270	264				
300-mm howitzer.....															
305-mm howitzer.....															
280-mm gun.....															
305-mm gun.....															
380-mm gun.....															

GERMAN FORCES

b. Antiaircraft artillery.—

1 Caliber and model	2 Length of bore (cal.)	3 Muzzle velocity (f/s)	4 Weight of shell (lb.)	5 Maximum range horizontal (yd.)	6 Maximum range vertical (ft.)	7 Rate of fire		8 Elevation	9 Depression	10 Traverse	11 Weight in action	12 Method of transport
						Theoretical	Practical					
20-mm AA and AT gun (super-HvM G).	65	2,950	0.308	6,124	12,468	280	---	90	0	360	1,012 lbs.	Towed by L tractor.
37-mm AA gun.....	50	2,800	1.4	8,744	15,600	150	---	85	-10	360	1.7 tons	Towed by truck.
47-mm AA gun.....	---	2,620	3.3	11,695	24,000	25	15	85	-10	360	1.7 tons	Tractor.
75-mm AA gun, L/60.....	60	2,775	14.3	17,815	37,000	20	20	85	-3	300	2.9 tons	Do.
88-mm AA gun, L/60 I.....	56	2,750	18.8	16,000	37,000	25	15	85	-3	360	5.2 tons	Do.
90-mm AA gun.....	50	2,540	22.4	13,700	30,000	15	8	80	0	360	6.4 tons	Do.
105-mm AA gun.....	60	2,950	32.2	19,100	42,640	15	15	80	10	360	11.7 tons	Do.
127-mm AA gun.....	50	2,500	55	19,500	42,000	20	12	90	0	360	---	Do.
130-mm AA gun.....	---	3,450	89	---	66,000	15	10	---	---	---	---	---

¹ Penetration of face-hardened armor plate, angle of impact of 20° to normal: at 500 yds.—4.2 in.; at 1,000 yds.—3.8 in.

1 Name, model, and class	2 Motors	3 Crew	4 Bomb load (lb.)	5 Ceiling (ft.)	6 Operating range (miles)	7 Operating speeds	8 Rate of climb (min. to ft.)	9 Armor	10 Armament
Focke-Wulf Kurier — Heavy Bomber. Heinkel—Bomber: HE—111 Mk. Vc.....	4	6	—	28,000	775-1,180	265 mph at 9,500 ft.....	2.5 min./3,280 ft.; 14.3 min./ 13,120 ft.	—	Cannon and MGs.
HE—111 Mk. Vc.....	2	4	4,400	26,200	2,110 with 2,200 lb.	280 mph at 14,000 ft.....	17 min./13,120 ft.	—	3 flex. 50-mm MGs or cannon in nose.
HE—111 K. Mk. V.....	2	4	4,400	24,100	2,170 with 4,400 lb.	274 mph at 12,300 ft.....	16.8 min./13,120 ft.	—	Same as 111 Mk. Va.
HE—111 K. Mk. LLI.....	2	4	2,200-4,500	24,100	1,000	252-272 mph*	2.1 min./3,280 ft.	—	Same as above. *Type motor.
Heinkel—Bomber: 177	4	5	12,000	36,000	1,863-4,000	Max. 340 mph	36 min./20,000 ft.	—	5 MGs.
Dornier—Bomber: DO—17.....	2	3	2,200	29,283	965-1,860; 1,200 at 210 mph.	Max. 288 mph	1.8 min./3,280 ft.; 17 min./ 19,680 ft.	—	8 flex MGs.
DO—215.....	2	4	2,200	27,230	1,044 at 264 mph.	Max. 312 mph at 16,400 ft.	1.8 min./3,280 ft.; 12.8 min./ 16,400 ft.	—	5 MGs.
Junkers—Bomber: JU—88.....	2	4	2,200-4,000	29,520	1,560 at 185 mph.	Max. 320 mph at 15,580 ft.	7.1 min./15,000 ft.	—	3 Mgs.
JU—87—Dive bomber.	1	2	1,320	27,890	498 at 186 mph.	242-250 mph.; dive—430 mph.	8.5 min./13,120 ft.	—	2 MGs.
Messerschmitt—Fighter: ME—109.....	1	1	500	36,080	620 at 298 mph; 540 at 322 mph.	Max. 354 mph	3.8 min./13,120 ft.	8-mm	2 MGs. 2 20-mm cannon.
ME—110.....	2	3	1,100	—	1,300 at 315 mph.	Max. 370 mph	10.1 min./20,000 ft.	—	4 MGs. 2 20-mm cannon.
Heinkel—Pursuit: HE—113.....	1	1	—	37,000	—	Max. 400 mph	—	—	2 MGs. 1 cannon.
Focke-Wulf—Pursuit: FW—187.....	2	2	—	38,700	—	Max. 400 mph	1.9 min./6,560 ft.	—	4 MGs. 2 20-mm cannon.
FW—198.....	1	1	—	34,500	590 at 295 mph.	Max. 370 mph	2,750 ft. per min.	—	4 MGs. 2 cannon.

CHAPTER 2

MOVEMENT

SECTION I. Facilities.....	Paragraphs 26-31
II. Troop Movements.....	32-34

SECTION I

FACILITIES

■ 26. ANIMALS.—*a. Animal-drawn transportation.*—

(1). 4-horse large field wagon (HF 2).

Characteristics:

Weight, empty.....	1, 760 lb.
Weight, loaded.....	4, 400 lb.
Weight behind each horse.....	1, 100 lb.
Length less pole.....	14.2 ft.
Cubic capacity.....	54, 000 cu. ft.

(2) 2-horse light field wagon (HF 1).

Characteristics:

Weight, empty.....	1, 342 lb.
Weight, loaded.....	2, 992 lb.
Weight behind each horse.....	1, 496 lb.
Length less pole.....	13.8 ft.
Cubic capacity.....	48, 100 cu. ft.

b. Number.—(1) Horses on hand in Germany:

December 5, 1938	1937	1936
3, 442, 700	3, 433, 800	3, 410, 300

Imports for 1938 numbered 19,576, so most of the imported horses must have been destined for the army.

(2) Horses in the German Army (November 1, 1941):

	Total
Cavalry Divisions.....	6, 000
Corps Cavalry Regiments (14 with 950 each).....	18, 000
Horse-drawn Artillery (230 with 2030 each).....	466, 900
Infantry Regiments (690 with 606 each).....	418, 140
Divisions (230 with 4201 each).....	966, 230
Total in German Army.....	990, 230

■ 27. MOTOR TRANSPORT.—*a. Total.*—(1) Estimated total motor-vehicle equipment (including tracked vehicles, but excluding armored vehicles and motorcycles) is slightly under 500,000 units in the German Army.

(2) Motor vehicle equipment of the Air Force and AA units is estimated about 135, 000 units.

(3) Civilian vehicles prior to the war:

Private cars.....	1, 300, 000
Commercial, etc.....	475, 000

b. Cargo truck.—Characteristics:

- 6-cylinder, water-cooled diesel motor.
- 120 hp European rating.
- 6 wheels, 2 axles (4 x 4, 2 dual tires).
- Maximum speed, 45 mph.
- Brakes—compressed air and hydraulic.

■ 28. AIR TRANSPORT.—a. German transport aircraft.—

1	2	3	4	5	6			7	8		9
Model	No. of engines	Cruising speed (mph)	Cruising range (miles)	Radius of action at cruising (miles)	Load per aircraft			No. of aircraft available	Total load		Remarks
					Personnel	Freight (lb.)	Troops		Per-sonnel	Freight (lb.)	
Junkers 52.....	3	170	1,000	400	3	17		1,500 (approx.)	30,000		Normal load.
Do.....	3	170	250	100	3		5,000	1,500 (approx.)		75,000	Do.
Do.....	3	162	1,070	428	3		3,000	1,500 (approx.)		45,000	Do.
Do.....	3	162	780	312	3		5,000	1,500 (approx.)		75,000	Do.
Do.....	3	162	250	100	3		5,000	1,500 (approx.)		112,500	Do.
Do.....	3	165	830	332	3		5,000	1,500 (approx.)		75,000	Overload.
Do.....	3	165	300	120	3		8,000	1,500 (approx.)		120,000	Do.
Do.....	3	170	1,000	400	2	10-12		1,500 (approx.)	21,000		Parachutists.
Junkers 252.....	3	200									New type—few in serv- ice in 1942.
Junkers 90.....	4	199	1,300	520	3	40		40-50	1,935		Normal load.
Do.....	4	199	1,300	520	3		3x3 ton tanks	40-50		135x3 ton tanks	Do.
Do.....	4	230	1,080	432	3		13,000	40-50		585,000	Normal load with Jumo 211 engine.
Do.....	4	230	810	324	3		9,000	40-50		405,000	Normal load with B MW 132 H. engines.
Do.....	4	225	790	326	3		22,000	40-50		990,000	Overload.
Do.....	4	230	950	380	3		22,000	40-50		990,000	Assisted take-off.
Do.....	4	225	1,950	780	3		13,000	40-50		585,000	Extra fuel tanks.
Junkers 290.....	4				3-7	40					Improved Ju 90—few in service in 1942.
Heinkel 116.....	4	205 (max.)	2,795	1,112	4	16		16 under construc- tion in 1940.	{		Converted mail and freight carrier.
Do.....	4	205 (max.)			4		3,200				
Blohm and Voss 142.....	4	217	2,700	1,580	4	20					Only a few—not in general use.
Do.....	4	217	2,700	1,580	4		4,000				

Blohm and Voss 222	6	170	4,400 to 5,600 (est.)	1,760 to 2,240	80+	22,000			New type—few as yet, increasing numbers ex- pected.
Do	6	170	4,400 to 5,600 (est.)	1,760 to 2,240					
Focke-Wulf 200	4	230	1,200	480	5-6	6,000	Few		Usually restricted to staff duty.
Do	4	230	1,200	480	5-6		Few		Obsolete as transport. Few may still be in use.
Junkers 86	2	200	700	280	4				
Do	2	200	700	280	4	2,000			

FM-E 101-10

28 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

b. Gliders.—(1) The glider types which are considered to be operational are:

Type	Load
D. F. S. 230.....	16 men or 2,834 pounds.
Gotha 242.....	23 men or 5,500 pounds.
Merseburg.....	40-50 men or 20,000 pounds.

(2) A fourth type, the Goliath, capable of carrying 140 men or 16 to 20 tons (35,000-40,000 lb.), has been identified, but it is not believed to be operational as yet.

(3) The Germans appear to favor the D. F. S. 230 for troop transport. This glider carries one complete German machine-gun unit of 10 men with all equipment and ammunition. This glider has a gliding range in still air of 35 miles from 10,000 feet, or 10 miles from 3,300 feet.

(4) The Gotha has been used primarily for freight carrying and can be towed by several different types of tug. The gliding range is not known.

(5) The Merseburg with its reputed load is wide enough to take a Pz Kw II tank, but with this load is too heavy to be towed by a single Junkers 52.

(6) The Goliath has a twin fuselage, each of which can accommodate 70 men or 17,500 to 20,000 pounds. Towing might be accomplished by a special, high-powered tug or a team of three Junkers 52's or four Messerschmitt 110's.

(7) The Germans are believed to have at least 4,000 gliders in operational use, with an adequate supply of glider pilots. The majority of the gliders are D. F. S. 230's. Thus, in one trip, the Germans should be able to transport 55,000 men or 15,000,000 pounds of supplies.

(8) A glider *Staffel* organized for transport consists of 12 to 15 airplanes.

c. Performance of glider tugs.—

Tug	D. F. S. 230			Gotha 242			Merseburg		
	Towed	Miles	Cruising	Towed	Miles	Cruising	Towed	Miles	Cruising
Messerschmitt 109.....	1	500	140						
Messerschmitt 110.....	1	1,230	140						
	2	1,050	140						
2 x Messerschmitt 110.....							1	280	140
Junkers 52.....	1	1,600	110						
	2	1,410	110	1	(?)	110	1	990	110
	3	1,270	110						
Henshel 126.....	1	630	120						
	2	490	120						
Henshel 123.....	1	350	110						
	2	260	110						
2 x Junkers 52.....							1	1,100	110
2 x Henshel 126.....							1	180	120
2 x Henshel 123.....							1	100	110
Heinkel 111.....	1	1,548	120						
	2	1,366	120						

¹ All-up weight 50,000 pounds. Tugs at maximum fuel capacity.

■ 29. RAIL TRANSPORT.—*a. Engines.*—Types:

(1) *Electric.*—Weight 102 tons; 4 traction wheels, 2 idlers on each rail; 6,000 hp; operate to 100 mph; haul 17 coaches.

(2) *General.*—Standardization has reduced types from 210 to 13. Some have maximum speed of 122 mph, but can only haul up to 250 tons. Some haul a maximum weight of 650 tons, at a minimum of 74 mph on the level, or 37 mph on a grade of 1 percent. Temporary maximum on the level, 87 mph. By a readjustment of carrying springs, can reduce axle pressure from 20 to 18 tons. Dimensions:

Locomotive:

Total distance between axles (mm.)	14,525
Dead weight of locomotive (metric tons)	131.71
Service weight of locomotive (metric tons)	143.57

Tender:

Dead weight of tender (metric tons)	34.3
Service weight of tender (metric tons)	82.3

Length of locomotive and tender:

Over buffers (mm.)	26,520
--------------------	--------

b. Cars.—November 6, 1941 estimate of rolling stock:

Passenger cars	68, 942
Baggage cars	22, 028
Freight cars	650, 229

Ship cargo of 5,000 tons requires 500 cars to move.

There are estimated about 14,000 high-capacity cars, loading 40 to 50 tons.

NOTE.—See chart for availability of locomotives and rolling stock.

FM-E 101-10

29 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

c. *Facilities.*—Electrified track in Germany is all standard, that is, 143.5 cms. Railroads constitute 78 percent of the total transport.

(1) *German Railroads.*—

(*Greater Germany's economic estimate, November 6, 1941*)

	1938 Old Reich and Aus- tria	1937 Czecho- slovakia	1938 Poland	1940 France	1940 Nether- lands	1939 Bel- gium	1940 Nor- way	1939 Den- mark
<i>Motive Power</i>								
Total locomotives.....	23,996	4,122	5,780	18,500	1,124	3,594	536	801
Steam.....	22,076	4,091	—	—	901	3,593	481	—
Gasoline.....	6	7	—	—	54	—	—	784
Small.....	1,130	—	—	—	—	—	—	—
Electric.....	784	24	—	—	—	1	55	—
Diesel electric.....	1,873	—	—	—	108	—	—	17
Total motor rail cars.....	—	532	—	700	197	45	86	565
Gasoline motor rail cars.....	—	—	—	—	44	—	—	—
Diesel motor rail cars.....	—	—	—	—	—	—	—	—
Electric cars.....	—	12	—	—	153	29	—	—
Total units of motor power...	25,869	4,666	5,780	19,200	1,474	3,639	622	1,366
<i>Rolling Stock</i>								
Total freight cars.....	629,632	94,271	169,533	450,000	27,000	114,002	12,380	11,629
Closed freight cars (box).....	223,795	133,594	—	—	—	—	—	—
Open freight cars (flat).....	387,301	160,104	—	—	—	—	—	—
Tank cars.....	—	186	—	—	—	—	—	—
Refrigerator cars.....	—	191	—	—	—	—	—	—
Road service cars.....	18,536	—	—	—	—	—	—	—
Passenger cars.....	66,325	10,278	13,020	31,000	1,731	8,299	2,305	1,583
Mail cars.....	—	3,082	—	—	—	—	—	—
Baggage cars.....	21,580	13,082	—	—	—	—	—	723
Other vehicles.....	—	—	—	—	—	285	—	—
Total rolling stock.....	717,537	107,631	182,553	481,000	28,731	122,586	14,685	13,935

¹ Indicates state-owned.

(Greater Germany's economic estimate, November 6, 1941)—Continued

	1939 Hun- gary	1938 Ru- mania	1938 Yugo- slavia	1940 Greece	1937 Bul- garia	1938 Estonia Latvia and Lith- uania	Grand Total
<i>Motive Power</i>							
Total locomotives.....	1,848	3,527	2,309	384	659	729	67,909
Steam.....	1,813				655	715	
Gasoline.....						14	
Small.....							
Electric.....	33						
Diesel-electric.....	2	1			4		
Total motor rail cars.....	134	236				40	4,408
Gasoline motor rail cars.....	7						
Diesel motor rail cars.....	127						
Electric cars.....	33				4	4	82
Total units of motive power.....	2,015	3,763	2,309	384	663	773	72,523
<i>Rolling stock</i>							
Total freight cars.....	40,111	55,471	53,703	6,618	10,896	15,229	1,690,475
Closed freight cars (box).....	15,722	23,681			4,445		
Open freight cars (flat).....	24,389	30,240			6,259		
Tank cars.....		1,550			182	184	
Refrigerator cars.....					3	240	
Road service cars.....					7		
Passenger cars.....	3,473	3,612	5,130	809	687	1,615	149,867
Mail cars.....	79	305			44	45	
Baggage cars.....	1,100	527		89	242	109	
Passenger and freight vehicles.....							
Other vehicles.....					78	283	
Total rolling stock.....	44,763	59,915	58,833	7,516	11,947	17,281	1,868,913

(2) *Trackage.*—

1 <i>Territory</i>	2 <i>Single or first track</i>	3 <i>Other main track</i>	4 <i>Yard track and sidings</i>	5 <i>Total trackage (kilometers)</i>	6 <i>Municipal systems</i>	7 <i>Electrified (kilometers)</i>	8 <i>Narrow gage</i>	9 <i>Standard gage</i>	10 <i>Density per 100 square kilometers</i>
Old Reich and Austria.....				64,772.64	10,319	3,204.74	1,364.28	58,743.71	14.56
Czechoslovakia.....	11,343.61	1,953.0	1,262.4	13,774.2		77	1,311.9	12,984.7	8.63
Poland.....	13,995	5,389	1,282	20,666	1,447	225	2,143	18,102	5.3
France.....				42,608		3,371			
Netherlands.....	1,657	4,394	2,307	8,358		1,129	None	8,358	
Belgium.....				4,839		69.1	None	4,839	
Norway.....				3,828		407.6	682	3,146	
Denmark.....				6,982.5		52			
Rumania.....	3,698	7,677	3,942	15,317		None	743	15,234	
Yugoslavia.....				9,945					
Greece.....				3,063.7					
Hungary.....	10,170.9	1,044.4	3,513.3	14,728.6	126	430.7	None	14,728.6	
Bulgaria.....			873	4,268		None	500	3,768	
Latvia, Estonia, and Lithuania.....	6,297	142	1,138.6	7,577.6		12			
Russia.....				85,498			998	84,500 (1,524 meters)	

¹ Indicates state-owned.

(3) *General facilities of railroad nets.*—

(a) *Hungary.*—Except in the great central plains of Hungary, the railroads naturally follow the river lines and cross the Carpathians at the most favorable passes. The most vulnerable feature of the whole network is that there are only five railroad bridges, across the Danube, in the country. Of these, two are at Budapest; one at Komarom; one east of Pecs; one from Dunafoldvar to Solt.

(b) *Poland.*—There are six main double-track lines connecting the railroad nets of Germany and Poland (north to south):

Berlin—Stettin—Gdynia—Tczew.

Berlin—Schneidemuhl—Tczew.

Berlin—Poznan.

Breslau—Poznan.

Dresden—Breslau—Ostrow.

Breslau—Katowice—Krakow.

When considering German troop movements across Poland, two main lines should be taken into consideration. They are—

Prague—Bohumin—Krakow.

Vienna—Bohumin—Krakow.

(c) From inspection it would appear that the related railroad nets in Germany and Poland are more suited to rapid concentration of large numbers of troops to the East Prussian area, than to the southeastern frontier of Poland.

(d) The main connections between Soviet and Polish rail nets are—

Leningrad—Polock—Molodeczno (single-track).

Moscow—Minsk—Baranowicze (double-track).

Moscow—Homel—Luniniec (single-track).

The German-Polish net is more adequate, strategically, than the Soviet-Polish net.

■ 30. WATER TRANSPORT.—*a. Tonnage available.*—(1) Total gross tonnage of German merchant vessels as of January 1, 1942:

3,875,414 (does not include 87 tankers of 624,747 gross tons).

(2) Special invasion-type barges:

3,000 barges.

(NOTE.—These barges are concentrated in the Lowlands and in French ports and each has a capacity of 5 tanks plus men and equipment. 200 barges will transport one armored division with its first flight of vehicles. Photo reconnaissance in May 1942 showed only 131 tank landing craft, 52 Siebel ferries, and 560 invasion barges.)

(3) Germany is building in Greek ports 300-ton concrete barges which are intended to carry 1,000 men each and two 25-ton tanks. Germany probably has in this area at the present time about 300 concrete barges, and it has been reported that the ultimate goal for the summer of 1942 is 1,000 such barges.

(4) It has been estimated that 5 tons of cargo space per man is required to transport overseas a modern fighting force with equipment and stores.

b. Invasion craft.—Craft available to the Germans for the invasion of England as of December 1941 included the following types:

(1) *Tank landing craft.*—The design of these craft is based on that of ordinary commercial barges, but with the addition of numerous watertight compartments. It is estimated that the time required to build one of these barges is between 6 and 8 weeks. Between 50 and 60 of these landing craft is the total believed available to the Germans in December 1941.

(2) *Invasion barges.*—The invasion barge is defined as having speed of 6 to 8 knots and drawing not over 4 feet of water forward and 6 feet aft. Displacement for 250 to 700 tons, averaging 400 tons. The trim could be quickly adjusted by the use of a powerful pump or pumps. Most of these barges are self-propelled, but a certain lesser number are dumb with bow conversion. The estimated number of barges of between 250 and 700 tons and self-propelled with a speed of 6 knots or over does not exceed 2,000. In addition, there are about 1,000 modern barges self-propelled with a displacement between 120 and 200 tons, capable of crossing the English Channel. The tank or troop-carrying capacity of this class of barge is probably not over one-third that of the 400-ton barge. In the case of the 400-ton barge a carrying capacity, after modification allowing for rapid unloading, is as given below for definite classes of equipment:

7 light or 6 medium, or 4 heavy tanks.

4 lorries or 6 tractors.

20 antitank or infantry guns.

10 gun-howitzers, or 4 antiaircraft guns.

■ 31. BRIDGES AND BRIDGE EQUIPMENT.—*a. Bridges.*—(1) Bridging columns transport and maintain bridging equipment, and the bridges are erected by the companies.

(2) The following bridges can be built by the division engineer battalion, but it

FM-E 101-10

31 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

is to be noted that units of all arms, except artillery, have enough bridging material to cross small rivers without engineer help.

<i>Equipment</i>	<i>Load capacity in tons</i>	<i>Length in feet</i>
Type B ponton and trestle:		
Standard assembly, medium	9	252-270
Standard assembly, heavy	¹ 18	165-177
Special assembly, light	4	402-432
Special assembly, medium	8	234-264
Type K:		
Box girder and bridge	9	80
(4-girder construction)	19	64
	25	48

¹ Nominal rating. Will probably take about 27.

(3) All engineer companies carry timber of various sizes to build bridges up to 8 tons carrying capacity.

(4) None of the bridges carried in the division bridging column can carry more than 22 tons at the outside. For carrying across wet gaps loads heavier than can be taken by B equipment, rafts are constructed consisting of K box girder equipment supported on double piers made out of B equipment pontons.

b. Bridge equipment.—(1) Equipment carried by units.—(a) Divisional engineer battalions.

Two 4-ton pneumatic boats.

3½- and 5-ton wooden ponton and (steel) trestles.

Nine 18-ton steel pontons and trestles.

Assault boats.

Motor boats.

Outboard motors.

(b) GHQ engineer battalions.

9- and 18-ton steel pontons and trestles.

24-ton Herbert light alloy pontons.

(2) Boats available.—

<i>Type</i>	<i>By whom carried</i>	<i>No. carried</i>	<i>Dimensions</i>		<i>Capacity</i>
			<i>Length (feet)</i>	<i>Width (feet)</i>	
Pneumatic boats, large	Co (Mecz or part Mecz)	3	18	6	2¾ tons (2,240 lbs. per ton).
Do	Bridging Cln	12	18	6	2¾ tons.
Pneumatic boats, small	Co (Mecz or part Mecz)	6	10	4	616 lbs., 3 men.
Do	Bridging Cln	18	10	4	616 lbs., 3 men.
Assault boats (if with out- board motors 15-20 knots).	Bridging Cln	(?)	(?)	(?)	18 men.
Collapsible canoes	Bridging Cln	No details available, used for reconnais- sance, probably holds 2 men.			

The motorboat carried by the bridging column is used only for assisting ponton bridging operations, not for transport of troops.

Pontons are also propelled by outboard motors.

Cable ferrying equipment consists of 2 tripods about 10 feet high, a drum of steel wire rope, etc. Tripods must be not more than 200 yards apart and easy to erect.

(3) *Pneumatic boats.*—(a) These boats correspond to the folding boat equipment in the British Army, and (roughly) to the assault boats of the American Army. They are made of rubberized fabric in the form of a ring which is bulkheaded off into several air chambers so that the boat cannot easily be sunk. They are in two sizes, the larger of which takes about 15 minutes to inflate by hand bellows.

(b) The larger size is 18 feet long and 6 feet wide and has an available buoyancy of about 2½ tons. Rolled and packed for transport the boat occupies a cylindrical space 7 feet long by 3 feet in diameter and weighs approximately 350 pounds.

(c) The smaller boat is 10 feet long and 4 feet wide, has a crew of 2 men, and an available buoyancy of about 600 pounds. This boat weighs 115 pounds.

(d) These boats are light for their load capacity and when inflated can be carried easily at the double, 8 men for the large and 2 for the small boat. Although stable they are somewhat cumbersome and slow in the water, being particularly difficult to control in a wind. Some form of rowlocks or loops is provided to assist in rowing or steering the boats when used singly or as rafts.

(e) Boats are provided with rings for lashing on superstructure for making rafts and bridges. Only improvised decking or decking borrowed from other equipment is used.

(4) *Motor boats.*—These boats are used only for assisting ponton bridging operations and not for the transport of troops. Only about six men can be carried, but boats are provided with 100-horsepower, 6-cylinder water-cooled gasoline engines. The equipment includes a grapple hook, a long length of steel wire rope for towing rafts, also a searchlight. The boats are capable of towing a triple 18-ton raft at 6 miles an hour. The boats will be invaluable in the construction of bridges with the Herbert equipment.

(5) *Outboard motors.*—There are three types of outboard motors in use. The latest of these is a model with a 3-horsepower, 4-cylinder gasoline engine used for towing in bridging operations or for ferrying (see also (4) above).

(6) *Ponton trailer.*—(a) The 9- and 18-ton bridge equipment is transported on 4-wheel trailers. The weight of the trailer is about 4,000 pounds, without the load. The load is about 6,000 pounds.

(b) To carry the bridge train's complement of 9- and 18-ton equipment, there are four types of trailer. All have the same chassis; they differ only in the arrangement of pins, grooves, etc. The trailer described above is the "ponton trailer"; on it are loaded one ponton and items of superstructure as described (sufficient to make one-half of a complete 9-ton raft). The names of the trailers and the respective loads involved are listed in the following table. Composition of the bridge train is described later.

Trailers for 9- and 18-ton ponton equipment

<i>Name of trailer</i>	<i>Items of load</i>
Ponton.....	1 ponton, 16 chess, 1 curb balk, 4 balk, 1 stiffener, 1 coupler, 2 clamps, 1 anchor, 1 communicating track.
Transom.....	1 transom, 16 chess, 1 curb balk, 4 balk, 2 trestle legs with guy poles, 1 connecting track.
Ramp.....	6 ramp balk, 32 chess, 2 curb balk, 1 connecting track.
Bank.....	1 seat (or 1 transom), 16 chess, 2 curb balk, 6 balk, 1 stiffening, 1 connecting track.

(c) Obviously the light ponton equipage has been designed with a view to those divisional loads which weight less than 5 tons. It is essential to get these loads across ravines and dry gaps as well as across streams. With that thought in mind, the light bridge train is to include relatively many trestles. Thus, the bridge train in the divisional battalion is to include—

40 light pontons.

6 trestles, complete.

(d) With these items will be sufficient units of superstructure to permit construction of 276 feet of mixed ponton and trestle bridge. Obviously, with the equipage of the train, a trestle bridge of 161 feet could be built.

(7) *3½- to 5-ton wooden half-pontons.*—(a) The pontons are 12 feet long by 5 feet beam and weigh about 300 pounds. They are gunwale-loaded and open, and can be used for the 3½-ton bridge or for the 5-ton bridge. The pontons, being open and splayed, can be nested for transport.

(b) To form the superstructure, roadbearers and chesses are in effect joined together and form complete units of roadway about 20 feet long by 2 feet wide. Any number of such units can be used side by side, five being used to form a 10-foot roadway.

(8) *9- to 18-ton pontons and trestles.*—(a) The ponton is similar to our own. The inner measurements are 24 feet 6 inches by 5 feet beam by 3 feet 3 inches, and the weight is about 1,600 pounds. In addition to a crew of four it has a carrying capacity of 15 men with field equipment of 10,000 pounds with 9-inch freeboard. Being undecked it is more suitable for ferrying than the British pontons, but has the disadvantage of a definite minimum of freeboard which must be strictly observed. When used in bridge or raft the pontons are gunwale-loaded.

(b) The superstructure consists of steel I-beam barks, 7 inches by 3 inches by 21 feet, weighing 350 pounds, and chesses 10 inches by 2 inches by 12 feet 3 inches, weighing 50 pounds. The load is also shared by heavy curb rails which are racked down at two places to intermediate transoms passing under the barks. Eight barks are used for the medium bridge and 14 for the heavy bridge. The equipment includes steel trestles; piers consist of single trestles for either the medium or heavy bridge, while floating piers are of one or two pontons, respectively.

(9) *24-ton Herbert ponton bridge and trestles.*—(a) The pontons are upward of 60 feet in length and divided laterally into eight or nine sections. They are of steel or light alloy, gunwale-loaded and are used to a minimum freeboard of 12 inches; the bow is provided with a raised bulwark to assist in the rough water experienced on large rivers. The ponton sections are decked and provided with hatches, and it is possible for the maintenance crew to rest and sleep inside. The ponton weighs approximately 10 tons and displacement with the freeboard mentioned is nearly 60 tons.

(b) The equipment also includes trestle piers, either of steel or pile timber construction. The latter are used for shore bays at river crossings or shallow dry gaps, while the steel trestles built up of standard parts can be constructed to a height of over 60 feet above foundation level and still carry the full load for which the bridge is designed.

(c) The main girders carrying the roadway are composed of sections in the form of pyramids 6 feet 6 inches high with bases 8 feet 3 inches long by 4 feet 6 inches wide. Transoms are hung in special stirrups from the apex of each pyramid and the transoms in turn carry the bark. A standard bay is 82 feet 6 inches, that is, ten pyramid sections, pin-connected.

(d) From the information available it is calculated that in standard bays the bridge would take loads of 18 tons; that is, medium tanks and artillery. However, with closer spacing of pontons thus reducing the length of a bay, the load capacity could probably be increased to take a 35-ton tank.

(e) The pontons are too large to be used conveniently on any but the largest rivers, and the construction and launching takes too long to be considered in any way as an assault operation. The Herbert equipment may therefore be classified as a semipermanent bridge, and its use is probably confined to back areas.

(10) *Heavy tank rafts.*—(a) If the Herbert bridge is excluded, it will be noted that none of the bridges mentioned above are capable of taking 35-ton tanks, a few of which are known to have been used on the Western Front.

(b) There is evidence that a special heavy raft was used for these tanks, and was probably designed for the purpose. This consisted of a small box girder section (similar to the K-Brückengerät described in (11) (a) below) 60 feet long and supported at each end by a pair of double ponton piers. The exact load capacity of this raft is not known, but the available buoyancy of the complete raft as described would be over 45 tons, and the strength of the superstructure is, without doubt, proportionate. Loading of raft is by means of special 8-foot shore bays made of lattice girders.

(11) *Fixed bridges.*—(a) *Small box girder bridge (K-Brückengerät).*—This is almost a copy of our standard small box girder bridge. The principal members are similar, and the launching nose used is identical. The tracked load-carrying capacities and corresponding spans are probably equal to or greater than the following:

	Tons
4-girder, 48-foot span	25
4-girder, 64-foot span }	21
2-girder, 32-foot span {	
2-girder, 64-foot span	10

(b) *Girder bridge.*—There is also a larger through-type sectional girder bridge capable of spanning gaps of at least 140 feet and probably capable of taking heavy loads. No definite details are available.

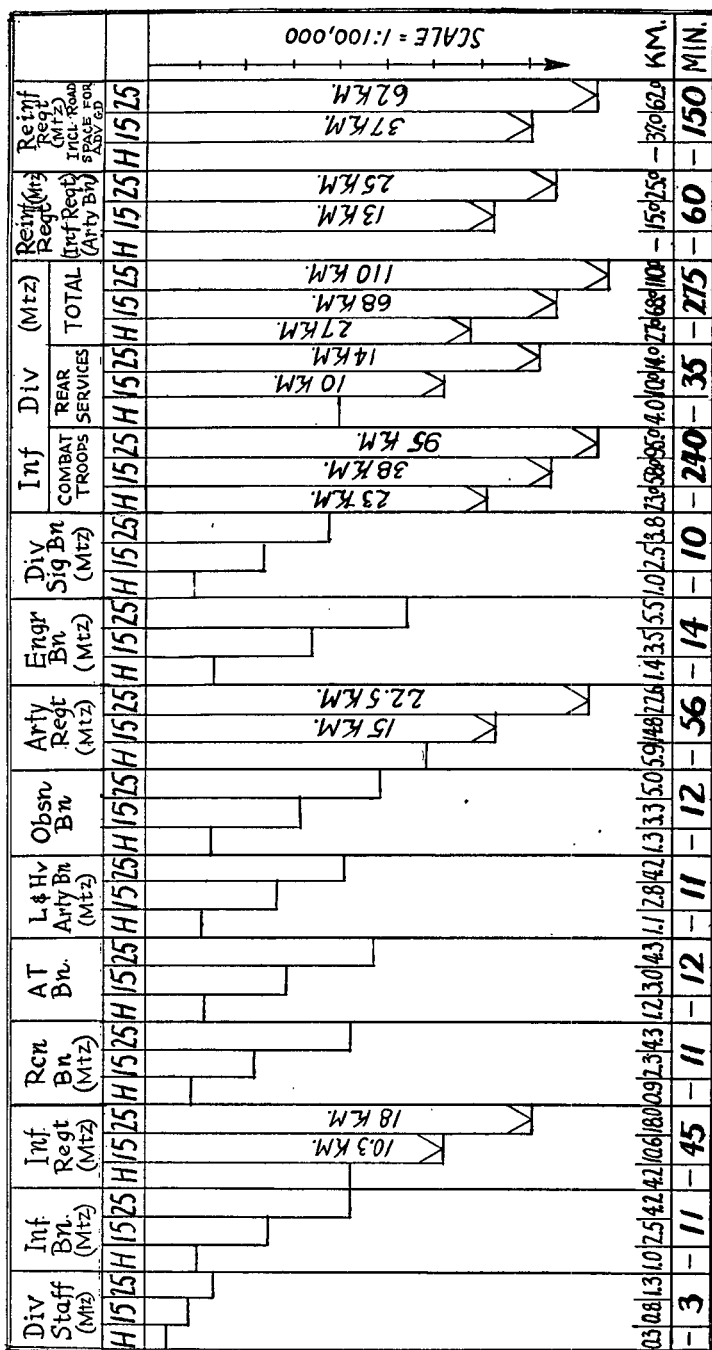
c. *Data on movements by armored formations.*—(1) The average rates of advance along roads by troops in German armored formations in the campaign in the west, 1940, are given in a captured official document as follows. (The advance is assumed not to be held up, and the roads average.)

	Wheeled vehicles			Tracked vehicles		
	Length of march		Time taken	Length of march		Time taken
	Km.	(Mi.)	Hrs.	Km.	(Mi.)	Hrs.
By day	50	(31¼)	2	30	(18½)	1¾
	100	(62½)	4½	60	(37)	4
	200	(125)	10	100	(62½)	6½
By night	50	(31¼)	3½	30	(18½)	3
	100	(62½)	6½	60	(37)	6

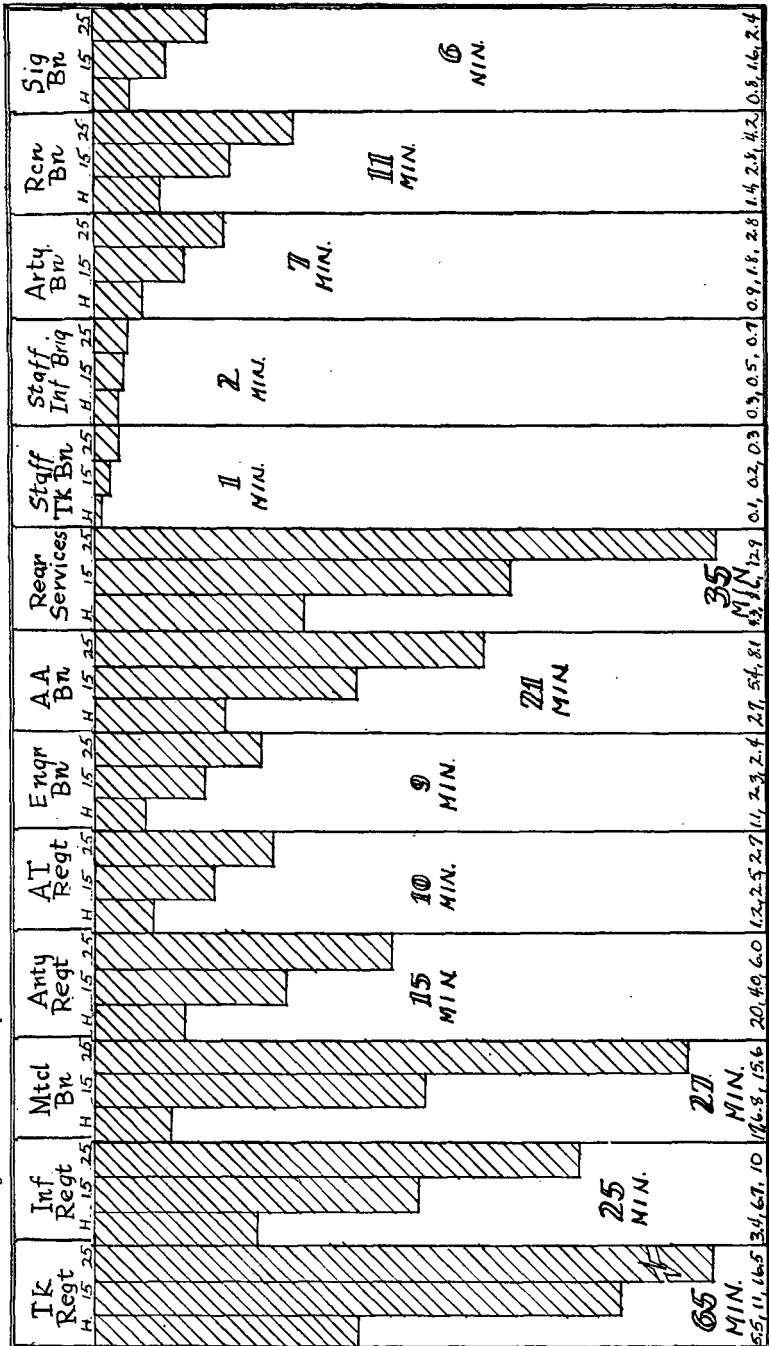
SECTION II

TROOP MOVEMENTS

32. MARCH TABLES AND ROAD SPACES.—a. Road lengths—Infantry division.—



b. Time lengths and road spaces—Armored division.—(1)



FM-E 101-10

32-33 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

(2) A captured document, of recent date, gives the average length of a complete armored division on the march, including services, as follows. The division is marching in five groups, with 20 minutes interval between groups.

At the halt, or on the move at 10 kilometers per hour

(6¼ mph)----- 120 km. (75 mi.)
or 12 hrs.

On the move at 25 kilometers per hour (15½ mph)----- 170 km. (106½ mi.)
or 7 hrs.

If the fighting troops alone are considered (without reconnaissance unit or attached troops, and without any tactical intervals), and are marching in four groups, with 20 minutes interval between groups, the above figures become—

90 kilometers (57½ mi.) or 9 hours.

150 kilometers (93¾ mi.) or 6 hours.

In both cases, 10 percent of all vehicles are deducted for traffic regulation duties.

For comparison, the length of a motorized division on the march is 75 percent of the above.

In compiling the above figures, the following intervals were reckoned:

Between vehicles—	<i>Yards</i>
At the halt, or on the move at 10 kilometers per hour-----	20
On the move at 25 kilometers per hour-----	25
Between units-----	50
Between formations-----	250

(3) A further document captured from another armored division states, probably correctly, that the following intervals are *normal*:

Between vehicles on the move-----	<i>Yards</i> 25
Between units-----	100
Between formations and march groups-----	1,000 (2½ min.)

At speeds above 25 kilometers per hour, the distance between vehicles must be increased to as many yards as the speed is kilometers per hour. This has the effect of increasing the marching length by about 15 percent for every increase of 5 kilometers per hour in speed, so that the net gain in speed of advance is comparatively small.

■ 33. BY RAIL.—*a. Train make-up.*—Procedure is the same as ours. They use make-up yards, and send the trains to the departure yards as they are needed. The trains are all standard: infantry, artillery, and motorized. The trains never exceed 100 axles, or 50 cars. In addition there are interspersed special cars for antiaircraft defense. Each unit carries its equipment along with it.

b. Speed.—The average speed of a train, either troop, equipment, or supply, is 35 kilometers per hour.

c. Number of trains to move units:

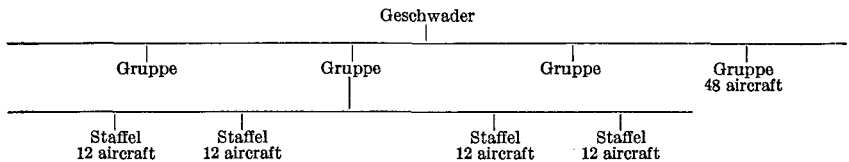
	<i>Trains</i>
Infantry regiment.....	8
Artillery regiment.....	11
Pioneer battalion.....	5
Supply services.....	7
Mountain division.....	80
Infantry division without motorized units.....	42
Infantry division complete.....	66

(24 trains used to carry the motorized equipment.)

■ 34. By Air.—a. The Germans are estimated to have approximately 1,700 transport aircraft, of which 1,500 are Junkers JU 52's. The remaining 200 are chiefly Junkers JU 90, the Focke-Wulf FW 200, and the Blohm and Voss BV 222 flying boat. The table given in paragraph 28 includes all types generally recognized as transports, with corresponding ranges and loads.

b. The Junkers JU 52 is the standard troop transport for the German Air Force. These aircraft have been organized into Kampfgeschwader (wing) z. b. V. (zur besonderer Verwendung—special duty). Each Geschwader has four Gruppen (groups). Each Gruppe is made up of four Staffeln (squadron). There are 12 aircraft in each Staffeln.

c. Each Geschwader (wing) thus has a normal complement of about 200 aircraft and is capable of carrying (1) an entire parachute regiment, plus equipment; or (2) 3,000 ordinary troops. The Germans have at least three and probably four Kampfgeschwader z. b. V. (special duty), plus several additional Gruppen for transport.

d. The following aircraft are required to transport the following units *in one trip*:

Parachute division @ 7,000 men (3 parachute rifle regiments plus divisional troops).....	4 Geschwader @ 800 aircraft.
Parachute rifle regiment @ 1,700 men.....	1 Geschwader @ 200 aircraft.
Parachute rifle battalion @ 480 men.....	1 Gruppe @ 50 aircraft.
Parachute company @ 120 men (rifle or heavy).....	1 Staffel @ 12 aircraft.
Assault regiment.....	1 Geschwader and gliders.
Air-landing division.....	900-1,000 aircraft.

CHAPTER 3

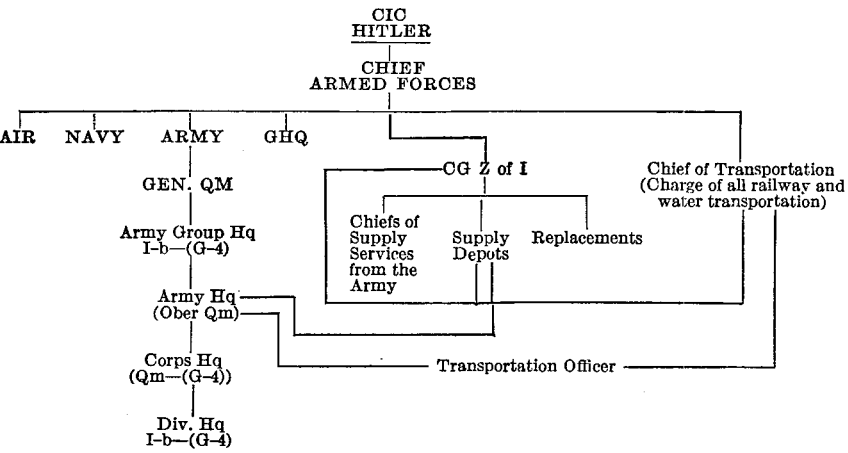
SUPPLY

	Paragraphs
SECTION I. General organization.....	35-36
II. Classes of supply.....	37
III. Supply columns and trains.....	38-39
IV. Service units (army, corps, and division).....	40-43
V. Rations.....	44
VI. Supply diagrams.....	45-49
VII. Ammunition data.....	50-52

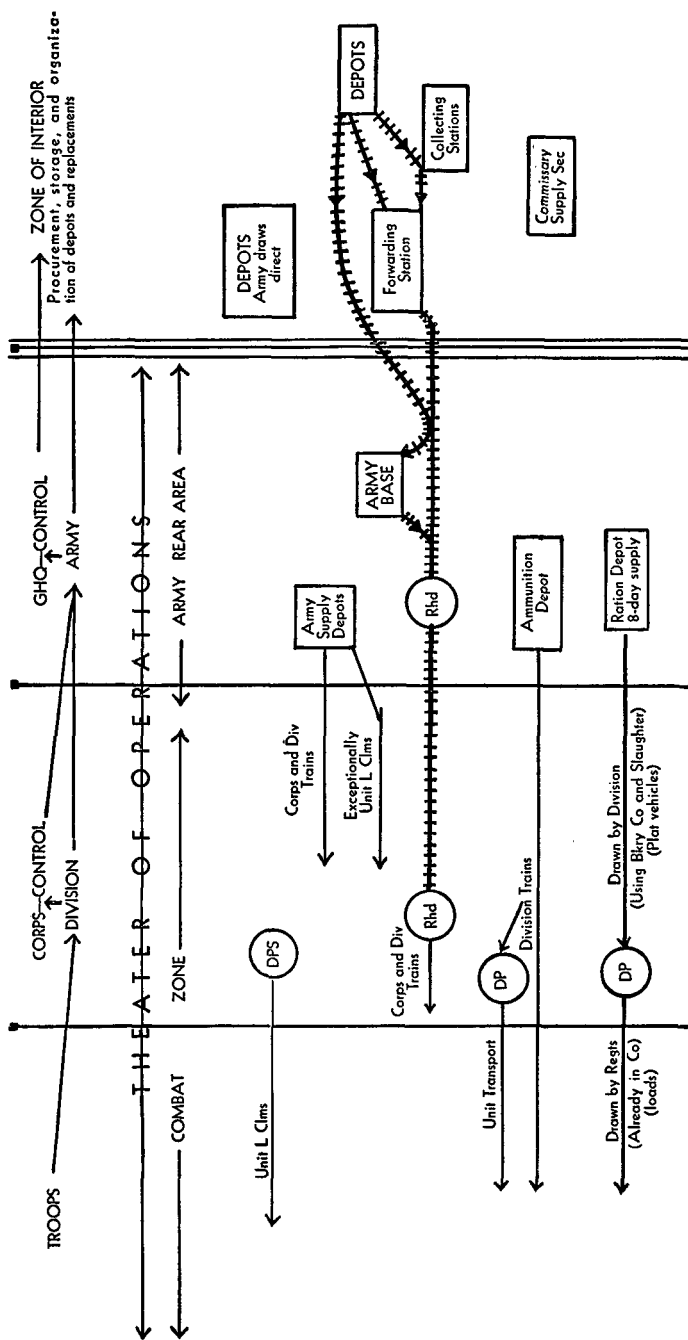
SECTION I

GENERAL ORGANIZATION

■ 35. ORGANIZATION OF SUPPLY SERVICE.—



■ 36. THEATER ORGANIZATION.



NOTE.—Width and depths of zones are not prescribed, but determined by the situation. Trend is to eliminate all intermediate depots wherever possible.

SECTION II

CLASSES OF SUPPLY

- 37. GENERAL CLASSES OF SUPPLY.—
Rations—Class I
Ammunition—
All other—

SECTION III

SUPPLY COLUMNS AND TRAINS

- 38. SUPPLY COLUMNS AND TRAINS.—

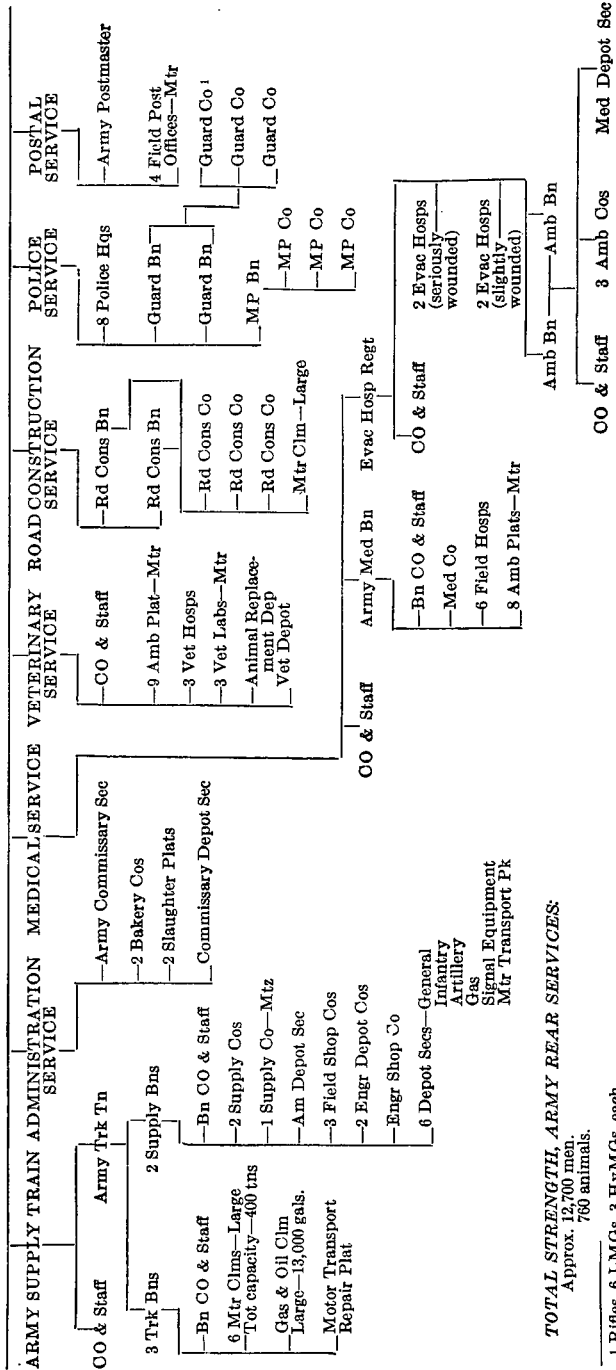
Type	Capacity (tons)	Distance per day (miles)
Large motortruck column-----	60	125
Small motortruck column-----	30	125
Animal-drawn column-----	30	12.5-20
Mountain animal-drawn column-----	15	12.5-15
Pack train-----	5	12-15
- 39. BASIC USE.—
 - GHQ Mtr Trk Clms, large-- Transportation reserve for GHQ to use for Army sup, attached as needed to armies, corps, and divs.
 - Army Trk Clms----- Maintain rolling reserves and assist in stocking parks and depots.
 - Corps Trk Clms, small----- Augment Divs Clms and Sup Corps troops.
 - Div Trk Clms, small, Wag-
on Clms and Pack Tns----- Carry portion of first refill of Div Am. Haul from Div Rhd and Army (depots, trans-loading points) to DPs. 2 Trk Clms assigned to Arty Regt during combat as Arty Am Tn.
 - Lt Clms and Tns----- Connect troops and Div Sup establishments, controlled (except combat Tns) by higher Hqs.

NOTE.—All trains organized as units of 15-, 30-, or 60-ton capacity. All supplies for issue and transportation made in 30-ton lots.

GERMAN FORCES

SECTION IV
SERVICE UNITS
(ARMY, CORPS, AND DIVISION)

■ 40. ARMY REAR SERVICES.—



TOTAL STRENGTH, ARMY REAR SERVICES:

Approx. 12,700 men.
760 animals.

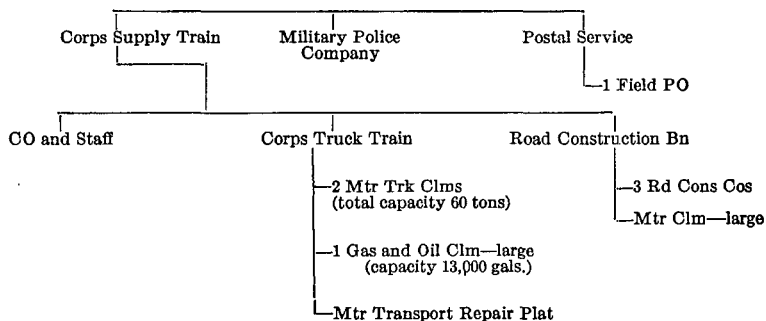
¹ Rifles, 6 LMGs, 3 HMGs, each.

FM-E 101-10

41-43 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

■ 41. ARMY SUPPLY.—Army carries major load of supply and evacuation in theater of operations. Establishes depots as far forward as possible. Army G-4 functions as our G-1 and G-4 combined. Deals directly with GHQ, G-4 or CG, Z of I on supply, and with representative of Chief of Transportation at Army headquarters. Army Base area receives supplies from Z of I by train: depots to forwarding station to Army. Includes administrative offices such as commissary or ammunition which fill requisitions and load trains from depots assigned. Practice is to eliminate intermediate depots as much as possible, but keep trains loaded in base area and ship as needed. Ammunition depots usually 20 to 40 miles in rear of front. 3,000 to 6,000 tons stock maintained. Commissary depot usually carries 8-day supply.

■ 42. CORPS REAR SERVICES.—



Strength:

800 men (approx.).

Supervises and regulates supply of divisions, corps troops, and attached troops.

Prorates supplies and establishes priorities.

Takes direct action only in an emergency.

■ 43. DIVISION SUPPLY (G-4).—

STRENGTH:

25 Officers.

12 Civilian

Officials.

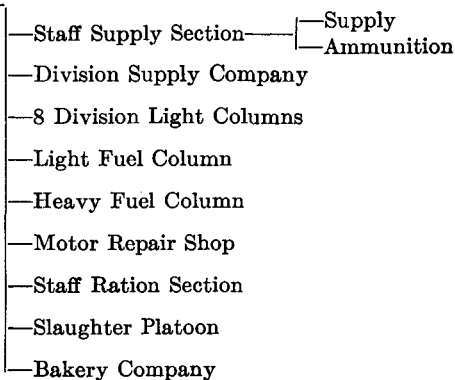
824 EM.

TRANSPORT:

26 Motorecycles.

21 Cars.

176 Trucks.



Combat Train.—Field kitchen and combat wagon per unit.

Ration Train.—Ration wagon and forage wagon per unit.

Regt and Bn Hqs have one truck added. Hauls from Div to Bn.

Baggage Train.—One truck per unit.

Infantry Regt has a horse-drawn ammunition column.

SECTION V

RATIONS

■ 44. CLASS I SUPPLY.—

a. Carried in the division.—

	Field ration	Iron ration
With each man.....	—	1 (reduced)
On each combat vehicle.....	—	1
In the field kitchen.....	1	1
In the unit ration train.....	2	—
In the division train.....	1	—
Total.....	4	3

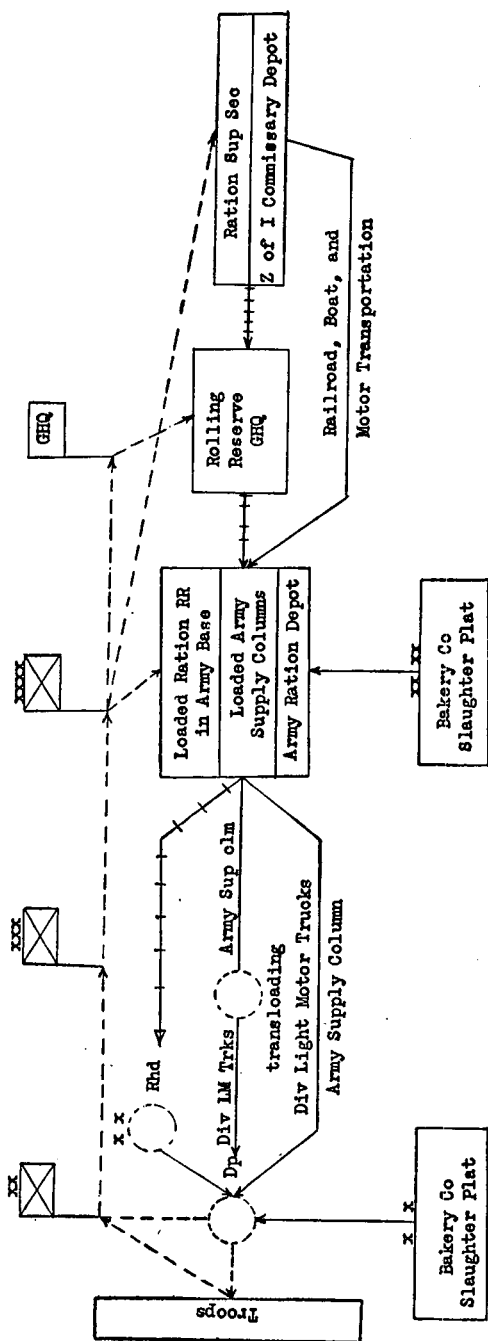
Total weight of ration carried in the division: 94.4 tons (approx.).

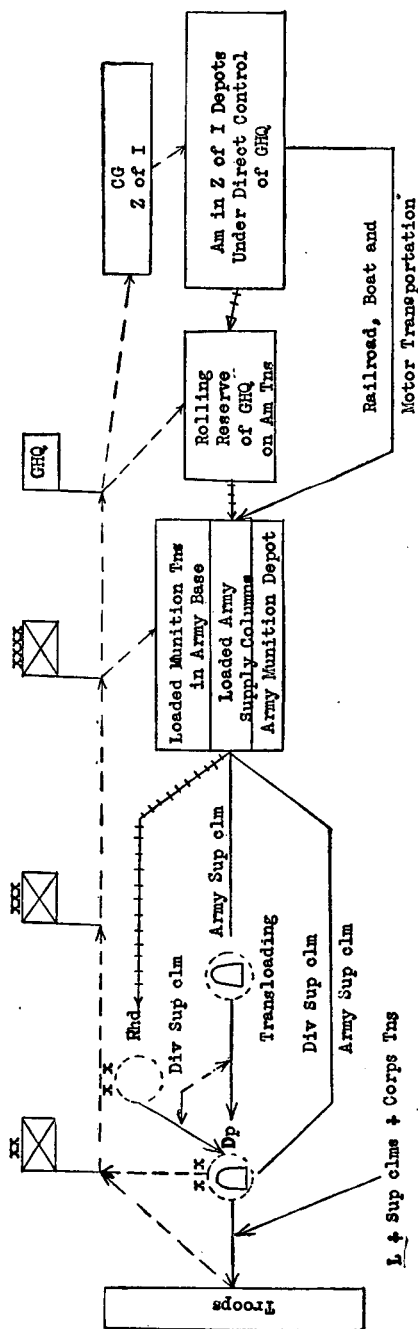
b. Weight of 1 day's ration (field).—

	Per man (lb.)	Per division (tons)	Per 500,000 men (tons)
Total weight (approx.).....	2. 92	23. 6	420

c. System of distribution.—Division hauls from Army distributing point. Battalion and regiment haul from division distributing point. Company hauls from battalion distributing point. (If units are motorized, unit ration trucks draw from the division.)

45. RATINGS.—





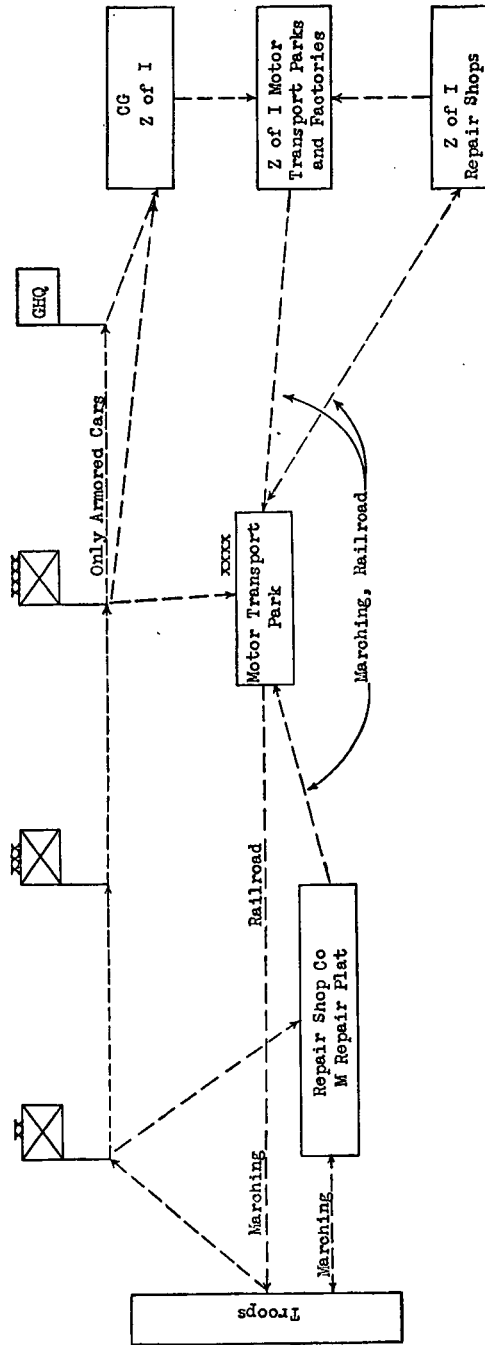
Hauled by Div, Regt, or Bn L Cms to Regt, Bn, or Btry Am Pts and refill combat trains.
L Inf Cms of Regt transports munitions for L and Hv W pns of Regt.
Arty Bn has L Arty Csm.
L Cms may be held as rolling reserve and Div Csm transfers to combat vehicles.

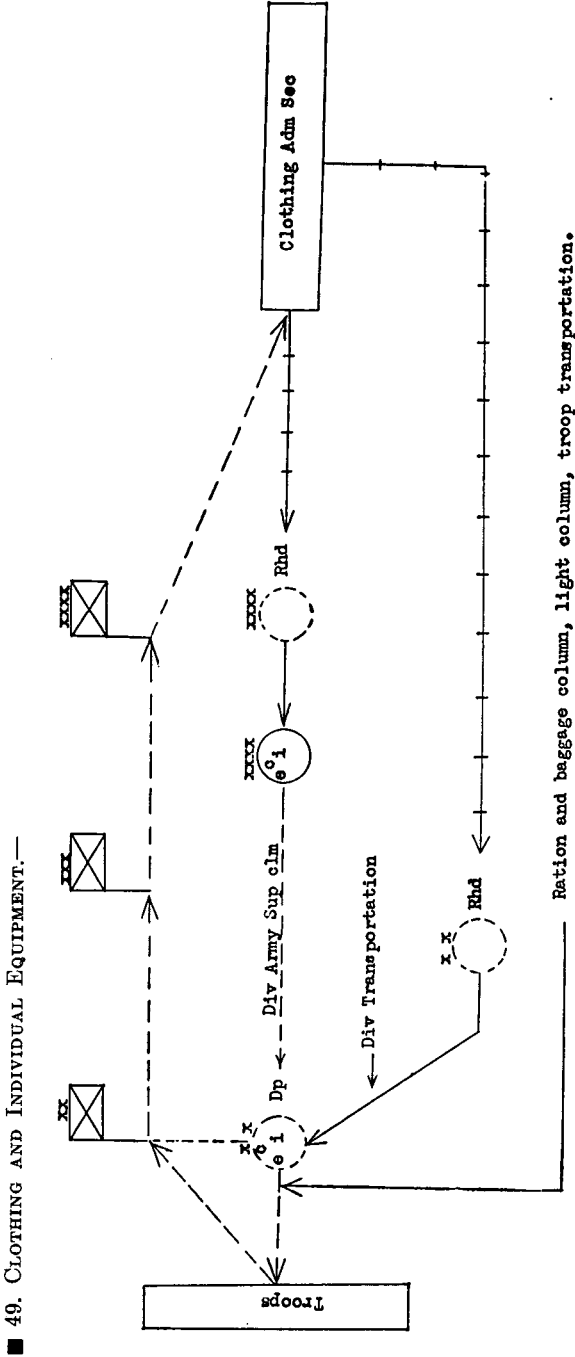
47 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES



GERMAN FORCES

■ 48. REPAIR—MOTOR VEHICLES AND MECHANIZED EQUIPMENT.—





GERMAN FORCES

SECTION VII

AMMUNITION DATA

■ 50. DIVISIONAL AMMUNITION QUOTAS.—

- a. Combat allowance—that part carried by the men, combat vehicles or caissons.
- b. Local reserves—that part carried by the unit light columns.
- c. Division reserves—that part carried in the division columns.
- d. Two ammunition quotas (units of fire) for all weapons of the division are carried in the division.
- e. Ammunition quota for all weapons in an army is held on army columns or trains.

■ 51. UNITS OF FIRE (rounds).—

1	2	3	4	5	6	7	8	9	10
<i>Weapon</i>	<i>Infantry units (including MGs and mortars)</i>	<i>Cavalry units</i>	<i>Artillery units</i>	<i>Tank units</i>	<i>Engineers</i>	<i>Airplanes</i>	<i>Armored cars</i>	<i>Service units</i>	<i>Notes</i>
7.9-mm rifle or carbine.....	90	90	20	-----	45	-----	-----	20	
7.9-mm LMG.....	2,500	2,500	1,000	-----	1,000	2,500	2,500	1,000	
7.9-mm HvMG.....	4,500	-----	-----	4,500	-----	-----	-----	-----	
50-mm Morts.....	120	-----	-----	-----	-----	-----	-----	-----	
81-mm Morts.....	30	-----	-----	-----	-----	-----	-----	-----	
Field gun.....	180	-----	-----	-----	-----	-----	-----	-----	
AA (88 or 75-mm).....	-----	-----	300	-----	-----	-----	-----	-----	
AA (37-mm).....	-----	-----	1,500	-----	-----	-----	-----	-----	
75-mm Inf How.....	200	-----	-----	-----	-----	-----	-----	-----	
150-mm Inf How.....	125	-----	-----	-----	-----	-----	-----	-----	
105-mm gun.....	-----	-----	125	-----	-----	-----	-----	-----	
150-mm How.....	-----	-----	125	-----	-----	-----	-----	-----	
150-mm gun.....	-----	-----	75	-----	-----	-----	-----	-----	
210-mm How.....	-----	-----	50	-----	-----	-----	-----	-----	
305-mm How.....	-----	-----	-----	-----	-----	-----	-----	-----	
280-mm How.....	-----	-----	-----	-----	-----	-----	-----	-----	
305-mm gun.....	-----	-----	-----	-----	-----	-----	-----	-----	
380-mm gun.....	-----	-----	-----	-----	-----	-----	-----	-----	
Hand grenades.....	40	-----	-----	-----	40	-----	-----	-----	
Rifle grenades.....	40	-----	-----	-----	40	-----	-----	-----	

FM-E 101-10

52 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

■ 52. SCALE OF ISSUE OF AMMUNITION.—

<i>Weapon</i>	<i>On the man or with the gun</i>	<i>Co & Bn Res</i>
Rifle	90 rds per man, Rifle Cos..... 45 rds per man, all other Cos	40 rds per man.
Cavalry carbine	75 rds per man	
Machine pistol	192 rds per gun	
LMG	3,100 rpg divided between gun team and Co and Bn Res. 1,000 rpg in AT Co.	
HvMG	5,250 rpg divided between Co limbers and Bn Res.	
Revolver	32 rpg	
Grenade .....	.....
81-mm mortar	48 rpg	
50-mm mortar	20 rpg	
37-mm AT gun in AT Bn	330 rpg	
20-mm HvMG	900 rpg	25 rpg.
37-mm AA gun	600 rpg	204 rpg.
88-mm AA gun	192 rpg	133 rpg.
105-mm How	102 rpg in Btry and Bn Clm	148 rpg in Div Clm.
105-mm gun	78 rpg in Btry and Bn Clm	72 rpg in Div Clm.
150-mm How	60 rpg in Btry and Bn Clm	90 rpg in Div Clm.

JAPANESE FORCES

PART TWO—JAPANESE FORCES

CHAPTER 1

ORGANIZATION

	Paragraphs
SECTION I. Governmental and geographic organization.....	53-54
II. Type army organization.....	55
III. Division organizations.....	56-61
IV. Air Force and miscellaneous combat units.....	62-67
V. Supply units.....	68-69
VI. Characteristics of matériel.....	70-74

SECTION I

GOVERNMENTAL AND GEOGRAPHIC ORGANIZATION

■ 54. GEOGRAPHIC ORGANIZATION.—

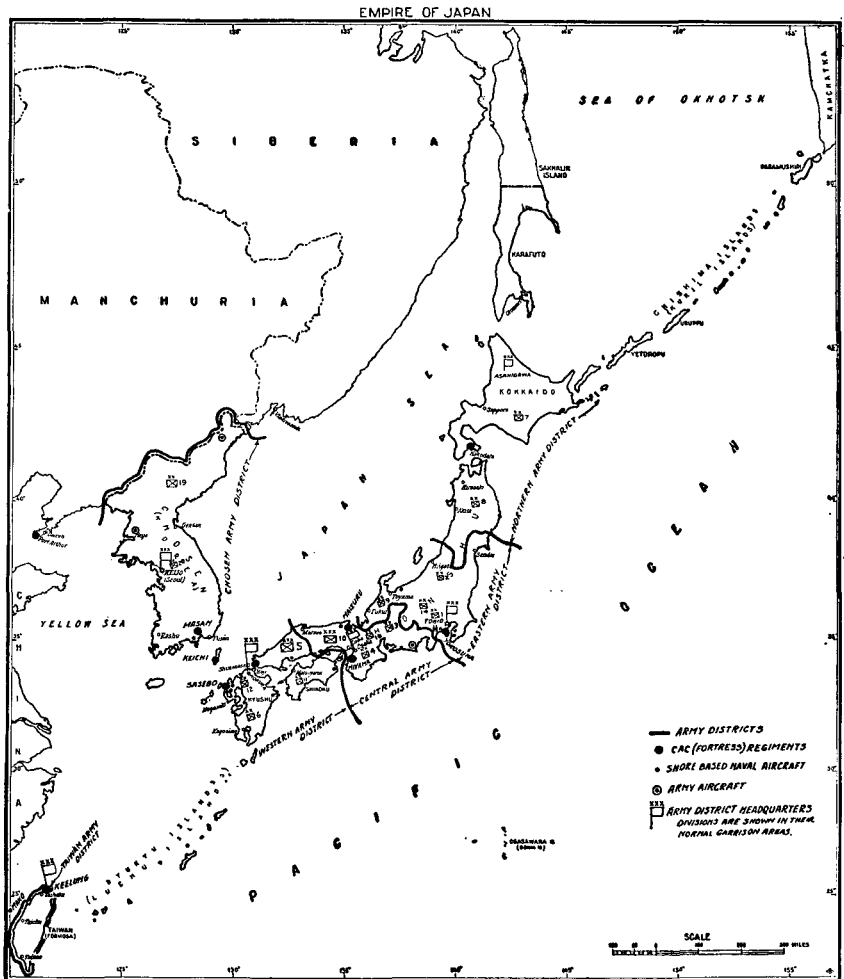


FIGURE 2.—Geographic organization of military forces.

SECTION II

TYPE ARMY ORGANIZATION

- 55. TYPE ARMY ORGANIZATION.—The largest peacetime organization in the Japanese army was a division. Type army assignment is believed to be as follows:

ARMY HEADQUARTERS

INFANTRY	TANKS	CAVALRY	ARTILLERY	ENGINEERS
5 Inf Divs (1 with pack transport)	1 Regt (3-4 Bns)	1 Brig reinf by Bn Mtz Inf Bn of Horse Arty Hv MG Tr Mtd Engrs Co Armd-C Det	Regt Mtn Arty Brig Hv FA Arty Information Det 2 Regts AA Arty	Regt Engrs 10 Bridge Cos
AVIATION	SIGNAL SERVICE	LINE OF COMMUNICATION SERVICE		
Regt Bomb Avn Regt Fur Avn Regt Obn Avn Bln Regt Air Service Sig Det	Tg Regt Wireless Regt Slt Det	10 Deps 15 Transport Dets of 10 Wag Cos each 1 Mtr Transport Det of 12 Cos 4 Res Field Hosps 4 Evac Hosps 1 LC Hosp 1 Sick Horse Dep 1 Sn Det 5 Bns of 2d Res Inf 1 Tr of 2d Res Cav 1 Btry of 2d Res FA 1 Ry Regt 1 L Ry Regt 20 Labor Cos		

STRENGTH:

110,000-135,000 Officers and men.

NOTE.—There is no Corps organization.

DIVISION ORGANIZATIONS

[illegible]

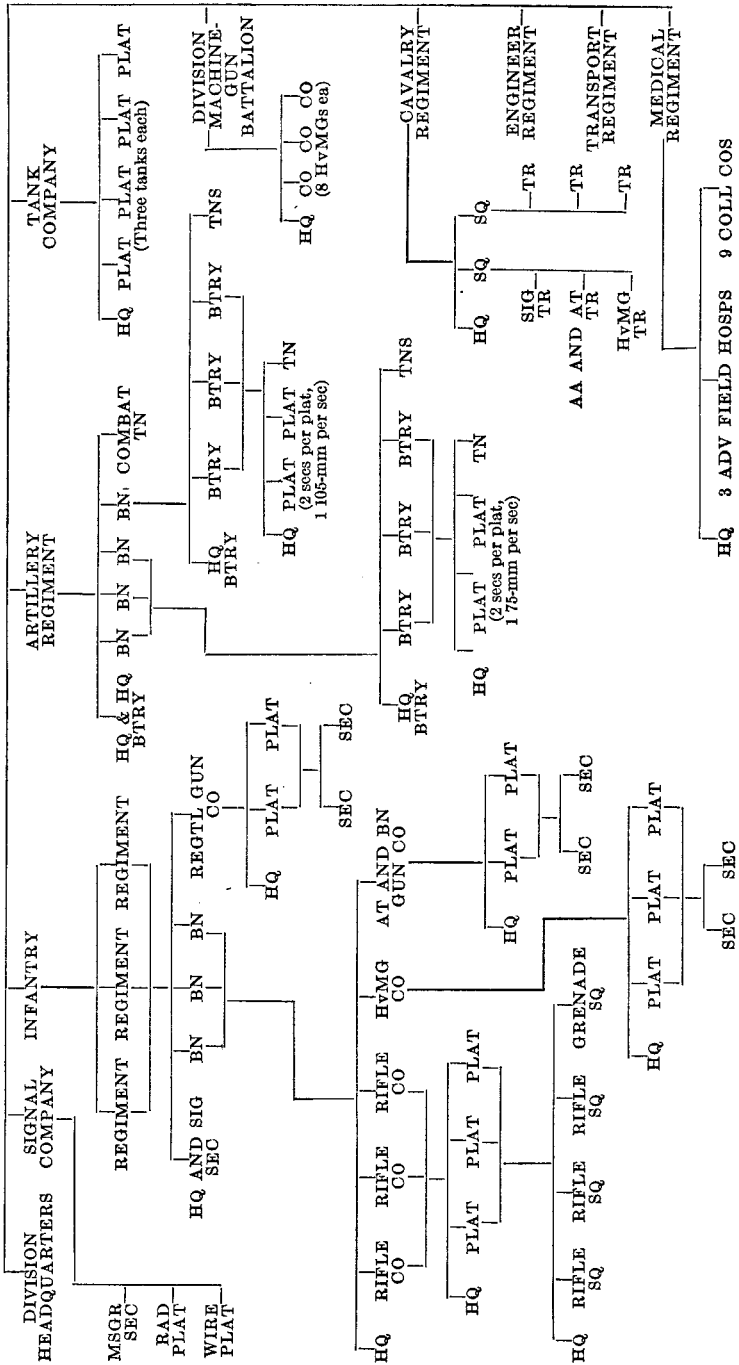
HEADQUARTERS AND SIGNAL DETACHMENT	INFANTRY	MEDICAL REGIMENT	ARTILLERY REGIMENT	CAVALRY REGIMENT	ENGINEER REGIMENT	TRANSPORT REGIMENT	TANK COMPANY
	BRIG	HQ	BN BN BN BN (76-mm guns)			HQ PLAT PLAT PLAT	
		BRIG					
	HQ & SIG DET	REGT		HQ	37-mm GUN SEC	RIFLE TR	HvMG PLAT
		REGT					

58 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

58. INFANTRY DIVISION (Table of organization).

Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		Officers	Enlisted men	Horses	75-mm field guns	105-mm bows	75-mm mtn guns	70-mm tnf cannon	HvMGs	LMGs	Rifles	Pistols	Sabers	Carts, transport	Cargo load, tons	Ambulances		
Div Hq.	17	91	52								41	39	45	12	2.5			
Sig Co.	4	195	25								71	25	5	18	3.6			
2 Inf Brigs of 2 Regts each	358	14,780	1,730				16	24	96	288	11,606	2,172	608	444	181.6			
F.A. Regt.	110	2,612	2,048		36	12				138	296	361	152	132	165			
Cav Regt.	18	400	413						2	8	264	81	353	32	7.1			
Engr Bn.	14	361	80								246	53	25	8				
Div Transport	27	2,744	1,893								145	73		1,680	336			
Med Troops	22	909	84											40		33		
Field Hosps	100	2,800	484											160		264		
Horse Dep.	3	44	47											12				
Total Div.	673	25,016	6,856		36	12	16	24	98	434	12,669	2,804	1,188	2,550	703.8	297		
<div>Remarks</div> <div>This organization was not adhered to in China for various reasons. Trend was toward a smaller and more mobile force with greater increase in automatic weapons. Strength in personnel varies with the type of division. A Tk Co is included and service units are cut considerably with the use of wheeled transport. Strength is believed about 18,000 officers and men.</div> <div>ARMAMENT:</div> <div>Rifles (Inf and Cav) . . . 7,464</div> <div>Sabers (Cav) 412</div> <div>LMGs: Inf Regt, 116</div> <div>Cav Regt, 8</div> <div>Tk Co, 30 502</div> <div>HvMGs 52</div> <div>Grenade throwers 340</div> <div>37-mm A.T. guns 13</div> <div>70-mm cannon 12</div> <div>75-mm mtn guns 8</div> <div>75-mm field guns 36</div> <div>105-mm bows 12</div> <div>Tks 15</div> <div>About one-half of present Japanese divisions are believed to be organized as noted above. Others are believed to be organized as triangular divisions.</div> <div>The composite units of this division follow the general organization of similar units in the new division except in strength of personnel and numbers of weapons.</div>																		

69



b. Table of organization.—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Unit	Officers	Enlisted men	Rifles or carbines	Pistols	Sabers	LMGs	HvMGs	76-mm guns mounted	70-mm Bn guns	87-mm AT guns	76-mm guns	105-mm hows	Tks	Carts, am	Grenade dis-chargers	Horses	Cars	Motorcycles	Trucks	AA MGs	
Div Hq.....	16	40	50	16												10	5	5			
Sig Co.....	4	156	124	24	18											23			2		
Inf:																					
Bn.....	(23)	(615)	(472)	(127)	(72)	(27)	(6)		(2)	(2)				(4)	(32)	(34)					
Regt Gun Co.....	(3)	(72)	(41)	(32)	(6)			(4)						(8)	(43)	(43)					
Regt.....	(78)	(1,933)	(1,485)	(423)	(232)	(81)	(18)	(4)	(6)	(6)				(20)	(96)	(150)					
Total Inf—3 Regts.....	234	5,839	4,455	1,269	698	243	54	12	18	18				60	288	450					
Arty Regt.....	105	2,365	296	361	152	72					36	12				1,916					
Cav: 1st Sq: Sig Tr.....	(2)	(64)	(40)	(20)	(66)											(66)				(2)	
AA/AT MG Tr.....	(3)	(66)	(40)	(22)	(69)					(2)						(76)					
HvMG Tr.....	(3)	(49)	(20)	(10)	(52)		(4)									(36)					
2nd Sq.....	(12)	(297)	(297)	(21)	(309)	(12)										(330)					
Total Cav Regt.....	27	484	397	79	508	12	4			2						607				2	
Engr Regt.....	17	504	453	30	49	18										90			28		
Transport Regt.....	24	732	681	59	61	18										16	27	194			
Tk Co.....	6	119	48	10	13	16							13				2	8	8		
Med Regt.....	31	481														*36					
Div MG Bn.....	14	312	127	68	25		24								9	62					
Div totals.....	478	11,052	6,631	1,916	1,622	379	82	12	18	20	36	12	13	60	297	3,194	23	40	230	2	

This is believed standard Japanese division organization, toward which they are working. About one-half of present division strength is organized as such, with other divisions organized as modified square divisions.

Trks are rad trks.

*Pull 2-wheel cart amb.

■ 60. INFANTRY DIVISION PACK.—

Differs from actual infantry division in that divisional artillery consists of 3 battalions of pack 75-mm howitzers. Infantry regimental mountain gun companies pack their ammunition.

All trains throughout the division are pack.

No tank company.

No light machine guns in the artillery.

Infantry has 48 heavy machine guns as against 52 in regular infantry.

Strength and armament details unknown.

■ 61. REINFORCED INFANTRY BRIGADE.—

Such units are known to exist. Their strength and composition are not known. They are believed to be more or less special Task Force organizations.

SECTION IV

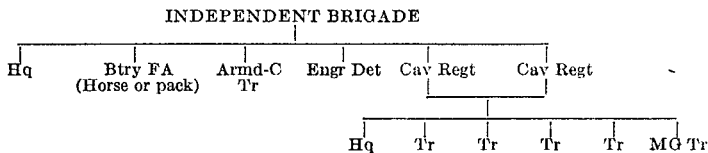
AIR FORCE AND MISCELLANEOUS COMBAT UNITS

■ 62. ARMY AVIATION.—*a.* GHQ Air Force is composed basically of wings. Air divisions exist as component parts of the GHQ Air Force. These do not replace the wings, but are administrative and tactical units for grouping regiments geographically and on basis of similarity of mission.

b. Air regiments are composed of squadrons. This seems to be an administrative measure, as assignments range from one or two to nine squadrons per regiment.

c. The squadron is the basic Japanese air unit. Composed of three flights, there are 13 to 16 pilots, including enlisted men, and nine or ten airplanes per squadron. Squadrons usually have more enlisted men pilots than officer pilots.

■ 63. NONDIVISIONAL CAVALRY.—

**STRENGTH:**

788 O and EM.

884 Horses.

ARMAMENT:

680 Carbines.

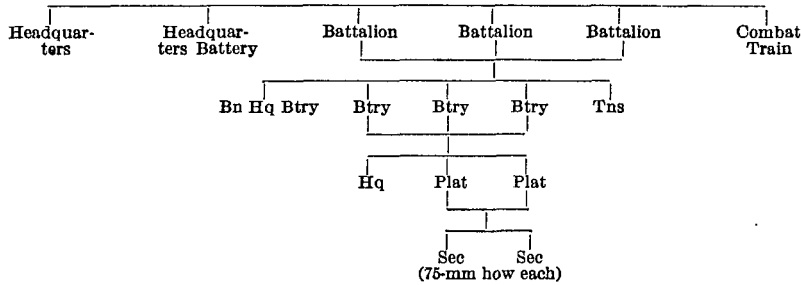
6 LMGs.

8 HvMGs.

FM-E 101-10

64-66 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

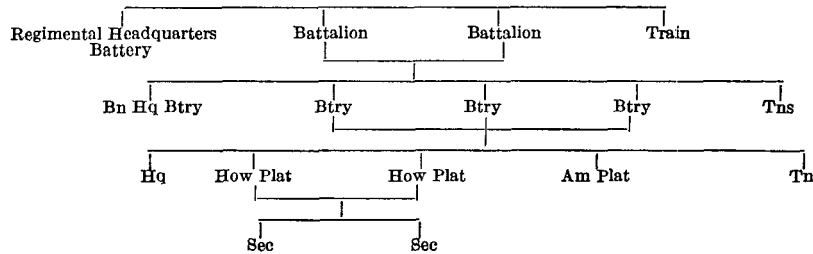
■ 64. 75-MM FIELD ARTILLERY REGIMENT, PACK DIVISION.—



Strength:
Unknown.
Armament:
Unknown.

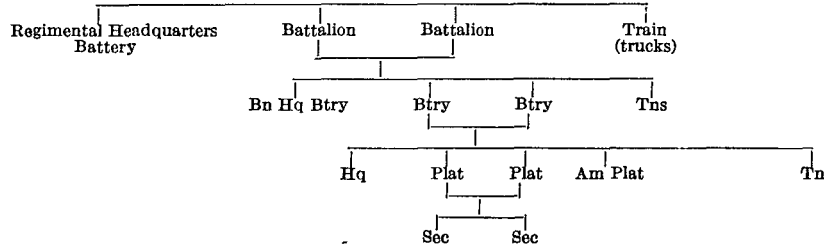
NOTE.—Independent regiment, pack artillery, is organized as above but with only two battalions. All transport is pack.

■ 65. REGIMENT, 155-MM HOWITZERS, HORSE-DRAWN.—



STRENGTH:
Unknown.
ARMAMENT:
Unknown.

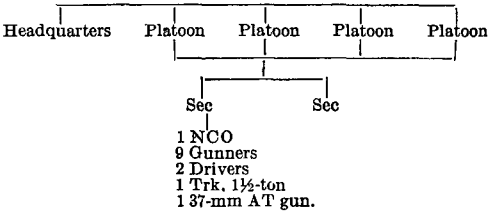
■ 66. REGIMENT, 105-MM GUNS, TRACTOR-DRAWN.—



STRENGTH:
Unknown.
ARMAMENT:
Unknown.

JAPANESE FORCES

■ 67. INDEPENDENT ANTITANK COMPANY.—



STRENGTH:
150 (approx.).

ARMAMENT:
8 37-mm AT guns.

NOTE.—These units are believed to exist as special troops with assignments to organizations as needed.

SECTION V
SUPPLY UNITS

■ 68. JAPANESE TRANSPORT.—

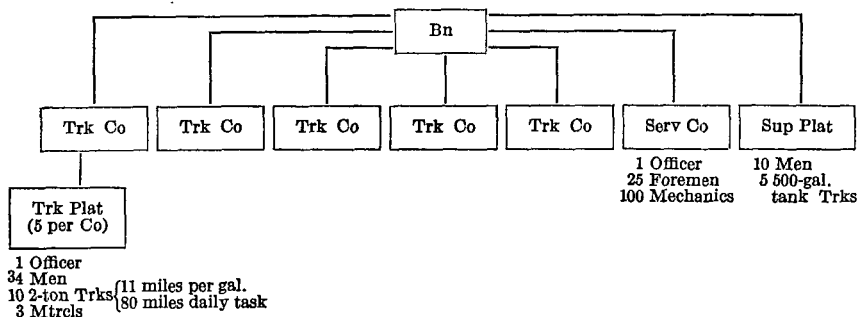
Unit	O	EM	Remarks
Div Transport Regt, Inf.....			Hq, 3 Trk and 3 Wag Cos. Four-wheeled Wags, carts, and Mtrs. Believed Trks will replace Wags when they are available and roads permit.
Transport Regt, proposed Inf Div.	24	732	Hq and 3 Mtr Cos. Each Mtr Co to include 3 autos, 8 Mtrcls, and 64 Trks.
Transport Regt, Pack Div.....			Same as normal Inf Div except all Cos consist of 3 Plats of 3 Secs of 5 Sqds of 10 pack horses each—total, 450 pack horses.

NOTE.—These units carry rolling reserve of the division.

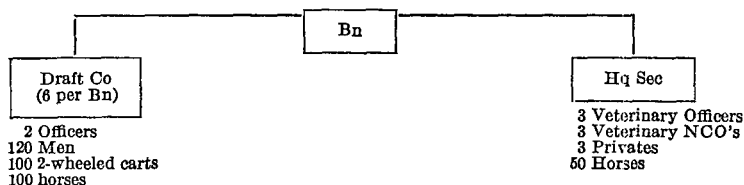
■ 69. TRANSPORT REGIMENT FOR TRIANGULAR DIVISION (ABOUT 18,000 STRENGTH).—*a.* It is believed that at present Japanese transport is only partially motorized. For the purposes of this study it has been arbitrarily decided to show the ammunition columns as motorized and the ration columns as horse-drawn.

b. Transport regiment, having total strength of 1,804, is composed of—

(1) Motorized ammunition battalion with strength of 1,061; 250 2-ton trucks having a capacity of 500 tons, five 500-gallon gasoline tank trucks; 20 automobiles and 75 motorcycles.



(2) Draft battalion, horse-drawn, with strength of 743; with 600 two-wheeled carts of 500 pounds capacity each, and 650 horses.



c. The organization carries—

(1) One day of fire for the division for all weapons including small arms. (This does not include the day of fire carried by the firing units.) Estimated weight 500 tons.

(2) Two days' rations for the personnel of the division and 2 days' forage for the 4,109 horses of the division. (This does not include the ration carried on the person.) Estimated rations for men, 50 tons for 2 days, include rice, barley, dried fish or tinned meat, salt and shoyu, plus ½ pound of vegetables or eggs when available. Weight 2.75 pounds per man per day. Forage is estimated at .013 tons per horse per day or approximately 100 tons for the 4,109 horses of the division.

JAPANESE FORCES

SECTION VI
CHARACTERISTICS OF MATÉRIEL

70. INFANTRY AND CAVALRY WEAPONS.—

1	2	3	4	5	6	7	8	9	10	11
Weapon and caliber	Weight in firing position (lb.)	Method of operation	Type of feed	Maximum rate of fire (rds. per min.)	Practical rate of fire—prolonged (rds. per min.)	Weight per round (lb.)	Maximum range (yd.)	Maximum effective range (yd.)	Effective radius of burst—fragmentation (yd.)	Remarks
Arisaka Rifle, M1905 6.5-mm.	8.69	Bolt.	Clip rds.			.019	4,375	500		39" long. Mauser type. Bayonet .8 lb., 16" long.
7.7-mm Rifle, M1919.		Bolt.				.003 (proj.)				Modified bolt and stock shortened. Because of different caliber not likely to be issued.
Pistol, Pattern 28 (1933) (Smith & Wesson) 9-mm, double-action.		6-rd. cylinder.				.002 (proj.)				Type is Smith & Wesson.
Nambu LMG, M1922 (permanent bipod), 6.5-mm.	22.44	Gas-operated air-cooled hopper-fed.	30-rd hopper.	500	100-150		4,375	600		Has an alternate tripod mount. No provision for single shots. No correction for windage or drift.
HvMG Model 3 (1914), 6.5-mm.	119	Gas-operated air-cooled.	Strip 30 rds.	500	200		4,375	1,300-2,400		Life of barrel, 40,000 rds. No correction for windage or drift. Pack horse transport.
Hv Grenade Thrower, M89, 50-mm.	10.5	Propelling charge.	Hand.		10-20		700	40-700	25-50	One man holds and aims thrower and fires by use of a lanyard, second man loads. Ammunition fuze, time or impact.
Inf Rapid-fire Gun, M94, 37-mm or less.	120	Full auto breech.	Hand.					2,500	Nil	Small, short-delay nose fuze. Used as close protection against tanks and armored cars.
Inf Bn Gun, M92 70-mm Rifled Gun.	178	Breech.	Hand.		10	8.8	2,800	300-1,500	40	
76-mm Mtn Gun, M14 (1908).	420	Oil recoil breech.	Hand.		10		7,675	2,100		
37-mm gun, M11 (1922) (obsolete). ¹										
HvMG M92 (1932), 7.7-mm.	122	Hotchkiss air-cooled.		450	200-250		4,587	850		

¹ This gun is similar to U. S. obsolete 1-pounder. Has been replaced, but believed still in use.

* Most effective.

■ 71. FIELD ARTILLERY.—

1	2	3	4	5		6	7	8		9	10	11	12		Remarks	13
Weapon—type and caliber	Weight of piece, including transport attachment, normal load exclusive of personnel (lb. approx.)	Piece transport	Weight of prime mover with normal load (lb. approx.)	Normal over-all width traveling position		Time to change place or from firing to traveling	Transverse	Normal rate of fire (rds. per min.)		Maximum effective range (yd.)	Approximate weight of ammunition	Unit of fire (rds. per piece)	Rate of march			
				Piece	Prime mover			Short bursts	Prolonged				Roads	Cross country		
75-mm Gun, M1906	4,500	Horse-drawn.					120 mls.			9,000–11,800	HE-13				Rapid fire gun—excellent sights. ¹	
75-mm Mtn Gun, M94 (1934).	1,500	Pack.					700 mls.			7,500–8,750	12.8					
105-mm Gun, M1032		Tractor	5 tons				30°			12,000–20,000						
105mm Gun, M1925		Tractor	5 tons				30°	2	1	14,000–Max.						
105-mm How M91 (1931).		Horse-drawn.					800 mls.			11,500						
155-mm How M1915		Horse-drawn in 2 loads.					6°	6-8	1							
150-mm Gun M1929		Tractor					800 mls.			Max.—27,340						

¹ All Japanese sights seem to be of good quality.

■ 72. ARMORED VEHICLES.—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Type of vehicle	Weight (tons gross)	Armament	Main armor (in.)	Crew speed on roads (mph)	Spanning capacity (ft.)	Slope climb (degrees)	Safe ford- ing depth (in.)	Ver- tical obsta- cle (in.)	Radi- us of action (mi.)	Dimensions (in.)			Clear- ance (in.)	Remarks
										H	L	W		
Tankette, M2592 (1932)	3	1 MG	.31-.55	2	30	49"	34	33	25	60	64	122	69	Flag--
Tankette, M2598 (1938)	3	2 MGs	.55	3	33	49"	34	33	25	61	64	123	69	2,500 rds. per gun.

JAPANESE FORCES

	7	.25-.375	3	22				77	57	Flag
L Tk, M2595 (1935) (see note).	1 37-mm. 2 MGs									
L Tk, M2592 (1932)	5 1 MG. 1 13-mm MG	.31-.43	3 28	4'6"	34 30	20	73 154	64 12		Flag
L Tk, M2593 (1933)	7 2 MGs	.86	3 28	5'8"	42 32	20	72 176	71 15		Flag
L Tk, M2595 (1935) (see note).	7.7 1 47-mm. 2 7.7 MGs	.39-.47	3 22		40 38.4	31.2	78 177	78 14.4		Radio.
L Tk—copy of Vickers-Armstrong.	8.1 2 MGs	.51-.2	3 22	6'	45 36	29	96 82	180 95		
L Tk, M2599 (1939)	7 1 37-mm. 1 MG	.63	3 12.5	6'4"	38 20		110 88	188 68		250 rds. 37-mm; 2,500 rds. MG.
Med Tk, M2589 (1929)	11.5 1 37-mm. 2 MGs	.43-.67	5 20	8'6"	35 36		150 102	210 100	18	Flag
Med Tk, M2590 (1930) (or 92 (1932)).	11.31 1 37-mm. 2 MGs	.23-.67	5 27		38		147 102	210 100		Flag
Med Tk, M2594 (1934)	14 1 37-mm. 2 MGs	.43-.67	5 28	10'6"	46 36	36	124 102	250 100	18	
Med Tk, 97 (1937)	14-15 2 MGs. 1 Mort	.58-.95	4 25-28	9'6"	40 38.4	39.4	117 267	98 14		Radio.
Med Tk, 2599 (1939)	12 1 47-mm. 3 MGs	.67	5 25	7'11"	40 39	33	160 110	220 100		Possible flame thrower.
Hv Tk, 2596 (1936)	26 1 75-mm. 1 37-mm	1.38	10 36	15'	40 50	33	175 110	372 128		250 rds. 37-mm; 2,500 rds. MG.
Hv Tk, M2597 (1937)	35 2 MGs 2 37-mm.	1.38	6 28	7'	45 50	42	128 114	293 118		500 rds. HE; 5,000 rds. MG.
L Amphibian (1941)	7-9 1 37-mm. 1 MG	.5-1.0	3				84 192	84		2,000 rds. MG; 120 rds. 37-mm.
Sumida six-wheeled arm'd-C, M2593 (1933).	7 7 Rifles or LMGs.	Up to .61	6 Road 25 Rail 37				116 306	75		

NOTE.—L Tk M295 (1935) listed first was originally classed as a tankette with a crew of 2 and weight 4 tons. This tankette may exist as such and the second L Tk of this classification may be an additional model.

<i>1</i> Name, model, and class	<i>2</i> Motors	<i>3</i> Crew	<i>4</i> Bomb load (lb.)	<i>5</i> Ceiling (ft.)	<i>6</i> Operating range (mi.)	<i>7</i> Operating speeds (mph)	<i>8</i> Rate of climb (min. to ft.)	<i>9</i> Armor	<i>10</i> Armament
Fighter BFW, Messerschmitt 109.....	1	1	—	36,050	620 at 298 mph.	Max. 354	3.8/13,120	—	4 MGs; 2 20-mm can- non.
Kawasaki 97 Fighter.....	1	1	—	32,000	335	Max. 300 at 15,000 ft.	5.5/15,000	—	4 MGs.
(Kawasaki Kawa 102) 98 Fighter.....	1	1	—	—	—	Max. 270 at 10,000 ft.	—	—	2 MGs; 2 20-mm can- non.
Mitsubishi 97 Fighter.....	1	1	—	29,000	375	Max. 265	7.5/15,000	—	4 MGs.
Mitsubishi 98 (Karigane II) (resembles Nor- throp A-17).	1	2	—	—	—	Max. 310	—	—	—
Mitsubishi Zero Fighter (Type 00 Model 1 Sento Ki).	1	1	—	39,300	2,000 (approx.)	Max. 298	—	—	2 20-mm cannon; 2 MGs.
Nagoya Zero Fighter.....	1	1	—	32,810	6 to 8 hrs	Max. 344	Fast.	—	2 20-mm cannon; 2 MGs.
Nakajima 96 Fighter (fragile) (resembles Boeing P26A).	1	1	—	Critical	312	Max. 240 at 7,000 ft.	6/5,000	—	4 7.7-mm MGs.
Nakajima 97 Fighter.....	1	1	—	13,000	—	Max. 280	—	—	3 MGs.
Seversky 98 Fighter (copy).....	1	2	500	33,000	389	Max. 280	1/3,400	—	2 7.7-mm MGs and 20-mm cannon.
Mitsubishi Century Fighter.....	2	—	—	31,000	840	Max. 350	—	—	2 27-mm cannon.
Dive Bomber 96.....	1	3	1,100	250	241 Dive	—	—	—	3 7.7-mm MGs.
Kawasaki 97 Light Bomber.....	1	2	800	25,000	490	Max. 236	—	—	3 MGs.
Mitsubishi Kanikazi Light Bomber 97.....	1	2	681.3	30,000	450	Max. 260	—	—	3 MGs.
Mitsubishi Mits 103 Light Bomber.....	1	—	1,000	27,000	790	Max. 260	—	—	3 MGs.
Mitsubishi Mits 104 (Type 98) Light Bomber. Light Bomber 97.....	1	2-3	3,300	25,000	260	Max. 250	—	—	3 MGs.
Light Bomber 99.....	1	2	1,304	24,283	6 hours	Max. 256	Far.	—	3 7.7-mm MGs.
Medium Bomber 98 (Mitsubishi 104).....	1	2-3	—	—	—	Max. 299	—	—	2 20-mm cannon; 2 MGs.
Kawasaki (Kawa 95) Type 97 Heavy Bomber.....	2	3-5	4,400	24,500	1,250	Max. 245	—	—	2 25-mm cannon; 4 MGs.
Mitsubishi 97 Heavy Bomber.....	2	5-7	4,400	23,000	1,180	Max. 220	—	—	1 cannon; 4 MGs.
Mitsubishi 98 (Mitsu 106) Heavy Bomber.....	2	5	2,200	23,000	1,180	Max. 220	—	—	—

JAPANESE FORCES

Heavy Bomber 96	2	7	2,200	22,600	750	217-296. Max. 230; cruise 150.	2.11/3,280	Seats	5,7.7-mm MGs. 4 7.7-mm MGs; can- non.
Heavy Bomber 97 (modified)	2	7	3,000		1,800				
Heavy Bomber 98 (Fiat B. R. 20, 1937)	2	7	6,614	29,500	2,400 (2,200lb.); 1,553 (net d. load.)	Max. 281; cruise 235.	18/16,405		3 12.7-mm Breda and 7.7-mm Safat MGs.

■ 74. ANTIAIRCRAFT ARTILLERY.

1 <i>Type and caliber</i>	2 <i>Weight</i>		4 <i>Elevation</i>	5 <i>Traverse</i>	6 <i>Range</i>		7 <i>Vertical</i>	8 <i>Rate of fire</i>		10 <i>Emplace</i>	11 <i>Remarks</i>
	<i>Gun and prime mover</i>	<i>Gun and mount</i>			<i>Horizontal</i>	<i>Vertical</i>		<i>Maximum</i>	<i>Sustained</i>		
75-mm Gun, M1922	12,800 pounds	4,800 pounds	-10 to 85	360	11,000 yd.	19,725 ft.	15-20	12	12	10 min.	
105-mm AA Gun	13 tons	7 tons	0 to 85	360	19,400 yd.	36,000 ft.	12	10	10	1 hr.	
75-mm Gun, M1928		5,300 pounds	0 to 85	360	15,200 yd.	32,800 ft.			15		
20-mm Oerlikon		836 pounds	-40 to 85	360	5,450 yd.	12,200 ft.			120		

CHAPTER 2

MOVEMENTS

Paragraphs

SECTION I. Facilities.....	75-82
II. Troop movements.....	83-85

SECTION I

FACILITIES

■ 75. GENERAL.—*a.* In general, Japanese operations are from close bases. That fact permits deck loading and the use of a variety of small ships which could not be employed over a longer supply line. Food supplies need not be carried for long periods. In addition, the Japanese soldier requires very little ship space per man and, having been trained to live off the country and exploit its resources, he travels very lightly.

b. Japan's army is not as completely motorized as they desire, but, because of the types of country in which it has been operating, this has not proved a handicap. Coolie labor has been drafted for transport, and everywhere the transport system has been quickly organized around local available transport facilities by commandeering private cars, trucks, horses, wagons, bicycles, and boats. The great flexibility of the Japanese type of organization has made it possible for the Japanese army to overcome any difficulties which might have been expected to arise because of an apparent shortage of transport facilities.

■ 76. ANIMAL-DRAWN TRANSPORTATION.—The Japanese do not have motorized equipment available in sufficient quantity, and hence the wagon or two-wheeled cart plays a very important role in army transportation. No exact figures are available on the number of these carts which are being used, but a rough estimate, based on the computation of 600 two-wheeled carts for each transport regiment for each of the 82 divisions, and 400 carts for some 40 or more independent brigades and regiments, would indicate more than 65,000 such vehicles in use. These carts can be produced very quickly and inexpensively, and it is safe to say that the army has or can have as many carts as it needs.

■ 77. MOTOR TRANSPORT.—*a. Trucks.*—The Japanese Army is well supplied with light motor trucks ($1\frac{1}{2}$ to 3 tons capacity). The Nissan is a modified cab-over-engine design at 2-ton capacity. The Toyota is a faithful copy of the 1939 Chevrolet truck. Several types of heavy trucks, some powered with Diesel and some with gasoline engines, have been manufactured in Japan for several years past, but production has always been small. The standard prime mover of the Japanese Army is a six-wheeled vehicle of 3 to 4 tons capacity, powered with a 6-cylinder engine of approximately 90 horsepower. Two rear axles are used and the four rear wheels drive. The front end is of conventional design. It has an unusually high ground clearance. This standard prime mover is the chassis of the Japanese armored car. All privately owned commercial vehicles in Japan proper have been converted to charcoal burners, and it is possible that many of the Japanese army trucks used in Japan proper may have been converted to use this type of fuel.

b. Motor cars.—Only two types of passenger vehicles are manufactured in Japan at present. The Nissan, the standard seven-passenger automobile of the Japanese Army, is an adaptation of the 1935, six-cylinder Graham Paige. The Toyota Company began to manufacture in 1940 an European-type passenger car smaller than the Ford, with a wheel base of only 100 inches and a small six-cylinder engine. A large number of Fords and Chevrolets are available and this number has been materially increased by the acquisition of Ford factories and assembly plants in occupied territory.

JAPANESE FORCES

■ 78. AIR TRANSPORT.—In 1941 it was estimated that the Japanese had sufficient aircraft to carry a force of 3,300 men. It is unlikely that production exceeds 50 airplanes per month. The table below lists the types of airplanes primarily designed for transport service, together with information concerning their performance.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Types	Basic purpose	Description	Crew	Passengers	Armament (MGs)	Motors (all air-cooled)	Total horsepower	Max. speed in mph	Cruising speed in mph	Max. ceiling in feet	Range in miles	Wing span in feet	Weight empty in lbs.	Weight loaded in lbs.
Nakajima 19 Bomber-Transport	A	TRM	1			2	1,740	217	186		2,484	72'2"	10,450	
Mitsubishi "Hinazuru" (Air-speed "Envoy")	C	TEL	1	8		2	960	174	149	16,500	620	52'4"	3,775	5,890
Nakajima Douglas DC-2	C	SRL	3	14		2	1,420	217	186	23,000	1,302	85'	11,880	17,490
Douglas DC-3	C	SRL		24		2	*1,800	212	*191	*21,400	*2,125	95'	*16,857	*24,400
Fokker (probably obsolete)	C	RH	2	8		3	2,250	118		14,800	650			
Junkers JU 52	C	STRL	2	14-17	2	3	*2,280	*189	*176		*1,000	95'11"	15,400	23,200
"Lockheed 14"	C	STM	4	10-12		2	*1,640	265	*216	26,300	*1,705	65'6"	*11,025	*17,500
Mitsubishi MC-30 Freight Carrier	A	STRL	3-5	11		2	1,800		102		1,620	82'		11,000
Nakajima A.T.	C	SRL	2	8		2	920	230	217	29,500	1,519	65'4"	7,656	10,736
N.K.K. T.K. 3	C	H	2	8		2	900	205	174		530	55'9"	5,940	9,020
Nakajima "Akasuki" Cargo Carrier	C	L	2	4		2	1,500	205	155		3,725	86'5"		
Tokyo Gasu Denki TRI	C	TL	2	4		2	480	180	155	19,700	1,120	47'11"	3,014	5,500

EXPLANATION OF SYMBOLS.—(A) Army; (C) commercial; (E) elliptical tip; (H) high-wing monoplane; (L) low-wing monoplane; (M) middle-wing monoplane; (R) round tip; (S) swept back; (T) tapered.

*No data available on actual performance of Japanese models; specifications given are for the original designs.

■ 79. RAIL TRANSPORT.—*a. Engines.*—(1) According to the last figures published (1937, for the year 1935-36) there were 4,235 locomotives (200 electric) owned by the Government. The average locomotive weighs 85 tons, and the average tractive effort is approximately 40 percent less than locomotives in the U. S. The principal classes of engines are the 4-6-2 passenger engine with double-truck tender, total weight 115 tons, and the 2-8-2 freight engine with double-truck tender, total weight 124 tons. Maximum axle weight is 15 tons.

(2) There were 808 engines owned by private companies.

b. Cars.—(1) *Passenger.*—In 1935 there were—

10,813 passenger cars with a total seating capacity of 689,201. Of these—

9,219 had a seating capacity of 529,139.

1,403 had a seating capacity of 142,613.

191 rail cars (electric cars)—seating capacity 17,449.

Ninety-nine percent of the cars are third class, and each has a seating capacity of 64 passengers.

The speed is never over 50 mph. According to the Tokyo Year Book of 1934, the highest speed of passenger trains has been increased to 64 mph for the 3'6" gage.

(2) *Freight.*—In 1937 there were (Government-owned)—

67,485 with a loading capacity of 892,442 metric tons:

36,224 box cars—loading capacity 456,446.

220 tank cars—loading capacity 2,596.

30,294 gondola-type—loading capacity 433,400.

In addition, private companies owned 10,989 freight cars.

c. Mileage.—(1) There are in Japan—

12,731 miles of railroads, operated by the state; 4,219 miles of railroads, operated by private companies; 1,410 miles of railroads, interurban and city trains.

(2) Of this total mileage only 1,347 miles are more than single track. Very little multiple track exists. Up to 1940, 244 route miles were electrified. Direct current is used, distributed by overhead trolley lines at 1,200 or 1,500 volts. The three large power stations are at Kawasaki, Akabane, and on the Shinaogawa River.

(3) No coal exists on the main island, the supply coming from Hokkaido and Kyushu and also from Chosen.

(4) Tokyo is the main traffic junction and from it there radiate more multiple-track railroads than from any other one point. Seventy-five percent of the electric mileage is around Tokyo.

(5) Recently the Shimonoseki Tunnel has been opened, so that there is a continuous railway service from Tokyo through Yokohama, westward along the coast through Nagoya, Osaka, Kobe, and along the inland sea to Shimonoseki. This is the only line where sharp grades are not encountered. The distance covered is 1,097 kilometers (686 miles). The line between Tokyo and Kobe is particularly vulnerable, since it crosses numerous rivers where they are widest just before they enter the sea, requiring a large number of long bridges. The same is true between Kobe and Shimonoseki but this particular section of the line is difficult to reach, since it is protected by the screen of islands that surround the inland sea.

(6) The most important lines are on the main island of Honshu. Of secondary importance is the southwestern island of Kyushu with the two important ports of Nagasaki and Moji. Of lesser importance are the northwestern island of Hok-

kaido and the island of Shikoku. South Sakhalin or Karafuto has a small network. The Honshu trunk line is double-tracked throughout. There are four tracks:

Tokyo-Yokohama (29 kilometers—18 miles).

Osaka-Kobe (128 kilometers—80 miles).

Kyoto-Akashi (95 kilometers—60 miles).

d. Leading local railways in Japan (last known figures).—

<i>Title</i>	<i>Open miles— Length of lines</i>	<i>Motive power</i>	<i>Feet-inches gauge</i>
Bantan Railway.....	45.6	Electric.....	3'6"
Chichibu Railway.....	41.2	Electric and steam.....	3'6"
Chugoku Railway.....	49.5	Steam.....	3'6"
Echigo Railway.....	66.4	do.....	3'6"
Fuji Minoba Railway.....	20.9	do.....	3'6"
Geibi Railway.....	56.2	do.....	3'6"
Ibigawa Electric Railway.....	35.8	Steam and electric.....	3'6"
Iwate Keiben Railway.....	40.7	Steam.....	2'6"
Iyo Railway.....	{ 35	do.....	3'6"
	{ 3.4	Electric.....	3'6"
Joso Railway.....	31.9	Steam.....	3'6"
Kokura Railway.....	24.9	do.....	3'6"
Musashimo Railway.....	27.2	do.....	3'6"
Nagoya Railway.....	{ 42.1	do.....	3'6"
	{ 46	Electric.....	3'6"
Nankai Railway.....	{ 42.9	Steam.....	3'6"
	{ 35.4	Electric.....	3'6"
Omi Railway.....	27.5	Steam.....	3'6"
Shimabara Railway.....	26.2	do.....	3'6"
Tobu Railway.....	{ 143.2	do.....	3'6"
	{ 2.8	Hand.....	2'0"
Tomakomai Railway.....	25.5	Steam.....	2'6"
Tsukuba Railway.....	24.9	do.....	3'6"

e. Formosa.—Railroads in Formosa have—

200 locomotives.

600 passenger cars.

8,000 freight cars, mostly open, 10–20 ton capacity.

The Government railways operate 881 kilometers (550 miles) of 3'6"-gauge railroad. Private companies operate 1,247 kilometers (775 miles) of 2'6"-gauge railroad and narrower. The capacity of all double-track sections may be estimated at 48 pairs of trains. Crossing loops are short, and therefore trains of 30 cars and 750 tons are the maximum accommodated. The principal railway line runs through the western coastal area of the island, linking Kielung with Taihoku and Takao.

f. Manchuria.—(1) Engines.—

South Manchurian Railways:

500 locomotives, passenger and freight.

100 switching engines.

12 Diesel 4-car units.

State Railways:

1,250 locomotives.

(2) *Passenger cars:*

850—South Manchurian.

2,000—State Railways.

(3) *Freight cars:*

9,000—South Manchurian.

17,000—State Railways.

(4) The railway system has developed around the South Manchurian Railway Company, the main line being Dairen-Hsingking. The management of the company is in daily contact with the Kwangtung Army, with headquarters at Hsingking and Dairen. The main line is double-tracked. Other railways are State-owned and operated by the South Manchurian. The most important of these is the former Chinese Eastern Railway, cross-country from Manchuli to Suifenho (Pogranichnaya). The southern main line branches off the former at Harbin whence it runs to Hsingking and connects with the South Manchurian.

(5) The Chinese Eastern Railway was formerly part of the Trans-Siberian Railway. It has been duplicated by a northerly route, entirely in Siberian territory at a short distance from the Manchurian border. The Chinese Eastern was taken over by the Manchukuo State Railways in 1935 and incorporated into their own system. The gage was converted from the Russian 5-foot gage to standard. A connection with the Siberian railways system exists now only at Manchuli, where a break in the gage occurs.

(6) Other important trunk lines are Peking-Mukden, entering Manchuria from China at the point where the Chinese Wall reaches the sea; and the Antung-Mukden, a section in the overland route from Japan through Korea.

<i>g. Korea.—(1) Rolling stock (1937)—</i>	<i>For 1.435 m. gage</i>	<i>For .76 m. gage</i>
Locomotives.....	315	31
Passenger cars.....	754	75
Freight cars.....	3, 444	319

A 1941 report gives—

400 locomotives.

900 coaches.

4,500 freight cars.

(2) *Passenger coaches.*—Passenger cars are few, speed is low, the rolling-stock locomotives and coaches are of the American style. The trains are light, consisting of up to 8-bogie carriages, weight behind tender 300 to 350 tons. All carriages are of the open-type; sleepers, American-style; baggage and mail cars are separate units.

(3) *Freight cars.*—Freight cars consist of four-wheeled and four-bogie cars; 15-, 20-, 30-, and 40-ton carrying capacity. There are few special cars in use.

(4) The railways are the principal land transport in Korea. Motor traffic is negligible except in the larger towns. The principal center of the railroad system is Seoul (Keijo) and Heijo. The ports are the termini. A considerable number of narrow-gage light railways serve as feeders from the outlying districts.

(5) The principal lines are a trunk line from Fusan via Keijo, Heijo to Shingshu on the Manchurian border; thence by a long bridge across the border to Antung and Mukden, where it connects via the Manchurian system with all parts of that country. The second main line runs from Keijo to the east coast at Gensan; thence to the northeast corner of the country, to the ports of Seishin, Rashin, and Yuki. Most of the other lines are in the western half of the peninsula.

(6) Existing routes into Manchuria are at Antung and at Kamisambo-Nanyo.

(7) New construction, now nearing completion, aims at provision of a second main south-north line and cross-country lines from harbors on the Japan Sea to Manchuria.

(8) Keijo-Taidan—167 kilometers, double track.

(9) Government railways—standard gage:

	<i>Kilometers</i>	<i>Miles</i>
Route mileage.....	3, 867	2, 417
Double track.....	170	100
Total main line track.....	4, 037	2, 425
Sidings (approximately).....	1, 000	625

(10) Government Railways—2'6" gage:

Route mileage.....	203	127
Sidings.....	30	20

(11) Private companies (railways and tramways):

Route mileage.....	1, 327	830
--------------------	--------	-----

(12) Bus routes:

Route mileage.....	26,000	16, 250
--------------------	--------	---------

■ 80. MISCELLANEOUS LAND TRANSPORT FACILITIES.—*a. Bicycles.*—Japan is one of the world's largest producers of bicycles and the bicycle is very widely used throughout the country. It is estimated that there are approximately 7,000,000 bicycles in Japan and their use as a means of transport should not be underestimated. There is a standard army type of heavy construction designed along English lines, with front- and rear-wheel brakes and large wheels. The Japanese army has made wide use of the bicycle in all campaigns of the present war. In practically all of its campaigns the Japanese army has seized private bicycles in the invaded territory and used them for transport purposes.

b. Motorcycles.—The standard motorcycle of the Japanese army is a twin-cylinder Harley-Davidson type of 1,500-cc displacement. This design has an unusually high road clearance, with large wheels, and is of very heavy construction. When used with a side car, a reverse gear is incorporated in the transmission. This is a satisfactory military vehicle. One design includes a mount for a 7.7-mm machine gun on the side car. Detachable shields can be fitted to both side car and motorcycle.

c. Motor tricycles.—The commercial motor tricycle (Sanrinsha) is a purely Japanese design developed during the past 12 years. With a rated capacity of 1,000 pounds, these light vehicles often carry a ton and have been used by the Japanese army in Japan proper and to some extent in North China and Manchuria. Engines vary in size from 300 cc to 1,000 cc; practically all are single-cylinder. The smaller type are chain-driven but the larger are shaft-driven. All have three speeds forward and one reverse.

FM-E 101-10

81 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

81. WATER TRANSPORT.—a. Known tonnage as of December 7, 1941.—

1	2	3	4	5	6	7	8	9	10	11
Gross tons	Tankers		Combination ves- sels		Freighters		Public service vessels		Total all types	
	No.	Total tonnage	No.	Total ton- nage	No.	Total ton- nage	No.	Total tonnage	No.	Total tonnage
1,000-2,000.....	3	3,299	36	51,251	240	364,820	2	2,731	281	422,101
2,000-3,000.....	1	2,417	39	100,041	187	465,336	9	21,562	236	589,356
3,000-4,000.....	1	3,271	29	96,727	147	502,266	11	38,913	188	641,177
4,000-5,000.....	0	0000	14	60,103	138	620,322	-----	-----	152	680,425
5,000-6,000.....	5	27,672	14	75,998	167	927,124	-----	-----	186	1,030,794
6,000-7,000.....	3	19,072	12	76,970	104	685,696	-----	-----	119	781,738
7,000-8,000.....	11	80,517	9	68,223	47	340,502	3	21,962	70	511,204
8,000-9,000.....	13	106,103	5	42,459	30	253,888	-----	-----	48	402,450
9,000-10,000.....	8	76,793	17	161,754	4	38,209	-----	-----	29	276,756
10,000-12,000....	14	141,775	15	164,073	-----	-----	-----	-----	29	305,848
Over 12,000.....	5	90,916	8	125,731	-----	-----	-----	-----	13	216,647
Total.....	64	551,835	198	1,023,330	1,064	4,198,163	25	85,168	1,351	5,858,496

¹ 13 of these, totaling 224,147 gross tons, have a maximum speed of over 18 knots and are probably operating as fleet auxiliaries. Tankers are of modern design and construction, 42 of the 64 having been built since 1927.

² 58 of these vessels, totaling 521,755 gross tons, have a normal sea-cruising speed of over 15 knots; 57 vessels, totaling 400,941 gross tons, were built during and since 1930; 80 vessels totaling 366,072 gross tons were built prior to 1920.

³ Approximately 310 of these vessels totaling 1,150,000 gross tons have a maximum speed of 15 knots or over; 479 vessels totaling 1,683,374 gross tons were built prior to 1920; 382 vessels, totaling 1,674,949 gross tons, were built during and after 1930.

⁴ The majority of Japan's public service vessels are ferries operated by the Ministry of Railways, principally between Japan and Korea.

b. Summary.—

	Number	Tonnage
Known ships as of Dec. 7, 1941.....	1,351	5,858,496
Estimated unreported construction 1940, 1941....	38	210,395
Estimated unlisted vessels.....	105	300,000
Estimated ships as of Dec. 7, 1941.....	1,494	6,368,891

c. Seizures and acquisitions.—

Gross tons	Number	Tonnage	Gross tons	Number	Tonnage
1,000-2,000.....	46	66,115	7,000-8,000.....	7	52,042
2,000-3,000.....	33	80,818	8,000-9,000.....	2	16,437
3,000-4,000.....	22	75,379	9,000-10,000.....	1	9,877
4,000-5,000.....	5	23,455	Over 10,000.....	8	111,349
5,000-6,000.....	17	89,932			
6,000-7,000.....	11	71,222	Total.....	152	596,266

c. Seizures and acquisitions.—Continued.

<i>Nationality of ships acquired or seized</i>	<i>Number</i>	<i>Tonnage</i>
Axis.....	36	193, 899
Allied.....	90 (1 72)	280, 986 (1 235, 239)
French.....	24	114, 089
Neutral.....	2	7, 652
	152 (1 134)	596, 626 (1 550, 879)

¹ Adjusted for Allied ships probably sunk or scuttled, or constructive total loss.

d. Estimate of Japanese shipping position as of June 1, 1942 (vessels over 1,000 tons).—

<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
	<i>Freighters and passenger vessels</i>		<i>Tankers</i>		<i>Total</i>	
	<i>No.</i>	<i>Tonnage</i>	<i>No.</i>	<i>Tonnage</i>	<i>No.</i>	<i>Tonnage</i>
Estimated tonnage as of Jan. 1, 1942 (excluding losses).....	1, 430	5, 817, 056	64	551, 835	1, 494	6, 368, 891
Estimated gains through capture, seizure, and acquisition as of June 1, 1942:						
(1) Allied.....	75	222, 450	3	12, 789	78	235, 239
(2) Axis.....	35	188, 786	1	5, 113	36	193, 899
(3) French.....	24	114, 089			24	114, 089
(4) Neutral.....	2	7, 652			2	7, 652
Estimated new construction (Jan. 1, 1942–June 1, 1942).....	25	106, 000	3	19, 000	28	125, 000
	1, 591	6, 456, 033	71	588, 737	1, 662	7, 044, 770
<i>Less:</i>						
Estimated war losses (Dec. 7, 1941–June 1, 1942).....	125	676, 091	14	102, 519	139	778, 610
Estimated marine casualties (Oct. 1, 1941–June 1, 1942).....	8	25, 000			8	25, 000
	133	701, 091	14	102, 519	147	803, 610
Estimated tonnage available to the Japanese as of June 1, 1942....	1, 458	5, 754, 942	57	486, 218	1, 515	6, 241, 160

FM-E 101-10

81 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

e. Summary estimate as of June 1, 1942:

Estimated tonnage available to the Japanese as of June 1,
1942 (round figures) 6, 240, 000

Estimate of required tonnage June 1, 1942:

Economic supply of Japan and her troops in	
China and Manchuria.....	3, 000, 000
Naval auxiliaries.....	400, 000
Lay-ups and repairs.....	700, 000
Unusable types, domestic services, etc.....	100, 000
Supply of troops and present transport needs	
in southern occupied areas.....	900, 000
	<hr/> 5, 100, 000

Available tonnage for additional operations..... 1, 140, 000

f. *Special transports*.—The Japanese have developed a special type of transport to carry troops and small landing craft. The transports have sliding or rolling doors on their sides, permitting landing craft berthed on rollers to be rolled into the water fully loaded with men and equipment. At least some of the transports also have rear slide hatches, or ramps, with which to load and unload heavy equipment.

g. *Landing craft*.—Six types of these have been developed. Most of them are featured by double keels (for stability and strength) and by armored bows which can be dropped to permit field guns and small tanks to be run off the boats onto the beach. The armored fronts are capable of stopping .50-caliber bullets, but .30-caliber fire will penetrate the sides. The different types and some additional characteristics of the boats are as follows:

(1) *Type A*.—This is a large, open boat on the bow of which is a landing ramp which falls forward onto the beach, thus enabling guns to be wheeled off. The engine and coxswain usually are protected by bullet-proof plating. It is used by main landing forces. The approximate over-all length of the boat is 50 feet and the length at the water line is 41 feet. The length of the beam is 12 or 13 feet. The boats are propelled by low-speed two- or four-cylinder gasoline or Diesel engines and attain a speed of about 10 knots. It is estimated that the boats can carry 110 to 120 fully-equipped men.

(2) *Type B*.—This boat, small and of open type and holding 50 to 60 men, is used by the initial covering party. It has an over-all length of 20 to 40 feet and is powered with a two- or four-cylinder gasoline or Diesel engine. Some of the boats have bullet-proof shields and light machine guns in the bow.

(3) *Type C*.—This is an armored motor launch used for close support, reconnaissance, and maintenance of communication. It is approximately 40 feet long and has a beam of 12 to 13 feet. The boat, constructed of steel plate, is believed capable of attaining a speed of 15 knots.

(4) *Type D*.—It is used solely as a towboat, supplementing type A. The boat has an approximate over-all length of 30 feet and a beam of 10 feet. It is constructed of wood, and is similar to a standard motor launch.

(5) *Type E*.—This is an airplane-propeller-driven boat, about 50 feet long and 10 feet wide, which was designed for use in shallow or weed-infested water. About 10 feet of the forward underwater body rises above the water when the boat is going at full speed. The draft at light load appears to be not over 2 feet.

(6) *Type F*.—It is constructed of steel plates and is of two sizes—30 feet over-all and 40 feet. It has a beam of 12 feet and a speed of about 9 knots.

h. Motor torpedo boats.—Characteristics of the boats are as follows:

- (1) Length: 32 feet, 6 inches to 49 feet.
- (2) Beam: 6 feet, 6 inches to 9 feet, 9 inches.
- (3) Body: Flat-bottom steel frame, wood planking.
- (4) Motor: Radial-cooled aircraft engine with reduction gear and angle drive up to 400 ground-maximum horsepower.
- (5) Armament: Two torpedo tubes mounted on each side, four depth charges, one machine gun.
- (6) Crew: Three or four.
- (7) Speed: 52 mph. or over.
- (8) Endurance: 10 hours at full speed if about 1,150 gallons of gasoline are carried.

i. Tonnage calculations.—Various tonnage calculations for sea movement of Japanese forces, armament, and supplies have been estimated as follows:

(1) *Personnel and horses.*—The tonnage allowances for troops and horses vary according to the length of the voyage, route taken, and season of the year. In each case a margin is allowed for a certain quantity of stores, coal, ammunition, and vehicles.

	<i>Long sea voyages (tons)</i>	<i>Short sea voyages (3 days) (tons)</i>
For each man.....	5	3
For each horse.....	10	9

(2) *Matériel.*—For every 1,000 tons of Japanese shipping, various vehicles (loaded), tanks, and other equipment can be shipped as shown in the following table:

Trucks (3-ton).....	12
Trucks (30-cwt—approx. 1½ tons).....	23
Trucks (1-ton).....	40
Tractors (field artillery).....	50
Cars.....	40
Ambulances.....	30
Howitzers (105-mm).....	50
Infantry guns (37-mm).....	100
Tankettes.....	30
Light tanks.....	25
Medium tanks.....	15

(3) *Ship dimensions in relation to tonnage.*—The length, breadth, and draft of Japanese vessels in relation to tonnage is given in the following table:

<i>Draft (feet)</i>	<i>Length (feet)</i>	<i>Breadth (feet)</i>	<i>Approximate tonnage</i>
15	230	33	1,000
19	280	39	2,000
21	330	44	3,000
23	360	48	4,000
25	390	51	5,000
26	420	53	6,000
27	440	55	7,000
28	450	57	8,000
28	460	58	9,000
29	470	59	10,000

■ 82. ROADS AND BRIDGES.—*a. Japan.*—The published figures of road mileage in Japan are practically meaningless since they include all sorts of alleys, lanes, and unimproved roads, and give no indication of the kind of surface. The latest official figures, which were published in 1937, show a total of approximately 600,000 miles of roads. Of the 125,000 miles of road which are suitable for motor transportation, 100,000 miles are suitable the year round, and 25,000 during dry weather only. In 1935 there were approximately 120,000 bridges on roads suitable for motor transportation. Most of these are constructed to sustain a uniform load of 100 pounds per square foot. In 1937 there were 74,100 miles of highway bus routes in Japan. Because of construction difficulties, many sections of Japan are left without any roads, and connecting links between particular areas are very poor.

b. Taiwan.—The road system of Taiwan is laid out according to strategic necessity. A main truck highway runs from north to south through the western coastal area and upon it converge many feeder roads. The east coast, on the other hand is only poorly provided with highways. In 1936, the 11,300 miles of road were classified as follows: concrete—16; asphalt—140; macadamized—50; improved earth and gravel—10,094; unimproved earth—1,000.

c. Chosen.—With the exception of a few main roads, most of the roads in Chosen are either ordinary cart roads or earth covered with unrolled gravel. There are 17,375 miles of classified roads divided as follows: First-class roads (over 24 feet in width)—2,000 miles; second-class roads (18 to 24 feet in width)—6,200 miles; third-class roads (12 to 18 feet in width)—9,175 miles.

d. Manchukuo.—At the end of 1939 there were about 20,000 miles of roads in Manchukuo. Only about one-fourth of the roads were improved, these being chiefly earth, gravel, or clay. Bridges are well constructed of concrete and are suitable for military use.

e. Occupied China.—Roads in operation in this area total upward of 15,000 miles, in contrast to the prewar mileage of more than 20,000. A large proportion is of unimproved dirt, but main highways are largely surfaced. The surfacing is usually a low-cost type, consisting of clay or water-bound macadam, broken brick or stone, with gravel. Most of these roads are poorly maintained and the Japanese have made few improvements.

SECTION II

TROOP MOVEMENTS

■ 83. MARCH TABLES AND ROAD SPACES.—*a. Marching ability of various arms.*—

Arms	Pace, speed, and distance						
	Marching pace (meters per minute)			Marching speed (kilometers per hour)		Distance per day	
	Ordinary	Quick	Double				
Infantry.....		86	145		4	24 km (usually continuous marching at 6 hours per day).	
				Type of pace	Speed per hour	Classification	Distance (kilometers)
Cavalry.....	100	220	320	$\frac{1}{4}$	7	Brigade and group....	65 to 97.5
				$\frac{1}{2}$	8	Reconnaissance unit...	97.5 to 130
				$\frac{3}{4}$	9	Officers' reconnaissance.	130 to 195
				$1\frac{3}{4}$	10		
				$\frac{3}{4}$	11		
Mountain Artillery..	86	145	-----	Usually keep pace with the infantry.			
Field Artillery.....	86	220 (180)	320	For short distances figures are same as for cavalry.			
Horse Artillery.....	100	220	320	Same as for cavalry.			

¹ The $\frac{3}{4}$ pace means that in 1 hour the troop does 40 minutes trot and 20 minutes walk.

b. Speed of armored force vehicles.—According to Japanese manuals a mixed mechanized force can cover between 60 and 70 kilometers (37–44 miles) in a day, the following being the normal speed on the march of columns of various types:

	Ordinary conditions		Dim lights		No lights	
	Km per hr	Mph	Km per hr	Mph	Km per hr	Mph
Tank regiment.....	8–12	5–7½	6–8	3¾–5	4–6	2½–3¾
Light tank company.....	12–18	7½–11	6–8	3¾–5	4–6	2½–3¾
Truck column.....	12–20	7½–12½	6–8	3¾–5	4–6	2½–3¾

The following speeds are those given in instructions to drivers and indicate the speed to be adopted on receipt of the corresponding signal:

	Km per hr	Mph
Low speed.....	6	3¾
Ordinary speed.....	12	7½
Fast speed.....	18	11

Full speed: As fast as the terrain will permit, but not exceeding 35 km per hr. (21¾ mph).

FM-E 101-10

83 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

c. Length of various units on the march and intervals between them (in meters):

[Figures in parentheses are for pack-animal formations]

<i>Name of units</i>	<i>Combatant units</i>	<i>Heavy baggage (rations, ammunition and baggage)</i>	<i>Intervals between units</i>
Infantry:			
Army Headquarters.....	200	200	-----
Division Headquarters.....	150	150	-----
Company.....	75	-----	} 8
Machine Gun Company.....	110	-----	
Battalion (less unit trains).....	440	95	} 20
With unit trains.....	580	(135)	
Infantry-Gun Company.....	170	25 (35)	-----
Regiment.....	2, 100	370 (500)	20
Cavalry:			
Squadron:			
2-Section Unit.....	210	-----	} 15
4-Section Unit.....	120	-----	
Regiment:			
2-Section Unit.....	500	200	} 20
4-Section Unit.....	310	(320)	
Horse Artillery Battery.....	450	-----	-----
Machine-gun Company.....	550	-----	-----
Brigade (less trains).....	3, 000	} 800	-----
Trains.....	1, 900		-----
Field Artillery:			
Battery (less supply vehicles).....	220	-----	} 20
With Supply Vehicles.....	300	-----	
Battalion (less supply vehicles).....	1, 050	} 270	} 30
With supply vehicles.....	1, 230		
Regiment (less supply vehicles).....	4, 000	} 1, 000	-----
With supply vehicles.....	4, 500		
Regimental supply vehicles.....	400	100	-----
Mountain Artillery:			
Battery (less supply vehicles).....	220	-----	-----
With supply vehicles.....	330	-----	-----
Battalion (less supply vehicles).....	1, 230	} (390)	} 30
With supply vehicles.....	1, 400		
Regiment (less supply vehicles).....	4, 400	} (1, 500)	} 30
With supply vehicles.....	5, 400		
Regimental supply vehicles.....	970	(250)	120
6-inch Howitzers:			
Battery (less supply vehicles).....	320	} -----	} 20
With supply vehicles.....	480		
Battalion (less supply vehicles).....	1, 550	} 400	} 30
With supply vehicles.....	2, 000		
Regiment (less supply vehicles).....	4, 100	} 1, 050	} 30
With supply vehicles.....	4, 950		
Regimental supply vehicles.....	4, 950	1, 050	30
10-cm Gun Regiment.....	4, 000	-----	-----
Heavy Artillery Brigade, Transport Unit.....	5, 000	-----	-----
Field AA Artillery Unit.....	300	-----	-----

<i>Name of units</i>	<i>Combatant units</i>	<i>Heavy baggage (rations, ammunition and baggage)</i>	<i>Intervals between units</i>
Engineers:			
Company (less unit trains)	120	50	} 8
With unit trains	190	(60)	
Battalion (less unit trains)	260	120	} 15
With unit trains	400	(150)	
Field Searchlight Unit	170	45	
Bridging Train	2,000 (6,200)		
Transport:			
Company	1,600 (1,610)		
Horse Depot	130 (160)		
Heavy Truck Company	1,200		
Signals:			
Signals Unit	200 (230)		
W/T Platoon	60 (30)	20 (25)	
Field Telegraph Company	400 (500)	40 (45)	
Balloon Battalion	2,200		
Medical Unit	800 (240)		
Field Hospital	375 (440)		

NOTES:

Foot units are calculated as marching in columns of 4.

The table is based on the 2-Japanese books: "Notes on Tactical Operations on the Continent" (TAIR-IKU-SENJUTSO-SACYO-SANKO) and "Field Service Regulations" (JINCHU-YGMUREI).

d. Length of various columns on the march and intervals between (in meters).—

[The divisional trains are keeping intervals in accordance with a march with military precautions.]

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H
Advance Guard 1,500	Advance Guard 1,900	Advance Guard 2,000	Point, Advance Party, and Support ¹ 1,050	Point, Advance Party, and Support ¹ 1,400	Point, Advance Party, and Support ¹ 330	2,300	About 2,500
about 700 m	about 700 m	about 800 m	about 900 m	about 700 m	about 700 m	about 1,000 m	Advance transport of one infantry division (length about 2.5 km.)
Main Body 2,200	Main Body 2,800	Main Body 3,200	Reserve ¹ 1,350	Reserve ¹ 3,300	Reserve ¹ 1,400	4,000	
One column with one infantry regiment and one battery of field artillery as nucleus. (Length about 4.5 km.)	One column with one infantry regiment and one artillery battalion as nucleus. (Length about 5.4 km.)	One column with four battalions of infantry and one artillery battalion as nucleus. (Length about 6 km.)	Main Body 4,000	Main Body 10,600	Main Body 10,600	about 1,000 m	
		One column with one infantry brigade and one artillery battalion as nucleus. (Length about 8.3 km.)	Combatant unit of one division in one column. (Length about 17.5 km.)	about 2,000 m	Transport of one infantry division in one column. (Length about 16.5 km.)		
			Transport and baggage 19,500				
			One complete division with divisional transport. (Length about 36 km.)				

¹ The U. S. terms used here are not necessarily the exact equivalents of those parts of the column to which they refer.

■ 84. RAILWAY TRANSPORTATION.—*a. Composition of trains and speed of railway.*—One train of Japanese rolling stock consists of 28 to 30 coaches and cars of different kinds. Its arrangement is as follows:

<i>Elements</i>	<i>Number of coaches and freight cars</i>
Locomotive.....	
1st- and 2d-class passenger coaches.....	1
3d-class passenger coaches.....	1
Temporary passenger coaches.....	10
Covered freight cars.....	10
Partly covered freight cars.....	2
Cattle cars.....	3
Box cars.....	1
Flat cars.....	(omitted)
TOTAL.....	28

Speed of train about 30 kilometers per hour.

b. Accommodation for men, horses, and materials.—

<i>Single coaches, etc.</i>	<i>Accommodation for men and horses</i>			<i>Artillery accommodation</i>				<i>Commissariat accommodation</i>	
	<i>Officers</i>	<i>En-listed men</i>	<i>Horses</i>	<i>Heavy guns</i>	<i>Field and medium artillery with ammunition wagons</i>	<i>Mountain guns</i>	<i>In-fantry guns</i>	<i>Empty trucks</i>	<i>Trucks</i>
1st and 2d class passenger coach.....	30								
3d class and temporary passenger coach, or covered freight car.....		70							
Cattle car or covered freight car.....			12						
Box car and flat car.....				1	1	2	4	8	60 pack animals or 16 vehicles.

NOTES:

Medical equipment and engineering materials of a division are transported separately, about 49 coaches, etc., being required.

Each train can accommodate only 600 to 700 men of all arms, fully equipped.

FM-E 101-10

84 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

c. *Number of coaches, etc., required for transportation of division.*—According to preceding table the number of coaches, etc., required by a regular four-regiment division is as follows:

<i>Classification</i>	<i>Number</i>	<i>Type of coach, etc. required</i>	<i>Number of coaches, etc. required</i>
Officers.....	773 men.....	1st- and 2d-class coach.....	26
Enlisted men.....	24,427 men.....	3d-class or temporary passenger coach.....	349
Horses.....	8,150 head.....	Box cars or covered freight cars.....	680
Mountain guns.....	36 pieces.....	Flat cars.....	18
Infantry guns.....	56 pieces.....	do.....	14
Empty trucks.....	499 vehicles.....	Box cars and flat cars.....	63
Stores, etc., carried by transport units.....	499 vehicles.....	do.....	32
Medical and engineering stores.....	.....	Box cars.....	49
TOTAL.....	.....	.....	1, 231 cars.

The above table shows that 1,231 cars, etc., are required for transporting a division. If one train is composed of 30 cars, etc., then 41 trains are required, and, if composed of 28 cars, then 43 trains are required. Therefore, the average number of trains required is 42.

d. *Plan for rail movement.*—

<i>Troops</i>	<i>No. 1 Bn Ammunition Train</i>	<i>Regtl Cmdr Inf Arty Inf Regtl Sig Sec (??)</i>	<i>No. 2 Bn</i>	<i>No. 3 Bn</i>
Commander.....	Major KIMURA	Col. SAKUMA	Major SUGIURA	Major TAKANOBU.
Officers.....	28.....	36.....	33.....	38.....
Enlisted men.....	887*.....	714.....	827.....	876.....
Train commander.....	1,909.....	1,713.....	1,715.....	1,701.....
Station of departure.....	SHUKKEN (?).....	SHUKKEN (?).....	(??).....	.....
Time.....	1910/11.....	0200/11.....	0440*/11.....	0500*/11.....
	12.....	12.....	12.....	12.....
Arrive URAGUCHI.....	0630/11.....	1200/11.....	0650/11.....	1850*/11.....
	12.....	12.....	12.....	12.....
Passenger cars.....	.....	1.....	.....	.....
Substitute (or temporary?) passenger cars.....	17.....	13.....	17.....	(??).....
Horse cars.....	13.....	13.....	6.....	7.....
Baggage cars.....	7.....	9.....	8.....	(??).....
TOTAL.....	31.....	36.....	33.....	(??).....

*Practically illegible on original.

?? Illegible on original.

NOTE.—Totals as usual do not agree in most cases. It appears that all troop trains left at night—probably for security reasons.

e. Practical example of railway transportation of the Japanese army.—

SCHEME OF RAILWAY TRANSPORTATION OF THE 5TH DIVISION

[Mukden Army Nos. 850 and 851]

Units, men, and horses transported	Quantities transported			1st- and 2d-class passenger coach	3d-class passenger coach	Tempor- ary passenger coaches (covered freight cars)	Partly covered box cars	Cattle cars	Box cars	Flat cars	Rolling stock used
	Men		Horses								
	Officers (including warrant officer, class I.)	NCOs and EM									
Headquarters, 11th Infantry Regiment; 1 Battalion, 11th Infantry Regiment (less Infantry-Gun Platoon).	31	740	152	1	1	10	2	13	1	-----	28
1 Battalion of the 11th Infantry Regiment; 5th Division Headquarters-----	57	710	119	1	1	10	2	10	2	1	24
1 Battalion of the 11th Infantry Regiment; 1 Infantry-Gun Company, 11th Infantry Regiment; 1 Antitank-Gun Platoon, 11th Infantry Regiment-----	30	719	134	1	-----	12	1	12	3	-----	29
Headquarters, 11th Infantry Regiment; Infantry-Gun Platoon, 11th Infantry Regiment; 1 battalion of the 41st Infantry Regiment; Infantry-Gun Platoon of the 41st Infantry Regiment-----	31	747	115	1	-----	12	2	11	3	-----	24
1 Battalion of the 41st Infantry Regiment; Infantry-Gun Company of the 41st Infantry Regiment; Antitank-Gun Platoon of the 41st Infantry Regiment-----	30	779	134	1	-----	12	1	12	3	-----	29
Headquarters, 41st Infantry Regiment; 1 Battalion of the 41st Infantry Regiment (less Infantry-Gun Platoon)-----	31	740	152	1	1	10	2	13	1	1	29
Headquarters, 21st Infantry Regiment; 1 Battalion of the 21st Infantry Regiment (less Infantry-Gun Platoon)-----	31	740	152	1	1	10	2	13	1	-----	28
1 Battalion of the 21st Infantry Regiment; Antitank-Gun Platoon of the 21st Infantry Regiment-----	30	779	134	1	-----	12	-----	12	3	-----	28

84 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

Scheme of railway transportation of the 5th division—Continued

Units, men, and horses transported	Quantities transported			1st- and 2d-class passenger coach	3d-class passenger coach	Temporary passenger coaches (covered freight cars)	Partly covered box cars	Cattle cars	Box cars	Flat cars	Rolling stock used
	Men		Horses								
	Officers (including warrant officer, class I.)	NCOs and EM									
Headquarters, 21st Infantry Brigade; 1 Battalion of the 20th Infantry Regiment; Infantry-Gun Platoon of the 20th Infantry Regiment; Infantry-Gun Platoon of the 42d Infantry Regiment.....	30	719	107	1	-----	12	2	11	3	-----	29
Headquarters, 47th Infantry Regiment; 1 Battalion of the 47th Infantry Regiment (less 1 Company, and Infantry Platoon).....	24	666	149	1	1	9	2	13	2	-----	28
Headquarters, 36th Infantry Brigade; 1 Battalion of the 47th Infantry Regiment (less 1 Company); Vehicular Company the Medical Unit of the 5th Division.....	27	753	114	1	1	10	1	12	2	-----	29
1 Battalion of the 47th Infantry Regiment (less 8th Company); Infantry-Gun Company of the 47th Infantry Regiment; Antitank-Gun Platoon of the 47th Infantry Regiment; Infantry-Gun Platoon of the 47th Infantry Regiment.....	25	700	105	1	-----	11	1	12	4	-----	29
Headquarters, 23d Infantry Regiment; 1 Battalion of the 23d Infantry Regiment (less 1 Company), and Infantry-Gun Platoon.....	24	666	149	1	1	9	2	13	2	-----	28
1 Battalion of the 23d Infantry Regiment (less 2d Company); Medical Unit, 5th Division (less Vehicular Company).....	38	856	116	1	1	11	2	10	1	2	28
1 Battalion of the 23d Infantry Regiment (less 1 Company); 1st Field Hospital, 5th Division.....	74	681	110	1	1	10	2	12	3	-----	28
1 Company, 23d Infantry Regiment; Infantry-Gun Platoon; Antitank-Gun Platoon; Hospital, 5th Division.....	27	631	77	1	1	10	1	9	3	-----	25

JAPANESE FORCES

One-half of the 5th Company, 5th Transport Regiment; 1 Company, 23d Infantry Regiment. (Same as above)	8	429	198			1	5	2	17	3	28
Battalion Headquarters, 5th Medium Artillery Regiment; 1 Battery, 5th Medium Artillery Regiment.	7	421	198			1	5	2	17	3	28
Battalion Headquarters, 5th Medium Artillery Regiment; 1 Battery, 5th Medium Artillery Regiment.	14	293	221	1			3		19	7	30
1st and 2d Field AA Units of the 20th Division.	5	168	138			1	2		12	5	29
1 Battery, 5th Medium Artillery Regiment; 1 Infantry-Gun Company, 45th Infantry Regiment.	9	275	149			1	3		10	6	26
Headquarters, 42d Infantry Regiment; 1 Battalion, 42d Infantry Regiment (less Infantry-Gun Platoon).	31	740	152	1		1	10	2	13	1	28
1 Battalion, 42d Infantry Regiment; 1 Infantry-Gun Company, 42d Infantry Regiment; Antitank-Gun Platoon, 42d Infantry Regiment.	30	779	134	1			12	1	13	2	29
1 Battalion, 42d Infantry Regiment; 1st Company, 5th Engineer Regiment.	31	817	114	1		1	12	1	10	2	27
Headquarters, 11th Infantry Brigade; 1 Battalion, 13th Infantry Regiment.	28	729	87	1		1	11	1	8	1	23
Headquarters, 13th Infantry Regiment; 1 Infantry-Gun Company, 13th Infantry Regiment.	10	308	101	1			5	1	12	3	22
1 Battalion, 13th Infantry Regiment; Antitank-Gun Platoon, 13th Infantry Regiment; Battalion of the 13th Infantry Regiment.	25	710	82	1			11	1	7	2	22
Headquarters, 6th Division; 1 Battalion, 13th Infantry Regiment.	54	740	99	1		1	11	1	9	2	26
2d Squadron, 5th Cavalry Regiment; Divisional Signal Unit of 5th Division.	15	401	203	1			5	2	18	1	27
Headquarters, 5th Field Artillery Regiment; 1 Company, 47th Infantry Regiment.	28	380	164	1			6	1	15	5	28
Battalion Headquarters, 5th Field Artillery Regiment; 1 Battery, 5th Field Artillery Regiment; 1 Company, 47th Infantry Regiment.	19	366	152			1	5	1	14	6	26
Same as above.	19	366	152			1	5	1	14	6	26
Battalion Headquarters, 5th Field Artillery Regiment; 1 Battery, 5th Field Artillery Regiment; 1 Company, 23d Infantry Regiment.	19	366	152			1	5	1	14	6	26
2 Batteries, 5th Field Artillery Regiment.	10	30	202			1	3		18	8	30
1 Battalion, 3d Independent Mountain Artillery Regiment.	19	406	268	1			4		23	2	30

Scheme of railway transportation of the 5th Division—Continued

Units, men, and horses transported	Quantities transported			1st- and 2d-class passenger coach	5d-class passenger coach	Temporary passenger coaches (covered freight cars)	Partly covered box cars	Cattle cars	Box cars	Flat cars	Rolling stock used
	Men		Horses								
	Officers (including warrant officer, class I.)	NCOs and EM									
Headquarters, 1st Tank Battalion; 1 Company, 1st Tank Battalion.....	13	164	-----	1	-----	2	3	-----	2	19	27
1 Company, 1st Tank Battalion; 1st and 2d Field AA Units, 12th Division.....	10	294	-----	-----	1	4	4	-----	3	18	30
1 Company 1st Tank Battalion; 3d and 4th Field AA Units, 12th Division.....	10	294	-----	-----	1	4	4	-----	3	18	30
Half wagon line, 1st Tank Battalion; 1 Company, 45th Infantry Regiment; Infantry-Gun Platoon, 45th Infantry Regiment.....	21	511	12	-----	1	6	1	1	2	19	30
Half Wagon Line, 1st Tank Battalion; 1 Company, 45th Infantry Regiment.....	20	469	-----	-----	1	5	2	-----	-----	20	28
Headquarters, 45th Infantry Regiment; 1 Battalion, 45th Infantry Regiment (less 1 Company, and Infantry-Gun Platoon).....	24	666	149	1	-----	9	1	13	2	7	27

NOTES.—The units came from Korea. The movement of the whole division from Antung to Mukden lasted from Aug. 6 to Aug. 10, 1940. Destination was Tientsin.

■ 85. WATER TRANSPORT—*a Shipping capacity required for transportation of men, horses, and materials.—*

Classification	Tonnage required
1 man.....	3.
1 horse.....	9 (equals 3 men).
1 field gun.....	18 (equals 6 men).

b. Number of transports and tonnage required for transportation of a division.—
There is a difference between the organization of the Japanese four-regiment division and the three-regiment division. The following is the number of transports and tonnage required for transportation of a regular four-regiment division.

Classification	Quantity	Tonnage Required
Men.....	25, 200	75, 600 (each man counted at 3 tons).
Horses.....	8, 150	73, 350 (each horse counted at 9 tons).
Guns.....	92	1, 656 (each gun counted at 18 tons).

Grand total..... 150, 606

Number of 3,000-ton transports required..... $150,606 \div 3,000 = 51$.

Number of 5,000-ton transports required..... $150,606 \div 5,000 = 31$.

c. Mileage and time required from Japanese ports to Chinese main ports.—

Destination	Starting point							
	Yoko- hama	Nagoya	Osaka	Hiro- shima	Nagasaki	Maizuru	Taka- matsu	Kokura
Darien.....	1, 178 M 92 H	1, 075 M 83 H	848 M 65 H	733 M 56 H	377 M 45 H	940 M 72 H	792 M 61 H	614 M 57 H
Tang-ku.....	1, 398 M 108 H	1, 275 M 99 H	1, 048 M 81 H	933 M 72 H	777 M 60 H	1, 140 M 88 H	992 M 77 H	814 M 63 H
Tsingtao.....	1, 152 M 89 H	1, 029 M 80 H	802 M 62 H	687 M 53 H	321 M 41 H	893 M 63 H	746 M 58 H	568 M 44 H
Shanghai.....	1, 648 M 128 H	1, 025 M 79 H	798 M 61 H	683 M 53 H	464 M 36 H	889 M 69 H	742 M 68 H	564 M 44 H
Canton.....	1, 640 M 127 H	1, 630 M 126 H	1, 432 M 110 H	1, 300 M 100 H	1, 124 M 87 H	1, 560 M 120 H	1, 515 M 116 H	1, 240 M 95 H

NOTE: M = Nautical miles; H = hours.

FM-E 101-10

85 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

d. Sea transport plan for part of 5th division when leaving Japan.—

Name of ship and tonnage	Units	Men			Horses	
		Officers	Enlist- ed men	Total	Num- ber of horses	Total
ASO Maru (3,020 tons)	21st Infantry Brigade Headquar- ters.	4	63	26 O, 696 EM.	16	93
	21st Infantry Regiment Head- quarters.	7	183		77	
	1st, 2d, and 3d Companies.....	15	540		-----	
SOMEDONO Maru (5,154 tons).	1st Battalion of the 21st Regiment (less 2d and 3d Companies).	10	181	36 O, 903 EM	83	204
	2d Battalion of the 21st Regiment (less 5th Company).	20	431		83	
	Divisional Signal Unit.....	6	241		38	
	3d Battalion of the 21st Infantry Regiment.	25	631		-----	
SINGAPORE Maru (5,852 tons).	5th Company of the 21st Infantry Regiment.	5	150	47 O, 1,324 EM	-----	245
	Infantry-gun Company of the 21st Infantry Regiment.	4	100		39	
	Antitank-gun platoon of the 21st Infantry Regiment.	-----	88		12	
	Cavalry Squadron.....	7	154		159	
	Engineering Company.....	6	201		35	
	42d Infantry Regiment Headquar- ters.	7	183		-----	
HAKODATE Maru (5,312 tons).	1st Battalion of the 42d Regiment. 9th and 10th Company of the 42d Infantry Regiment.	25	631	42 O, 1,114 EM	-----	160
	2d Battalion of the 42d Infantry Regiment.	10	300		-----	
	3d Battalion of the 42d Regiment (less 9th and 10th Companies).	23	631		-----	
DAITO Maru (5,425 tons).	Antitank-gun Platoon of the 42d Regiment.	15	331	45 O, 1,110 EM	-----	217
	Infantry-gun Platoon of the 42d Regiment.	1	48		-----	
	Infantry-gun Platoon of the 42d Infantry Regiment.	4	100		-----	
Point of embarkation.....				Hiroshima		
Date of embarkation.....				Aug. 2		
Destination.....				Fusan (Korea)		
Date of disembarkation.....				Aug. 4		

JAPANESE FORCES

e. Translation of embarkation plan of 214th Infantry Regiment (33d Division), etc.—

Ship No.	Name	Speed	Tons	Units	CO	Officers	Enlisted men	Total	Horses	Baggage (No. of packages)	Loading date	Jetty	Interpreter's comments
842	TEIYO Maru	11.2	6,869	Div Hq. Div Sig Sec. MG Bn Cndr Mtn Arty 7.21.	Maj. KIMURA	21 8 4 7 6 7 45	50,148 78,130 357.73 210,149	1,358	162	130,380 8,650.50 300,170 70,230	13th and after.	URAGUCHI.	Figures do not tally with total and it is not clear to which units the various figures for officers and enlisted men refer. Presumably 7 Troop Mtn Arty. Meaning of "2.1" not clear.
176	HIBURI Maru	10.0	4,364	Hq 2d Bn. No. 5 Co. No. 6 Co. $\frac{1}{2}$ No. 2 Bns MG. One Sec Regt Arty Tr.	Maj. SUGIURA	6 5 4 4 1	77 124 143 100 60	524	82	340 240 300 70 70 Regt Arty 2 236 MG 4		URAGUCHI.	These figures do tally — in this case personnel probably refer to the units given opposite.
448	CALCUTTA Maru	10.0	5,388	Regt Hq; No. 3 Co; No. 4 Co; Main portion No. 3 Bn's MGs; Main portion Regt Arty; Remainder of Sig Sec Mtd Plat.	Col. SAKUMA			913					I have not come across "mounted platoon" (joba shota) before. Other details not given in original.

e. Translation of embarkation plan of 214th Infantry Regiment (33d Division), etc.—Continued.

Ship No.	Name	Speed	Tons	Units	CO	Officers	Enlisted men	Total	Horses	Baggage (No. of packages)	Loading date	Jetty	Interpreter's comments
272	GENZAN Maru	9.0	5,708	No. 7 Co.; No. 8 Co; ½ No. 2 Bn's MGs; No. 9 Co; Am Tn, 2/3 No. 7 Trs, Mtn Arty; Hq 33 Engr Regt; No. 2 Co Engr Regt.	Lt. Col. YAGI, 33 Engrs.			832					Other details not given in original. 2-3 No. 7 Troop Mtn Arty suggests that 33 Mtn Arty Regt is also organized on the basis of 3 guns per troop instead of 4.
214	PANAMA Maru	10.0	5,287	Hq No. 3 Bn; No. 10 Co; No. 11 Co; No. 12 Co; ½ No. 3 Bn's MGs; 1/3 No. 8 Tr, 33d Mtn Arty.	Maj. T A K A. NOBU.			731					Other details not given in original. ½ No. 8 Tr—see note above.

CHAPTER 3

SUPPLY

SECTION I. Organization and responsibility	Paragraphs
II. Supply data	86-87
	88-89

SECTION I

ORGANIZATION AND RESPONSIBILITY

■ 86. SUPPLY METHODS.—*a.* Procurement and supply of base depots is the responsibility of the Minister of War for all classes of supply.

b. Base depots are the rear terminals of the line(s) of communication (LC), and are set up to receive, store, and forward all classes of supplies.

c. LC organizations are responsible for receiving, billeting, rationing, and forwarding replacements, men, and matériel, as well as supplies; for evacuation of casualties, prisoners of war, excess supplies, salvage, and captured equipment; for requisition of local supplies; for organization and operation of wagon trains from local equipment; and for local defense of LC installations.

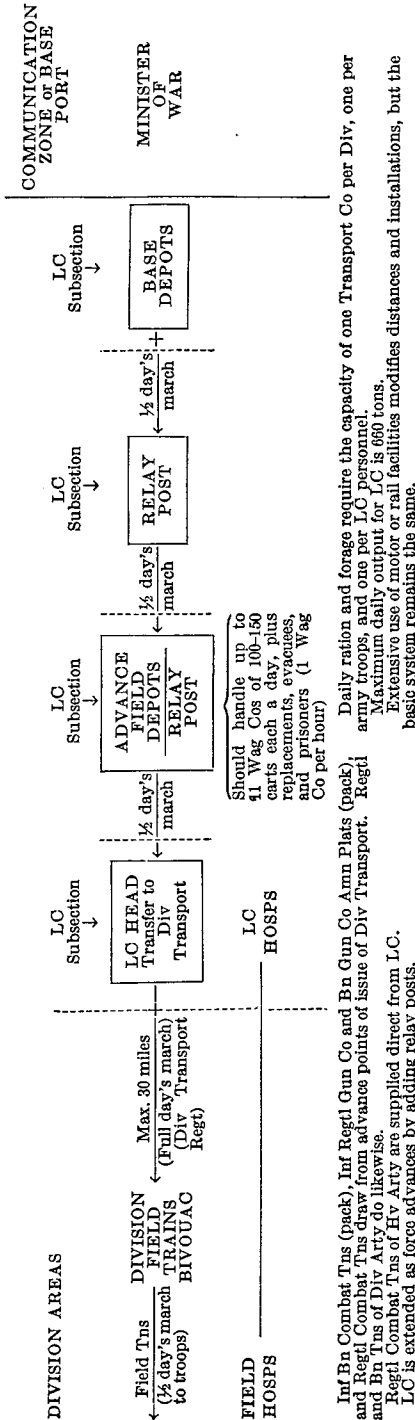
(1) Troops and local levies are at their disposal for carrying out these functions. These include headquarters, signal detachments, LC Wagon Companies (60 tons capacity each, 250 men per company, attached on basis of four per division and 4 per army troops), Trk Cos (about one-fourth the number of Wag Cos), transportation supervision detachment (one per local company organized), LC hospital (one per division), reserve troops (LC defense), reserve engineers (road work and construction), light railway detachment (62 miles of track for base depot area), and Labor Troops (handling supplies and construction).

(2) LC handles supply forward to the LC head where it is transferred to the division transport regiments. These carry to the unit field trains.

(3) Lines of communication are set up along a main supply line (road, rail, or water). They have length without distribution in depth. They are generally set up on the basis of *one per division*. There is a great dependence upon commandeered equipment for supplemental transport.

d. There is very little supply movement except ammunition and rations. The Japanese soldier is taught to live off the country as much as possible in order to cut down on supply transportation. This is possible because of the nature of the terrain in which a great deal of his fighting is done. The individual soldier carries 1 day's ration and 5 days' supply of rice. The individual soldier's pack weighs about 60 to 65 pounds, including rations and ammunition. Principal method of supply transportation is a cart with about 400 to 800 pounds capacity. Change to motor transport is being made where and when possible.

87. LINE OF COMMUNICATION.—



SECTION II

SUPPLY DATA

■ 88. AMMUNITION SUPPLY.—The following table is an approximation of the amount of ammunition that is carried within the division:

<i>Weapon</i>	<i>Unit of fire (rd. per gun)</i>	<i>Regiment (rd. per gun)</i>	<i>Div trans- port (rd. per gun)</i>	<i>Div total (rd. per gun)</i>
75-mm Gun.....	300	303	277	580
105-mm How.....		178	160	338
75-mm Mtn Gun.....		156	60	216
70-mm Inf Cannon.....		160	80	240
37-mm Gun.....				
Grenades.....				
HvMG.....		9,600	5,875	15,475
LMG.....				2,970
Rifle.....		180	150	330

■ 89. RATION SUPPLY.—Three days of ration and forage supply are carried within the division: 1 day on the unit field train, and 2 days within the division transport.

ITALIAN FORCES

PART THREE—ITALIAN FORCES

CHAPTER 1

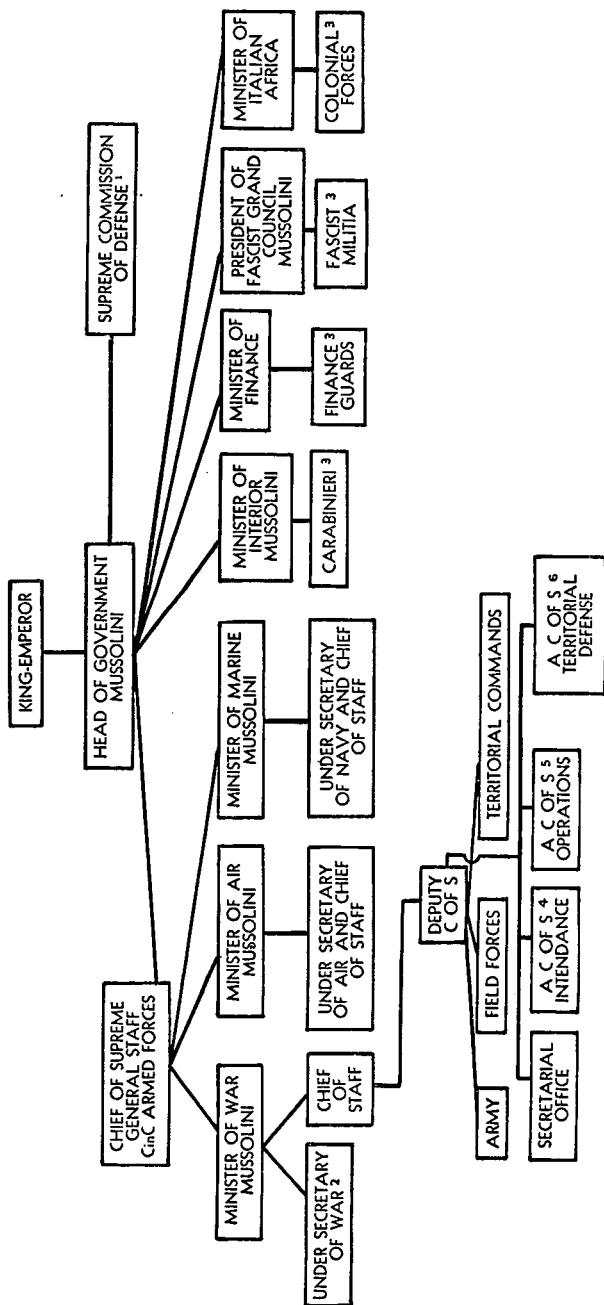
ORGANIZATION

	Paragraphs
SECTION I. Political.....	90
II. Field forces, army and corps.....	91-92
III. Division organizations.....	93-101
IV. Miscellaneous combat units and engineers.....	102-107
V. Air Force.....	108
VI. Black Shirt militia units.....	109-111
VII. Characteristics of matériel.....	112-116



SECTION I
POLITICAL

90. GOVERNMENTAL ORGANIZATION.—



¹ Comprises high government officials and ranking officers of Army, Navy, and Air Force. Responsible for coordination of effort, decisions of policy, national organization and mobilization, development and utilization of resources, and State activities concerned with defense. Mussolini is chairman.

² Office of the Under Secretary of War includes all administrative functions, plus access to advisory council of arms and services.

³ Subject to duty with Army, Navy, or Air Force in time of emergency.

⁴ Handles organization, mobilization, transportation, and services.

⁵ Handles territorial and colonial operations, training, military history, and intelligence.

⁶ Handles defense sectors, AA militia, and coast defense militia.

SECTION II

FIELD FORCES, ARMY AND CORPS

■ 91. ARMY.—*a. Army group.*—Composed of from one army with two attached corps to five armies.

b. Army.—Composed of two or more army corps.

c. Corps.—Organization of army corps is elastic. Composed of two or more divisions, three being normal number. Each type corps has a normal allotment of corps troops, and additional may be assigned as needed. See paragraph 92 for composition of these types of corps.

d. Divisions.—(1) Following is a list of types of Italian division (see charts for composition):

Binary Infantry Division.

Motor-Transportable Infantry Division (Metropolitan type).

Motor-Transportable Infantry Division (Libyan type).

Motorized Infantry Division.

Binary Infantry Division (Mountain type).

Alpine Division.

Fast-Moving ("Celere") Division.

Armored ("Corazzata") Division.

(2) Infantry Division Staff consists of—

Commanding General and Aides.

Chief of Staff.

General Staff:

Operations and Services.

Information.

Personnel and Administration.

Artillery Officer.

Engineer Officer.

Medical Officer.

Commissary Officer.

Veterinary Officer.

(3) Infantry Division Headquarters consists of—

	Officers	Enlisted men
Hq and General Staff	27	
Hq Troops:		
Hq Co	1	71
Topo Sec	1	6
Mtr Prk	1	27
MPs—3 Secs	3	195
Post Officer	1	3
TOTAL	34	302

92. ITALIAN CORPS TROOPS (Table of organization).—

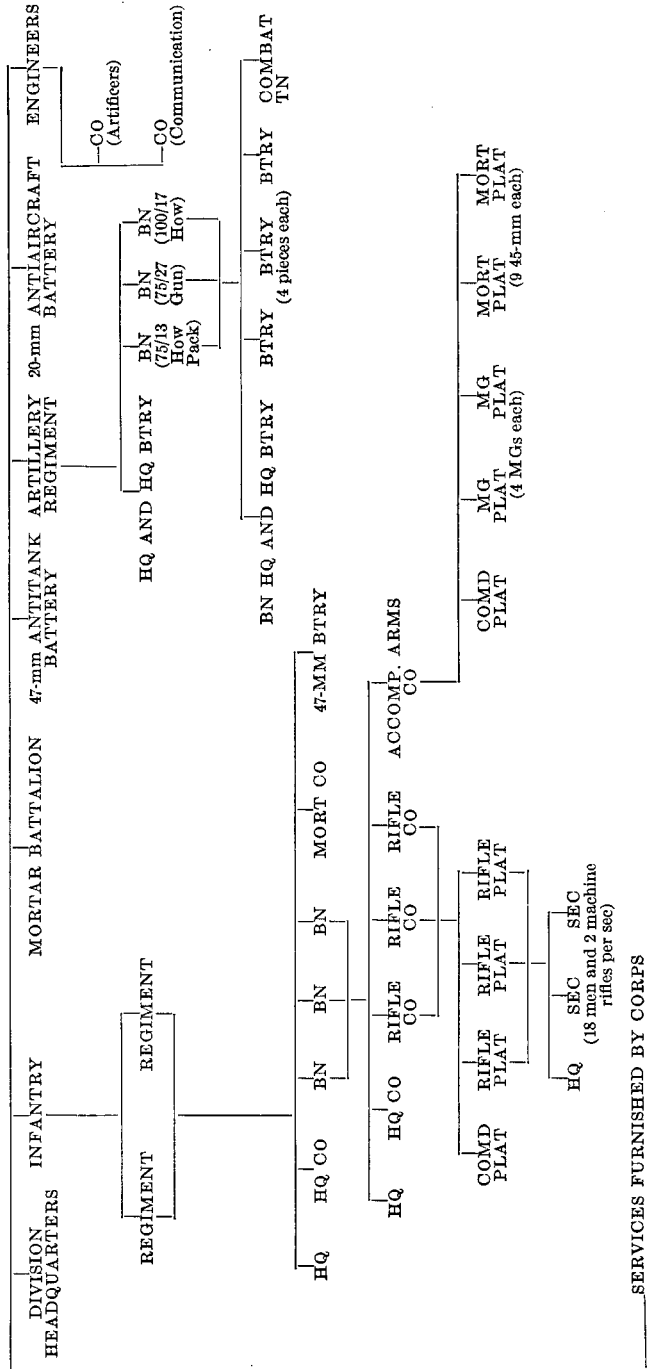
Type of Corps	Troops																							Remarks			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	25	26	27
Normal	Binary Inf Div	Motor-Transportable (Metropolitan)	Motor-Transportable (Lithuan)	Mtz Inf Div	Binary Inf Div (mountain type)	Alpine Div	Fast-moving Div ("Celer")	Armored Div ("Corazzata")	Bn of Tks (med)	Mtz MG Regt	Arty Regt	Supplementary Corps Arty	Bn AA Arty	Cml Bn	Bn Engrs (artillery)	Ty-Tp Co	Rad Co	Various services	Cav Regt	Regt Bersaglieri	Combat Bn Fascist Militia	Army Arty Bns	Mixed Engr Bn (Artificer & Communications)	Mixed Co	Mtr Gp (Mtr Pk)		
Motor-mechanized																											
Motor-transportable																											
Fast-moving																											
Motor-transportable																											

1 This is an additional assignment of artillery over the Corps Arty Regt.

NOTE.—Troops listed in columns 10 to 26, inclusive, represent corps troops. Numbers indicate assignments to type corps.

SECTION III

93. BINARY INFANTRY DIVISION.—a. Organization.—



b. Table of organization.—

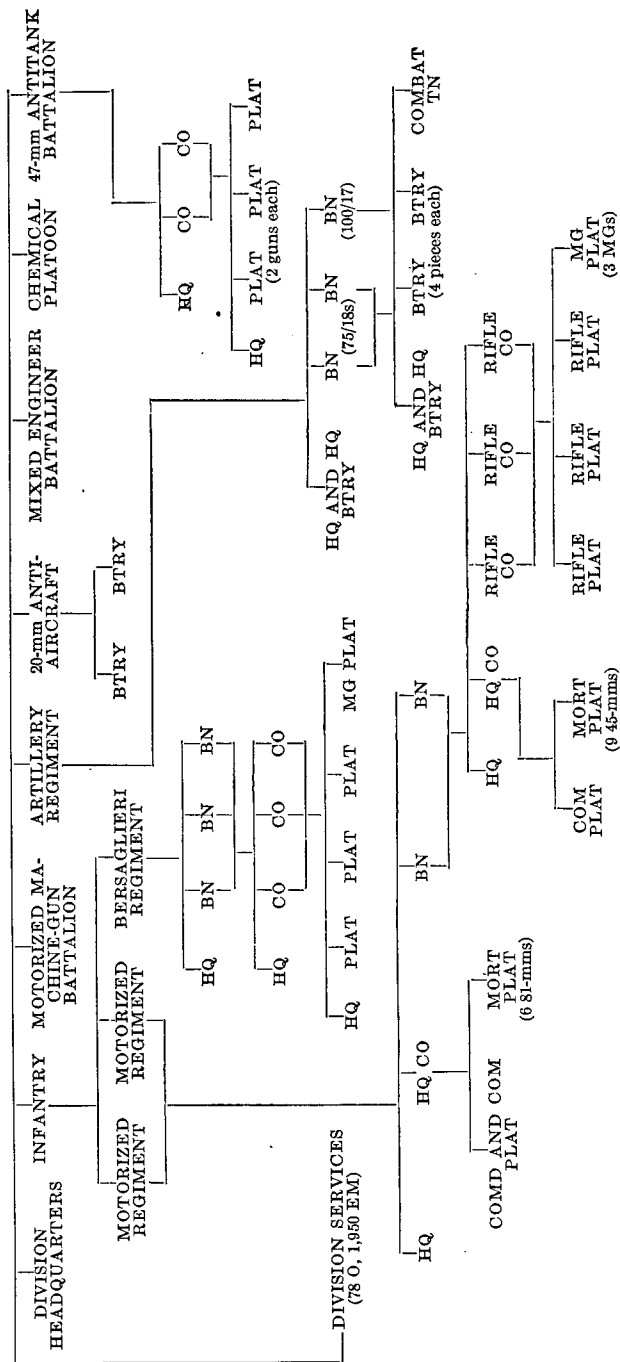
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Remarks
Unit	Officers	Enlisted men	Machine rifles	MGs	45-mm mortars	81-mm mortars	80-mm AA guns	47-mm guns	75/13-mm hows	75/27-mm guns	100/17-mm hows	Animals	Bcls	Mtrcl	Autos	Auto canteens	Cargo trks	Tractors	Special trks	
Div Hq.....	34 (117)	302 (3,161)	(108)	(24)	(54)	(6)		(8)				23 (381)	90 (19)	10 (10)	5		10 (20)			
Inf Regt.....	234	6,324	216	48	108	12		16				763	38	20	8	66	40			
Inf-2 Regts.....	21	601			27							12	4	2	1	10	13			
Mort Bn.....	6	235						16				76	1		1	4	5			
47-mm AT Btry.....																				
Arty Regt:																				
Hq and Hq Btry.....	(11)	(126)											(10)	(4)	(9)	(2)	(6)			Also 24 caissons.
Bn 100/17-mm Hows.....	(21)	(525)							(12)				(20)	(13)	(2)	(11)	(34)	(27)	(1)	Do.
Bn 75/27-mm Guns.....	(21)	(525)		(6)					(12)				(20)	(13)	(2)	(11)	(34)	(27)	(1)	
Bn 75/13-mm Hows (Pack).....	(22)	(829)		(6)								(389)	(24)	(3)			(17)			
Arty Regt.....	75	2,005		18					(12)											
20-mm AA Btry.....	5	117					8		12	12	12	389	71	33	13	24	91	54	2	
Engr Co—Artificer.....	5	210											2	7	1	2	18			
Engr Co—Communication.....	6	268											4	1	1		7			
Med Co.....	7	133											4	2	1	1	9		1	
													2	1	1		16			
Div totals.....	395	10,194	216	66	135	24	8	32	12	12	12	1,263	216	76	32	107	209	54	3	

■ 94. MOTOR-TRANSPORTABLE INFANTRY DIVISION, METROPOLITAN TYPE.—This has the same organization as Binary Infantry Division except that there are fewer animals and no mortar battalion. Basic transportation (except for personnel) has been added. Personnel transportation is furnished by the corps or army motor pool. The infantry regiment in this type division has the same organization and armament as that in the Binary Division. The strength varies by only a few less men. Strength: Officers, 117; enlisted men, 3,078. Artillery and other division units are motorized.

ITALIAN FORCES

95. **MOTOR-TRANSPORTABLE INFANTRY DIVISION, LIBYAN TYPE.**—This differs from the Metropolitan type in having a few more men, no animals, fewer 45-mm mortars, and more machine guns. It has all basic transport except that for personnel and matériel, which comes from corps motor pool. Infantry regiment of this type division has same basic organization. Strength: Officers, 111; enlisted men, 2,760. There are 36 machine guns and 27 45-mm mortars included in its armament. Artillery and other division units are motorized.

96. **MOTORIZED INFANTRY DIVISION (METROPOLITAN).—a. Organization.**—



b. Table of organization.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Remarks
Unit	Officers	Enlisted men	Machine rifles	MGs	45-mm mortars	81-mm mortars	80-mm AA guns	47-mm guns	75/18-mm hows	100/17 mm hows	Bcls	Mtrcls	Autos	Auto carelles	Cargo trks	Special trks	Tractors	
Div Hq.....	38 (70)	320 (1, 770)		(18)	(18)	(6)					84 (8)	31 (27)	9 (4)		8	1		
Mtz Inf Regt.....	140	3, 540	108	36	36	12					16	54	8	118				
Inf-2 Mtz Regts.....	53	1, 556	54	24								871	3		41	2		
Bersaglieri Regt.....	14	300		18							3		1	13				
Mtz MG Bn.....																		
Arty Regt:																		
Hq & Hq Btry.....	(13)	(130)									(7)	(9)	(5)	(6)	(12)	(1)		Also 8 caissons. Do.
Bn 75/18-mm Hows.....	(17)	(380)		(4)					(8)		(12)	(9)	(3)	(35)	(22)	(1)	(18)	
Bn 75/18-mm Hows.....	(17)	(380)		(4)					(8)		(12)	(9)	(3)	(35)	(22)	(1)	(18)	
Bn 100/17-mm How.....	(17)	(380)		(4)						(8)	(12)	(10)	(3)	(12)	(34)	(1)	(20)	
Total Arty Regt.....	64	1, 270		12					16	8	43	37	14	88	90	4	56	
2 Btrys 20-mm AA Guns.....	8	190					12				4	12	2		34			
Mixed Engr Bn.....	17	510									4	17	2		21	11		
Omnl Plat.....	1	90									1			1		3		
47-mm AT Bn.....	15	270						12			1				48			
Div Services.....	78	1, 950		29								38	15	661	102	53		
DIV TOTALS.....	428	10, 086	162	119	36	12	12	12	16	8	155	1, 066	54	881	345	74	56	

ITALIAN FORCES

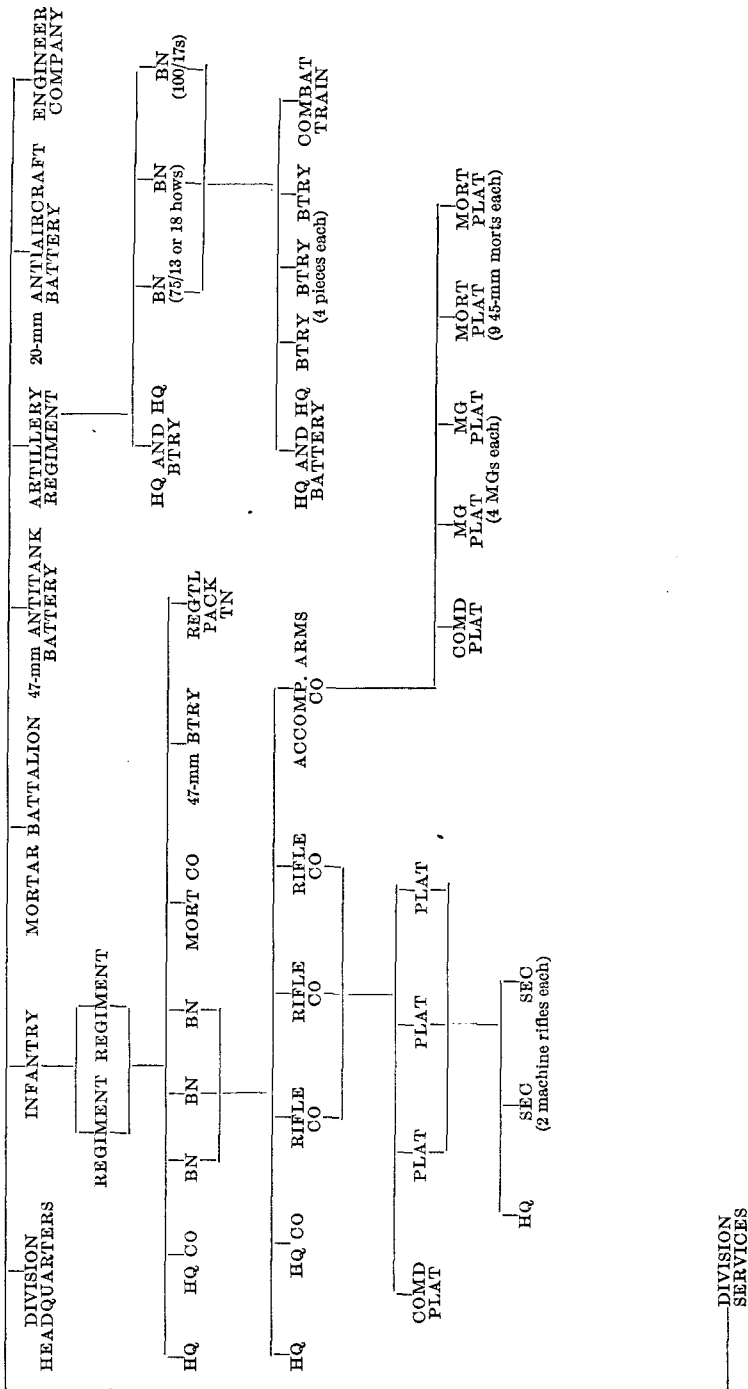
■ 97. MOTORIZED INFANTRY DIVISION, NORTH AFRICA.—a. Organization.—

DIVISION HEADQUARTERS		MOTORCYCLE COMPANY	INFANTRY	DIVISION SUPPORT AND ANTITANK BATTALION		LIGHT TANK BATTALION	ARTILLERY REGIMENT	MIXED ENGINEER BATTALION					
		MOTORIZED REGIMENT	MOTORIZED REGIMENT										
b. Table of organization.—													
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Unit	Officers	Enlisted men	80-mm guns	87-mm or 47-mm guns	75-mm gun	100/17-mm guns	LMGs	HeMGs	AT rifles	81-mm mortars	L Tks	Mtr vehicles	Mtrcls
Div Hq.....	287						8					18	50
Mtrcl Co.....	163						10	5	4			5	119
Inf Hq.....	47											5	8
2 Mtr Inf Regts.....	3,502		16	32			162	50	60	18		282	94
Div Support and AT Bn.....	323		8	8						9		38	11
L Tk Bn.....	236										46	65	11
Arty Regt.....	1,602		24		24	12		18				219	31
Mixed Engr Bn.....	382											17	13
TOTALS.....	6,542		48	40	24	12	180	73	64	27	46	649	337

b. Table of organization.—

998. BINARY INFANTRY DIVISION, MOUNTAIN TYPE.—*a. Organization.*—

98 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

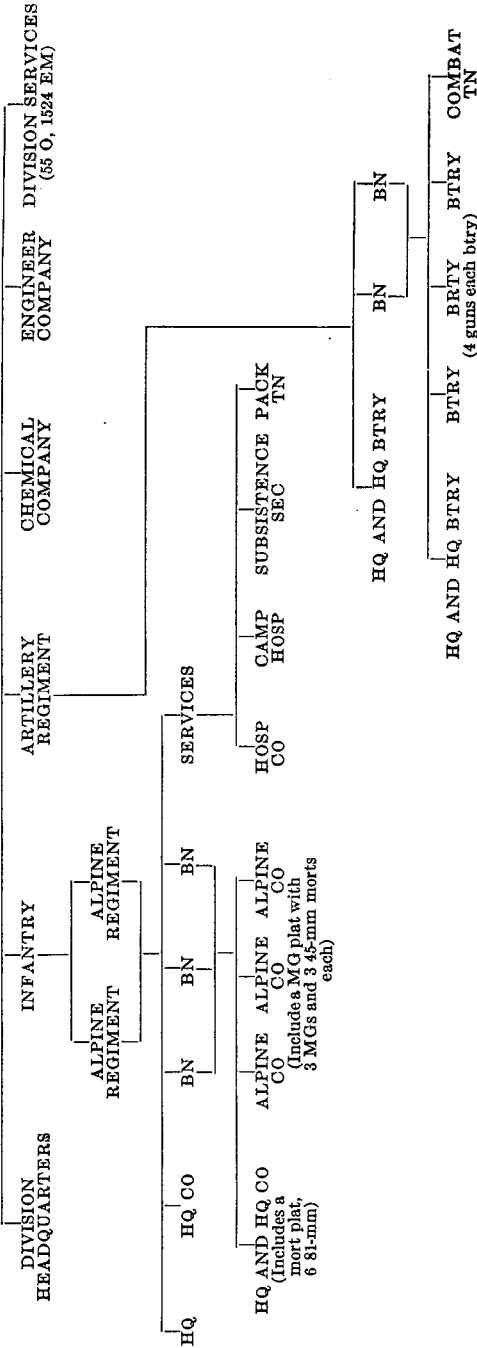


ITALIAN FORCES

b. Table of organization.—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Unit	Officers	Enlisted men	Machine rifles	MGs	45-mm mortars	81-mm mortars	80-mm AA guns	47-mm guns	76/13- or 18-mm hows	100/17 mm hows	Animals	Bcls	Mtrcls	Wags	Autos	Auto currelles	Cargo ltrks	Remarks
Div Hq.....	34 (120)	302 (3,367)									23 (493)	90 (20)	10 (10)		5 (4)		10 (30)	
Inf Regt.....											986	40	20	4	8	66	40	
Total Inf—2 Regts.....	240	6,734	216	48	108	12		16			137	4	3		1	21		
Mort Bn.....	21	615			27	12					152	1			1	4	5	
47-mm AT Btry.....	6	311																
Arty Regt.....																		
Hq and Hq Btry.....	(12)	(125)									(60)	(10)	(4)	(11)	(1)		(4)	
Bn 100/17-mm Hows.....	(25)	(1,160)							(12)		(705)	(21)		(179)				
Bn 76/13- or 18-mm Hows.....	(28)	(1,100)							(12)		(609)	(21)		(41)				
Total Arty Regt.....	93	3,455		18					24	12	1,983	73	4	272	1		4	
20-mm AA Btry.....	5	272					8				119	6		4				
Engr Co.....	6	350									97	7				17		
Div Services.....	17	618									377	4	1	5	1	2	16	
DIV TOTALS.....	422	12,687	216	66	135	24	8	32	24	12	3,874	225	38	285	17	110	75	

■ 99. ALPINE DIVISION.—a. Organization.—



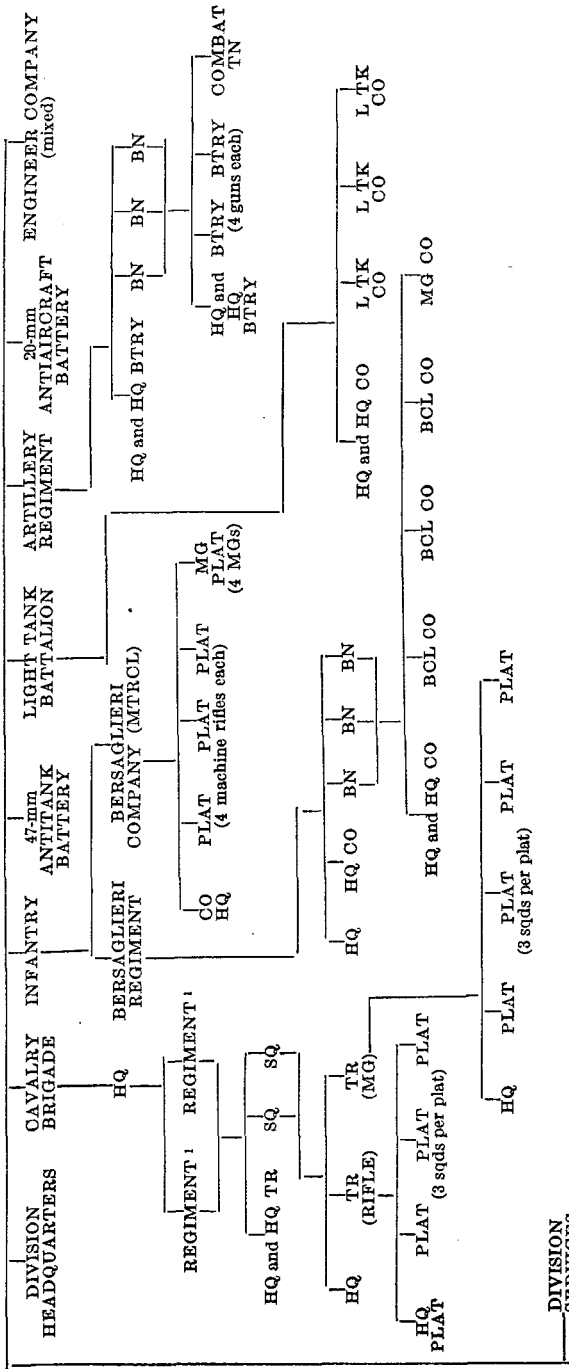
ITALIAN FORCES

b. Table of organization.—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Unit	Offi- cers	Enlisted men	Mu- chine rifles	MGs	45-mm morts	81-mm morts	75/15- or 18- mm hows	Flame throw- ers	Ani- mals	Ecls	Mtrcls	Waps	Autos	Auto- car- ettes	Cargo trks	Special trks	Remarks
Div Hq.....	33	235							56		10		2		2		
Inf:																	
Alpine Regt.....	(128)	(4,650)	(81)	(27)	(27)	(18)		(28)	(1,424)	(13)	(5)	(61)	(1)	(17)			
Total Inf—2 Regts.....	256	9,300	162	54	54	36		56	2,848	26	10	122	2	34			
Arty Regt:																	
Hq and Hq Btry.....	(11)	(130)							(46)	(1)		(5)	(1)				
Bn 75/13 or 18-mm Hows.....	(34)	(1,350)		(6)			(12)		(741)	(3)		(43)					
Alpine Arty Regt.....	79	2,830		12			24		1,528	7		91	1				
Cml Co.....	4	230							16	6						2	
Engr Co.....	6	350							97		7			17			
Div Services.....	55	1,524		2					739	14	12	14	3	24	128	5	
DIV TOTALS.....	433	14,469	162	68	54	36	24	56	5,284	53	39	227	8	95	130	7	

Pack battalion.

100. "CELERE" DIVISION.—a. Organization.—



¹ Regiment usually has two Sqs of two Trs each. Both Trs may be rifle, or one rifle and one MG, or two rifle and one MG Tr.

ITALIAN FORCES

b. Table of organization.—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Unit	Officers	Enlisted men	Machine rifles	MGs	90-mm A.A. guns	47-mm guns	75/18-mm hows	L Tks	Animals	Ecls	Mtrcls	Autos	Auto car-ettes	Cargo trks	Tracs	Special trks	Remarks
Div Hq.....	27	190							27	58	12	8		16			
Cav Brig.:																	
Brig. Hq.....	(7)	(75)							(64)	(3)	(8)	(2)		(3)			
Regt. Hq & Hq Tr.....	(12)	(110)							(80)	(10)	(12)			(15)			
Rifle Tr.....	(4)	(140)	(9)						(138)	(3)							
MG Tr.....	(5)	(120)		(12)					(156)	(3)							
Total Sq.....	(10)	(250)	(18)						(287)	(9)							
Total Cav Brig.....	(37)	(310)	(36)	(12)					(810)	(31)	(12)			(15)			
Bersaglieri Regt.—Bel.....	81	1,605	74	24					1,684	65	32	2		33			
Bersaglieri Co.—Mtrcl.....	96	2,540	81	27						2,216	178	4		37			
47-mm AT Btry.....	6	170	15	5		8					160			4			
L Tke Bn.....	21	270	16	122				61		3				28		10	
Arty Regt.:										34		1		4			
Hq & Hq Btry.....	(13)	(125)								(9)	(9)	(5)	(6)	(12)		(1)	Also 8 caissons.
Bn 75/18-mm Hows.....	(17)	(390)		(4)			(8)			(11)	(11)	(3)	(42)	(21)	(20)	(1)	Total 24 caissons.
Total Arty Regt.....	64	1,295		12			24			42	42	14	132	75	60	4	
20-mm AA Btry.....	5	110								2	7	1		9			
Mixed Engr Co.....	6	340	2						16	13	17	5		38		9	
Div Services.....	21	473		2						3	20	3		211		6	
TOTAL DIV.....	333	7,253	188	192	8	8	24	61	1,727	2,436	468	38	132	455	60	29	

ITALIAN FORCES

b. Table of organization.—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Unit	Officers	Enlisted men	Machine rifles	Mgs	80-mm AA guns	47-mm guns	76 guns	76/87-mm guns	Flamethrowers	L Tks ¹	M Tks	Bcls	Mtrcls	Autos	Autocorrelles	Cargo trks	Tractors	Special trks	Remarks
Div Hq.....	15	163											75	6	2	14		1	
Bersaglieri Regt—Mtrcl.....	53	1,556	54	24									871	3	41	22		2	
47-mm AT Btry.....	6	130				6							3						
Tk Regt.....	84	1,040		480	46		44		16	186	44		53	6		45		64	Machine guns and tank guns are tank armement.
Arty Regt:																			
Hq & Hq Btry.....	(13)	(125)										(9)	(9)	(5)	(6)	(12)		(1)	
Bn 75/27-mm Guns—T.D.....	(21)	(520)		(6)				(12)				(20)	(13)	(4)	(9)	(31)	(27)	(1)	
Total Arty Regt.....	55	1,165		12				24				49	35	13	24	74	54	3	
2 Btrys 20-mm AA Guns.....	8	190			12							4	12	2		34			Also 24 caissons.
Mixed Engr Co.....	3	155											11	1		4		14	Also 48 caissons.
Div Services.....	12	223										2	17	1		27			
DIV TOTALS.....	236	4,622	54	496	58	6	44	24	16	186	44	55	1,077	32	67	220	54	84	

¹ Replaced by Italian M13 or French Renault and Somua tanks.

SECTION IV
MISCELLANEOUS COMBAT UNITS AND ENGINEERS

■ 102. ARMY ARTILLERY REGIMENT.—

<i>Unit</i>	<i>Officers</i>	<i>Enlisted men</i>	<i>Machine guns</i>	<i>149/35-mm guns</i>	<i>152/37-mm guns</i>	<i>152/13-mm hows</i>	<i>210/8-mm hows</i>	<i>152/45-mm guns</i>	<i>200/9-mm hows</i>	<i>305-mm hows</i>	<i>Bats</i>	<i>Mtrcls</i>	<i>Automobiles</i>	<i>Cargo trks</i>	<i>Tractors</i>	<i>Special trks</i>
Hq & Hq Btry.....	19	105	6	12	12						12	3	3	9		3
Bn 149/35-mm Guns ¹	21	550	6								26	2	4	23		48
Bn 152/37-mm Guns ¹	21	585	6		12						26	2	4	23		48
Bn 152/13-mm Hows ¹	21	520	6			12					26	2	4	23		36
Bn 210/8-mm Hows ¹	19	545	6				12				25	1	4	16		4
Bn 152/45-mm Guns ¹	23	445	6					12			25	1	4	16		4
Bn 260/9-mm Hows ¹	23	520	6						12		25	1	4	16		4
Bn 305-mm Hows ²	23	415	6							6	25	1	4	16		4
Regt Trac Prk.....	11	240									2	2	3	2		5
3 Trac Gps.....	42	768									42	3	12	21	270	18
TOTAL REGT.....	223	4703	42	12	12	12	12	12	12	6	234	18	46	165	270	174

NOTE.—Each battalion has 3 firing batteries. This is a normal regiment; however, a regiment may have a varying number of battalions.

¹ This battalion has three 4-gun firing batteries. ² This battalion has three 2-gun firing batteries.

ITALIAN FORCES

■ 103. ARMY ANTI-AIRCRAFT REGIMENT (Table of organization).—

[Regiment may have varying number of battalions. Regiment is normally assigned to army artillery. Battalions detached and assigned to corps artillery.]

1	2	3	4	5	6	7	8	9	10
Unit	Officers	Enlisted men	MGs	75-mm AA guns	Bcls	Mtrcls	Autos	Cargo trks	Special trks
Hq & Hq Btry.....	7	65	---	---	7	3	3	5	2 (1 rad and com, 1 machine shop).
1st Bn: Hq and Hq Btry.....	3	55	---	---	4	6	2	5	2 (S-L trks).
Sound Locator Sec.....	---	29	---	---	---	---	---	---	9 (2 mtr caissons and 1 fire-control trk, each btry).
3 Btrys, 75/27-mm C. K.....	12	390	6	12	24	3	3	21	15 (am trks and 1 machine shop).
Combat Tn.....	3	85	---	---	2	1	---	5	26
Total Bn.....	18	559	6	12	30	10	5	31	2 (S-L trks).
2d Bn: Hq and Hq Btry.....	3	55	---	---	4	6	2	5	33 (2 mtr caissons, 4 tracs, 1 fire control, 4 am trks and trs, each btry).
Sound Locator Sec.....	---	29	---	---	---	---	---	---	18 (includes 12 am, 1 machine shop).
3 Btrys, 75/46-mm Mod. 34.....	12	405	6	12	24	3	3	21	53
Combat Tn.....	3	90	---	---	2	1	---	5	81
Total Bn.....	18	579	6	12	30	10	5	31	---
TOTAL REGT.....	43	1,203	12	24	67	23	13	67	---

■ 104. CORPS ARTILLERY REGIMENT (Table of organization).—

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Unit	Officers	Enlisted men	MGs	105/28-mm guns	149/19-mm hows	Bcls	Mtrcls	Autos	L passenger	Cargo trks	Tractors	Special trks	Remarks
Regt Hq and Hq Btry...	13	130	---	---	---	12	3	3	2	8	---	3	Each battalion has three 4-gun firing batteries.
3 Bns 105/28-mm Guns...	63	1,590	18	36	---	78	18	12	15	63	81	54	
3Bns 149/13-mm Hows...	63	1,710	18	---	36	78	18	12	15	63	81	90	
TOTAL REGT...	139	3,430	36	36	36	168	39	27	32	134	162	147	

NOTE.—Each battalion has a headquarters, headquarters battery, 3 firing batteries and a combat train. Each firing battery has 4 pieces.

FM-E 101-10

105-107 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

■ 105. PARACHUTE TROOPS.—Upon last information, these existed as small, experimental units. German instructors have taken over their training, and it is assumed that organizational data will conform to that of the Germans.

a. A parachute battalion consists of 29 officers and 297 men, organized into 3 companies, each with 62 machine carbines, 54 light machine guns, and a mining platoon for demolition work.

b. Personnel carry pistols, daggers, and hand grenades. There is also a communication section equipped with radio transmitters and air-to-ground receiving sets, and a medical section.

■ 106. GENERAL ENGINEER UNITS.¹—

1 Unit	2 O	3 EM	4 Remarks:
Composite Co, Inf Div.....	6	350	Hq and 5 Secs. Combines Engr and Com functions.
Composite Co, Armd Brig.....	3	155	Hq and 4 Secs. Same functions as above.
Composite Co, Mtz Div.....	7	345	Hq and 4 Secs. Same functions as above.
Composite Bn, Mtz Div.....	17	505	Hq, 2 Cos and 1 Sec. Same as above.
Mtz Bn (Autocarreggiata).....	16	465	Hq and 2 Cos.
Mtz and Wagon-Transported Bn.....	18	485	Hq and 2 Cos.
Mtz and Pack Bn.....	18	545	Hq and 2 Cos.
Wagon-transported Bn.....	16	525	Hq and 2 Cos.
Wagon-transported and Pack Bn.....	18	585	Hq and 2 Cos.
Pack Bn.....	18	725	Hq and 2 Cos.

¹ These are classed as general engr units and combine the ordinary functions of such with their communications functions.

■ 107. SPECIAL-FUNCTION ENGINEER UNITS.—

1 Unit	2 O	3 EM	4 Remarks
Bridge Co.....	2	133	4 Secs. L bridges.
Bridge Co.....	1	50	2 Secs. No. 1 metal bridge.
Ponton Bn—L Bridges.....	22	770	Hq and 2 Cos. 16 ponton trks and 8 trestle trks.
Ponton Bn—L Bridges with Bridge Hauling Unit.....	21	695	Hq and 3 Cos.
Ponton Bn—Hv Bridges.....	18	800	Hq and 2 Cos.
Ponton Bn—Metal Bridges.....	25	556	Hq and 2 Cos.
Aerial Ropeway Bn.....	15	474	Hq and 2 Cos. Aerial ropeway type A-1 on heavy trk.
Balloonist's Sec.....	6	100	1 anchored balloon.
Cam Co.....	7	265	8 Secs.
Electrical Mechanic's Co.....	7	285	Hq and 4 Secs; Co Prk, 5 Secs.
Fire Fighting Co.....	6	285	Hq and 4 Secs.
Mining Bn.....	16	505	Hq and 2 Cos.
Photo Co.....	7	65	1 Sec 2 Sqds.
Slt Operators.....	6	168	3 Secs. 50-cm, 75-cm, and 90-cm SIts.
Water Sup Co.....	7	255	Hq and 5 Secs.

129

■ 108. ROYAL AIR FORCE.—

```

graph TD
    FLEET --> DIVISION1[DIVISION]
    FLEET --> DIVISION2[DIVISION]
    DIVISION1 --> BRIGADE1[BRIGADE]
    DIVISION1 --> BRIGADE2[BRIGADE]
    DIVISION2 --> BRIGADE3[BRIGADE]
    DIVISION2 --> BRIGADE4[BRIGADE]
    BRIGADE1 --> WING1[WING]
    BRIGADE1 --> WING2[WING]
    BRIGADE2 --> WING3[WING]
    BRIGADE2 --> WING4[WING]
    BRIGADE3 --> GROUP1[GROUP]
    BRIGADE3 --> GROUP2[GROUP]
    BRIGADE4 --> GROUP3[GROUP]
    BRIGADE4 --> GROUP4[GROUP]
    GROUP1 --> SQUADRON1[SQUADRON]
    GROUP1 --> SQUADRON2[SQUADRON]
    GROUP2 --> SQUADRON3[SQUADRON]
    GROUP2 --> SQUADRON4[SQUADRON]
    GROUP3 --> SQUADRON5[SQUADRON]
    GROUP3 --> SQUADRON6[SQUADRON]
    GROUP4 --> SQUADRON7[SQUADRON]
    GROUP4 --> SQUADRON8[SQUADRON]
  
```

(Has two or more homogeneous Fighter or Bomber Air Divs)

(Two or more Air Brigades)

(Two or more Wings)

(Two or more Groups)

(Two or more Squadrons)

(Bomber Squadron consists of six initial and three reserve aircraft.
All others consist of nine initial and three reserve aircraft.)

SECTION VI

BLACK SHIRT MILITIA UNITS

- 109. COMBAT LEGION, CC. NN.—Consists of a headquarters and 2 battalions organized in the same manner as regular units.
Strength: Officers, 63; enlisted men 1,630. *Armament:* 72 machine rifles; 14 machine guns; 18 45-mm mortars.
- 110. CC. NN. BATTALION, MOTOR-TRANSPORTABLE.—Consists of headquarters and headquarters company and three rifle companies. *Strength:* Officers, 25; enlisted men, 682. *Armament:* 4 machine guns; 36 machine rifles.
- 111. CC. NN. BATTALION, BICYCLIST.—Same organization as above unit. Armament other than 27 machine rifles is unknown.
Strength: Officers, 21; enlisted men, 593; bicycles, 570.

NOTE: These Fascist militia units have been incorporated into the regular army divisions, excepting the motorized divisions .

SECTION VII

CHARACTERISTICS OF MATÉRIEL

■ 112. INFANTRY WEAPONS.—

1 Weapon and caliber	2 Weight in firing position	3 Method of operation	4 Type of feed	5 Maximum rate of fire (rds. per min.)	6 Practical rate of fire—loaded (rds. per min.)	7 Weight per round (lb.)	8 Maximum range (yd.)	9 Maximum effective range (yd.)	10 Effective radius of burst—fragmentation (yd.)	11 Remarks
Rifle, 6.5-mm M91 Mannlicher-Carcano.	8.6 lb.			12						
Machine rifle, 6.5-mm Revelli.	9 lb.			120	40					
Pistol, 9-mm Glisenti:										
M1910.	1.927 lb.			14						
M34.	1.615 lb.			14						
Pistol, Beretta, 9-mm M34.				14						
Machine Pistol, 9-mm Beretta.										
Machine Pistol, 9-mm Brixia.										

Grenade:	7.4 oz.								Principally blast effect.
Ø T. O. M35 ¹	7 oz.								do.
Breda, M35 ²	7 oz.								do.
SRCM ³	0.81 lb.								
Bayonet ⁴	24.75 lb.			460				1,650	
Machine Gun: 6.5-mm L. Breda, M30									
6.5-mm Fiat M14	88.185 lb.			480				2,186	
8-mm Heavy Fiat, M14/35	88.625 lb.			600				5,687	4,372 indirect
Mortar:									
45-mm Brixia, M1935	34 lb.			25-30			1	586	
Modified Stokes, 81-mm	1,100 lb.								
Inf Cannon, 65/17-mm	660 lb.						11.4	7,000	
A.T. gun, 47/32-mm	677 lb.			12-14			3.3	7,000	
AA Gun, 20-mm, Breda M35				220		120	A.P. 308 H.E. 297	2,730	
Machine gun, 8-mm Breda M37	84.23 lb.			450				6,343	

¹ Length, 3.4 inches; diameter, 2.1 inches.² Length, 3.8 inches; diameter, 2.1 inches.³ Length, 3.1 inches; diameter, 2.5 inches.⁴ Blade 11.81 inches long.

FM-E 101-10

113 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

1 <i>Weapon—type and caliber</i>	2 <i>Weight of piece, firing position, with normal load exclusive of personnel (lb. approx.)</i>	3 <i>Piece transport</i>	4 <i>Weight of prime mover with normal load (lb. approx.)</i>	5 6		7 <i>Time to emplace or change from firing to traveling</i>	8 <i>Traverse</i>	9		10 <i>Maximum effective range (yd.)</i>	11 <i>Approximate weight of ammunition</i>	12 <i>Unit of fire (rds. per piece)</i>	13		14 <i>Employment</i>	15 <i>Remarks</i>
				<i>Normal over-all width with trailing position (inches)</i>	<i>Prime mover</i>			<i>Short bursts</i>	<i>Prolonged</i>				<i>Roads</i>	<i>Cross country</i>		
65/17-mm Gun.....	1, 100						8			7, 000	11.4				Mtn Div.....	Inf. accompanying gun.
75/13-mm Mtn How.....	1, 200	Pack					7			6, 750	14.3				Mtn Div.....	
75/18-mm Mtn How.....										10, 300	14.3				Div.....	
75/18-mm Gun How 1934.....	1, 760									10, 200	13.9				Div.....	
75/18-mm Gun How 1935.....	2, 200									10, 200	13.9				Div.....	
75/27-mm Field Gun, Mod. 06, 11, 12.....	2, 000									11, 000	14				Div.....	
75/34-mm Field Gun.....	2, 500									13, 500	14				Div.....	
100/17-mm How 1914.....	2, 700									8, 400	28				Div.....	
100/17-mm Mtn How 1916-1934.....	1, 200						5			8, 400	30				Mtn Div.....	
105/28-mm Gun.....	5, 000						14			12, 500	35				Corps.....	
105/32-mm Gun.....	9, 000									17, 400					Corps.....	
105/40-mm Gun.....	9, 000						60			18, 500	35				Corps.....	
149/13-mm How SK-1914.....	5, 500						8			9, 000	90				Corps.....	
149/19-mm How.....	11, 200						60			16, 000	90				Corps.....	
149/35-mm Gun.....	16, 000									17, 400	92				Army.....	
149/40-mm Gun.....	22, 600						60			24, 000	112				Army.....	
152/13-mm How.....	7, 200						8			10, 300	100				Army.....	
152/36.6-mm Gun.....	25, 400						6			21, 800	123				Army.....	
152/45-mm Gun.....	33, 000						10			21, 300	103				Army.....	
210/22-mm How.....	31, 600						75			17, 500	225				Army.....	
210/8-mm How.....	15, 400						360			8, 700	220				Army.....	
260/9-mm How.....							12			9, 800					Army.....	
305/10-mm How.....	57, 600						360			13, 000	842				Army.....	
305/17-mm How 1917.....	67, 500						360			19, 200	772				Army.....	

ITALIAN FORCES

114

■ 114. ARMORED VEHICLES.—

Type of vehicle	2	3	4	5	6	7	8	9	10	11	12			13	14
											Dimensions (in.)				
	Weight (tons gross)	Armament	Main armor (in.)	Crew	Maximum speed on roads (mph)	Spanning capacity (ft.)	Slope climb (degrees)	Safe fording depth (in.)	Vertical obstacle (in.)	Radius of action (mi.)	H	L	W	Belly clear. (in.)	Communication
Light C. V. 3 (33-35), or L 3-35.....	3-3½	2 8-mm MGs or 1 LMG and flame thrower.	.31	2	26	4'9"	45	26	24	55-60	51	126	55	9	Flag or Rad/Tg. Flame thrower, 110 yd.
Light Fiat Ansaldo, 3000 B (late model).....	5	1 37-mm; 1 LMG....	.629	2-3	20	5'	45	---	20	90	78	138	67	23	
Light Fiat Ansaldo, 3000 B.....	5	1 37-mm and 1 LMG; or 2 LMGs.	.709	2-3	13	5'	45	35	20	60	91	166	66	18	Obsolete.
Light L 5 21/30.....	5.8	2 8-mm or 1 37-mm.	---	2	13	4'11"	41	35½	24	(5 hrs.)	87	147	66	13	Flag or W/T. Obsolete.
Light L 6-40.....	6.4	1 20-mm; 1 8-mm....	.984	2	22	4'3"	40	35	35	---	77	149	78	13	Rad/Tp.
Light Carro d'assalto.....	6-8	1 20-mm and 1 8-mm; or 2 8-mm.	1.02	3	20	5'10"	45	30	---	124	75	154	72	13	Rad/Tg and Rad/Tp.
Light Renault, R 35.....	11	1 37-mm; 1 LMG....	1.57	2	12½	5'3"	40	31	33	90-95	97	158	72	14	Rad/Tg or flag.
Light M 11-39.....	11	1 37/40-mm; 2 8-mm.	1.12	3	20	6'7"	40	39½	31½	125	84	185	84	14	Being replaced by M 13/40.
Light M 13 (form M 11).....	13	1 37-mm; 2 LMGs....	1.18	3	20-22	6'6"	45	36	32	112	83	193	86	16	Rad/Tg Omd C.
Light M 13-40.....	13	1 47/32-mm; 4 8-mm.	1.18	4	19	6'11"	45	39½	30½	123	93	193	87	14	Rad/Tg.
Light Carro di Rottura.....	14.75	1 47-mm; 2 8-mm....	1.18	4	25	6'	40	30	23	186	87	176	84	16	Rad/Tp.
Medium Somua, S 35.....	18	1 47-mm; 1 LMG....	1.57	---	29	7'10"	40	39	35	140	106	210	80	16	Rad/Tg and flag.
Medium Pesante, "P 25".....	22-25	1 47/32-mm; 3 LMGs.	---	6	20	9'10"	---	47	42	---	108	300	102	---	

1 <i>Classes of aviation</i>	2 <i>Motors</i>	3 <i>Bomb load (lb.)</i>	4 <i>Crew</i>	5 <i>Ceiling</i>	6 <i>Tactical operating range (miles)</i>	7 <i>Maximum speed per hour (miles)</i>	8 <i>Climb (time to/feet)</i>	9 <i>Armor</i>	10 <i>Armament</i>	11 <i>Remarks</i>
FIGHTERS										
A. U. T. 18 (Umbra).....	1	---	1	---	---	304	---	---	2 MGs.	---
Caproni Vizzola S. A. F. 5.....	1	---	1	31,160	373-620	---	6.3/19,680	---	1 cannon; 4 MGs	---
Fiat CR 32.....	1	2112	1	26,240	525 at 211 mph.	242	11/19,680	---	2 MGs.	---
Fiat CR 42.....	1	2112	1	31,300	480 at 150 mph.	279	7/19,680	---	2 MGs.	---
Fiat G 50.....	1	2112	1	35,480	435 at 261 mph.	299	5.2/16,400	---	4 MGs.	---
Macchi C 200.....	1	2112	1	32,470	435 at 280 mph.	313	6.5/19,680	---	2 MGs.	---
Meridionali RO 51.....	1	---	1	---	---	317	7/19,680	---	2 MGs.	---
Reggiane RE 2000 "Falco I".....	1	---	1	31,000	620 at 299 mph.	329	6.3/19,680	---	2 MGs.	---
Macchi MC 202.....	1	---	1	34,000	---	(Est.) 350	---	---	2 MGs.	---
BOMBERS										
Savoia-Marchetti SM 85.....	2	---	1	---	---	317	---	---	---	Dive bomber.
Breda 88.....	2	2,200	2	32,140	1120 at 280 mph.	352	11/16,400	---	2 cannon; 1 MG.	---
Caproni CA 311.....	2	---	3-4	27,300	---	270	---	---	3 MGs.	---
Cant Z 1007 Bis.....	3	2,200	5	26,200	1372	280	1550 per min.	---	4 MGs.	---
Caproni CA 135 Bis.....	2	1,760	5	22,960	1240	273	---	---	3 MGs.	---
Fiat BR 20.....	2	2,200	4	23,520	1863	268	22.5/19,680	---	3 MGs.	---
Fiat CR 25.....	2	14-77	3	32,140	1180	286	12/19,680	---	3 MGs.	---
Piaggio P 32 MK II.....	2	3,520	3	26,240	1240	294	15/13,120	---	4 MGs.	---
Savoia Marchetti S. M. 79.....	3	2,200	4	27,880	1240	295	19.8/16,400	---	4 MGs.	Bomber-reconnaissance. Reconnaissance-bomber seaplane.
Cant Z 506B.....	3	---	6	24,500	1210	298	---	---	4 MGs.	---
Caproni CA 312 Bis.....	2	---	3	19,680	560	248	13/13,120	---	3 MGs.	Reconnaissance-bomber seaplane.

ITALIAN FORCES

■ 116. ANTIAIRCRAFT ARTILLERY.—

1 Caliber & Type	2 Muzzle velocity (ft/s)	3 Max. hor. range (yds.)	4 Max. eff. ceiling (ft.)	5 Weight of projectile	6 Rate of fire	7 Weight in action (tons)	8 Eleva- tion to— (degrees)	9 Traverse (degrees)	10 Remarks
75/27-mm, C. K.	1,675	6,600	13,150	14.5	15	4.64	70	360	Krupp gun mounted on lorry.
75/46-mm, Ansaldo Mod. 34	2,350	17,000	27,200	14.3	20	3.24	90	360	
75/50-mm, Ansaldo 1933	3,200	17,000	27,500-34,000	14.3	15-20	5	90	360	Tractor-drawn.
20/65-mm, Breda M35	2,750	6,000	8,200	.297	220	(lb.) 677	30	(wheels) 30 (tripod) 360	Motor transport drawn or 4 pack loads.
20/70-mm, Scotti	2,720	5,900	7,000	.275	120	(lb.) 501	85	360	Carried in vehicle
37/54-mm, Breda 39	2,620	7,700	13,500	1.76	70	---	90	360	Mobile platform mounting.
76/40-mm, old Model 1917	2,264	9,000	15,750	14.5	15	---	80	360	Stationary pedestal.
76/45-mm	2,463	10,900	21,000	14.3	---	---	---	360	
77/28-mm	1,700	7,700	13,100	13.2	---	2.47	73	360	
90/53-mm	---	15,300	32,810	---	20	6.8	---	---	Mobile mount, tractor-drawn.
102/45-mm	2,477	14,425	31,000	29	10-12	---	70	360	
102/47-mm	2,950	16,500	32,800	33	8	---	80	360	

CHAPTER 2

MOVEMENT

SECTION I. Facilities.....	Paragraphs 117-123
II. Troop movements.....	124-126

SECTION I

FACILITIES

■ 117. GENERAL.—*a. Transportation problems.*—The maintenance of Italian railroads in recent years has become very lax, due to the following factors:

(1) Production has been directed almost entirely toward military equipment.
 (2) The terrific strain imposed on the railroads in moving troops and their equipment.

(3) The necessity of handling practically all imports by rail, due to the Allied Nations' blockade.

(4) The heavy demands made by Germany on Italian exports necessitates the movement by rail of the largest part of these commodities.

(5) The sale of Italian rolling stock causes the remaining trains to be loaded to maximum capacity with a consequent lowering in operating efficiency.

b. Road transport.—The large quantity of cement in Italy makes road building relatively simple. However, the scarcity of trucks for internal transportation purposes, and the shortage of gasoline to operate them, nullifies the roads in relieving the transportation difficulties. Because of this shortage there has been a marked trend toward the use of oil engines and engines using a fuel with an alcohol base called Robur—a mixture of gasoline and ethylic and methyl alcohol.

■ 118. ANIMALS: TYPE AND ASSIGNMENT.—

Pack Animals:

Mules—Horse pack battalion; Arty and Inf Regts.

Sardinian horses—Normal type, Inf Regt; Mtn type, Alpine Regt; Inf Regt, Autotransportable; Inf Regt, Autotransportable, Libyan type; Combat Legion CC. NN. (Black Shirt militia); Cav Regt.

Riding Animals:

Saddle horses—Inf Regt, normal type; Inf Regt, Mtn type; Alpine Regt; Inf Regt, Autotransportable; Inf Regt, Autotransportable, Libyan type; Combat Legion CC. NN. (Black Shirt militia); Cav Regts.

■ 119. MOTOR TRANSPORT.—

Types available	Number	Unit to which ordinarily assigned	Max. loads		Operating radius (miles)	Basic use
			Personnel	Supply (tons)		
Automobiles.....	All parts of army.....	.....	.....	.....	.....
Autocarrette.....	Inf, Alp, and Mtr Divs.....	.....	.....	.....	.....
Lighter trucks.....	Inf, Alp, Mtr, and Celere Divs.....	.....	.....	.....	.....
Heavy trucks.....	All parts of Army.....	.....	.....	.....	.....
Tractors.....	Celere Divs and Arty Regts.....	.....	.....	.....	.....
Motorcycles.....	All parts of army.....	.....	.....	.....	.....
Trucks—office.....	Autocentri and Tk Regts.....	.....	.....	.....	.....
Auto Ambulances.....	Autocentri.....	.....	.....	.....	.....
Auto Busses.....	Autocentri.....	.....	.....	.....	.....
Trailers.....	Autocentri and Tk Regts.....	.....	.....	.....	.....
Fiat Autocarro—18 BL.....	20-25	3.4	125	.....
Fiat Autocarro—18 BLR.....	20-25	3.93	125	.....
Fiat Autocassone—18 BL.....	125	.....
Fiat Furconcino—50 BM.....25	180	.....
Fiat Autocarro—621.....	20-25	2.4	100	.....
Fiat Autocarro—618 CM.....	12-15	1.24	187	.....
Fiat Autocarro—Dovunque 33.....	20-25	1.98	176	.....
Fiat Autocarro—Dovunque 35.....	20-25	1.98	208	.....
Fiat Autocarro—633 NM.....	24-30	4.94	235	.....
Fiat Trattore—Pesante Campale 26.....99	125	.....
Fiat Trattore—Pesante Campale 30-30 A.....99	125	.....
Fiat Trattore—Leggero 31.....49	100	.....
Fiat Trattore—Leggero 37.....	6	.99	137	.....
Fiat C. C. I. Trattore—708 CM.....	44	.....
Breda Trattice—PES 32.....	3.4	93	.....
Breda Trattice—PES 33.....	1.99	93	.....
Ceirano Autocarro—50 CM.....	20-25	4.9	140	.....
Ceirano Autocarro—50 CMA.....	140	.....
Ceirano Autobagro—47 CM.....	2.96	224	.....
Ceirano Autocarro—47 CM.....	20-25	2.96	130	.....
Isotta Fraschini Autocarro—D70NM.....	2.96	200	.....
Isotta Fraschini Autocarro—D80NM.....	24-30	4.9	160	.....
Bianchi Mediolanum—1936.....	20-25	2.96	135	.....
Bianchi—68 A.....	20-25	2.96	192	.....
O. M. Autocarretta—32-35.....79	100	.....
O. M. Autocarretta—36 P.....	10	.....	100	.....

FM-E 101-10

119-121 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

■ 119. MOTOR TRANSPORT—Continued.

1	2	3	4	5	6	7
Types available	Number	Unit to which ordinarily assigned	Max. loads		Operating radius (miles)	Basic use
			Personnel	Supply (tons)		
O. M. Autocarretta—36 M. T.				.89	100	
O. M. Autocarro—40 M. P.			12-15	1.18	250	
O. M. Autocarro—1 CRD.			20-25	2.96	190	
O. M. Autocarro—3 BOD.			24-30	4.90	190	
SPA Autocarro—25 C 10 RE.			16-20	1.70	180	
SPA Ambulanza—25 C 10 RE.					180	
SPA Frigorifero—25 C 10 RE.				1.30	180	
Autobus & Carro (SPA) Alpine 25 C 10 RE.			17-19		180	
SPA Autocarro—38 R.			20-25	2.40	176	
SPA Autocarro—36.			20-25	2.40	176	
Daimler Trattice da—100 hp.				4.90	75	
Daimler Trattice da—80 hp				3.90	75	
Lancia Autocarro — RO. NM.			24-30	4.90	180	
Lancia Autocarro — RO. BM.			24-30	4.90	150	

■ 120. AIR TRANSPORT.—

1 <i>Type of plane</i>	2 <i>Number available</i>	3 <i>Maximum personnel</i>	4 <i>Loads supply (lb.)</i>	5 <i>Operating radius (mi.)</i>	6 <i>Basic use</i>
S-73	24				Transport and bomber.
S-74	12				Do.
S-81	12	18	¹ 4,400	372	Do.
S-82	120	25	¹ 6,600	992	Do.

¹ Bomb load.

- 121. RAIL TRANSPORT.—*a. Motive power.*—With the exception of the Po Valley line, all the main Italian lines now use electric traction. The Brenner line is double-tracked and electrified, but its electrification is of the tri-phase variety. Tri-phase electrification is a particularly vulnerable type. It is in use over most of the lines in Italy. Due to the strategic vulnerability of this type, the lines that have been electrified since 1933 have been supplied with direct current. This makes two kinds of electric current in use. Both the direct current and the tri-phase use overhead wires, and both use about the same voltage (3,000). Whereas the Italian industry uses 50 cycles a-c, the railroads use 16.6 cycles.

b. General railroad facilities.—In June 1939 there were in Italy 23,252 kilometers of railway. Of these, 16,981 kilometers were operated by the State, and 6,271 kilometers by private enterprise under State supervision. Of the State network, 4,856 kilometers were electrified.

(1) Reports of electrification of all Italian railroads, June 30, 1939, show:

Electrified	6,736 km.
Non-electrified	16,516 km (1 km=0.62137 mile).

(2) According to the latest information, Italian railroads operated by the State, December 31, 1938, comprised 16,354 kilometers of standard-gage track and 596 kilometers of narrow-gage track. Private railroads had 2,701 kilometers of standard and 3,570 kilometers of narrow-gage.

(3) The density of the Italian railroad net is 6.5 kilometers to the 100 square kilometers, as compared with the French density of 11.6 to the 100 square kilometers.

c. Railroads of Sicily (January 1, 1936).—

	Standard	Narrow
Real length.....	1,295 km.....	800 km.
Maximum grade.....	0.25 percent..	0.40 percent.
Speed permitted roadbed.....	60-100 km....	30 km.
Practical speed of passenger trains.....	35-57 km.....	20 km.

d. Rolling stock (standard and narrow) (June 30, 1939).—

Locomotives and rail motorcars:

Steam.....	4, 283
Electric.....	1, 482
Others.....	665
Passenger and mail cars.....	8, 007
Baggage and freight cars.....	132, 734

■ 122. WATER TRANSPORT.—

Total tonnage available as of March 1, 1942—1,890,000 tons (est.).

Tanker tonnage available as of October 1, 1941—414,870 tons—61 ships.

■ 123. ROADS AND BRIDGES.—*a. Road types.—*

General types	Capacities in vehicles per hour	Load capacities	Construction time per mile
State roads—surface-treated and water-bound macadam.	Width: 27 feet plains, 16 feet mountains.	-----	-----
Provincial roads—surface-treated and water-bound macadam, bituminous conglomerate.	Width: 21 feet plains, 15 feet mountains.	-----	-----
Communal roads—waterbound macadam, bituminous conglomerate, unimproved earth and nonsurfaced.	Width: 18 feet plains, 6-9 feet mountains.	-----	-----
Autostrada—concrete.	-----	-----	-----
Private roads—water-bound macadam, unimproved earth and nonsurfaced.	-----	-----	-----

b. Available road nets.—(1) Autostradas (superhighways):

Turin—Milan—Bergamo—Brescia.

Milan—Sesto C. (Lake Maggiore): (1) Branch to Varese, (2) Branch to Varese—Como road.

Padua—Mestre (Venice).

Genoa—Serravalle.

Pisa—Lucca—Pistoia—Florence.

FM-E 101-10

123 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

Rome—Lido di Roma.

Naples—Pompeii.

(2) Main roads with right-of-way:

Turin—Vercelli—Novara—Milan—Brescia—Verona—Vicenza—Padua—Mestre (Venice).

Turin—Asti—Alessandria—Piacenza—Cremona—Mantua—Monselice—Padua.

Milan—Piacenza—Parma—Reggio Emilia—Modena—Bologna—Forlì—Rimini.

Padua—Rovigo—Ferrara—Ravenna—Pesaro—Ancona—Pescara—Foggia—Bari—Brindisi—Lecce—Maglie

Grimaldi—Impera—Savona—Genoa—La Spezia—Pisa—Leghorn—Grosseto—Civitavecchia—Rome—Naples.

Fano—Foligno—Terni—Rome.

(3) Good roads:

Fiume—Trieste—Mestre (Venice).

Bologna—Florence.

Florence—Leghorn.

Brennero—Bolzano—Trento—Verona.

Consenza—Catanzaro—Reggio Calabria.

Palermo—Messina.

Catania—Messina.

Sardinia: Cagliari—Sassari.

C. Bridges.—Statistics only on military bridges constructed by the engineers.

<i>Types of construction</i>	<i>Capacity</i>	<i>Construction time</i>
Girder Bridge No. 1.....	} 20 tons on 2 axles.....	3 to 5 minutes per linear meter. 20 minutes by 5 men.
Girder Bridge No. 2.....		
Cantilever Steel Truss.....	210 tons on 2 axles.....	
Girder Bridge No. 3—Lattice Girder.....	210 tons on 2 axles.....	
Footbridge No. 1—Floating Footbridge.....	67 lb./I. F.....	
Footbridge No. 2—Floating Footbridge.....	1 ton on 1 axle; 1.5 tons on 2 axles.	
Mountain Footbridge—Lattice Girder, deck type.	202 lb./I. F.....	
Ponton Bridge No. 0.....	3 tons on pontons; 5 tons on trestles.	
Ponton Bridge No. 1.....	11 tons on 2 axles.....	
Ponton Bridge No. 2.....	12-18 tons.....	
Ponton Bridge No. 3.....	672 lb./I. F.....	
Raft "K".....	6 tons.....	
Cableway No. 1—3-cable shuttle.....	606 lb.....	
Cableway No. 2—3-cable, semicontinuous.....	441 lb.....	
Cableway No. 3—3-cable, semicontinuous.....	551 lb.....	

ITALIAN FORCES

SECTION II
TROOP MOVEMENTS

■ 124. MARCH TABLES.—a. Infantry.—

Unit	Time required for passing						
	1	2	3	4	5	6	7
	Carriage roads						
	Speed: 4 km in 50 min.						
Unit	Mountain track, mule track						
	Speed: 250 meters of grade in 50 min.						
	Formations						
	Men in column of three, animals in single file	Men in column of two, animals in single file	10 percent grade	15 percent grade	20 percent grade	25 percent grade	30 percent grade
Company of Body of Battalion	1m, 30s	1m, 42s	4m, 36s	7m, 35s	11m, 12s	15m, 30s	21m.
Rifle Company	2m.	2m, 30s	6m, 35s	11m, 7s	16m.	22m.	29m, 25s.
Company of Accompanying Weapons	4m, 3s	4m, 43s	11m.	18m.	26m, 24s	36m, 30s	48m, 36s.
Battalion of Infantry ¹	12m.	14m, 23s	43m, 34s	1h, 11m, 6s	1h, 40m, 54s	2h, 18m, 15s	3h, 1m, 15s.
Company of Body of the Regiment	5m, 4s	5m, 38s	7m, 6s	11m, 45s	17m, 12s	24m.	32m.
Accompanying Battery	4m, 11s	4m, 32s	7m, 10s	11m, 25s	16m, 30s	22m, 30s	30m, 18s.
Company of Mortars (81's)	2m, 57s	3m, 20s	5m, 50s	9m, 36s	14m.	20m.	25m, 48s.
Regiment of Infantry ²	50m.	58m, 20s	2h, 10m.	3h, 21m, 36s	4h, 55m.	6h, 45m.	9h, 5m.

¹ These figures allow for space between companies a distance of 10.9 yards on carriage road and 109.4 yards on mountain track or mule track.

² These figures allow for the following spaces between battalion and battalion, company of mortars (81-mm) and accompanying batteries: 32.8 yards on carriage road and 547 yards on mountain track or mule track.

FM-E 101-10

124-126 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

b. Mechanized forces.—

Unit	On carriage roads of a grade of less than 10 percent	
	In daytime	
	Ordinary march	Fast march
Column of heavy tanks.....	11.2 mph.....	15.5 mph.

■ 125. TROOP MOVEMENT BY RAIL.—a. The typical military railway train in Italy comprises 40 cars and carries 1 battalion; 1 car for officers; 19 cars for troops; 12 open cars for wagons; 8 open cars for animals.

b. The operating crew ranges from four to eight men.

c. Thirty trains are required to move one division with 120 more trains for hauling artillery, ammunition, and matériel of the division. Italy has a capacity of 25½ divisional trains. Equipment is therefore adequate for troop movement.

d. On a single-track mountain line with grades from 10/1000 to 25/1000 with steam locomotive, not more than 30 trains each way may circulate in 24 hours. If there are double tracks the traffic can be doubled.

■ 126. TROOP MOVEMENT BY AIR.—

1	2	3	4	5
Number of airplanes	Type unit	Time required to procure airplanes, bases, and load	When type of move used	Time required to move troops
140 (model 582).....	Inf Regt, 3,278 men and equipment...	.....	.....	1,000 miles in 5 hours.

CHAPTER 3

SUPPLY

SECTION I. General data.....	Paragraph 127
II. Supply units.....	128

SECTION I

GENERAL DATA

■ 127. SUPPLY SYSTEM.—*a.* Little information is available as to Italian supply methods. However, with their activities so closely related to German operations, it may be that their methods are greatly influenced by German domination in field action.

b. Days of fire for infantry weapons are as prescribed below:

	<i>Rounds</i>
Pistol.....	10
Grenade.....	4
Rifle.....	60
Machine rifle.....	1, 300
MG Fiat 35.....	2, 000
MG Breda 37.....	2, 000

c. The following table shows the ammunition supply carried within the field artillery battalion:

<i>Weapon (mm)</i>	<i>With the battery (rds. per gun)</i>	<i>With the Bn Combat Tn (rds. per gun)</i>	<i>Total in Bn (rds. per gun)</i>
65/17 Alpine.....	260	250	510
65/17 Pack.....	160	250	410
75/16 Alpine.....	156	159	315
75/18 Pack.....	96	159	255
100/17 M1916.....	72	180	252
100/17 (Light).....	75	114	189
100/17 M1914.....	72	189	261
75/27 Horse.....	177		250
75/27 M1911.....	128	144	272
75/27 (Light).....	108	207	315
75/27.....	204	203	407
105/28.....	124	100	224
149/13.....	48	100	148
149/35.....		70	70
152/13.....		70	70
152/37.....	50		
210/8 Mod. DS.....	27		27
260/9 M1916.....	26		26
305/10.....	15		15
305/17.....	15		15

d. Gas and oil supply is handled from central depots to Army auto parks and from there to division fuel sections. These fuel sections maintain a supply of a variable number of units. These units are sufficient to run a vehicle for 50 kilometers (31 miles).

SECTION II

SUPPLY UNITS

■ 128. ANIMAL TRANSPORTATION AND TRANSPORTATION UNITS.

<i>1</i> <i>Unit</i>	<i>2</i> <i>O</i>	<i>3</i> <i>EM</i>	<i>4</i> <i>Remarks</i>
Pack Transportation Sec.-----	1	120	100 pack animals. Mtn pack transportation sec is the same.
Wag Sec.-----	1	140	120 draft animals, 60 wags, 1 bcl and 9 mtr trcls.
Mtn Pack Transportation Co (3 secs.)---	6	410	312 pack animals, 4 wags.
Wag and Pack Unit in Army Corps.----	3	295	Wag sec and pack sec. 100 pack animals and 62 wags.
Wag and Pack Units in Army Corps (3 Cos).	12	925	As many units as there are divs in the army corps. 300 pack animals and 192 wags.
Wag and Pack Units in Div.-----	16	840	As many units as there are regts in the div. 624 pack animals and 10 wags.
Wag and Pack Unit.-----	4	435	2 wag secs—122 wags. 1 pack sec—100 animals.
Army Wag Squadron.-----	12	985	As many cos, 2 secs each, as there are army corps in the Army. 372 wags.

PART FOUR—MISCELLANEOUS DATA

CHAPTER 1

UNIFORMS, EQUIPMENT, AND INSIGNIA

	Paragraphs
SECTION I. German.....	129-131
II. Italian.....	132-133
III. Japanese.....	134-135

SECTION I

GERMAN

■ 129. UNIFORMS.—

Enlisted men

Officers

Headgear:

Helmet painted gray. Lugs for face shield. Scuttle shape.

Greenish-gray oversea cap, can
be worn under helmet.

Oversea cap of greenish-gray,
black leather visor, dark gray-
green band.

Blouse:

Greenish-gray, darker shade collar.

Collar may be folded back and
left open at the neck.

Choker collar.

Black soft-leather belt, dull white metal buckle.

Trousers and breeches:

Gray trousers tucked into half-length boots.

Gray breeches with leather "facings" and riding boots.

Overcoat:

Gray, doublebreasted, dark green collar.

■ 130. PERSONAL EQUIPMENT.—

a. On the man.—Pack (haversack for mounted troops); shelter half, complete with ropes, etc.; canteen and cup, mess kit and utensils; gas mask and cape; entrenching tool and sidearms; iron ration; nap case and message book; whistle and field glasses.

b. On the transport.—Overcoat, shoes, shirt, towel, socks, housewife, shaving and cleaning kit, iron ration, canvas clothing, drawers and scarf.

NOTE.—Chief consideration is to have uniform light, comfortable, weatherproof, and inconspicuous. Officers' uniforms in the field must conform to cloth and quality of the ranks.

c. Special uniforms.—

Armored troops—Loose-fitting black uniform with a black beret.

Mountain troops and rifle battalions.—Oversea cap with visor, ankle puttees and ankle boots. Rucksack and large canteen.

Other special uniforms to meet the needs of the situation.

FM-E 101-10

131-132 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

- 131. **INSIGNIA.**—*a. Branch of service.*—Colored piping of shoulder strap and colored center of collar patch. Concealed or removed usually for combat.

White and green.....	Infantry and rifle troops.
Rose.....	Tank and antitank units.
Grass green.....	Motorcycle units.
Gold yellow.....	Cavalry and bicycle units.
Copper brown.....	Reconnaissance units.
Bright red.....	Artillery.
Black.....	Engineers.
Lemon.....	Signal.
Bright blue.....	Transport troops.
Dark red.....	Chemical warfare.

- b. Rank insignias on shoulder straps.*—

General officers.....	Two heavy silver-lace strands twisted with one gold-lace strand.
Major General.....	No gilt star superimposed.
Lieutenant general.....	One gilt star superimposed.
General.....	Two gilt stars superimposed.
Colonel general.....	Three gilt stars superimposed.
Field officers.....	Heavy silver lace twisted in two strands.
Major.....	No gilt star superimposed.
Lieutenant colonel.....	One gilt star superimposed.
Colonel.....	Two gilt stars superimposed.
Company officers.....	Flat solid silver lace on foundation coloring of arm of service.
2d lieutenant.....	No gilt star superimposed.
1st lieutenant.....	One gilt star superimposed.
Captain.....	Two gilt stars superimposed.

Enlisted men:

Privates first class wear diamond-shaped design in a circular sleeve patch.

Junior noncommissioned officers wear chevrons.

Noncommissioned officers (sergeant or higher) wear stripes of silver braid on shoulder patch.

- c. Unit designation.*—Numerals on shoulder straps indicate regiment or similar unit. Shoulder-strap button carries number of company or similar unit.

SECTION II

ITALIAN

- 132. **UNIFORMS.**—The field uniform as prescribed is worn by officers and enlisted men alike.

- a. Field uniform (wool).*—

Headgear.....	Gray-green field cap or steel helmet.
Blouse.....	Gray-green with open collar. No piping or embroidery.
Shirt.....	Gray-green, worn with collar and tie.
Breeches.....	Gray-green without stripes.
Puttees.....	Gray-green wrap leggings. Mounted and motor-transport troops may wear black leggings.
Boots.....	Black ammunition.

b. Field uniform (tropical).—

Headgear..... Khaki topee of cork with tinted goggles. Helmets painted a whitish color.

Blouse..... Khaki cotton, with turn-down collar buttoning up to the neck.

Trousers and..... Trousers with tight fit just above the ankles, cotton.
breeches. Cotton breeches with puttees, leggings or stockings.
Shorts are also worn.

Boots..... Black ammunition. Also heavy tan hobnails.



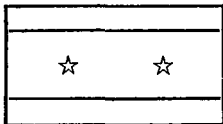
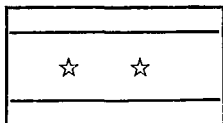
Black Shirt militia wear the same uniform except for a black shirt and tie.

■ 133. INSIGNIA.—*a. Insignia of arm.*—Worn on the front of all headdress. Stenciled on helmets. Metal insignia on caps and shoulder straps of officers in tropical uniforms.

Regimental number shown in boss or center circle of arm insignia.

NOTE.—Some of the old distinctive uniforms of the various units may still appear in some cases. There are innumerable special unit insignia which may be encountered. They follow a colored gorget sytem too extensive to enumerate.

b. Insignia of rank.—

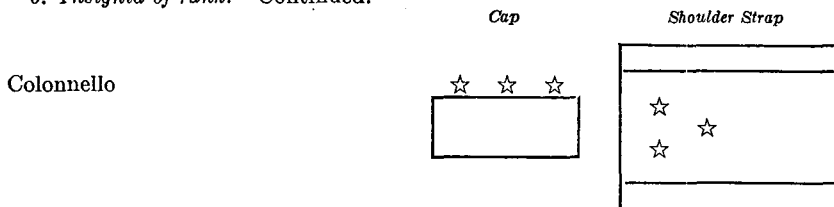
	Cap	Shoulder Strap
Maresciallo d'Italia	☆☆☆☆	
Generale d'armata	☆☆☆	
Generale di Corpo d'armata	☆☆	
Generale di divisione or tenente generale	☆☆	

Generale di brigata or maggiore generale is same as above except that he has only one star.

FM-E 101-10

133-134 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

b. Insignia of rank.—Continued.



Tenente colonnello and maggiore differ only in the number of stars; lieutenant colonel has two, and major has one.



Tenente has two stars arranged as capitano, and sottotenente has only one. Warrant officers have shoulder straps with 1, 2, or 3 bands of yellow silk streaked with black, depending on their relative rank, and one band on their caps. Other ranks wear chevrons. Sergeant major's and sergeant's are yellow, the others red.

SECTION III

JAPANESE

■ 134. UNIFORMS.—

<i>Enlisted men</i>	<i>Officers</i>
<i>Coat:</i>	Olive-drab, cotton, or wool.
Single-breasted, sack coat.	Higher collar, shorter length.
Turned-down collar.	Cuff stripe of dark brown braid.

Insignia of rank and organization on front edge of collar.

Colored chevrons, denoting service, above flap of right pocket.

Red—Infantry, including tanks.

Yellow—Artillery.

Green—Cavalry.

Maroon—Engineers.

Sky Blue—Aviation.

Blue-Black—Transport.

Dark Green—Medical.

Black—Military Police.

Trousers and breeches:

Breeches and woolen olive-drab spiral puttees.	Trousers with high waist and no cuff.
	Breeches and boots.
	May wear spiral puttees with either.

Shoes:

Heavy russet shoes.

Black shoes or boots.

German type russet boot.

Cap:

Field: Olive-drab cloth, head-shaped, narrow visor and leather chin strap. Ventilation holes, adjustable slit in rear for size. Star on vertical front seam.

Dress: Olive-drab color, similar to U. S. except smaller crown and shorter visor, red piping and headband. Star on headband in front, silver for officers and gold for enlisted men. Leather is black.

Overcoat:

Olive-drab wool, double-breasted, turndown collar, detachable hood.

One, two, or three bands of brown braid to indicate company, field, or general officer.

Cape:

Olive-drab wool, conventional type. Throat piece has bars of braid for rank as overcoat.

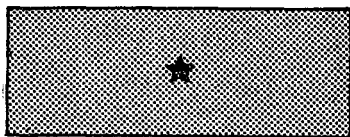
- 135. INSIGNIA.—*a. Unit insignia.*—Arabic numerals are worn on collar flaps to indicate regiment.

Special units wear regimental number on left and special ornament on right.

Numerals and branch of service insignia removed for field service.

NOTE.—Enlisted men's uniforms are generally ill-fitting but serviceable. In the field, officers conform to enlisted uniforms. Special types of uniforms are issued for special occasions, winter for Manchuria and China, tropical (shorts) for southern operations, etc. Predominant color is olive drab. Extensive use is made of conforming coloration in uniforms and camouflage nets for the individual.

b. Insignia of grade.—Cloth patch on both collar flaps of the coat, overcoat, and cape.



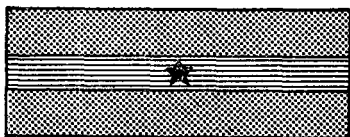
Privates—Plain red patch.

☆ (yellow star)—2d Cl Pvt.

☆☆ (yellow star)—1st Cl Pvt.

☆☆☆ (yellow star)—Superior Pvt.

(Stars are cloth).



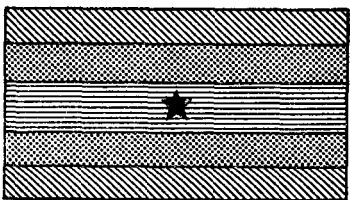
Noncommissioned officers—Plain red, one gold band.

☆ (yellow)—Corporal.

☆☆ (yellow)—Sgt.

☆☆☆ (yellow)—Sgt Maj or 1st Sgt.

(Stars are cloth.)

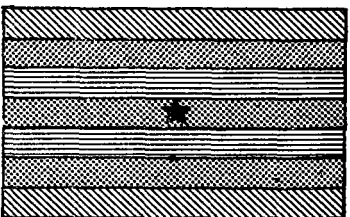


Company officers—Red cloth, gold braid border, gold band center.

☆ (yellow metal)—2d lt.

☆☆ (yellow metal)—1st lt.

☆☆☆ (yellow metal)—Captain.

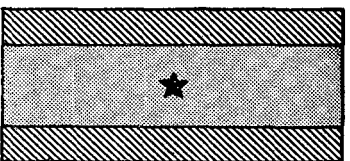


Field officers—Red cloth, gold braid border, 2 gold bands.

☆ (yellow metal)—Maj.

☆☆ (yellow metal)—Lt col.

☆☆☆ (yellow metal)—Col.



General officers—Gold cloth, gold braid border.

☆ (yellow metal)—Maj gen.

☆☆ (yellow metal)—Lt gen.

☆☆☆ (yellow metal)—Gen.



RED



GOLD BRAID



GOLD BAND



GOLD CLOTH

CHAPTER 2

COMPARATIVE ARMY RANKS

■ 136. TABLE.—

<i>United States</i>	<i>Japanese</i>	<i>Italian</i>	<i>German</i>
General.....	Gensui.....	Maresciallo d'Italia.....	Generalfeldmarschall.
Lieutenant general.....	Taishō.....	Generale d'armata.....	Generaloberst.
Major general.....	Chūjō.....	Generale di corpo d'armata.....	General der Flieger.
Brigadier general.....	Shōshō.....	Generale di divisione.....	Generalleutnant.
Colonel.....	Taisa.....	General di brigata.....	Generalmajor.
Lieutenant colonel.....	Chūsa.....	Colonnello.....	Oberst.
Major.....	Shōsa.....	Tenente colonnello.....	Oberstleutnant.
Captain.....	Taii.....	Maggiore.....	Major.
		Primo capitano.....	Hauptmann (all arms except cavalry and horse artillery).
		Capitano.....	Rittmeister (cavalry and horse artillery).
		Primo tenente.....	
1st lieutenant.....	Chūi.....	Tenente.....	Oberleutnant.
2d lieutenant.....	Shōi.....	Sottotenente.....	Leutnant.
Cadet officer.....		Maresciallo ufficiale.....	
Warrant officer (1).....	Junshikan.....	Maresciallo maggiore.....	
Warrant officer (2).....		Maresciallo capro.....	
Warrant officer (3).....		Maresciallo.....	
Master sergeant.....	Tokumu-Sōchō.....	Sergente maggiore.....	Oberfeldwebel.
1st sergeant.....	Sōchō.....		Feldwebel.
Staff sergeant.....			Fähnrich.
Sergeant.....	Gunsō.....	Sergente.....	Unterfeldwebel.
			Unteroffizier.
			Stabsgefreiter.
			Hauptgefreiter.
Corporal.....	Gochō.....	Caporal maggiore.....	Obergefreiter.
(Lance corporal).....	Jōtōhei.....		Gefreiter.
Private 1st class.....	Ittōhei.....	Caporal.....	Oberschütze.
Private.....	Nitōhei.....	Soldato.....	Mannschaften.

CHAPTER 3
COMPARATIVE MEASUREMENTS

SECTION I. Comparative monetary units.....	Paragraph 137
II. Weights and measures.....	138-139

SECTION I
COMPARATIVE MONETARY UNITS

■ 137. TABLE.—

<i>Japanese</i>	<i>Italian</i>	<i>German</i>
10 rin=1 sen.....	5 centesimi=1 soldo.....	100 pfennigs=1 mark.
100 sen=1 yen.....	20 centesimi=1 quatto soldi.....	(1 mark=\$.24 U. S. at par).
(1 yen=\$.84459 U. S.).....	50 centesimi=1 mezzolira.....	
	100 centesimi=1 lira (L.).....	
	(1 lira=\$.0526 U. S.).....	

SECTION II
WEIGHTS AND MEASURES

■ 138. GERMAN AND ITALIAN.—Both the Germans and the Italians use the metric system. In the table below the slight variations in spelling are shown, so that by combining the proper prefix with the proper unit the entire table of weights and measures can be obtained.

<i>English</i>	<i>Italian</i>	<i>German</i>	<i>English</i>	<i>Italian</i>	<i>German</i>
milli- centi- deci- deka- hecto- kilo-	milli- centi- deci- deka- etto- chilo-	milli- zenti- dezi- deka- hekto- kilo-	} meter gram liter	metro gramma litro	meter gramm liter

■ 139. JAPANESE.—a. Distance and length.—

Ri=36 cho 2,160 ken.....	=2.4403 miles.....	=3.92727 kilometers.
Ri=(marine).....	=1 knot.....	=1.85318 kilometers.
Ken=6 shaku=60 sun.....	=5.965163 feet.....	=1.81818 meters.
Shaku=10 sun=100 bu.....	=0.994194 foot.....	=0.30303 meter.

b. Quantity, capacity, and cubic measures.—

$$\text{Koku} = 10 \text{ to} = 100 \text{ sho} = \left\{ \begin{array}{l} 4.96005 \text{ bushels} \\ 47.95389 \text{ gallons (liq-} \\ \text{uid) U. S. A.} \\ 5.11902 \text{ bushels (dry)} \\ \text{U. S. A.} \end{array} \right\} = 1.80391 \text{ hectoliters.}$$

Go.....	=10th of a sho.
Koku (capacity of vessels).....	=10th of a ton.


































c. *Weights.*—

Kwan (kan)=1,000 momme	}	$\left\{ \begin{array}{l} 8.26733 \text{ pounds} \\ \text{avoirdupois} \\ 10.04711 \text{ pounds} \\ \text{troy} \end{array} \right\}$	=3.7500 kilograms.
Kin=160 momme-----	=	$\left\{ \begin{array}{l} 1.32277 \text{ pounds} \\ \text{avoirdupois} \\ 1.60754 \text{ pounds troy} \end{array} \right\}$	=0.60000 kilogram.
Momme=10 fun-----	=	$\left\{ \begin{array}{l} 0.13228 \text{ ounce avoirdupois} \\ 0.12057 \text{ ounce troy} \end{array} \right\}$	=3.75000 grams.

CHAPTER 4



































COMPARATIVE MAP SYMBOLS FOR PRINCIPAL FIELD UNITS

■ 140. TABLE OF MAP SYMBOLS.—

	<i>Japanese</i>	<i>Italian</i>	<i>German</i>
Army.....	A		
Army headquarters.....			
Army corps.....	C		
Corps headquarters.....			
Division.....	D		
Division headquarters.....			
Motorized division headquarters.....			
Armored division headquarters.....			
Alpine division headquarters.....			
Motor-transportable division headquarters.....			
Celere (fast) division headquarters.....			
Infantry.....	i		
Brigade.....	B		
Brigade headquarters.....			
Regiment.....	R		
Regimental headquarters.....			
Battalion.....			
Battalion headquarters.....			
Company.....	≡ or III		

MISCELLANEOUS DATA

140

	<i>Japanese</i>	<i>Italian</i>	<i>German</i>
Company headquarters.....			
Bicycle company.....			
Motorcycle company.....			
Machine-gun company.....			
Antitank company.....			
Cavalry:.....	K		
Brigade.....	KB		
Brigade headquarters.....			
Regiment.....			
Regimental headquarters.....			
Troop or squadron.....	 or 		
Field Artillery:.....	A		
Regimental headquarters (horse).....			
Regimental headquarters (motorized).....			
Battery (horse).....			
Battery (motorized).....			
Mountain artillery:.....	BA		
Regimental headquarters.....			
Battery.....			

FM-E 101-10

140 STAFF OFFICERS' FIELD MANUAL, ENEMY FORCES

	Japanese	Italian	German
Heavy field artillery-----	SA		
Battery of howitzers-----			
Battery of guns-----			
Antiaircraft artillery battery-----			
Observation post-----			
Tank-----			
Brigade headquarters-----			
Heavy tank battalion-----			
Heavy tank company-----			
Medium tank battalion-----			
Light tank company-----			
Aviation unit-----			