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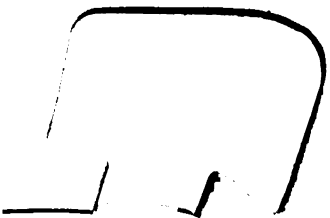
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WAR DEPARTMENT, - - ADJUTANT GENERAL'S OFFICE
(MILITARY INFORMATION DIVISION.)

No. XXXVIII.

MAJOR GENERAL HENRY C. CORBIN,
ADJUTANT GENERAL, U. S. ARMY.
LIEUT. COLONEL W. A. SIMPSON, A. A. G.,
IN CHARGE OF DIVISION.

NOTES OF MILITARY INTEREST

FOR 1902.

COMPILED AND ARRANGED BY
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FIRST LIEUT. H. B. FERGUSON, CORPS OF ENGINEERS;
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FIRST LIEUT. R. S. CLARK, 9TH INFANTRY.

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NOTES OF MILITARY INTEREST FOR 1902.

I.—BUDGETS.

AUSTRIA-HUNGARY.

Military budget for 1903 compared with 1902.

[REPORTED BY CAPT. FLOYD W. HARRIS, FOURTH CAVALRY, UNITED STATES MILITARY ATTACHÉ AT VIENNA.]

Branch of the service.	1903.	1902.	Increase.	Decrease.
ORDINARY EXPENDITURES.				
Central administration	Crowns.* 1,044,919	Crowns.* 1,004,919	Crowns.* 40,000	-----
Territorial and local headquarters and officers in local positions	3,434,924	3,420,240	14,684	-----
Intendance and auditing department	2,560,163	2,560,035	128	-----
Religious service	481,360	480,345	1,015	-----
Administration of military justice	797,063	792,894	4,169	-----
Superior headquarters and staffs	4,935,614	4,935,470	144	-----
Pay and allowances of troops:				
Infantry	33,798,644			
Rifles	3,630,649			
Cavalry	9,686,814			
Field artillery	8,082,820			
Fortress artillery	1,766,940			
Pioneers	2,148,676			
Railway and telegraph regiment	429,146			
Train	1,391,835			
Other expenditures on troops, such as schools, transportation, recruiting, etc	8,347,082			
	69,180,306	68,016,046	1,164,260	-----
Military educational institutions	3,844,209	3,830,380	13,829	-----
Military technical board	202,436	202,436		-----
Subsistence stores	1,321,539	1,321,539		-----
Bedding stores	94,910	94,910		-----
Establishments of the clothing administration	382,424	382,424		-----
Technical artillery (ordnance department)	9,915,160	9,551,043	364,117	-----
Depots of train material	202,913	197,899	5,014	-----
Depots of pioneer material	284,951	327,899		42,948
Bureaus of military construction	9,392,320	9,366,947	25,373	-----
Military geographical institute	426,426	426,426		-----
Medical department	8,747,471	8,742,852	4,619	-----
Pensions	25,002,646	25,002,646		-----
Military prisons	204,340	204,340		-----
Miscellaneous expenditures	1,059,429	1,053,429	6,000	-----
Subsistence in kind	39,465,353	38,637,406	827,947	-----
Rationing of troops (all articles of rations cooked by the troops themselves)	41,757,493	39,701,656	2,055,837	-----
Clothing and bedding	19,391,737	19,125,423	266,314	-----
Quarters	30,847,853	30,009,373	838,480	-----
Remounts	6,704,474	6,495,456	209,018	-----
Bounties and increased pay for reenlistment of noncommissioned officers	5,720,000	5,520,000	200,000	-----
Total	287,402,483	281,404,433	5,998,000	-----

Military budget for 1903 compared with 1902—Continued.

Branch of the service.	1903.	1902.	Increase.	Decrease.
EXTRAORDINARY EXPENDITURES.				
Replenishment of war stores.....	7,022,000	7,650,080		628,080
Buildings, quarters, and drill grounds.....	7,648,758	7,549,400	99,358	
Temporary extraordinary demands.....	4,714,496	4,556,555	158,941	
Extraordinary expenditures for carrying out changes in organisation.....	439,152	264,088	175,064	
Total.....	19,824,406	20,019,103		194,697
HEADQUARTERS, TROOPS, AND ESTABLISHMENTS OF THE OCCUPIED TERRITORY (BOSNIA AND HERZEGOVINA).				
Pay and subsistence of troops, purchase of horses, armament, train, engineering and construction, equipment, medical service, etc.....	7,894,000	7,447,000	447,000	

* One crown equals \$0.203.

Comparative table of the budgetary strength for 1903 and 1902.

Branch of the service.	1903.		1902.	
	Officers.	Enlisted men.	Officers.	Enlisted men.
Central administration (ministry of war, etc.).....	201	61	201	61
Territorial and local headquarters and officers in local positions.....	992	1,064	980	1,052
Intendance and auditing department.....	840		840	
Religious service.....	150	147	149	146
Administration of military justice.....	209	292	205	298
Superior headquarters and staffs.....	871	849	871	849
Infantry:				
1 company bodyguard.....	4	129	4	129
102 regiments of the line.....	8,816	161,009	8,816	161,009
Rifles, 42 battalions.....	974	16,491	974	16,491
Cavalry:				
1 squadron bodyguard.....	4	132	4	132
42 regiments (16 dragoon, 16 huszar, 11 uhlan).....	1,764	45,726	1,764	45,726
Artillery:				
56 regiments field artillery, 42 field howitzer batteries, 16 batteries horse artillery, and 3 batteries mountain artillery.....	1,825	30,198	1,589	25,502
6 regiments and 3 battalions of fortress artillery.....	398	7,762	398	7,762
Pioneers, 15 battalions.....	480	8,430	480	8,430
Railway and telegraph regiment, 3 battalions.....	86	1,487	86	1,487
Train, 91 squadrons.....	435	3,471	426	3,390
Officers and men permanently detached and not available for duty with troops.....	372	687	372	687
One-year volunteer surgeons, and veterinarians.....		45		45
Firing schools, aeronautic establishments, remount depots, etc.....	44	349	44	349
Military educational institutions.....	141	2,728	138	2,609
Military technical board.....	18	120	18	120
Subsistence stores.....	399	1,007	399	1,007
Bedding stores.....	15	88	15	88
Establishments of the clothing administration.....	110	495	110	495
Technical artillery (ordnance department).....	292	1,414	288	1,386
Depots of train material.....	9	86	9	86
Depots of pioneer material.....	9	152	14	170
Bureaus of military construction.....	399	369	399	345
Military geographical institute.....	172	122	172	122
Medical department.....	1,431	4,169	1,430	4,141
Administration of soldiers' homes.....	7	24	7	24
Military prisons.....	95	30	95	30
Miscellaneous (military attachés).....	8		8	
Total active list.....	21,570	289,133	21,305	284,168
Inmates of soldiers' homes.....		749		749
Pupils of military schools (boys).....		6,225		6,405

* Includes 250 girls.

BUDGETS.

7

Composition of the general staff.

	1903.	1902.
General	1	1
Lieutenant generals	2	2
Major generals	2	2
Colonels	33	33
Lieutenant colonels	50	50
Majors	63	63
Captains	164	164
Officers attached to the general staff	157	157
Officers detailed from the active army and the retired list (2 majors and 30 captains)	32	32
Accountants and registry officials	2	2
Enlisted men, including 8 armeediener	643	643

Budgetary strength of the general staff for 1903, after deducting the number of officers and men provided for under other sections of the budget, and actual strength of the general staff, according to the army register for 1903.

	Budget.	Army register.
General	1	1
Lieutenant generals	2	3
Major generals	2	3
Colonels	29	45
Lieutenant colonels	24	56
Majors	62	86
Captains	155	283
Officers attached to the general staff	149	209
Officers detailed from the active army and the retired list	1	30
Accountants and clerks	2	2
Enlisted men, including 8 armeediener	564	643

BELGIUM.

Military budget.

Branch of the service.	Amounts asked for 1903.	Amounts appropriated for 1902.
ORDINARY EXPENDITURES.		
	<i>Francs.*</i>	<i>Francs.*</i>
Central administration	692,415.00	530,600.00
Pay and allowances	24,840,410.64	24,569,380.64
Hospitals and dispensaries	910,335.00	910,335.00
Institutions of higher instruction	240,075.00	214,975.00
Ordnance department	2,148,444.05	1,889,944.05
Engineer material	1,585,000.00	1,585,000.00
Bread, meat, forage, and other allowances	18,610,032.35	18,602,332.35
Various money allowances and fees	427,754.68	427,754.68
Pensions and relief	392,000.00	407,100.00
Unforeseen expenses	68,949.00	67,949.00
EXTRAORDINARY EXPENDITURES.		
Various services	5,339,000.00	7,067,666.25
Total	55,254,415.72	56,273,036.97

*One franc equals \$0.193.

Effective strength.

Arm of the service.	Officers.	Men.
General staff.....	79	
Staff of provinces and towns.....	39	
Intendancy.....	39	
Medical officers at hospitals.....	96	
Infantry (19 regiments).....	1,921	27,788
Cavalry (8 regiments).....	370	5,771
Artillery (8 regiments, 4 special companies).....	633	8,682
Engineers (1 regiment, 1 battalion, 5 special companies).....	152	1,700
Administrative battalion.....	78	982
Total.....	3,406	44,923

Composition of the general staff.

Active section:	
Lieutenant generals.....	1
Major generals.....	18
Reserve section:	
Lieutenant generals.....	2
Major generals.....	4
Staff corps:	
Colonels.....	5
Lieutenant colonels.....	5
Majors.....	10
First captains.....	17
Second captains.....	10
Total.....	79

BRAZIL.*Military budget for 1902.*

General administration.....	\$19,079
Supreme military court.....	35,950
General accounting department.....	59,582
Superintendence department.....	71,891
Military instruction.....	250,224
Arsenals, supply depots, and forts.....	281,054
Machine shops.....	87,718
Hospital service.....	83,775
Pay.....	3,682,603
Provisions and forage.....	3,948,763
Inactive classes.....	500,342
Extras.....	50,000
Military colonies.....	24,477
Construction.....	662,926
Material.....	2,053,474
Total.....	11,892,359

Strength of the army on March 14, 1902.

	Officers.	Noncom- missioned officers and men.
14 regiments of cavalry and transport corps:		
Nominal strength.....	364	5,948
Effective strength.....	506	2,866
6 regiments field artillery:		
Nominal strength.....	150	2,412
Effective strength.....	150	1,250
6 battalions heavy artillery:		
Nominal strength.....	126	1,874
Effective strength.....	131	1,247
Artillery, total effective.....	344	2,497
6 battalions engineers:		
Nominal strength.....	36	826
Effective strength.....	36	751
40 battalions infantry:		
Nominal strength.....	840	17,000
Effective strength.....	1,368	8,591
Total nominal strength.....	2,015	28,160
Total effective strength.....	2,966	14,705

FRANCE.**MILITARY BUDGET FOR 1902.**

[REPORTED BY CAPT. T. BENTLEY MOTT, ARTILLERY CORPS, UNITED STATES MILITARY ATTACHÉ AT PARIS.]

The law of March 30, 1902, fixed the ordinary expenditures at 667,577,850 francs, as against 632,400,171 francs appropriated in 1901, and the extraordinary expenditures at 49,122,150 francs, as against 60,708,150 appropriated in 1901. The total amount of both expenditures is therefore 716,700,000 francs in 1902 as against 693,108,321 francs appropriated in 1901. The net increase in the amount appropriated in 1902 over the amount appropriated in 1901 is thus 23,591,679 francs.

This apparent increase demands some explanation. The war department budget for 1902 is the first to contain provision for the support of the "colonial troops," which provision amounts to a total of 26,329,000 francs, and more than balances the increase shown by the 1902 budget over that of 1901. Up to 1902 these troops were provided for in the naval budget under the title "artillerie de la marine" and "infanterie de la marine." A law passed in July, 1900, transferred these organizations to the control of the war department, and changed their designation to "colonial infantry" and "colonial artillery," but no provision was made for them in the war department estimates until 1902.

These estimates are for the support of only those colonial troops stationed in France; their effective is 1,615 officers, 25,729 men, 1,558 horses, and the amount asked for this support in 1902 was 26,329,000 francs.

Those "colonial" troops properly speaking, as well as any other troops that may be stationed in French colonies (except Algeria and Tunis), are supported out of appropriations carried in the budget for the colonies.

The budget of the minister of the colonies contains items for military purposes amounting to about 100,000,000 francs a year, and it supports an army of 1,750 officers and 54,600 enlisted men. Some of these are colonial troops, strictly speaking, and some are local and native regiments. There are only 39 native officers in these organizations, but more than half the men are natives.

By far the greater part of the colonial troops are stationed in France. The coast batteries are largely manned by the "colonial artillery," and the "colonial infantry" (formerly called "marine infantry") is generally stationed near the great seaports; though a brigade has recently been sent up to Paris.

Also, the naval budget supports 238 officers and 858 men of the colonial artillery detailed to the naval service (actually for naval ordnance work).

In estimating the cost of an army to France, then, the rough sum of 100,000,000 francs should be added to the figures of the war department budget, since that sum is borne by the budgets of the colonies and of the navy as above explained.

The regular army of France, raised by conscription, is not liable in time of peace to service outside of France; the colonial troops are recruited by voluntary enlistment and are liable to service in any part of the world.

In the figures which follow, the various expenses of the colonial troops stationed in France are included in the items under the heading "Home;" the expenses of the troops stationed in the colonies, other than Algeria and Tunis, are not included in the tables, as they are not a part of the war department budget; as stated above, they amount annually to about 100,000,000 francs.

The effective strength given includes the colonial troops.

Ordinary expenditures.

	Home.	Algeria.	Tunis.	Total.
	Francs.	Francs.	Francs.	Francs.
Salary of war minister and staff of the army	775,840			775,840
Personnel of central administration	3,223,040			3,223,040
Expenses for material of central administration	310,380			310,380
Printing	588,652			588,652
Geographical service	1,260,528	158,715	17,152	1,436,395
General staff (archives, library, and historical museum)	181,300			181,300
Military telegraphy	407,915	11,000	2,500	421,415
Department of military railroads (material)	125,500	900	100	126,500
General staff and staff service	10,819,494	692,581	196,501	11,708,576
Various departments and special staffs (personnel of control service, intendance department, and artillery and engineer staffs)	14,538,701	1,175,542	401,101	16,115,344
Military schools (personnel)	9,330,231			9,330,231
Military schools (material)	3,264,420			3,264,420
Personnel hors cadre and not classed in troop units	8,964,003	2,684,246	620,245	12,268,094
Pay of infantry	114,224,683	11,540,240	3,287,369	129,051,702
Pay of administrative troops	3,442,304	810,720	120,379	4,373,403
Pay of cavalry	24,699,335	4,328,837	750,259	29,778,431
Pay of artillery	30,941,017	617,467	451,583	32,010,967
Pay of engineers	4,546,772	291,644	97,777	4,936,193
Pay of train	3,047,083	512,594	177,984	3,738,261
Departmental gendarmerie	33,580,646			33,580,646
Republican guard	4,743,124			4,743,124
Provisions	37,560,882	4,129,089	1,398,922	43,088,893
Meat (fresh, canned, and salted)	52,816,949	4,562,264	1,616,661	58,995,874
Forage	67,867,880	5,346,455	1,619,286	74,833,321
Medical service	7,899,338	1,319,248	279,467	9,498,253
Department of military convoys	1,769,650	1,182,500	303,500	3,255,650
Travel allowance and special journeys	11,159,003	967,580	152,300	12,279,783
Clothing and camping equipage	50,053,179	4,517,652	1,474,961	56,045,892
Military bedding	10,646,788	1,004,874	309,469	11,961,131
Special transportation	730,850	333,200	151,000	1,215,050
Military operations in the extreme south of Algeria		3,500,000		3,500,000
Recruiting	395,248	5,412		400,660
Reserve and territorial army	172,860	5,520	1,270	179,650
Military justice and prisons	596,745	82,115	8,700	687,560
Workhouses and military penitentiaries	413,000	505,595	64,065	982,660
General remount service	15,043,230	1,152,210	292,010	16,487,450
Census of horses and mules	88,500	5,000		93,500
Horse equipment	4,372,923	311,721	95,905	4,780,549
Artillery establishments (personnel, general expenses, transportation)	10,208,685	354,150	89,035	10,651,870
Artillery establishments (purchase and manufacture of material and ammunition)	20,636,245			20,636,245
Government explosive factories	5,247,640			5,247,640
Engineer establishments	14,663,468	2,254,480	690,620	17,608,598
Fuel and light	269,104	10,900	800	281,504
Disabled soldiers	309,575			309,575
Unemployed and reduced pay	1,007,892			1,007,892
Relief and bounties	6,502,360			6,502,360
Special allowances	650,000			650,000
Secret expenditures	530,000			530,000
Pay of general officers and assimilated persons of the reserve cadre	3,571,515			3,571,515
Tunis gendarmerie			330,861	330,861
Totals	598,201,617	54,374,451	15,001,782	667,577,850

Extraordinary expenditures.

	Francs.
Siege train	500,000
Powder magazines	40,000
Field equipment	300,000
Armament of garrisons	538,000
Armament of coasts	5,252,350
Small arms	1,589,800
Ammunition	800,000
Experiments (artillery)	400,000
Building and machinery (artillery)	1,200,000
Defense of Cherbourg	700,000
Barracks	4,300,000
Drill and firing grounds, etc.	6,000,000

Extraordinary expenditures—Continued.

	Francs.
Construction of strategic roads.....	100,000
Improvements in isolated forts.....	650,000
Military telegraphy and ballooning.....	350,000
Fortifications, land defense.....	5,000,000
Fortifications, coast defense.....	3,300,000
Engineers' stores.....	200,000
Reserve engineers.....	50,000
Establishments (intendance).....	400,000
Establishments (medical).....	250,000
Reorganization of the defenses of Bizerte.....	5,800,000
Subsistence.....	70,000
Clothing.....	642,000
Medical service.....	100,000
Improvements in civil hospitals in the departments.....	350,000
Railroads.....	1,050,000
Geographical service.....	110,000
Improvements in armament (law of February 17, 1901).....	9,000,000
Total.....	49,122,150

The effective strength which served as a basis for the budget for 1902 differs as follows from that of 1901:

	Active army.		Gendarmerie.	
	Officers.	Men.	Officers.	Men.
1901.....	28,941	540,771	711	23,996
1902.....	28,712	628,991	712	24,011
Increase.....			1	15
Decrease.....	229	11,780		
To these must be added for 1902 the colonial troops, as follows.....	1,615	25,720		

The following tables show the distribution of staff, military schools, arms of the service, etc.:

Staff.

	Home.			Algeria and Tunis.			Total.		
	Officers.	Noncommissioned officers.	Total.	Officers.	Noncommissioned officers.	Total.	Officers.	Noncommissioned officers.	Total.
Generals of division.....	114	114	6	6	120	120			120
Generals of brigade.....	216	216	16	16	232	232			232
Officers of the general staff service.....	807	807	63	63	870	870			870
Archivists.....	163	163	17	17	180	180			180
Officers of the contrôle service.....	52	52			52	52			52
Intendance officers.....	268	268	47	47	315	315			315
Special artillery staff.....	956	472	1,428	85	47	132	1,041	519	1,560
Special engineer staff (officers, adjoints, etc.).....	848	280	1,128	147	71	218	995	351	1,346

Reserve cadre.

Generals of division.....	151
Generals of brigade.....	234
Contrôleurs general.....	13
Military intendants.....	40
Inspecting physicians and pharmacists.....	18

Personnel hors cadres or not classed in troop units.

Branch of service.	Home.			Algeria and Tunis.			Total.		
	Officers.	Noncommissioned officers.	Total.	Officers.	Noncommissioned officers.	Total.	Officers.	Noncommissioned officers.	Total.
PERSONNEL HORS CADRES.									
Recruiting service	176		176	2		2	178		178
Penitentiaries and prisons	5		5	14		14	19		19
Native affairs				74		74	74		74
Total personnel hors cadres	181		181	90		90	271		271
PERSONNEL NOT CLASSED IN TROOP UNITS.									
Medical personnel:									
Burgeons	324		324	153		153	477		477
Pharmacists	75		75	39		39	114		114
Administrative officers of the medical service	228		228	122		122	350		350
Total medical personnel	627		627	314		314	941		941
Administrative personnel	898	250	1,148	191	223	414	1,089	473	1,562
Veterinarians	38		38	1		1	39		39
Military interpreters	1		1	61		61	62		62
Total personnel not classed in troop units	1,564	250	1,814	567	223	790	2,131	473	2,604
Total of the personnel outside of the staffs, schools, and troop units	1,745	250	1,995	657	223	880	2,402	473	2,875

Military schools.

Name of school.	Officers.	Noncommissioned officers, corporals, and men.	Total.
Prytanée militaire (preparatory school for sons of officers without means)	8	46	54
Polytechnic school		38	38
Special military school (St. Cyr)	57	*1,228	1,285
School of application for artillery and engineers	153	40	193
Superior war school	99	291	390
School of application for cavalry	59	274	333
School of application of medicine and military pharmacy	15	27	42
School of administration		59	59
Normal school of gymnastics		142	142
Normal school of musketry		79	79
Schools of application for infantry fire		96	96
Infantry school		340	340
Artillery and engineer school		167	167
Preparatory schools of infantry		240	240
Preparatory school of cavalry		67	67
Preparatory school of artillery and engineers		60	60
Heriot orphan asylum		40	40
Medical school		48	48
Total	391	3,282	3,673

* This includes students (cadets), to the number of 960.

NOTE.—This table is as it is given in the budget. In cases in which no officers are given, the officers are probably included in regimental strength.

Distribution of the various arms of the service.

	Home.		Algiers and Tunis.		Grand total.	
	Officers.	Noncom-missioned officers, corporals, and men.	Officers.	Noncom-missioned officers, corporals, and men.	Officers.	Noncom-missioned officers, corporals, and men.
		Total.		Total.		Total.
INFANTRY.						
143 regiments of infantry of the line of 4 battalions each, less 115 companies	11,073	273,766	108	2,814	11,181	276,570
30 battalions of rifles of 6 companies	1,042	28,770			1,002	28,770
4 regiments of zouaves of 5 battalions of 4 companies, plus 2 depot companies	74	2,346	344	11,149	1,418	13,431
5 battalions of light infantry of Africa			165	7,605	165	7,605
4 companies of disciplinary fusiliers			16	1,000	16	1,000
4 foreign regiments of 6 battalions of 4 companies each			234	10,386	234	10,386
4 regiments of Algerian sharpshooters of 6 battalions of 4 companies each			504	20,484	504	20,484
1 company of Saharian sharpshooters			21	544	21	544
12 regiments colonial infantry of 3 battalions of 4 companies each	1,179	20,816			1,179	20,816
Total infantry	13,328	325,614	1,392	53,982	14,720	379,596
ADMINISTRATIVE TROOPS.						
21 sections of staff and recruiting secretaries		1,635		235		1,870
25 sections of military administrative clerks and workmen		6,038		1,702		7,740
25 sections of military hospital attendants		2,354		2,216		4,570
Total administrative troops		10,027		4,153		14,180
CAVALRY.						
79 regiments of 5 squadrons each (13 of cuirassiers, 31 of dragoons, 21 of rifles, and 14 of hussars)	3,434	64,503			3,434	64,503
6 regiments of African rifles of 5 squadrons each			254	4,722		4,722
8 companies of mounted cavalry	9	2,024	18	866	27	2,890
4 regiments of spahis of 5 squadrons each			164	3,287	164	3,287
Remount service	18	18	8	0	23	23
1 squadron of Saharian spahis				216		216
Total cavalry	3,461	66,527	463	9,173	3,924	75,700

BUDGETS.

ARTILLERY.									
18 battalions of foot artillery	622	13,704	14,226	18	516	534	540	14,220	14,760
19 regiments of field artillery	3,064	40,138	40,202	27	369	336	3,091	46,447	49,638
Mountain batteries	60	2,063	2,113	64	2,996	3,060	64	2,063	2,113
African batteries	19	741	760	2	307	309	19	741	760
Musicians of artillery schools	48	2,833	2,881	2	307	309	60	3,140	3,190
10 companies of workmen	12	303	316	12	303	303	12	303	316
3 companies of artificers	276	4,863	5,138	4	276	276	276	4,863	5,138
3 regiments of colonial artillery of 12 batteries (4 field, 2 mountain, 6 foot)	4,000	70,635	74,635	111	4,129	4,239	4,111	74,763	78,874
Total artillery									
ENGINEERS.									
6 regiments of engineers (sappers and miners)	419	8,209	8,628	26	645	671	445	8,854	9,299
1 regiment of 3 battalions of railroad sappers, 1 battalion of telegraphists	85	2,685	2,780	4	160	164	89	2,855	2,944
Drivers		285	285		676	676		961	961
Total engineers	504	11,189	11,693	30	1,481	1,511	534	12,670	13,201
TRAIN.									
20 squadrons at home and 19 mixed companies in Algeria and Tunis	360	4,354	4,714	52	2,263	2,305	412	6,607	7,019
Orderlies of staff officers		2,755	2,755		508	508		3,283	3,283
Total train	360	7,109	7,469	52	2,761	2,813	412	9,870	10,292
RECAPITULATION.									
Infantry	13,328	325,614	338,942	1,392	53,982	55,374	14,720	379,596	394,316
Administrative troops		10,027	10,027		4,153	4,153		14,180	14,180
Cavalry	3,461	56,527	59,988	453	9,073	9,586	3,914	65,600	69,514
Artillery	4,000	70,635	74,635	111	4,128	4,239	4,111	74,763	78,874
Engineers	504	11,189	11,693	30	1,481	1,511	534	12,670	13,204
Train	360	7,109	7,469	52	2,761	2,813	412	9,870	10,292
Grand total	21,053	481,101	502,754	2,038	75,578	77,616	23,601	556,679	580,370

NOTE.—There are also included in the budget the gendarmerie and the garde républicaine. The former consists of 26 legions in France (625 officers and 20,977 men) and a Tunisian detachment (4 officers and 139 men). The latter consists of 3 battalions of infantry of 4 companies each, and 4 squadrons of cavalry (total strength, 83 officers and 2,910 men).

GERMANY.

Military budget for 1903 compared with the amounts appropriated for 1902.

[REPORTED BY CAPT. WILLIAM S. BIDDLE, FOURTEENTH INFANTRY, UNITED STATES MILITARY ATTACHÉ AT BERLIN.]

Branch of service.	1903.	1902.	Increase.	Decrease.
Current expenditures:	Marks.*	Marks.*	Marks.*	Marks.*
War ministry	3,136,738	3,000,128	46,610	
Military chests	447,815	438,455	9,360	
Supply department	3,118,273	3,035,210	83,063	
Military chaplains	1,061,728	1,064,104	7,624	
Administration of military justice	1,537,400	1,317,635	219,765	
Imperial military court	544,928	522,647	22,281	
Higher troop commanders	3,527,493	3,525,369	2,124	
Governors of fortified places, garrison commanders, and their aids	662,047	659,491	2,556	
Aids-de-camp and officers in special positions	1,227,325	1,215,826	11,700	
General staffs and national surveys	3,549,943	3,393,856	156,087	
Engineers and pioneers	2,497,330	2,447,917	49,413	
Pay of troops	132,675,433	131,643,697	1,031,736	
Allowances in kind	143,494,863	144,115,984		621,121
Clothing and equipment of troops	32,430,566	31,221,521	1,209,045	
Garrison administration and commutation	62,298,311	60,589,119	1,709,192	
Garrison construction	1,887,085	1,817,484	69,601	
Medical service	10,439,691	10,156,191	283,500	
Administration of train depots and care of field material	1,748,170	1,741,626	6,544	
Subsistence of replenishment and reserve troops	3,459,998	3,479,256		19,258
Purchase of remounts	12,519,247	12,415,925	103,322	
Administration of remount depots	3,449,326	3,396,410	52,916	
Traveling allowances and allowances for relay and transportation	9,425,160	9,280,361	144,799	
Military education and training	8,162,066	7,942,239	219,827	
Military prisons	845,192	847,983		2,791
Artillery and ordnance	45,747,917	44,521,975	1,225,942	
Technical artillery establishments	1,313,546	1,268,790	44,756	
Construction and maintenance of forts	3,138,988	3,079,181	59,807	
Extra allowances for quarters	11,281,151	11,124,612	156,539	
Reliefs and extra indemnities to active military persons and civilians not provided for elsewhere	1,349,364	1,341,725	7,639	
Extra allowances to military widows' fund	3,198,000	3,134,000	64,000	
Miscellaneous expenditures	2,075,807	1,909,107	166,700	
Military administration of Bavaria	64,082,791	63,268,647	814,144	
Total	575,788,765	568,473,624	7,315,141	
Extraordinary expenditures	80,409,803	85,253,176		4,843,373
Total current and extraordinary expenditures	656,198,568	653,726,800	2,471,768	
Expenses occasioned by the expedition to East Asia	15,332,826	33,254,824		17,921,998

* One mark equals \$0.238.

Military budget for the colonies for 1903, compared with the amounts appropriated for the year 1902.

	1903.	1902.	Increase.
	<i>Marks.</i>	<i>Marks.</i>	<i>Marks.</i>
East African protectorate	2,437,321	2,389,031	48,190
Kamerun protectorate	1,082,969	1,083,076	9,893
Togo protectorate	104,100	104,100	—
Southwest African protectorate	2,478,493	2,396,574	81,919
Kiauchau protectorate	2,441,765	2,368,639	73,216
Total	8,554,538	8,341,320	213,218

The following are the more important changes for 1902:

On October 1, 1902, there were added to the permanent organization 7 machine-gun detachments and 6 companies of foot artillery; the fourth engineer and eighth fortress inspections have been created; the organization of the fortress construction corps has gone forward. Wireless telegraphy, system of Professor Braun (Siemens & Halske), was tried successfully for limited distances in the fall maneuvers.

The distribution of the rifle M. 98 has been continued to include several corps, and in the coming year will probably include the entire army.

New regulations have been issued for the training of the army, of machine-gun detachments, of balloon troops, for guard duty and for horse levying. New articles of war have been promulgated.

Much attention has been devoted to the question of adopting the system of rapid-firing guns with recoiling barrels.

The following changes are proposed in the military appropriation bill for 1903:

To add 4 companies of foot artillery on October 1, 1903; to expend 100,000 marks in promoting the military automobile under the direction of the communication troops; to form an additional regiment of cavalry from the 5 squadrons of mounted rifles (Jäger zu Pferde) at Posen, and to form a detachment under a field officer of the 2 squadrons at Graudenz.

To establish a military technical high school at Berlin.

Budgetary strength of the German army for 1903, compared with strength of army for 1902.

Branch of the service.	Officers.			Noncommissioned officers and men.				
	Strength for 1903 (proposed).	Strength in 1902.	Increase.	Decrease.	Strength for 1903 (proposed).	Strength in 1902.	Increase.	Decrease.
Infantry:								
Infantry proper, 216 regiments	12,073	12,073			367,639	367,405	174	
Rifles, 18 battalions	388	388			11,215	11,176	39	
Machine guns, 15 detachments (13 in 1902)	60	51	9		1,155	991	164	
Recruiting depots, 255 (254 in 1902)	863	930		67	5,917	5,889	28	
Total Infantry	13,384	13,442	9	67	385,920	385,521	405	
Cavalry:								
94 regiments (93 in 1902)	2,440	2,436	4		66,943	66,943		
Artillery: 94 regiments field; 18 foot	4,098	3,988	20		89,508	88,957	549	
Pioneers: 26 battalions	598	598			15,437	15,409	28	
Communication troops:								
Railroad troops (3 regiments, 1 battalion, 2 companies)	185	185			4,501	4,501		
Telegraph troops (3 battalions, 2 companies, 1 detachment)	50	50			1,526	1,527		1
Balloon troops (1 battalion, 1 detachment)	17	17			397	397		
Total communication troops	252	252			6,424	6,425		1
Train:								
23 battalions (17 in 1901)	332	331	1		8,305	8,254	51	
Special services	3,336	3,215	121		4,056	4,891		835
Imperial military court	8	7	1					
Total army	24,368	24,269	156	67	575,597	575,400	1,033	838
Net increase			80				107	

Noncombatants.

Noncombatants.	Strength for 1903 (proposed).	Strength in 1902.	Increase.
Surgeons.....	2,206	2,198	8
Paymasters and various.....	1,057	1,054	3
Veterinary surgeons.....	682	678	4
Armorer.....	1,012	1,011	1
Saddlers.....	94	93	1
Total noncombatants.....	5,051	5,034	17

Recapitulation.

	1903 (proposed).	1902.
Officers.....	24,358	24,269
Noncommissioned officers and enlisted men.....	576,597	576,400
Noncombatants.....	5,051	5,034
Grand total.....	606,006	605,703

Composition of the general staff.

PRUSSIA.

Chief of the general staff.....	1
Aids.....	2
General quartiermeister.....	1
Oberquartiermeister.....	3
Chiefs of section in the great general staff, or chiefs of the general staffs at general headquarters and in large fortresses.....	34
Captains and field officers.....	182
Railway commissioners:	
Field officers with rank and allowances of regimental commanders.....	3
Field officers with lesser rank.....	16
Captains, first class.....	3
Retired (penalontirte) officers, field officers, or captains.....	5

SAXONY.

Chiefs of the central section, or chiefs of the general staff at general headquarters.....	3
Chief of section of land survey with rank and allowances of regimental commander.....	1
Captains and field officers.....	15
Railway commissioners; field officers.....	2

WURTEMBERG.

Chief.....	1
Captain and field officers.....	4
Railway commissioner; field officer.....	1

BAVARIA.

Chief of the general staff of the army.....	1
Chief of section in the general staff.....	1
Chiefs of the general staffs at general headquarters.....	3
Officers, captains, and field officers.....	22
Railway commissioners:	
Field officers.....	5
Captain.....	1

GREAT BRITAIN.

Abstract of army estimates, 1902-1903.

Vote Nos.		Net estimate, 1902-03.	Net estimate, 1901-02.	Net expenditure, 1900-01.
	I.—NUMBERS.			
A	Number of men on the home and colonial establishments of the army, exclusive of those serving in India.....	420,000	450,000	
	II.—EFFECTIVE SERVICES.			
1	Pay, etc., of army (general staff, regiments, reserve, and departments).....	£18,940,400	£23,063,500	£16,201,361
2	Medical establishment: Pay, etc.....	1,025,000	1,068,600	1,185,341
3	Militia: Pay, bounty, etc.....	1,381,000	2,772,000	2,160,388
4	Imperial yeomanry in Great Britain: Pay and allowances.....	585,000	375,000	180,984
5	Volunteer corps: Pay and allowances.....	1,287,000	1,230,000	1,789,233
6	Transport and remounts.....	11,242,000	17,977,000	23,630,328
7	Provisions, forage, and other supplies.....	16,066,000	20,266,000	19,795,317
8	Clothing establishments and services.....	3,970,000	4,825,000	5,140,704
9	Warlike and other stores: Supply and repair.....	8,332,000	13,450,000	13,918,085
10	Works, buildings and repairs: Cost, including staff for engineer services.....	2,190,000	3,281,000	3,711,342
11	Establishments for military education.....	120,800	119,200	106,899
12	Miscellaneous effective services.....	110,800	218,200	*107,242
13	War office: Salaries and miscellaneous charges.....	332,000	306,000	313,033
	Total effective services.....	65,582,000	†88,970,500	88,025,713
	III.—NONEFFECTIVE SERVICES.			
14	Noneffective charges for officers, etc.....	1,786,000	2,271,000	1,740,210
15	Noneffective charges for men, etc.....	1,747,000	1,485,000	1,382,164
16	Superannuation, compensation, and compassionate allowances.....	195,000	188,500	188,089
	Total noneffective services.....	3,728,000	3,944,500	3,310,413
	Balances irrecoverable and claims abandoned.....			7,418
	Total effective and noneffective services.....	69,310,000	92,915,000	91,343,544

* Excess of receipts over expenditures.

† Including supplementary estimate of £5,000,000.

The provision for ordinary and war services is as follows:

	1902-03.	1901-02.
For war service:		
South Africa.....	£39,650,000	*£61,070,000
China.....	350,000	2,160,000
For ordinary service.....	40,000,000	63,230,000
	29,310,000	29,685,000
	69,310,000	92,915,000

* Including supplementary estimate of £5,000,000.

BUDGETS.

The following statement showing approximately the revised amounts required under the various votes in view of the conclusion of peace as compared with the provision made in the estimates submitted to Parliament, with explanations of the differences, was issued as a parliamentary paper November 6, 1902:

Vote.	Allocation of amount provided in estimates.	Allocation now required.	Less than original estimate.	More than original estimate.	Remarks.
1. Pay, etc., of army	£9,990,000	£14,690,000		£4,700,000	This excess is made up roughly as follows: Pay of general staff (including field intelligence), regular troops, etc., including gratuities of pay on demobilization. £2,300,000 War gratuity 2,000,000 Wages of civilian subordinates 500,000 4,700,000
2. Medical establishments	600,000	600,000			
3. Pay, etc., of militia	620,000	870,000		350,000	This excess is on account of gratuities of pay, etc., to militiamen on demobilization.
6. Transport and remounts	10,000,000	6,860,000	£3,150,000		This net reduction is made up as follows: Saving on land transport. £680,000 Saving on purchase of remounts 1,600,000 Additional receipts for sale of horses, mules, oxen, etc. 2,600,000 4,680,000 Less excess on sea transport. 1,500,000 3,180,000
7. Provisions, forage, etc.	12,080,000	10,780,000	1,250,000		} The saving on these three votes arises partly from the earlier cessation of hostilities and partly from additional receipts.
8. Clothing	2,485,000	1,985,000	500,000		
9. Stores	2,980,000	2,480,000	500,000		
10. Works, etc.	645,000	895,000		350,000	This excess is mainly on engineer services in the field and accommodation for officers. The excess would have been larger but for additional receipts to be derived from the sale of huts, blockhouses, etc.
12. Miscellaneous	40,000	240,000		200,000	The deficit arises mainly on compensation for losses, bank commission, medals, etc.
13. War office	60,000	60,000			
14. Non-effective charges (officers)	245,000	645,000		400,000	The excess is for gratuities, etc., on cessation of hostilities, to officers who had been reemployed from the retired or the reserve list, etc.
15. Non-effective charges (men)	55,000	55,000			
Total	39,650,000	40,250,000	5,400,000	6,000,000	
Net excess				600,000	

Note.—It is anticipated that the net excess of £600,000 over the amount provided can be met by savings on normal services mainly arising on Votes 3, 4, and 6.

Local military forces of various kinds are maintained by almost all the British colonies and protectorates. Usually their affairs are managed by the colonial secretary, but the protectorates of Central Africa, East Africa, Uganda, and Somaliland are controlled by the foreign office, which is directing the military operations against the Mullah in Somaliland carried on by the local forces, reenforced by Indian troops. The formal statement was made in the House of Commons, October 28, 1902, that the whole cost of the operations will be borne by the Somaliland protectorate funds, supplemented by an imperial grant in aid. For this year £25,000 has already been voted, and an additional sum will probably be necessary; if so, it would be borne by the civil estimates, like the original grant.

Composition of the general staff.

	Numbers.	
	1902-03.	1901-02.
Generals.....	5	3
Lieutenant generals.....	6	7
Major generals.....	28	27
Brigadier generals.....	21	9
Colonels on the staff.....	36	32
Deputy adjutants general.....	1	3
Assistant adjutant general.....	26	32
Deputy assistant adjutants general.....	57	67
Assistant quartermasters general.....	15	-----
Deputy assistant quartermasters general.....	24	-----
District inspectors of musketry.....	13	13
Brigade majors or staff captains.....	46	34
Assistant military secretaries and senior aids-de-camp.....	10	5
Aids-de-camp.....	44	42
Quartermasters.....	6	5
	338	279
Aids-de-camp to the King.....	6	6
Lieutenant of the Tower of London.....	1	1
Major of the Tower of London.....	1	1
Recruiting staff:		
Chief recruiting staff officer.....	1	1
Recruiting staff officers, Class I.....	1	1
Recruiting staff officers, Class II.....	10	10
Conducting staff sergeants, etc.....	31	31

The above is exclusive of the headquarters staff at the war office, which consists of the commander in chief, 1 private secretary, and 5 aids; military secretary, 4 assistants (1 for Indian affairs, paid by India), and 1 staff captain; director general of mobilization and military intelligence, assistant quartermaster general for mobilization, 1 deputy assistant, and 1 staff captain; adjutant general to the forces, 1 deputy, 5 assistants, and 4 deputy assistants; inspector general auxiliary

forces; inspector general of recruiting, 1 assistant, and 1 deputy assistant adjutant general; inspector general of cavalry; inspector general of artillery; director of army schools; quartermaster general to the forces, 1 deputy, 6 assistants, 8 deputy assistants, 1 military transport officer, and 8 staff captains; inspector general of remounts; chief paymaster; inspector general of fortifications, 2 deputies, and 5 assistants, 1 artillery adviser, 3 inspectors, and 7 officers of royal engineers; director general of ordnance, 1 deputy, 2 assistants, 4 deputy assistants, 1 staff captain; chaplain general; director general army medical service, 1 deputy, 1 assistant, 2 deputy assistants; a total of 96 officers.

Number of men on the regular establishment, exclusive of India.

	Officers.	Warrant officers, sergeants, and other enlisted men.	All ranks.	
			1902-03.	1901-02.
REGIMENTS.				
Cavalry:				
Householdregiments..	3	564	13,717	14,271
Lineregiments..	19			
Artillery:				
Horse artillerybatteries..	19	1,541	38,047	39,642
Field artillerybatteries..	116			
Mountain artillerybatteries..	3			
Garrison artillerycompanies..	83			
Engineers:				
Field unitsbatteries..	32	708	9,430	10,138
Telegraph divisions	3			
Fortress units	24½			
Submarine mining units	14			
Railway companies	3			
Survey companies	4			
	80½			
Infantry:				
Foot guardsbattalions..	10	3,517	115,825	119,342
Linebattalions..	112			
Line depotsbattalions..	68			
Army service corps	490	6,621	7,111	7,074
Royal army medical corps	616	3,045	3,661	3,596
Colonial corps	387	12,450	12,637	14,435
Departmental corps	272	2,830	3,102	2,820
Total regimental establishments	8,085	201,965	210,060	210,911
STAFF OF AUXILIARY FORCES.				
Honorable artillery company	1	4	5	5
Imperial yeomanry (home)	59	295	354	172
Militia artillery *	61	813	874	751
Volunteer artillery	67	349	416	417
Militia engineers †		128	128	118
Volunteer engineers †		99	99	90
Militia infantry *	252	3,525	3,777	3,776
Volunteer infantry	228	1,326	1,554	1,514
Militia medical staff corps		19	19	17
Volunteer medical staff corps	4	20	24	18
Total staff of auxiliary forces	672	6,578	7,250	6,878
Total regimental and auxiliary forces	8,757	208,543	217,300	217,789

Number of men on the regular establishment, exclusive of India—Cont'd.

	Officers.	Warrant officers, sergeants, and other enlisted men.	All ranks.	
			1903-03.	1901-02.
GENERAL AND DEPARTMENTAL STAFF.				
General staff (including headquarters staff) -----	496	170	606	503
Army pay department -----	236		236	236
Army veterinary department -----	110	8	118	117
Chaplain's department -----	104		104	86
Army medical staff (including headquarters staff) -----	99		99	96
Total staff and departments -----	985	178	1,163	1,036
MISCELLANEOUS ESTABLISHMENTS (EXCLUSIVE OF OFFICERS AND MEN INCLUDED UNDER "REGIMENTS.")				
Staff of military prisons -----	16	230	246	31
Staff of schools for instruction in gunnery -----	31	203	234	227
Staff of school of musketry -----	10	61	71	59
Gymnastic staff -----	16	134	150	150
Royal military academy -----	21	28	49	47
Royal military college -----	28	36	64	63
Other colleges and schools -----	41	64	105	88
Army school establishments -----	16	211	227	223
Ordnance factories -----	17		17	17
Miscellaneous establishments -----	37	37	74	68
Total miscellaneous establishments -----	233	1,004	1,237	973
Grand total -----	9,975	209,725	219,700	219,800
Additional numbers, imperial, colonial, and irregular forces, during the war in South Africa, and the expedition to China -----			200,300	230,200
Number to be voted -----			420,000	450,000

* Including Channel Islands and Colonial militia.

† Including submarine mining militia for Malta and Bermuda.

‡ The 6 officers are in the establishment of royal engineers.

§ The 21 officers are in the establishment of royal engineers.

Establishment of British regiments serving in India.

	Officers.	Warrant officers, sergeants, and other enlisted men.	All ranks.	
			1902-03.	1901-02.
Cavalry of the line, 9 regiments -----	261	5,374	5,635	5,635
Artillery:				
11 horse batteries -----	517	13,710	14,227	13,407
42 field batteries -----				
3 howitzer batteries* -----				
8 mountain batteries -----				
28 garrison companies -----				
Engineers -----	320	3	323	333
Infantry, 52 battalions -----	1,508	52,180	53,688	53,688
Army medical corps -----	332		332	332
Inspectors ordnance machinery, armorers, etc. -----	6	117	123	123
Total -----	2,944	71,384	74,328	73,518

* One of these batteries will not be sent to India until 1903-04.

NOTE.—In addition to the British army stationed in India, there is a native army, consisting, according to the latest returns at hand, of 2,168 European officers and noncommissioned officers, and 153,081 native officers and men. The expense of maintenance of these troops is borne by the revenues of India. It is not included in the British army estimates, unless these troops are used for service in the British Empire outside of India.

Establishment of the militia, 1902-03.

Arm of service.	Permanent staff.		Militia.		All ranks.		Enrolled July 1, 1901.	
	Officers.	Warrant officers, sergeants, and other enlisted men.	Officers.	Sergeants and other enlisted men.	1902-03.	1901-02.	Permanent staff.	Militia.
Garrison artillery	52	671	523	17,376	18,622	18,622	718	14,678
Field artillery	5	118	12	297	432		137	366
Engineers	* 4	113	108	2,131	2,352	2,299	100	2,132
Infantry	243	3,408	2,821	102,940	109,413	109,801	3,398	83,908
Medical staff corps		19	20	880	919	817	7	228
Channel Islands militia	8	75	148	3,040	3,271	3,271	75	2,750
Malta militia	* 4	74	66	2,180	2,324	2,324	64	2,009
Bermuda militia	* 1	7	9	390	407	407	5	211
Total force	313	4,485	3,307	129,234	137,739	137,641	4,504	106,282
		4,798		132,941				110,786

* Two adjutants and 2 quartermasters of militia engineers are included in the establishment of royal engineers; 2 additional officers of royal engineers are on the permanent staff of the submarine mining militia of Malta and Bermuda.

Imperial yeomanry.

	Permanent staff.		Yeomanry.		All ranks.
	Officers.	Sergeants.	Officers.	Noncommissioned officers and men.	
Establishment of yeomanry, 1900-01	19	148	702	11,088	11,907
Establishment of yeomanry, 1901-02	59	295	1,434	33,276	35,164
Present at training, 1900	18	123	462	8,064	8,657
Present at training, 1901	33	144	537	10,382	11,096
Enrolled on January 1, 1902	28	231	860	16,288	17,407

Volunteers.

	Permanent staff.		Enrolled members.		All ranks, including permanent staff.
	Adjutants.	Acting sergeant majors, and sergeant instructors.	Officers.	Noncommissioned officers and men.	
Honorable artillery company	1	4	45	864	904
Artillery	67	349	2,232	49,366	52,014
Engineers	21	99	839	18,628	19,587
Infantry, including Bermuda	228	1,326	8,151	261,061	270,786
Volunteer medical staff corps	4	20	124	3,330	3,478
Total	321	1,798	11,391	333,259	346,789
		2,119		344,650	

Number of officers and men on the regimental establishments of the army, army reserve, and auxiliary forces.

	Normal establishments, all ranks.		Effectives, all ranks.	
	1902-03.	1901-02.	Numbers by latest returns.	Period of latest returns.
Regular forces, regimental, home and colonial -----	205,430	207,215	232,263	Jan. 1, 1902.
Native Indian regiments -----	4,620	3,696	†10,461	Do.
Army reserve, first class -----	80,000	90,000	2,398	Do.
Militia, including permanent staff and old militia reserve -----	131,737	131,539	106,853	Do.
Militia reserve, new -----	50,000	50,000		
Militia of Channel Isles -----	3,271	3,271	2,825	July 1, 1901.
Militia, Malta and Bermuda -----	2,731	2,731	2,191	Jan. 1, 1902.
Yeomanry, including permanent staff -----	35,164	35,000	17,407	Do.
Volunteers, including permanent staff -----	346,769	375,000	277,396	Do.
Total home and colonial establishments -----	859,722	896,452	744,794	
Regular forces, regimental, on Indian establishment -----	74,328	73,518	63,598	Jan. 1, 1902.
Total -----	934,050	971,970	808,752	

* Including imperial yeomanry, 16,730, and enlisted volunteers, 5,400.

† Including 5,067 with China expedition.

‡ Exclusive of colonial forces serving in South Africa.

BUDGETS.

	Cavalry.		Artillery.				Engineers.		Infantry (excluding colonial corps).		Army medical corps.		Colonial and native Indian corps.				Ordnance and pay corps.	Total, all ranks.	
	Number of regts.	All ranks.	Home.	Field.	Mountain.	Garrison.	All ranks.	Number of companies.	Number of battalions.	All ranks.	Officers.	Men.	Infantry.	Local artillery.	Local engineers.	All ranks.			
Home	19	12,900	19	112	2	45	31,623	61	7,911	88	90,086	6,644	460	2,384		2,567	154,465		
Colonies and Egypt:																			
Mediterranean—																			
Gibraltar						7	1,766	4	418	3	3,086	89	16	80		65	5,470		
Malta						9	2,239	3	350	6	7,067	71	24	141		65	10,692		
Cyprus										1	123	1	1	6		4	184		
Africa—																			
Cape and Natal	2	1,186		3		2	895	2	338	12	12,168	125	26	170		102	15,010		
Mauritius						2	347	1	133	1	1,012	5	7	35	2	2,048	3,601		
St. Helena						1	169		32	1	4	4	1	4		10	517		
Sierra Leone						1	177		18	14	6	14	6	16	2	2,344	2,578		
Egypt	1	639		1	1		351	1	116	4	4,092	100	17	94	1	71	6,503		
Americas—																			
Halifax						2	632	2	179	1	1,012	13	6	14		29	1,784		
Equinault						1	211	1	116	1	5	5	1	6		10	348		
Bermuda						3	672	3	282	1	1,017	12	8	24		47	2,062		
Jamaica							66		66	5	376	5	7	18	2	18	1,741		
Barbados and St. Lucia						1	222		34	4	636	9	8	19	4	1,600	1,542		
Asia—																			
Ceylon and Straits Settlements						4	716	1	228	2	2,024	12	13	40	2	1,480	4,552		
Hongkong, Weihaiwei, etc						4	737	1	212	1	1,012	11	12	44	1	2,364	4,537		
Various stations, not specified									34	1	1,012				11	1,610	2,656		
Total, Colonies and Egypt	3	1,725		4	1	38	9,260	19	2,554	34	34,587	467	160	700	6	12,837	62,835		
India	9	5,635	11	45	8	28	14,227	1	323	62	53,688		832			123	74,323		
Grand total	31	20,260	30	161	11	111	65,110	81	10,668	174	178,361	7,111	952	3,064	20	6	12,837	3,225	291,628

* Native Indian battalions. † 1 battalion West India regiment and West African regiment. ‡ 4 companies West India regiment and the Chinese regiment.

Indian army expenditures and estimates.

	Accounts 1900-01.	Revised esti- mates 1901-02.	Estimates 1902-03.
INDIA.			
Effective services:	<i>Rupees.*</i>	<i>Rupees.*</i>	<i>Rupees.*</i>
Regimental pay and allowances.....	7, 18, 58, 256	7, 07, 01, 000	8, 84, 91, 000
Supply and transport.....	3, 90, 48, 972	3, 90, 76, 000	4, 18, 20, 000
Ordnance.....	71, 02, 726	86, 83, 000	1, 24, 62, 000
Other heads.....	3, 26, 38, 785	3, 20, 52, 000	3, 39, 02, 000
Total.....	15, 06, 48, 739	16, 04, 12, 000	17, 66, 75, 000
Noneffective services.....	91, 03, 829	88, 24, 000	92, 06, 000
Total India.....	15, 96, 52, 568	16, 92, 36, 000	18, 58, 80, 000
In pounds sterling.....	£ 10, 843, 505	£ 11, 315, 767	£ 12, 392, 000
ENGLAND.			
Effective services:			
Pay and furlough allowances of British forces in India, Indian troop service, stores for India, and other heads.....	<i>£.</i> 2, 064, 376	<i>£.</i> 2, 452, 500	<i>£.</i> 2, 871, 700
Noneffective services:			
Retired pay, pensions, etc., of British forces for ser- vices in India; noneffective and retired officers of the Indian service, etc.....	2, 384, 918	2, 361, 100	2, 401, 000
Total England.....	4, 449, 294	4, 813, 600	5, 272, 700
Total India and England.....	15, 082, 790	16, 129, 867	17, 864, 700
Total receipts, India and England.....	† 817, 374	899, 200	829, 267
Net expenditures and estimates.....	14, 265, 416	15, 230, 167	16, 835, 433

*A crore is ten millions, a lakh, one hundred thousand. These terms are used in the notation of sums in rupees. The exchange value of the rupee is fixed by the government at 16d.—fifteen to the pound sterling.

† Receipts are from such sources as discharge purchase money, balances due deserters, sales of damaged stores, condemned horses, etc.

A considerable saving was made in 1900-01, due to the absence of the Indian contingents in China and South Africa. This permitted special expenditures for six batteries of German guns, 20,000 Lee-Enfield guns, 300 artillery horses, an additional field howitzer battery, four general hospitals for the field army, improvements in rest camps, etc., a total of £425,000.

New expenditures for 1901-02 were also sanctioned for the rearmament of the native army, the reorganization of the transport service, purchase of Maxims for the field army, and new 10-pounder guns for mountain batteries, increase of two howitzer batteries and one garrison artillery company, formation of schools for mounted infantry, the addition of one British officer to each native Indian regiment, etc. The total cost of the measures involving new expenditure exceeds £944,000, in addition to £118,000 provided in the military works estimate.

CHANGES IN THE INDIAN ARMY.

General Sir Edwin Collen, military member of the Indian viceroy's council in March, 1901, presented to the council,

with his memorandum on the Indian military estimates for 1901-02, a statement of important measures for the improvement of the army and of the defense of India since 1885.

In that year many such measures were carried out or commenced, for example, the military forces were increased as follows:

	Cavalry.	Artillery.	Infantry.	Total.
British troops.....	1,332	1,373	7,962	10,667
Native army.....	4,704	3,000	11,968	19,672

The improvement of the coast and frontier defense was inaugurated in the same year. The defensive works at Aden were in progress until 1897.

COAST AND FRONTIER DEFENSES.

The expenditures for works and armaments for coast defense at Aden, Karachi, Bombay, Hooghley, Burma, and other points were 2,69,62,203 rupees, including floating defenses at Bombay, consisting of seven first-class torpedo boats, two torpedo gunboats, and two turret ships armed with 8-inch breech-loading guns. The floating defenses were, in 1890, placed conditionally under the control of the admiralty.

The northwest frontier defenses may be divided into three main groups, those of the Bolan Pass and Peshin Plateau, those for the defense of the Khyber Pass and its debouchure, and those for the strengthening of certain strategical points in rear, and for the protection of arsenals and supply depots. The works have been completed and the armament provided, the whole cost, including that for strategic railways, roads and bridges, being 15,83,25,647 rupees.

In 1886 a plan to provide reserves for the native army was adopted. The scheme, modified from time to time, in 1899 furnished from 60 to 280 reservists per regiment.

A force of military police was raised in 1886-87-88 in Bengal and Bombay for service in Burma, making a total of 18,500 men. Other measures were increases of pay and of pensions for wounds for native troops. Two additional native mountain batteries were raised in 1886 and one in 1898.

An improved system of recruiting for the native army through the agency of special staff officers at recruiting centers, in each of which a depot was established, was introduced into the Bengal army in 1892, in the Bombay command

in 1896, and in Madras in 1900. The principal changes sought have been the gradual elimination of inferior castes, the formation of entire regiments on the class system where practicable, and the reduction of the number of different class companies in one regiment.

In the Bombay army in 1891 two regiments were localized as frontier (Baluchistan) regiments, and later these regiments were reorganized, each regiment having four classes, two companies in each class. In the Madras army in 1892 two regiments, the thirtieth and thirty-first, were broken up and reorganized as the fifth and sixth Burma battalions, and in 1894 the twenty-ninth Madras infantry was converted into the seventh Burma battalion. These local battalions were largely made up from the Burma military police, at that time in course of reduction.

BRITISH TROOPS.

Among measures affecting British troops may be mentioned the improvement of regimental institutes, the establishment of a great many hutted camps in the hills for the occupation of troops during the hot season, the improvement of the water supply, and the adoption of rules for the administration of cantonments, and the application of electricity in punkah-pulling and for the lighting of soldiers' barracks. The transformation of the barracks into cooler, better lighted, and more cheerful quarters will greatly ameliorate the condition of the British soldier whose health is affected by the discomforts of the extremely trying hot weather in many parts of the country.

During 1893 the British infantry was supplied with the Lee-Metford rifle; by 1899 the British cavalry had the Lee-Enfield carbines, and the artillery the converted Martini-Enfield artillery carbines.

In 1889 the horse and field artillery were rearmed with 12-pounders. Cordite ammunition has since been gradually introduced, followed by the spade brake, Grenfell sights, tray system of carrying ammunition, and the assimilation of all carriages and wagons to one pattern.

India has been divided into six circles for purposes of artillery command. In 1891 the number of men for coast and frontier defense was increased by the addition of 25 men to each of the 23 garrison artillery companies.

Other recent measures for the improvement of the military situation are the extension of the steel factory at Cossipore, so as to allow of the manufacture of the steel required for projectiles, fuzes, gun carriages, etc., the establishment of factories for the manufacture of gun carriages at Jubbelpore; of clothing, harness, saddlery, and equipments in southern India; of cordite at Wellington, and for the filling of lyddite shells at Kirkee. The establishment of a small-arms factory has been decided on with the view of making India independent of England in the matter of warlike stores. The South African war made such large demands on the manufacturing establishments in England that the rearmament of the native army and the volunteers with the 0.303-inch rifle has been much delayed.

In 1888 the country was redistricted, the number of generals' commands being reduced from 33 to 30. The districts were divided into first-class, commanded by major generals, and second-class, commanded by colonels with the temporary rank of brigadier generals. The staff was also reorganized, the adjutant general's and the quartermaster general's departments being consolidated.

In 1891 the Indian staff corps was formed by the amalgamation of the Bengal, Madras, and Bombay staff corps, and in 1895 the presidential army system was finally abolished, the Bengal army was subdivided into the Bengal and Punjab commands, and the Madras and Bombay armies were formed into two commands, the Quetta district going to Bombay and Burma to the Madras command. The whole army of India, consisting of the Punjab, Bengal, Madras, and Bombay commands, each under a lieutenant general, was placed directly under the commander in chief in India, controlled by the government of India. The staff of each command was rearranged and as far as possible assimilated.

During the period under review there was also a reorganization of the military accounts department, of the ordnance department, and of the intelligence branch of the quartermaster general's department, sections being added thereto for the Hyderabad contingent, and for Burma. Changes were also effected in the department of military works, employment in which is to be the normal duty of royal engineer officers, and to be considered as regimental duty. This follows the lines of the system in force in the imperial service

at home and in the colonies, adapted to suit the reorganization of the army in India into four commands.

The military authorities are constantly endeavoring to improve the sanitation, health, and comfort of the army. Some of the measures involve large expenditures, such as improvements in hospitals, water supply, and drainage of cantonments, increasing the number and extending the operations of grass and dairy farms. These latter give a greater supply of fresh beef, butter, and milk, while, incidentally, cattle breeding is improved and fodder production increased so that eventually all the fodder required by the mounted branches will be supplied from these farms.

In 1886 a plan of mobilization by army corps was adopted for service beyond the frontier, and by divisions or brigades of all arms, according to circumstances, for service in India or beyond sea. This was changed in 1890 to the system of mobilizing by divisions. The basis of the plan is mobilization by stations, i. e., certain stations are designated from which the troops are withdrawn to form the field army. Funds have been provided from time to time to facilitate mobilization arrangements.

TRANSPORTATION.

After prolonged consideration of the subject of transport, induced by the experience of the Chitral and Tirah expeditions, a scheme was formulated in 1899 for the maintenance of several organized transport units, including those purchased or hired in time of war, and for an accurate census of owners of suitable animals and rates for hire of men and animals.

The complement of transport developed in 1885 was increased in 1891 by 2,000 mules at a cost of 8 lakhs. A further increase of 1,750 mules was sanctioned in 1896 in connection with the provision of mobilization equipments for the divisions of the field army, and again by 2,000 mules in March, 1900. The measures then adopted were an increase of 26 officers to the transport service, the organization of permanent cadres of mule and camel corps, and pony-cart trains; the creation of a permanent registration staff, and the formation of a reserve of drivers.

When complete the established strength will be 54 transport officers, 92 warrant and noncommissioned officers, 277

native officers, 149 veterinary assistants, 943 artificers, 21,226 drivers, 21,934 mules, 5,393 camels, 6,600 bullocks, 594 ponies, and 7,067 transport carts.

At the date of General Collen's report the actual strength was much below the establishment, a considerable amount of transport having been sent to South Africa and to China. His successor, General Sir Edmond Elles, in the following year states that 12 cadres of pack mules have been organized, capable of rapid expansion into full corps of 840 mules each; 9 cadres of camel corps, whose owners serve on the silladar system, have been formed which can be expanded quickly into complete corps of 1,068 camels each, and 2 cadres of pony carts, which, when mobilized, will give two full cart trains of 1,164 ponies and 580 carts each. This makes a small but valuable nucleus of efficient transport, and the system will be extended before long to the rest of the standing transport.

Established strength of the European and native army of India, exclusive of native artificers and followers, for 1900-01.

	Bengal command.		Punjab command.		Madras command.		Bombay command.		Total.	
	Officers.	Men.	Officers.	Men.	Officers.	Men.	Officers.	Men.	Officers.	Men.
EUROPEAN ARMY.										
Artillery	147	4,456	122	4,342	66	12,680	136	13,666	490	15,264
Cavalry	87	1,788	87	1,788	58	1,192	29	586	261	5,364
Infantry	493	17,080	406	14,062	250	10,040	319	11,044	1,508	52,228
Engineers, staff corps, etc.	363	17	309	---	177	27	209	38	1,068	52
Total	1,090	23,341	924	20,192	610	13,849	693	15,644	3,317	72,926
NATIVE ARMY.										
Artillery	4	256	29	1,867	4	256	---	---	37	2,379
Cavalry	100	6,250	156	9,845	30	1,848	---	---	359	22,625
Infantry	218	22,115	374	37,519	288	27,329	73	4,682	1,129	111,399
Bodyguard, sappers and miners, etc.	56	1,668	---	---	59	1,647	39	24,436	154	4,265
Total	378	30,189	559	49,231	381	31,080	361	30,168	1,679	140,668
Total European and native army	1,468	53,530	1,483	69,423	991	44,929	1,054	45,712	4,996	213,594
										219,690

* Includes 456 native drivers who are fighting men.

† Includes 301 native drivers who are fighting men.

‡ Includes 1,304 native drivers who are fighting men.

§ Includes 287 native drivers who are fighting men.

ITALY.

Military budget for the fiscal year ending June 30, 1903, compared with that of the previous year.

Branch of the service.	1901-02.	1902-03.
ORDINARY EXPENDITURES.		
	<i>Lira.*</i>	<i>Lira.*</i>
War ministry.....	2,487,940	2,452,440
Pensions.....	35,333,000	35,069,000
Staffs and inspection departments.....	3,930,700	4,037,000
Infantry.....	64,671,100	63,667,600
Cavalry.....	12,043,000	11,889,700
Artillery and engineers.....	23,654,200	23,383,800
Royal carabineers.....	26,400,100	26,388,100
Corps of invalids and veterans.....	176,600	184,700
Medical services.....	5,234,800	5,562,400
Commissariat, subsistence companies, and accountants in administrative departments.....	2,668,800	3,218,400
Military schools.....	2,627,100	2,753,500
Disciplinary companies and military penal establishments.....	1,005,500	803,700
Military geographical institutes.....	452,600	444,000
Personnel of department of military justice.....	397,000	400,100
Allowances to officers on waiting orders, unattached, etc.....	702,500	679,000
Allowances for officers' quarters, traveling expenses of officers and civil employes, maneuvers, etc.....	4,155,000	4,155,000
Clothing and equipment.....	18,415,300	18,370,900
Provisions.....	13,676,600	14,330,800
Forage.....	17,144,000	17,596,000
Barracks.....	3,917,400	4,189,700
Care and repair of mobilization stores.....	89,000	89,000
Remount service.....	4,564,000	4,374,000
Ordnance department.....	6,706,000	6,496,000
Engineer stores and works.....	5,554,600	5,544,400
Rent of real estate and water mains for military use.....	1,040,000	1,040,000
Expenses of department of military justice.....	27,000	27,000
Expenses for the Savoy and other military orders.....	110,500	86,500
Reimbursements for transfers and other special missions.....	84,000	86,000
Legal expenses.....	59,000	59,000
Periodical bounties to engineer officers depending on the Henry legacy.....	1,260	1,260
National target practice.....	600,000	600,000
Allowances to needy families of men recalled to the colors.....	100,000	100,000
Total.....	258,028,600	258,069,000
EXTRAORDINARY EXPENDITURES.		
Allowances to civilian employes, unattached and supernumerary.....	16,000	8,000
New military institutes and establishments.....	200,000	
Small arms and ammunition.....		2,000,000
Repair and transport of mobilization stores.....		300,000
Fortifications and works of defense.....	3,860,000	14,623,000
Rent of government property in use in the service of governmental departments.....	6,848,532	6,804,753
Total.....	10,924,532	23,825,753
Total ordinary and extraordinary expenditures.....	268,953,132	281,894,753

*One lira equals \$0.193.

Strength of the army according to the budget for 1902-03.

Branch of the service.	Officers.	Non-commissioned officers and men.
War ministry	65	
General staff and inspectorates	535	
Infantry (96 regiments of the line, 12 regiments bersaglieri, 7 Alpine regiments, each of 3 battalions of 4 companies)	7,532	127,456
Cavalry (24 regiments, each of 6 squadrons)	1,013	21,411
Artillery (24 regiments field, each of 8 batteries; 1 horse, of 6 batteries; 1 mountain, of 12 batteries; 1 brigade, 4 batteries; 3 regiments of fortress, 3 regiments and 1 brigade coast)	2,390	23,298
Engineers (5 regiments, 1 brigade railroad troops)		
Carbineers	597	24,470
Corps of invalids and veterans	11	17
Medical service	358	1,521
Commissariat	357	1,457
Military schools	315	1,111
Disciplinary companies and military penal establishments	68	1,550
Military geographical institute	15	
Military justice	16	
Unemployed, on leave, etc.	145	
Total	13,426	213,211

Composition of the general staff and staff corps, active and unemployed.

	Number.	
	1901-02.	1902-03.
General staff:		
Lieutenant generals	52	50
Major generals	92	91
Staff corps:		
Colonels	23	18
Lieutenant colonels	47	
Lieutenant colonels and majors		45
Majors	22	
Captains	62	74
Total	296	278

JAPAN.

Military budget for the fiscal year 1902-03.

ORDINARY EXPENDITURES.

	Yens.*
War department.....	241,584
Army :	
Pay.....	10,630,582
Office expenses.....	712,151
Maintenance of buildings.....	609,353
Contingent fund.....	5,881
Legal expenses.....	2,509
Travelling expenses.....	1,200,456
Miscellaneous.....	1,156,099
Allowances.....	628,352
Expenses of officers sent abroad.....	118,568
Provisions.....	7,466,619
Clothing.....	4,308,741
Arms and ammunition.....	3,572,618
Horses.....	3,493,262
Maneuvers.....	1,083,826
Invalids.....	393,145
Necessaries for troops.....	882,136
Allowances for retired officers.....	70
Prisoners.....	47,323
Military mapping.....	6,545
Imperial escort.....	1,215
Transportation.....	872,489
Secret expenses.....	121,600
	37,008,549
Gendarmerie.....	1,070,504
Colonial troops.....	153,520
Memorial services.....	7,550
Total ordinary expenditures.....	38,481,707

EXTRAORDINARY EXPENDITURES.

Fortifications.....	2,921,772
Construction of barracks and stores.....	250,082
Surveys.....	248,922
Improvement of military establishments.....	2,471,688
Manufacture of ordnance.....	1,644,528
Expenses for temporary construction service.....	47,574
Pacification of insurgents in Formosa.....	50,000
Special corps.....	247,655
Post-bellum settlement of Chino-Japanese war.....	10,370
Compilation of history of Chino-Japanese war.....	50,831
Special rewards.....	73,687
Total extraordinary expenditures.....	8,017,119

*One yen equals \$1.50.

COMPOSITION AND STRENGTH OF THE ARMY ACCORDING TO THE BUDGET OF 1901-02.

The composition is as follows:

Infantry, 52 regiments (156 battalions).

Cavalry, 17 regiments (51 squadrons).

Artillery—

19 regiments field artillery and mountain artillery
(114 batteries, 6-gun).

6 regiments and 2 independent battalions fortress
artillery.

Engineers, 13 battalions sappers, 1 battalion railroad
troops.

Train, 13 battalions.

Gendarmerie, 13 sections.

The numerical strength is as follows:

Officers and employees, 8,116.

Enlisted men, 135,533.

Horses, 18,880.

Guns, 456.

MEXICO.

Military budget for the fiscal year July 1, 1902, to June 30, 1903, compared with the previous year.

ESTIMATES (IN MEXICAN MONEY).

Branch of the service.	1901-02.	1902-03.
Office of secretary of war	\$59,335.75	58,135.75
General staff, transport service, etc.	504,926.21	526,175.21
Military headquarters of tactical units, military zones, forts, and prisons	189,747.30	201,510.50
Engineers and technical troops	853,539.49	927,369.74
Artillery and ordnance	1,252,731.59	1,270,797.74
Cavalry	2,418,172.85	2,427,011.53
Infantry	4,710,617.44	4,568,248.69
Medical department, veterinarians, etc.	489,261.53	492,502.32
Administration of military justice	469,075.40	469,075.40
Department of rolls, accounts, and special services	104,080.23	107,280.43
General expenses	1,580,000.00	1,580,000.00
War expenses in Yucatan	500,000.00	500,000.00
Total	13,122,687.79	13,128,107.22

Strength of the army, November, 1902.

Arm of the service.	Officers.	Non-commissioned officers and men.
Infantry (28 battalions of 4 companies each, 4 skeleton battalions, 2 regional companies)	902	15,740
Cavalry (14 regiments, 4 skeleton regiments)	589	6,817
Artillery (2 regiments of field artillery, 1 regiment mountain artillery, 1 regiment horse artillery, 1 squadron of small-caliber rapid-fire guns, 1 machine-gun company, 1 local battery, and 3 local sections)	149	1,584
Engineers (1 general park, 1 bridge-train company, 1 telegraph section, 1 battalion of 4 companies of sappers)	47	665
Ordnance department	76	306
Transport service (1 squadron of 2 companies)	11	41
Medical corps	139	293
Veterinary corps	17	-----
Army and general staff, personal staff of president, supreme military tribunal, military college, invalid corps, etc.)	1,380	486
Total	3,310	25,931

COMPOSITION OF THE GENERAL STAFF.

The personnel of the general staff consists of a general of brigade or a "general brigadier;" the latter is an intermediate grade between a general of brigade and a colonel and the title is usually shortened to "brigadier." This officer is the chief of the corps in the office of the secretary of war. There are

also 6 colonels, 8 lieutenant colonels, 17 majors, and 24 senior captains.

The number of junior captains and lieutenants in the corps, either in peace or war, is not fixed, but will depend upon the exigencies of the service according to the judgment of the war department, depending on the consideration that there should always be enough officers to supply the four divisions of the Mexican army, over and above the number required in the departmental service.

RUSSIA.

Military budget for 1903 and 1902.

Branch of the service.	Estimates for 1903.	Estimates for 1902.
	<i>Rubles.*</i>	<i>Rubles.*</i>
Central administration	5,332,806	2,959,084
Local administration	9,984,968	9,788,542
Technical services and schools	11,115,717	10,190,825
Medical service and hospitals	4,671,306	4,380,077
Clothing and equipment	21,533,805	20,446,800
Rations	50,216,135	48,688,061
Forage	19,900,496	18,896,819
Pay	73,686,424	71,901,505
Rent and maintenance of buildings	21,465,141	22,135,895
Building expenses	20,165,062	24,809,179
Manufacture and improvement of artillery and supplies	11,671,635	12,493,872
Field and garrison artillery target practice	3,040,438	2,965,064
Transportation, traveling expenses, couriers, and dispatches	11,892,499	11,857,047
Expenses of conscription	1,445,146	1,480,895
Exercise of reserve troops and militia	2,860,498	2,647,306
Expenses of the governorship general of Turkestan	1,398,248	1,404,452
Maintenance of separate corps of gendarmes	5,191,066	4,943,878
Rewards and relief fund	4,015,209	4,111,333
Deductions, allowances, and grants toward the formation of pension fund	5,533,187	5,391,674
Extraordinary expenses	867,443	612,243
Expenses of the Kwangtung Peninsula	5,835,621	7,088,539
Rearmament	24,588,983	17,887,610
Miscellaneous expenses	2,939,790	2,755,211
Reserve fund	4,076,384	4,707,806
Expenses on account of the budget for 1904	8,595,000	8,595,000
Total for ministry of war	329,923,806	322,638,537

* One ruble equals \$0.515.

Normal peace strength of the army in 1902.

Arm of the service.	Officers.	Men.
Infantry :		
5,826 companies, including 5 machine-gun and 21 disciplinary companies.....	24, 176	662, 300
Cavalry :		
467 squadrons and 323 sotnias	5, 171	127, 772
Artillery :		
479 foot batteries.....	5, 978	161, 505
50 horse batteries.....		
30 howitzer batteries.....		
20 mountain batteries.....		
5 sortie batteries.....		
78 flying parks.....		
Engineers, etc. :		
95 field sapper and 13 fortress sapper companies.....	1, 307	33, 912
28 companies and 1 detachment field telegraph and 7 detachment fortress telegraph troops.....		
16 pontoon companies.....		
35 railroad companies.....		
7 field engineer and 2 fortress engineer parks.....		
14 submarine-mining companies (of which 2 are river submarine).....		
6 balloon detachments.....		
1 instructional balloon park.....		
Corps military topographers.....		
Local troops.....		
Fortress gendarmarie.....	19	335
Hospitals.....	6	8, 627
Clergy.....		490
Prisons.....	67	110
Military school office.....	115	2, 106
Minister of war.....	88	75
There are in addition to the normal strength.....	605	* 74, 423
Grand total.....	38, 412	1, 076, 458
The above is inclusive of the Kwangtung troops of.....	318	15, 606

* Of which about 10,000 are artillery and the remainder infantry.

Besides these troops of the active army there are the following:

Gendarmarie.....	15, 000
Frontier guards.....	35, 000
Manchuria railway guards.....	16, 000
Recruits drawn for 1902.....	306, 245
Officers passing from the active army to the reserves.....	625
Opoichenie or militia :	
Infantry.....	1, 280
Cavalry.....	80
Artillery.....	40

General staff.

Generals.....	53
Lieutenant generals.....	107
Major generals.....	121
Colonels.....	223
Lieutenant colonels.....	177
Captains.....	267

DISTRIBUTION OF THE ARMY.

MILITARY DISTRICT, ST. PETERSBURG.

Guard corps; headquarters, St. Petersburg.
 First army corps; headquarters, St. Petersburg.
 Eighteenth army corps; headquarters, Dorpat.

MILITARY DISTRICT, FINLAND.

(Headquarters, Helsingfors.)

Two independent infantry brigades, Russian.
 Fifty-fifth regiment of dragoons, Russian.

MILITARY DISTRICT, VILNA.

Second army corps; headquarters, Grodno.
 Third army corps; headquarters, Vilna.
 Fourth army corps; headquarters, Minsk.
 Sixteenth army corps; headquarters, Vitebsk.
 Twentieth army corps; headquarters, Riga.

MILITARY DISTRICT, WARSAW.

Fifth army corps; headquarters, Warsaw.
 Sixth army corps; headquarters, Warsaw.
 Fourteenth army corps; headquarters, Lublin.
 Fifteenth army corps; headquarters, Warsaw.
 Nineteenth army corps; headquarters, Brest-Litovsk.
 First cavalry corps; headquarters, Warsaw.
 Second cavalry corps; headquarters, Warsaw.

MILITARY DISTRICT, KIEF.

Ninth army corps; headquarters, Kief.
 Tenth army corps; headquarters, Kharkof.
 Eleventh army corps; headquarters, Rovno.
 Twelfth army corps; headquarters, Vinnitza.
 Twenty-first army corps; headquarters, Kief.

MILITARY DISTRICT, ODESSA.

Seventh army corps; headquarters, Simferopol.
 Eighth army corps; headquarters, Odessa.

MILITARY DISTRICT, MOSCOW.

Grenadier corps; headquarters, Moscow.
 Thirteenth army corps; headquarters, Smolensk.
 Seventeenth army corps; headquarters, Moscow.

MILITARY DISTRICT, KAZAN.

Orenburg Cossacks; headquarters, Orenburg.
 Ural Cossacks; headquarters, Uralsk.
 Astrakhan Cossacks; headquarters, Astrakhan.

MILITARY DISTRICT OF THE DON.

Don Cossacks; headquarters, Novocherkask.

MILITARY DISTRICT OF THE CAUCASUS.

(*Headquarters, Tiflis.*)

First Caucasian army corps; headquarters, Alexandropol.

Second Caucasian army corps; headquarters, Tiflis.

Kuban Cossacks; headquarters, Ekaterinodar.

Terek Cossacks; headquarters, Vladikavkaz.

MILITARY DISTRICT, TURKESTAN.

(*Headquarters, Tashkent.*)

First Turkestan army corps; headquarters, Tashkent.

Second Turkestan army corps; headquarters, Askabad.

MILITARY DISTRICT, SIBERIA.

(*Headquarters, Omsk.*)

Thirteen battalions; headquarters, Omsk.

MILITARY DISTRICT OF THE AMUR.

(*Headquarters, Khabarovka.*)

First Siberian army corps; headquarters, Nikolsk-Usurisk.

Second Siberian army corps; headquarters, Khabarovka.

Transbaikal Cossacks; headquarters, Chita.

Amur Cossacks; headquarters, Blagoveshchensk.

Usuri Cossacks; headquarters, Vladivostok.

MILITARY DISTRICT, KWANGTUNG.

(*Headquarters, Port Arthur.*)

Sixteen battalions; headquarters, Talienwan and Port Arthur.

SPAIN.

*Military budget for 1902.**

Central administration :	Pesetas. †
Personnel	2, 992, 048
Material	333, 600
Provincial administration :	
Personnel	10, 232, 575
Material	384, 157
Army proper and auxiliary forces.....	66, 904, 504
Recruiting	100, 000
General officers, including those unassigned, and of the reserve.....	3, 282, 180
Personnel on duty away from their arms or on special services.....	1, 804, 600
Substitute and supernumerary officers, and liquidation commissions of the colonial armies.....	13, 351, 601
Military instruction.....	2, 523, 096
Penal establishments.....	123, 915
Subsistence.....	16, 315, 710
Quarters, light, and fuel.....	2, 151, 532
Camping.....	25, 000
Hospitals.....	2, 955, 912
Transportation.....	1, 031, 030
Horse breeding and remount service.....	2, 237, 484
Artillery material.....	5, 600, 000
Engineer stores.....	4, 809, 000
Various and unforeseen expenses.....	310, 000
Military orders with pensions for rewarding special merit.....	295, 210
Bounties for enlistment and reenlistment.....	5, 000, 000
Rent of buildings for military uses.....	310, 288
Civil guard.....	21, 595, 461
Obligations from previous fiscal years.....	4, 654, 679
Total.....	169, 283, 552
Budget for 1901.....	148, 993, 659
Increase for 1902.....	20, 289, 893

* From Gaceta de Madrid, July 7, 1901.

† Peseta equals \$0.103.

*Strength of the Spanish Army.**

	Officers.	Enlisted men.	Total.
Army proper :			
General officers.....	253		253
General staff corps.....	239		239
Royal corps of halberdiers.....	40	255	295
Infantry.....	7, 039	45, 725	52, 764
Cavalry.....	1, 678	12, 250	13, 928
Artillery.....	1, 292	13, 142	14, 434
Engineers.....	585	4, 384	4, 969
Civil guard.....	995	18, 554	19, 549
Carabineros (customhouse guard).....	653	14, 171	14, 824
Fortress staff corps.....	37		37
The train.....	8		8
Corps of veterans.....	146		146
Total.....	12, 965	108, 481	121, 446
Auxiliaries :			
Military justice.....	105		105
Chaplains.....	335		335
Administrative service.....	980	1, 460	2, 440
Sanitary service—			
Surgeons.....	612		612
Pharmacists.....	137		137
Veterinarians.....	205		205
Military equitation corps.....	76		76
Military offices.....	340		340
Brigade of workers and topographers of the general staff.....	14	386	400
Hospital brigade.....	38	881	919
Fortress wardens.....	112		112
Total.....	2, 954	2, 727	5, 681
Grand total.....	15, 919	111, 208	127, 127
Reserve officers.....	8, 123		8, 123

*Anuario militar de España, 1902.

COMPOSITION OF THE SPANISH ARMY.*

Infantry:

64 regiments, having each 2 four-company battalions; armed with Mauser, model 1893, caliber 7 millimeters. Strength of 1 battalion: Peace—23 officers and 326 enlisted men; war—27 officers and 1,000 men.

57 regiments of reserve.

20 battalions of rifles. Strength of 1 battalion: Peace—23 officers and 716 enlisted men; war—27 officers and 1,001 men.

Cavalry:

28 regiments. Strength of 1 squadron: Peace—5 officers and 100 enlisted men; war—5 officers and 150 enlisted men.

14 regiments of reserve.

Artillery:

17 regiments of field and mountain artillery, each regiment consisting of 4 batteries. Strength of 1 battery: 4 officers, 71-98 enlisted men; 6 guns.

10 six-company battalions of fortress artillery. Strength of 1 company: 4 officers and 88 enlisted men.

1 regiment of siege artillery.

4 companies of artillery workers.

8 depots of reserve artillery.

Engineer troops:

4 regiments of sappers.

1 regiment of pontoniers.

1 railway battalion.

1 telegraph battalion.

1 balloon company.

1 brigade of topographers.

1 company of engineer workers.

8 depots of reserve engineer troops.

Administrative troops:

16 companies.

Hospital corps:

19 companies.

Strength and composition of the general staff of the Spanish army on January 1, 1902.†

Colonels	31
Lieutenant colonels	63
Majors	77
Captains	68
Total	239

* Almanach de Gotha, 1902.

† Anuario militar de España, 1902.

SWITZERLAND.

Military budget for the fiscal year 1903 compared with the previous year.

Branch of the service.	1903.	1902.
I. Administration:	<i>Francs.</i>	<i>Francs.</i>
A. Personnel of administration.....	1,186,168	1,082,606
B. Personnel of instruction.....	1,383,665	1,346,163
C. Instruction.....	12,652,778	12,583,423
D. Clothing.....	3,436,479	3,584,752
E. Armament and equipment.....	1,884,981	1,711,260
F. Indemnities to officers for equipment.....	458,652	444,210
G. Cavalry horses.....	2,627,876	2,554,812
H. Subsidies to volunteer firing clubs and military societies.....	1,059,200	1,041,350
J. War material.....	1,484,968	610,000
K. Military establishments and fortifications.....	39,300	123,000
L. Fortifications.....	986,735	949,804
M. Topographical service.....	479,075	346,850
N. Allowances of pay after death.....	40,000	40,000
O. Commissions and experts.....	15,000	15,000
P. Printing.....	120,000	120,000
Q. Landsturm.....	32,000	32,000
R. Cost of administration of the supply of wheat.....	35,000	35,000
S. Allowances for horse depot.....	71,980	70,268
T. Insurance of military persons.....	556,000	571,000
U. Unforeseen expenses.....	2,500	2,500
II. Powder works administration.....	615,000	656,100
III. Horse depot.....	666,980	620,268
IV. Construction shops.....	358,850	462,000
V. Military powder factory.....	702,340	713,680
VI. Ammunition factories at Thun and Altorf.....	4,620,000	3,813,000
VII. Arms factory.....	1,581,600	1,487,400
Total.....	37,096,927	34,865,335

Strength of the Swiss army on January 1, 1902.

[REPORTED BY MAJ. G. R. CECIL, UNITED STATES MILITARY ATTACHÉ AT BERN.]

	Officers.	Non-commissioned officers and men.
Cavalry:		
<i>Élite—</i>		
Guides, 12 companies.....	71	1,439
Dragoons, 24 squadrons.....	161	3,098
Maxims, 4 companies.....	12	189
<i>Reserve (landwehr)—</i>		
Guides, 12 companies.....	22	491
Dragoons, 24 squadrons.....	47	2,083
Total cavalry.....	313	8,200
Artillery:		
<i>Élite—</i>		
Field artillery, 56 batteries.....	574	10,606
Fortress artillery, 14 companies.....	122	2,339
Position artillery, 10 companies.....	93	1,956
Mountain artillery, 4 batteries.....	36	928
Train troops.....	56	1,810
<i>Reserve—</i>		
Park artillery, 16 companies.....	106	3,430
Position artillery, 16 companies.....	96	2,778
Fortress artillery.....	7	113
Mountain artillery, 4 columns.....	13	368
Train troops.....	59	3,865
Depot park, 8 companies.....	61	1,956
Total artillery.....	1,222	30,148

Strength of the Swiss army on January 1, 1902—Continued.

	Officers.	Noncom- missioned officers and men.
Engineers:		
<i>Elite—</i>		
Sappers, 18 companies.....	179	3,524
Pontoniers, 4 divisions (abtheilungen).....	51	1,061
Pioneers, 8 companies.....	44	1,036
Balloon troops, 1 company.....	5	125
<i>Reserve—</i>		
Sappers, 16 companies.....	45	2,574
Pontoniers, 2 divisions.....	21	577
Pioneers, 8 companies.....	22	736
Total engineers	307	10,247
Infantry:		
<i>Elite, 106 battalions</i>	2,904	116,351
<i>Reserve I, 37 battalions</i>	1,066	41,065
<i>Reserve II, 37 battalions</i>	576	21,686
Total infantry	4,536	179,102
Sanitary service:		
<i>Elite, 40 ambulances</i>	248	1,637
<i>Reserve—</i>		
40 ambulances.....	107	711
3 sanitary trains.....	9	176
5 transportation columns.....	15	323
8 hospital sections.....	88	748
Total sanitary troops	467	3,594
Administration corps:		
<i>Elite, 8 companies</i>	42	1,341
<i>Reserve, 8 companies</i>	36	765
Total administration troops	78	2,106
Staffs	1,123	663
Landsturm:		
Armed infantry, 420 companies.....	1,703	41,935
Armed artillery, 23 companies.....	109	2,650
Total armed landsturm	1,812	44,785
Nonarmed landsturm (aid troops).....		237,257
RECAPITULATION.		
Cavalry, elite and reserve.....	313	8,200
Artillery, elite and reserve.....	1,222	30,148
Engineers, elite and reserve.....	307	10,247
Infantry, elite and reserve, I and II.....	4,536	179,102
Sanitary service, elite and reserve.....	467	3,594
Administration corps, elite and reserve.....	78	2,106
Staffs.....	1,123	663
Total strength of the army, elite and reserve	8,046	234,060
Landsturm (armed), infantry and artillery.....	1,812	44,785
Landsturm (nonarmed), aid troops.....		237,257

No changes have been made in the organization or armament since January 1, 1902.

II.—FIELD ARTILLERY.

[COMPILED BY FIRST LIEUT. H. B. FERGUSON, CAPT. OF ENGINEERS.]

During the year Sweden and Switzerland, after experiments extending through several years, have adopted the barrel-recoil Krupp field gun. Denmark has selected the same gun.

Austria-Hungary, Great Britain, and, of the lesser powers, Belgium, Brazil, Holland, Greece, and Turkey, continue to experiment.

The guns adopted in 1900 by Russia and Italy are being constructed at the home factories. Some have been issued to the troops. Germany retains her gun on rigid carriage. France is alone in having her field artillery actually armed with rapid-fire barrel-recoil guns with shields.

The relative merits of the two types of guns—carriage recoil and barrel recoil—have been discussed at great length, especially in Germany. The question of shields has been prominent, the issue being between (1) no shields, (2) 7.5-centimeter gun with about 3-millimeter shields, and (3) a lighter, 5-centimeter, gun with heavier shields.

In England the importance of heavy mobile guns even to the exclusion of field guns, except for horse artillery, has been raised. Austria-Hungary has adopted a 10.4-centimeter field howitzer.

EXPERIMENTAL SHIELDS.

KRUPP.—The Krupp firm displayed at the Düsseldorf Exposition three shields for field pieces. These shields, of chrome steel 3 millimeters in thickness, had been subjected to the fire of shrapnel from a 7.5-centimeter piece.

A battery of four pieces provided with shields was formed, an armored caisson rear carriage being placed at the side of them, manikins representing the personnel of the first three pieces. The whole was intended to represent a French field battery in action.

Thirty 7.5-centimeter shrapnel of 6 kilograms in weight, containing steel balls of 10 grams, with bursting interval varying from 30 to 130 meters (an average of 65 meters), were

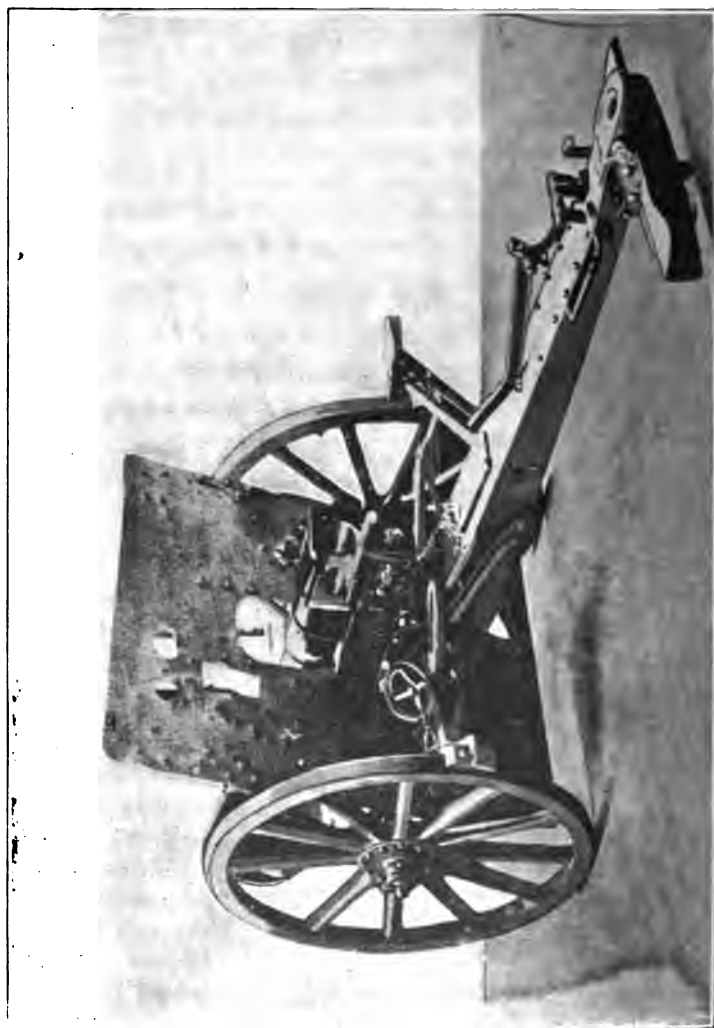


FIG. 1.

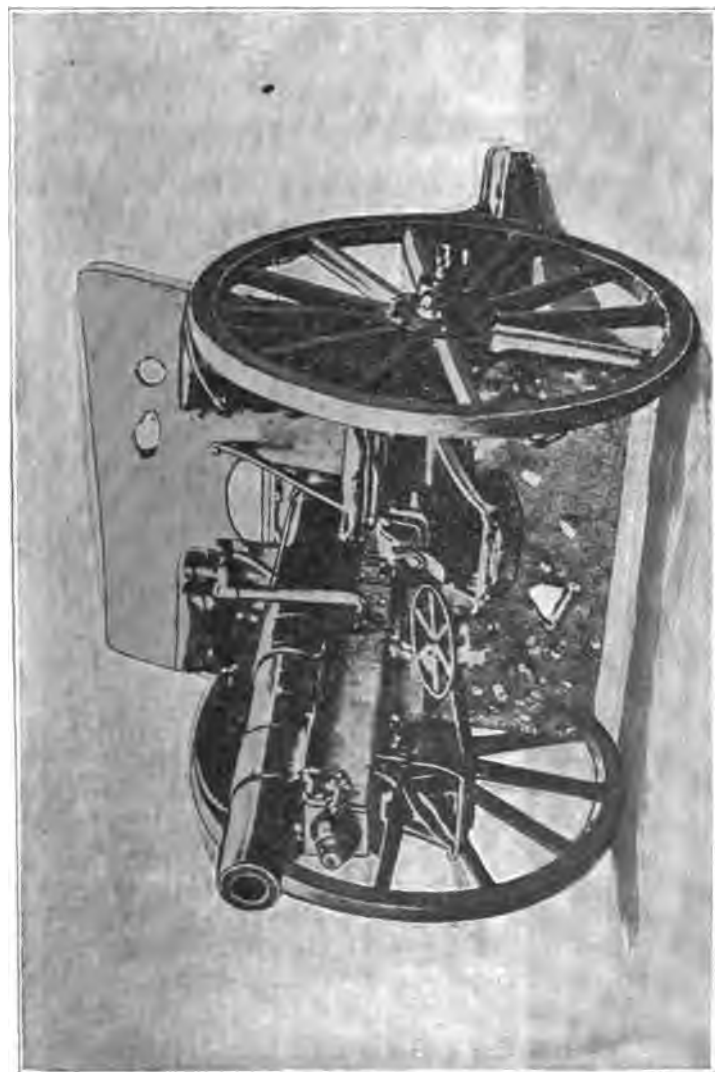


Fig. 2.

fired against this objective with an initial velocity of 500 meters, and at a distance of 3,500 meters. The shields of the carriages received 80 balls; 63 pierced them. Of the 16 manikins (8 erect and 8 seated) placed at the side of the pieces, 13—that is, 81 per cent—were hit. Of the 76 balls which hit the caissons, 13—that is, 17 per cent, piercing the shields—lodged in the wood backing. Nine—that is to say, 75 per cent of the cannoneers kneeling behind the caissons—were hit.

Eleven shrapnel with steel bullets were fired at carriage No. 4, near which no manikins had been placed. The shield was struck by 55 balls; 30—that is, 55 per cent—entirely pierced it.

A series of shrapnel filled with lead balls was fired against the battery at a distance of 2,000 meters. None of the lead balls penetrated the shield; they made only insignificant imprints, showing only the bruise made by the ball, but no sensible depression on the surface of the shield.

In another experiment one piece was exposed to infantry and artillery fire. One hundred and sixteen shots from 7.9-millimeter infantry guns, at distances of 450 and 350 meters, were fired against it, and then 18 shrapnel from rapid-fire field guns at a distance of 2,000 meters. The targets representing the cannoneers were destroyed three times. The shield was hit by various projectiles before their explosion; the wheel of the elevating gear was badly bent, but it was possible to straighten it out again so that it served its purpose sufficiently well. The quadrant sight was carried away; the tire of the left wheel was hit, but the felly below was not smashed; one spoke of the wheel was entirely carried away. With the piece thus damaged it was possible to recommence fire—not a slow fire, but an effective rapid fire.

“EHRHARDT.—The Ehrhardt firm exhibited seven hard-steel plates, two of 3, two of 4, one of 5, one of 6, and one of 7 millimeters in thickness, which had been subjected, first, to a fire of guns of 7.5 centimeters with shrapnel charged with hard-steel balls; second, to a rifle fire of 7.9 and of 6.5 millimeters charged with cartridges with ordinary bullets, with steel bullets, and with lead bullets with steel points; third, to a fire of the Reichenau 5-centimeter gun.

“Even at 1,500 meters the shrapnel with hard balls had effect against only the shields of 3 millimeters; even against

these but a small number of the balls which hit them pierced them. Against the shields of 4 millimeters the balls had no effect at all. The result is contradictory to that obtained in the experiments made by Krupp. Before drawing conclusions it will be well to wait until the exact data concerning these two series of experiments are made known. As to the special rifle projectiles, those of the 7.5-millimeter piece with steel points produced the best effects; they pierced at 300 meters even the shields of 5 millimeters. This is a serious danger for the cannoneers protected by the shields."—*Revue de l'Armée Belge, November, 1902.*

AUSTRIA-HUNGARY.

NEW ORGANIZATION.—According to the new organization, the field artillery will consist of 14 regiments of corps artillery, same as now; 45 regiments of divisional artillery, now 42; 4 divisions of mountain batteries, 1 for the Tyrol, as to-day, and 3 for Bosnia and Herzegovina, now 11 batteries.

The artillery regiments of the corps artillery will each be formed of 2 divisions of field-gun batteries and of 1 division of field howitzers, while the regiments of division artillery will each have only 2 divisions of field-gun batteries.

Each division of field-gun batteries will have 3 batteries of 6 pieces each, in all 36 pieces, until now 32. The increase per division will be 4 pieces, so that for all the corps artillery it will be $2 \times 14 \times 4 = 112$, and for the divisional artillery $2 \times 45 \times 4 = 360$; the total increase being 472 field guns.

The 14 divisions of howitzer batteries will be formed each of 3 batteries of 6 howitzers; that is, in all, of 252 howitzers.

Of the 45 regiments of divisional artillery, 44 will be attached to the divisions corresponding to the infantry troops. The Forty-fifth regiment will form a school regiment, which can also be employed in case of mobilization.

The Tyrol mountain artillery, now 4 batteries of 4 pieces each and 1 reserve cadre, will be 5 batteries of 4 pieces each. The Bosnian and Herzegovinian mountain artillery, now 11 batteries of 4 pieces each, will henceforth comprise 3 divisions of mountain batteries, each formed of 4 batteries of 4 pieces each, necessitating the organization of a new mountain battery of 4 pieces. The grand total of mountain guns will be 68.

In Bosnia and Herzegovina, as well as in the Tyrol, the field batteries for narrow passes are also attached to the

divisions of mountain batteries.—*Revue Militaire Suisse, August, 1902.*

FIELD GUN.—The experiments for the choice of a carriage continue. For this purpose a half million of crowns has been inscribed in the budget of 1902-03. On the other hand, the ammunition and the gun have already been adopted. This latter, in bronze steel, will be provided, according to the Vienna journals, with an eccentric obturator with a screw of the Nemetz system. The experiments will be continued through the winter to test the new guns under variations of weather and temperature, for which tests such an abnormally open winter as the last gave no opportunity. On the result of these experiments depends whether the question can be decided in the spring of 1903 or whether it must be postponed.

MOUNTAIN GUN.—"The new mountain guns of 7.2 centimeters, with which the new batteries of the Tyrol will be armed on October 1 next, were recently experimented with on the firing grounds of Oerkeny (southeast of Budapest). The characteristic of the new piece is a trail spade with a spring, which catches in the ground and limits the recoil from the time the shot is fired. The spring then brings the piece back to its first position. According to the *Reichswehr*, the range of the new mountain gun will be 4,750 meters, and its rapidity of fire can be brought to eight rounds per minute."—*Bulletin de la Presse, etc., June 30, 1902.* All the mountain batteries will be equipped during the winter.

HOWITZER.—The new howitzers are to be made at the Vienna arsenal and of hardened bronze (Uchatius's process). Each of the fourteen army corps is to be provided with three of these new howitzer batteries.

An Austrian artillery officer states that the reasons why bronze instead of steel is used in the manufacture of the guns of the Austro-Hungarian artillery are: First, and most important for his Government, bronze is much cheaper than nickel steel; second, the Austrians believe that they understand the manufacture of bronze better than other people do; and finally, the special bronze of which their guns are made has given satisfactory results.

The caliber is 10.4 centimeters. The weight of the howitzer is to be 395 kilograms, and that of its carriage 550 kilograms. Both shell and shrapnel will be used, the former weighing about 14 and the latter about 12 kilograms. The minimum charge will weigh 0.125 kilogram, which is to give an initial

velocity of 150 meters; the maximum charge will weigh 0.31 kilogram, which is to give an initial velocity of 300 meters. The heavier charge is intended for shrapnel only. The carriages have no shields.

“In the experiments with the new howitzer with the troops, several alterations in the carriage suggested themselves; they are not of an essential nature and do not disturb the carriage system, but only concern small details. In the equipment of the new howitzer batteries, no loss of time has resulted from these alterations, for the carriage model is finished and proven, and patterns have been made by the private firms who are concerned in the furnishing of these carriages. In a short time the announcement of the delivery of the same may follow. It is to be hoped that the construction of the howitzer tubes, as well as of the carriages and of the other material belonging thereto, will have progressed so far that in the spring of 1903 the setting up of the new howitzer may be begun.”—*Neue Militärische Blätter*.

CONSTRUCTION OF BATTERIES.—Regulations have been issued in Austria-Hungary for the construction of batteries in the field. The training for time of peace is prescribed. Chapter I of the regulations gives the fundamental principles of battery construction, definitions, and descriptions of the various elements, including gun platforms. Chapter II concerns the rapid construction and later reenforcement of batteries for field and siege guns. Chapter III gives the principles of the location, grouping, and construction of batteries of attack and their accessories. Chapter IV treats of temporary batteries in fortified places. The appendix contains tables giving the various dimensions, materials, tools and equipment, personnel, and transportation necessary for the above works. Type drawings of the various works are also given, but these and the regulations are intended as a guide, the actual works to be governed largely by local conditions.

FRANCE.

Though newspapers have stated that the secrets of the recoil system of the French gun had been sold by a French soldier, this report has been denied. The *Schweizerische Zeitschrift* of November, 1902, prints the following concerning this brake:

“The recoil energy of the barrel, when a round is fired, is taken up by a hydraulic brake. The return of the barrel is

the result of the expansion of the air compressed in recoil, hence the name hydropneumatic.

“Essentially the arrangement of these parts is as follows: Beneath the gun barrel are three cylinders (Fig. 3), 1 is the cylinder of the hydraulic brake, 2 is the pneumatic recuperator, while 3 is the air reservoir. The three cylinders remain motionless in firing, being firmly fastened to the upper carriage while the piston rod and piston of the hydraulic brake and of the pneumatic recuperator, carried back by the barrel in firing, are drawn out from the cylinder. In the recuperator, 2, and air reservoir, 3, the air is under a certain pressure

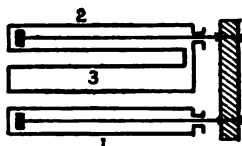


Fig. 3.

which suffices to hold the barrel in place under all conditions. In firing, the air behind the piston of the recuperator and hence that of the channel of connection is still further compressed; after the shot it expands again and thus forces the piston of the recuperator and with it the barrel to its normal position. In this position the mark on the right outer side of the barrel must coincide with the mark on the upper carriage. In addition there is another mark on the barrel which probably indicates the distance which the barrel may remain behind the normal position.”

Commenting on some firing trials with this gun, the *Revue de l'Armée Belge* states that “in practice, even after the first shot has driven in the spade, the derangement of the pointing caused by the following shots is not nil, but requires correction continually.”

The results obtained with a battery of four guns were that in three minutes they swept, without a gap, a breadth of 200 meters and depth of 450 meters at a range of 2,500 meters.

The field artillery has been increased by two batteries, which, with two mountain batteries and four foot batteries, have, by circular of December 6, 1902, been created and form the third regiment of colonial artillery, formerly a skeleton organization.

The French have developed and definitely adopted as essential elements of their system of rapid-firing field artillery,

complete methods for indirect fire and for the supply of ammunition to the fighting batteries.

Officers are still at work on a field howitzer to be lighter than the present 12-centimeter field howitzer.

INSTRUCTIONS FOR THE RESUPPLY OF AMMUNITION IN THE FIELD.*

(Approved August 1, 1902, to replace those of December 9, 1893.)

ARTICLE I.

GENERAL ARRANGEMENT OF THE SUPPLY.

1. The ammunition of an army is distributed as follows: (1) The ammunition of the line of battle; (2) ammunition of the parks of the army corps; (3) ammunition of the grand artillery park of the army.

2. The details of the ammunition of the line of battle and of the corps park are given in table, page 62.

3. **ARMY CORPS PARK.**—The normal army corps park is divided into three parts called "echelons," each commanded by a major and all under the orders of a colonel or lieutenant colonel.

The first "echelon" of a normal army corps park comprises: Three sections of 7.5-centimeter ammunition; one section of 8-centimeter ammunition; two sections of infantry ammunition. The second "echelon" comprises three sections of 7.5-centimeter ammunition; three sections of infantry ammunition. The third "echelon" comprised two park sections and one section for repair.

The units of the first two "echelons" are interchangeable among themselves. All the ammunition of the ammunition sections is carried in the caissons. The park sections carry only the artillery ammunition; this is usually packed in white cases and loaded on the park wagons;† the sections for repair have with them spare 7.5 centimeter guns with chests filled, forges and wagons containing the supplies, and spare parts necessary for repairing the artillery and the equipment of the army corps.

4. **THE GRAND ARTILLERY PARK OF THE ARMY.**—To each army is attached a grand artillery park for the purpose of assuring the resupply of ammunition of the corps parks and to furnish them with the spare pieces and caissons of 7.5 centimeters and with special supplies. It is commanded by a colonel or lieutenant colonel, who is at the same time in command of the artillery along the lines of communication. All the ammunition which it carries is in white cases. The whole amount of the ammunition of the grand park, collected for each one of the army corps, is called a division of the grand artillery park of the army.

Each division of the grand park of the army is divided into four elements (first, second, third, and fourth below), among which are distributed five equal lots of ammunition. The first two elements are arranged for the direct resupply of the army corps:

First. The artillery park of the line of communication has one-fifth of the grand park ammunition, all on transport wagons.

* Only the part referring to artillery ammunition has been translated.

† Some now on caissons of 90, altered, to be replaced.

Second. Depot for first has one-fifth of ammunition packed ready for transportation. This depot may also contain material for repair.

Third. Railway station reserves, which has one-fifth of ammunition.

Fourth. The arsenal reserve has two-fifths of ammunition and one section of the reserve carries spare material and material for repair, 12 guns, 12 caissons, and 19 white boxes of 75 centimeter ammunition.

ARTICLE II.

POSITION OF RESUPPLY UNITS IN MARCHING AND DURING COMBAT.

1. The line of battle is connected with the corps park by the group of "echelons of battery" [battery on war footing minus "fighting battery," line 15, table A, p. 87] at 500 meters or more from the batteries engaged.

2. ARMY CORPS PARK.—In marching, the first "echelon" usually marches at the head of the fighting train (*train de combat*) of the corps. The other parts of the park march at the place indicated in the order for the march.

When engaged in action, the artillery commander, after having received the instructions of the corps commander, designates to the commander of the park the points or zones which would be most convenient to fix upon as the most advanced centers of resupply. According to these indications, or on his own initiative, in case no orders are received, the commander of the park orders the positions of the echelons on the ground and fixes the duties of each.

The ammunition sections will not halt on the way except in cases of absolute necessity; then they will arrange themselves, in file, on the right side, avoiding as much as possible the left side. Whenever possible, they will form a park in the neighboring terrain, leaving openings in all directions. The ammunition sections are marked during the day by a yellow pennon for the infantry ammunition, blue for the artillery ammunition; during the night by lanterns of the same color as the pennons. Where a section leaves the route, a man with a pennon or lantern is stationed. The ammunition sections gather up as much as possible the arms, ammunition, and material of the army abandoned on the field of battle.

The park sections are indicated by blue and yellow signals together on the same wagon.

3. GRAND ARTILLERY PARK OF THE ARMY.—The artillery park of the line of communication is kept, under the command of the director of lines of communication, at such a distance from the army corps that its march is not hindered and that the resupply of the army, if it becomes necessary, may be rapidly effected.

When the line of communication is organized, the artillery park of the line of communication is usually sent to the head of the line of communication (end of railroad).

The depot of the park is placed under the command of the director of the lines of communication of the directing station. The railroad trains, consisting each of a train stationed in the depot situated in the zone of action of the directing commission, supply the army.

The reserves are organized like the preceding echelons, and the arsenal reserve is organized in proportion to the expenditure according to the orders of the minister, which should be solicited if necessary.

ARTICLE III.

PRINCIPLES OF RESUPPLY AND THE NECESSARY CONNECTIONS.

Each resupply unit is strictly charged to keep in touch with the units or troops which are in advance, so that no one will have to look back. The fighting troops especially should be freed from all preoccupation as regards their own resupply.

On the field of battle promptitude should be valued above regularity. When not on the field of battle, both are demanded.

The personnel given in the following table for the communication service should be regarded as a minimum :

The agents.	Communications to be established.	Cases in which they are established.
1 officer -----	Between the general commander of artillery and the commander of the park.	Under all circumstances.
1 noncommissioned officer ---	Between the commander of the park and each one of the colonels commanding the divisional artillery of the corps.	From the time the commander of the park receives the indication of the points or zones of resupply.
1 noncommissioned officer and 1 cyclist.	Between the commander of the park and each one of the echelon commanders under his orders.	Under all circumstances.
1 cyclist (corporal or cannoneer).	Between the second and third echelons of the army corps park.	Under all circumstances.
1 noncommissioned officer and cyclist.	Between the first and the second and third echelons of the army corps park.	Under all circumstances.
1 mounted cannoneer -----	Between the commander of an echelon and each section under his orders.	At the beginning of the march.
1 noncommissioned officer and 1 corporal.	Between each section of ammunition of artillery and the commander of the group of echelons of battery.	From the time the section has received an assignment.
1 corporal -----	Between each section of infantry ammunition or each detachment of that section and the chief artificer of each of the regiments to be resupplied.	From the time the section has received an assignment.

The commanding general of the artillery should also take measures so as to be able to announce without delay to the generals commanding the divisions that ammunition sections, or parts of ammunition sections, are ready to be placed at the disposition of the troops under their orders.

ARTICLE IV.

ORGANIZATION OF THE SERVICE FOR THE RESUPPLY OF AMMUNITION.

1. The general commanding the artillery of the army corps is responsible for the resupply of the troops with ammunition, and gives instructions to the commander of the park.

He informs the general commanding the corps as to the number of sections of ammunition which have been placed at the disposition of the troops engaged. This information is supplemented by that which may be obtained from the troops in the course of action.

2. The commander of the park, guided by the instructions which he has received or requests from the general commanding the artillery, enjoys a

great initiative to assure their execution as far as the means at his disposal allow.

In marching, at a distance from the enemy, he usually commands the park and the convoys of the army corps when they march together. Near the enemy, he usually marches with the first echelon of the park. He may before an engagement and at the order of the general commanding the artillery, march with that general officer.

From the time when he receives from him the orders relative to the various echelons of the park, or when in case of emergency he has himself made choice of the positions, he will then give notice to the commanders of the echelons; then by means of the reconnaissances made by the officers under his orders, or by the officers selected by the general staff of the echelons, he will have the communications with the line of battle made, studying the terrain to the rear of the troops.

As soon as he has received from the general commanding the artillery, after, when there was need, having requested it, the information relative to the placing of the first elements of the grand artillery park of the army, he informs the commander of the last echelon and, if possible, those of the first two.

3. The commander of an advanced echelon of the corps park, after having, according to the order of the commander of the park, conducted his echelon to the point of separation which has been assigned to him, makes sure according to the instructions which have been given him, of the organization of the resupply service of the line of battle, and, in the absence of orders supplies them himself, but he remains always in communication with the commander of the park and renders an account to him of the measures he has taken at his own initiative; he will keep him informed, in particular, of modifications he makes in the placing of the ammunition sections and as to the number of sections of which he makes use.

The terrain surrounding the position which the section occupies should be explained by him and the relation to the neighboring troops, if possible, so that measures of safety may be taken in good time.

He should always have at his disposition at least one artillery ammunition section and one unbroken half section of infantry ammunition. For this purpose he summons, when desired and in succession, the ammunition sections of the echelon which follows him.

After having caused those ammunition sections which were only broken to be filled out as much as possible, he sends to the rear the empty ammunition sections, sending them, according to the orders which he has received, either to the third echelon of the corps park of the army or to the advanced echelons of the grand artillery park of the army.

He takes under his command the ammunition sections which come to him from the rear.

4. The commander of an echelon of the second line of the corps park installs his section at the point which has been assigned to him as his station, sends to the echelon in front the units which are demanded of him and receives under his command the ammunition sections which after resupplying return from the rear.

5. The commander of the last echelon of a corps park installs his echelon at the point assigned him as his station, refills the empty artillery ammunition sections which are sent to him by means of the park sections, or of certain of their divisions which he has received the order to make advance; he takes measures to resupply the sections of the park from the most advanced parts of the grand artillery park of the army, according to the orders which he has received from the commander of the park. If these parts are sufficiently near they may be called to resupply directly the ammunition sections of the artillery. In any case they resupply directly the ammunition sections of the infantry.

The commander of the last echelon takes for the time being under his command the units which have operations to execute at the point where his echelon is stationed and then insures their return to point where the echelon of the second line is stationed.

He sends to the point which has been fixed for him the number of cannons which have been demanded from him by the commander of the park.

6. The director of the grand artillery park of the army is informed at the same time as the corps commanders by the director of the line of communication, of the points where the various elements of the artillery park of the line of communication are connected with the equipment of the army corps. He transmits the orders for execution to the commander of the artillery park of the line of communication, adding thereto the particular instructions and making provision for the personnel which the park of the line of communication should detach for the purpose of reloading the ammunition.

When the routes of communication are organized ammunition depots are made for the branch of the line of communication, the number being increased with the length of the route of communication.

Usually retrograde movements of the wagons of the army corps are avoided and the effort is made to make the ammunition resupply by means of a continuous movement of the wagons of the park of the line of communication from the rear toward the front.

The detachments of the army corps park which come for the purpose of resupplying pass for the time being, as far as concerns this service, under the orders of the director of the grand park.

On the other hand the director of the grand park receives from the director of the line of communication an indication of the points, days, and hours when and where the artillery park of the line of communication should present itself for resupply from the railroad trains.

Under the same conditions as in the case of the artillery park of the line of communication, the railroad trains may be called upon to resupply directly the parks of the army corps.

ARTICLE V.

[This article concerns resupply of infantry ammunition.]

ARTICLE VI.

THE RESUPPLY OF THE 7.5-CENTIMETER ARTILLERY AMMUNITION.

In general the artillery ammunition sections are not divided.

When the captain commanding an ammunition section has been advised as to the troops he is to resupply, he collects before his departure all the

information which concerns the position of the troops. He informs himself as to the position of the groups of echelons of batteries with which he is to enter into communication. He reconnoiters the terrain in the rear of the troop to be resupplied, and establishes there his section in a position favorable to the movement of the wagons, about 1,000 or 1,500 meters from the groups of echelons of battery. He establishes his communications with the commanders of these groups, sending them under the conduct of a guard the number of caissons required, and, eventually, the number of men and horses which he is ordered to furnish; he follows the groups of echelons of battery in their movements, and in that case takes the measures necessary so that the communication agents and the wagons of the section may be able to find them.

When a commander of an echelon of battery has sent the caissons which were demanded, he advises the commander of the group of echelons of battery to which he belongs thereof, and sends back to him a voucher of the ammunition on which he will take care to indicate the number of the battery. The commander of the group of echelons of battery seeks to find the same number on the caissons in the ammunition section with which he is connected.

The commander of the group of echelons of battery distributes among them, according to their needs, the caissons which are sent to him from the ammunition section; each chief of an echelon of battery, aided by a quartermaster sergeant, superintends the resupply. The caissons arriving from the ammunition sections are placed at the side of the empty caissons. The ammunition is reloaded. The rear train of caissons should be filled first.

If one of the firing batteries detaches itself from the group, its echelon follows it; it is accompanied by the communication corporal of the ammunition section. The resupply of the isolated battery is accomplished according to the preceding principles, the chief of the echelon entering in direct relations with the ammunition section.

If the three batteries of the group separate, the commander of the group of echelons of battery takes measures to insure direct communication of each echelon of battery with the ammunition section. He makes use for this purpose of one from the noncommissioned grades of these echelons.

The effort should not be made, during the combat, to reinstate the batteries in their normal effective, but only to furnish them, with the aid of the resources of the echelons of battery, with the men and horses necessary to continue the fire and to take care of all their wagons.

If the resources of the echelons of battery are not sufficient, the men, the horses, and the spare guns are demanded from the general commander of the artillery of the corps of the army by the commander of the division artillery or of the corps.

In this case the horses and the men are furnished by the ammunition section at the same time that they resupply the groups of echelons of battery. The guns are immediately sent directly from the repair section upon the order of the commander of the park as has been indicated in Article IV.

When an ammunition section is about to be exhausted, the captain who commands it informs the commander of the echelon, who takes measures

to have it replaced; when the caissons are empty, he guides them to a separate position and there takes the orders relative to the resupply.

After being resupplied, he returns to place himself with his section under the orders of the commander of the second echelon.

ARTICLE VII.

RESUPPLY OF AMMUNITION FOR THE 8-CENTIMETER HORSE BATTERIES.

The resupply of ammunition for the 8-centimeter horse batteries is made according to the same principles as for the 7.5-centimeter batteries. There are only the following differences:

The caissons of the firing battery are entirely replaced, as well as the personnel which is thereto attached, by a same number of caissons demanded from the group of echelons of battery.

The resupply of the echelon of battery is effected by a reloading of ammunition.

The 8-centimeter ammunition section may be divided, each part being placed under the command of an officer. It may also be detached from the first echelon of the ammunition sections and sent into the zone of the field of battle which borders on that where the independent cavalry operates. In this case the chief of that section remains alone responsible for the resupply of the batteries attached to this cavalry. He resupplies his section after the combat by leading the whole or a part back to the park sections which have been indicated to him as the position of the depots of the grand artillery park from which he shall receive his resupply.

ARTICLE VIII.

RESUPPLY AFTER THE COMBAT.

After the combat the resupply is continued according to the principles given above, at the place if possible, otherwise at the bivouac or cantonment, even during the night. The ammunition supply is filled according to the resources at hand, first the batteries and wagons of the company, then the ammunition sections, and finally the park sections. The cavalry troops of the corps of the army are resupplied with cartridges for portable arms by the ammunition sections of the infantry.

Except under exceptional circumstances and by the special order of the commander of the corps of the army, neither the caissons of the battery nor the wagons of the company are sent to the rear to be resupplied.

ARTICLE IX.

GENERAL RULES CONCERNING THE DELIVERY OF AMMUNITION.

During action, the commanders of battalions or troops isolated for the time being, the chiefs of detachments, the chiefs of groups of wagons of the company, the commanders of batteries or of the echelons of batteries are qualified to sign demands for ammunition. All demands for ammunition are honored immediately, no matter in what form made.

Should a detachment of wagons, or a party, present themselves without a written demand for resupply, the commander nevertheless satisfies the

verbal demand addressed to him. In this case he demands a receipt for the amount of ammunition given out, if possible, entered in the stub book, model No. 3.

When not on the field of battle all of the demands should be countersigned by the chief of the corps or detachment, and for the artillery units by the commander of the group.

The demands should never exceed the known necessities, the chiefs of the corps having always the right to send supplementary demands, if necessary.

The day after the combat, the first thing in the morning, each corps of the infantry troop or the cavalry, each unit of the artillery or of the equipment train, make a list for the purpose of obtaining the amount of ammunition necessary to reestablish the original supply of men and of wagons. These lists, made according to models 1 and 2, are sent through the regular channels to the general commander of the corps of the army and transmitted without delay to the general commander of artillery.

The general commander of the artillery corps of the army makes a summary of these lists; that is to say, a report indicating the condition of the ammunition of the army corps, the material needed, etc. This report is sent to the general commanding the army corps.

If a corps, of which the ammunition is exhausted, is no longer in communication with the parks and finds itself near a fortified place, the governor of this place may not, except upon the special authorization of the minister, resupply it except from the ammunition which he has at his disposal beyond the normal defense supply. He must immediately render an account to the minister of the ammunition which he has given and demand that it should be replaced, if necessary.

Table indicating the distribution of the supply of ammunition in the army corps.

General composition of the ammunition supply.	Infantry—number of cartridges.		Artillery—number of rounds.		
	Carried by—	Per man.	Carried by—	Per piece.	
				Of 7.5 cm. field gun.	Of 9 cm. horse- artil- lery.
Of the line of battle	The men	120.0	The battery chests	312.0	142.0
	The field wagons	65.5			
	The baggage wagons	(2.5)			
	Total	185.5		312.0	142.0
Of the army corps park	First echelon (ammunition sections).	44.2		62.6	355.6
	Second echelon (ammunition sections).	66.2		62.6	
	Third echelon (park sections and section for repair).			64.3	
	Total	110.4		189.5	355.6
	Grand total	295.9		501.5	497.6

GERMANY.

No reports have been published concerning official experiments in Germany, other than vague notes that expensive experiments are being made by the Krupp and the Erhardt firms, and at least part of these experiments are under supervision of the "artillery commission."

"The *Revue Militaire des Armées Étrangères* sums up as follows the state of opinion in Germany:

"There are three parties, each having at its head an eminent officer.

"1. The artillery general, von Hoffbauer, represents the party in statu quo. He believes in the present cannon (M. 1896 with rigid carriage) and that it will be at least twenty years before the new ideas are put into a practical form.

"2. General Reichenau disapproves of the 7.5-centimeter caliber and of the most commended properties of the barrel-recoil carriage; then, rejecting shrapnel also, he disapproves of the firing method based on the dispersion of a great number of shrapnel balls and returns to that method which is based on the effectiveness of single shots carefully aimed. He sacrifices all to the shield, favoring the use of shell only, the reduction of the caliber of the piece to 5 centimeters so as to add the weight gained to the armor plate; he recognizes fully the inefficiency of the shields for the material of 7.5 centimeters.

"3. General Rohne, after having long combatted the barrel-recoil carriage, is to-day an ardent admirer of the French material of 7.5 centimeters. According to him, everything is complete in this material, and if certain parts are adopted, it would be better to take the entire system (batteries with four pieces, wooden caissons, firing regulations, etc.). He says that an imperfect protection is better than no protection at all.

"In short, in Germany the material actually in use (M. 1896) has many partisans, despite the preference which has been shown in certain countries for the barrel-recoil system. As to the reformers, they do not agree among themselves, and the partisans of the French type regard the shields with a certain disfavor. Another factor tending to delay decision is the state of the finances of the Empire."

"After two years of experiments no definite decision has been reached. But if confidence may be placed in the press,

a provisional solution of the problem is to be made. The present gun tube will be retained, as well as the projectiles which would form the most expensive part of a new armament. The carriage alone will be modified. It is estimated that the cost of this change will not exceed 12,500,000 francs. If this is the case, it can not be intended to completely replace the carriage, as this would cost at least three or four times as much, even if the number of pieces in a battery were reduced from six to four. Hence only changes in detail will be made, thus obtaining a delay in which the experiments may be continued. As to what will be the nature of these modifications, opinions are different. Some say that the shields are not desired; others affirm, on the contrary, that the adoption of the shield is the chief motive determining the change. This alone would necessitate the replacing of the entire material, tube and projectiles included. However this may be, Germany will perhaps increase to a small degree the possible rapidity of fire, a certain protection will be assured to the cannoneers, probably at a sacrifice as regards the increased weight; but the piece will only fire a projectile of 6.85 kilograms with an initial velocity of 465 meters."—*Revista di Artileria e Genio*, December, 1902.

The London *Times* of February 20, 1903, says that "the Socialist journal *Vorwärts* states that a short time back a certain number of 3.5-inch guns were sent to the Krupp works for conversion. The expense of the conversion of the whole of the German field guns would reach nearly £2,000,000, including the cost of shields, but there still exists great difference of opinion as to whether these latter are necessary or not."

The light field howitzer seems to have fallen into great discredit. Just what will be the result is not known. Some rumors suggest it will be turned over to the foot artillery, others that it will be modified.

GREAT BRITAIN.

In December, 1902, the experiments with field guns were still being continued. No official announcements have been made public. A description of the Ehrhardt gun, modified, which gun was reported in various papers to have been adopted, is given below.

PAINTING GUNS.—A novel experiment has been made at Aldershot, England, whereby guns have been rendered almost invisible at a little distance. By an ingenious scheme of painting the guns and limbers rainbow fashion with the three primary colors—red, blue, and yellow—they have been found to harmonize with any sort of ground or background so admirably that at a small distance they are difficult to locate. Six guns so painted were placed on the Fox Hills, and the artillery officers at Aldershot were invited to try and locate them at about 3,000 yards with field glasses, and although all knew the direction in which they lay, none were able to pick them all up. Some horse artillery sent forward to engage the guns advanced to within 1,000 yards before they located them. At close quarters the gun appears all daubs and streaks. The idea is said to have been originated by Captain Sykes, of the Yorkshire militia.—*Canadian Military Gazette*.

PAID SPECIALISTS.—A. O. 96, May, 1902, prescribed that among the number of noncommissioned officers and men who may be paid for special duties there shall be: In each battery of horse, field, and mountain artillery, 12 gun layers, of ranks below sergeant. The pay is 3s. per day in addition to ordinary pay.

HEAVY ARTILLERY.—Earl Roberts is reported as saying: “The most important of the many lessons learned in the South African war, to my mind, is the necessity for including heavy long-range guns as part of the equipment of every field army.” Under the heading, “Do we need field artillery?” an article, by General Murray, K. C. B., R. A., appeared in the August and September *Proceedings R. A. Institution*. Among other things, he said: “The demands of peace are always for increased mobility; the demands of war are always for heavier shell power. We have not sufficient fast-moving (horse) artillery for our wants, more especially having regard to the fact that the importance of mobility is receiving increased attention, and that it is probable that in the future we shall have a much more largely increased use of mounted troops than in the past. We have not a sufficient proportion of heavy artillery for our field troops; call this artillery heavy field artillery, position artillery, or what not. I mean guns possessing the maximum of shell power consistent with a sufficient modicum of pace and mobility to keep well up

with dismounted troops. Is it necessary to maintain an intermediate class of artillery, which is too fast for the infantry, and too slow to keep pace with the cavalry?"

THE NEW 15-POUNDER QUICK-FIRING FIELD ARTILLERY GUN.

(FROM "THE ENGINEER," LONDON, MAY 16, 1902.)

We give this week a full description, with detail drawings and illustrations, of the new German quick-firing field artillery gun of 3 inches caliber, together with its carriage, which has been adopted for service in the British army, after a series of exhaustive trials at Oakhampton shooting ranges, during which its power of range and accuracy, as well as the complete success of the arrangements devised for the absorption of the shock of recoil on firing, have been most satisfactorily proved. The difficulties which were encountered at the first onset, as regards the fragile character of the wheels and sundry fractures of the axletree beds and telescopic carriage trails, have been ascertained to be the result only of accidental defects in manufacture or of local weakness in certain features, and such difficulties have been easily remedied.

A technical description of the gun is as follows: The material is nickel steel; total length, 90 inches; average weight, 737 pounds; caliber, 3 inches; length of bore, 85.79 inches, or 28.6 calibers; diameter of chamber, front 3.094 inches, rear 3.153 inches; length of chamber, 8.11 inches; system of rifling, polygroove, twist increasing from one turn in 60 calibers at breech to one turn in 25 calibers at 5.8 inches from muzzle, remainder uniform, one turn in 25 calibers; length of rifling, 77.67 inches; grooves—number 23, depth 0.0295 inch, width 0.237 inch; means of rotation, copper driving band.

The gun is without trunnions, and consists of an *A* tube, over which is shrunk a jacket, secured by a steel screwed ring, *A* (Plate I). Shrunk on the gun are also two steel guide rings, *B* and *C*, the lower portion of the front ring, *B*, being formed to receive the buffer cylinder, which is screwed into it. The portions of the guide rings which bear on the surface of the cradle are of bronze, and, together with a plane formed on the underside of the jacket at the breech, support and guide the gun during its travel on the cradle. The chamber is slightly coned to facilitate extraction of the cartridge case.

The breech is closed by an interrupted screw, divided so that one-tenth turn locks or unlocks it. The center of the breechblock is recessed to receive the firing mechanism, and is formed at its rear end with an interrupted rim, having four projections which engage in corresponding recesses in the carrier. In the rear face of the block is a groove for receiving the head of a securing pin, and in the rim a recess for the locking bolt. Secured by screws to the right of the breechblock is a screwed toothed segment in which a screwed pinion of the hand lever engages.

The carrier *E*, which holds the breechblock, is pivoted to the right side of the breech by the hand-lever pin, and contains the firing mechanism. The rear portion of the carrier is formed at *F* to receive a wedge, by means of which the gun is fired, and is provided at the end with a screw

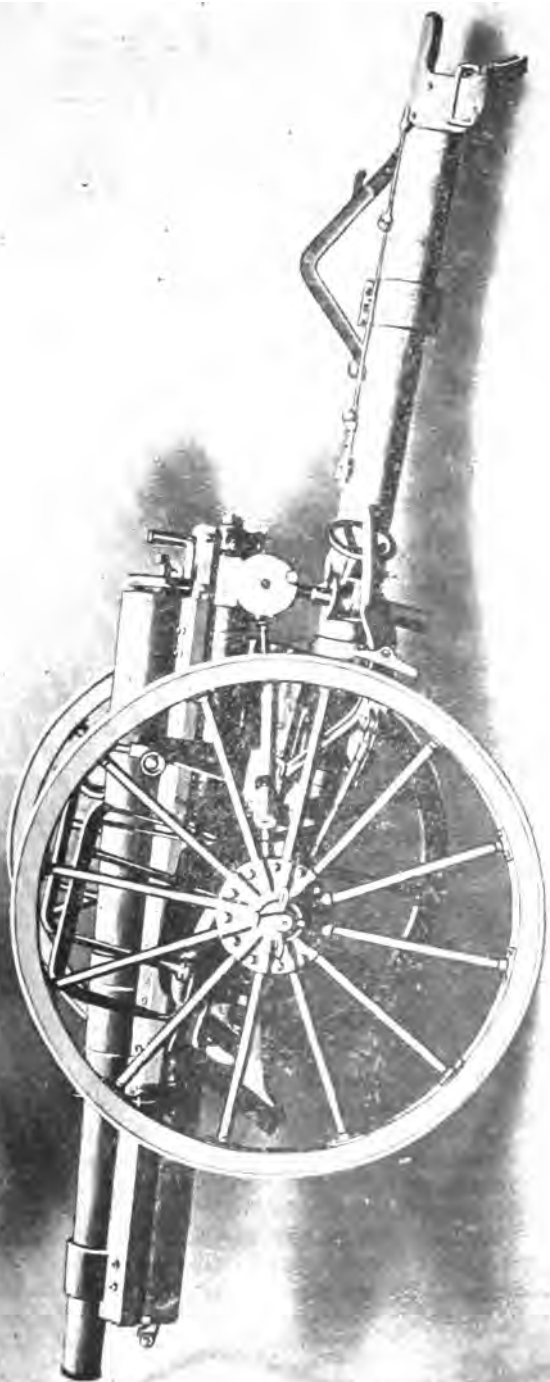


Fig. 4. The new 15-pounder quick-firing field gun (Great Britain.)

cover, which also holds in position a bronze bush, the latter forming a stop for the mainspring of the firing mechanism.

The two hinges of the carrier are provided with projections, *H*, which strike against the short arm of the extractor, and actuate the latter.

On the left of the carrier there is a projection containing a recess for the retaining latch of the hand lever and the locking bolt with a spring and cover screw.

Underneath that portion of the carrier which contains the firing mechanism is a safety arrangement by which the striker may be prevented from moving. The arrangement consists of a pin and spring, the latter being actuated by turning a milled head, *J*, underneath. The letters *F* (fire) and *S* (secure) indicate corresponding positions.

The extractor is pivoted near the carrier hinge by the axis pin; at the end of the extracting arms are studs which engage with the rim of the cartridge.

The firing mechanism consists of the firing pin, with a striker point, which is screwed on it, and secured by a set screw; a striker guide, over which the mainspring is fitted, and a buffer or "rebound" spring at the rear. The striker is provided with a recess for a safety catch, and behind it another recess for the firing wedge. The hand lever *K* is pivoted to the carrier by the axis pin, the latter being provided with a screw. The handle is recessed to receive the small pivoted lever which works the retaining latch, a spring being provided to insure the latch engaging when the breech is closed. The firing wedge is provided with a lanyard, the latter being fitted with a loop—for placing around the neck—and a wood toggle. The action of the mechanism is as follows:

Suppose the gun to have just been fired, on grasping the handle of the hand lever with the right hand, the lever is pressed in, and the retaining latch is thereby clear of the recess in the carrier, so that the hand lever is unlocked. On moving the handle round to the right, the screwed pinion causes the breechblock to revolve till the locking bolt moves forward, locking the breechblock to the carrier. In this position the threads on the breechblock are clear of those in the breech of the gun, so that the continued motion of the hand lever causes both to swing round together. When the block is clear of the breech the carrier strikes the short arms of the extractor, causing the latter to eject the empty cartridge case to the rear. A projectile and a cartridge are then inserted by hand, and on moving the hand lever round to the left, the breechblock, which is still locked to the carrier, enters the breech and forces the projectile and cartridge "home." As soon as the carrier comes against the face of the breech the locking bolt is pressed in, releasing the breechblock from the carrier, so that the continued motion of the hand lever causes the block to revolve by means of the pinion, thus closing it securely in the breech. So soon as the hand lever is quite home, the retaining latch, actuated by the spring, engages in the recess in the carrier. On inserting the firing wedge in the recess, and pulling the lanyard until the wedge is clear, the striker is drawn back and the mainspring compressed, and at the moment of the wedge leaving the recess the striker is released and the gun fired. By a rebound action the buffer spring brings the striker clear of the point of the breechblock. To prevent the gun being fired before the breech is

properly closed the striker is secured by a securing pin, which is only released when the breech mechanism is properly closed.

CARRIAGE.—The principal parts of the carriage are: (1) Upper carriage with (a) hydraulic buffer, (b) running-out springs, (c) sights. (2) Inner carriage. (3) Elevating and traversing gears. The upper carriage consists of a steel cradle, U section, supported in the center by a pivot, which fits into a socket in the axle of the lower carriage, and at the rear by the elevating gear which is attached to the lower carriage. The cylinder of the hydraulic buffer is contained in the cradle, being screwed at the front into the rear lower portion of the front guide ring of the gun. The cradle is closed in front by a steel plate, to which one end of the buffer piston rod is attached, *L*; at the rear it is closed by a steel plate containing a guide box for the cylinder. The cylinder contains in front a gland and stuffing box to prevent loss of liquid.

The rear end of the cylinder is closed by a screw, *M*, having a filling hole and a filling screw. There is also a screwed recess, in the center, for the reception of a spring spanner. The inside of the cylinder has longitudinal grooves of decreasing width, so that the space for the flow of the liquid varies during recoil, the object of the grooves being to insure uniform pressure during the travel.

The liquid to be used to fill the buffer cylinder is best pure glycerin, specific gravity 1.26, and the correct quantity is $8\frac{1}{2}$ pints, the buffer being filled to its capacity. In order to test whether the buffer is filled, the gun is depressed and the filling screw removed, when the glycerin should be seen.

The piston is fixed at the rear end of the piston rod, and in order to control the resistance of the passing glycerin the edges of the front portion are only slightly rounded, while the rear portion is well rounded. In the rear end of the piston is screwed a tube closed at the rear end, and provided with grooves increasing in width toward the rear end. Over this tube comes the cover tube of the cylinder on the rebound, the object being to bring the gun gently into firing position after recoil.

Placed in position around and outside of the cylinder are five sets—of four each—of steel wire springs, *N*, which, after having been compressed in recoil by the action of the front guide ring on the gun, return the gun into the firing position. The five sets of running-out springs are separated from each other by four separating disks.

In the front lower part of the front guide ring is screwed the pressure plate, which, by the forward movement of the gun, moves against an india-rubber buffer, *O*, which also assists in checking the rebound action. The same lettering applies to all three figures, those from *P* to *Y* only being found in the plan illustrated.

The top sides of the cradle are projected by two lengths of sheet steel, to prevent the entry of either dust or rain, into the open space above the springs, shown in the small cross section of the cradle. The two lengths of sheet steel are secured by screws to the guide rings, as seen, and to the plane underneath the breech end of the gun. They are united at the sides, at the breech end of the gun, by a cover plate.

The cradle is sighted on the left side with fore and hind sights, as shown in the illustrations. The foresight consists of a steel pillar, having a

pointed apex with a flat portion on the rear side. The sight is fitted to a bracket on the cradle by means of a taper pin and nut.

The rear sight consists of a curved sight bar, U section, provided with a crosshead, having a notched deflection leaf and traversing screw, giving $1\frac{1}{2}$ degrees deflection right and left, and a sight socket which is fitted to a bracket on the cradle by means of a taper pin and nut. The sight bar is graduated on the rear face with a yard and fuze scale, and on the side face with a degree scale. The front face of the bar is provided with a rack engaging with the pinion in the sight socket. The socket has a milled head, and a drum graduated with a yard scale, which is fitted to the pinion spindle, and serves as a means of adjusting the sight bar. A slot in the outer casing, and an indicator point engraved on the socket, are provided to facilitate reading the scale.

An adjustable level is fitted to the sight bar immediately below the crosshead, and is provided with a rack gearing with a pinion and milled head on the sight bar. The lever may be used as a clinometer.

The lower carriage consists principally of an axle mounted on two wheels, and a tubular telescopic trail. Two seats, with guard irons, are provided for the gun numbers to ride on, and also a seat, *P*, for the layer. In the center of the axle is a socket, *R*, for the reception of the pivot of the upper carriage. The trail is attached to the axle by two arms in such a manner as not to prevent turning motion of the axle. Outside the front portion is a rib, over which two recesses inside the rear portions are guided in closing the trail, the object being to prevent the circular-turning motion of the trail. At the front of the trail, under the breast of the carriage, is a space, *Z*, inclosed by a door, which serves for carrying certain small stores required for the service of the gun. At the rear end of the trail is a traversing lever, *S*, which works in a slot, and can be folded down when not in use. There are also handles for lifting, a trail, *T*, and a spade attachment, *U*. At the front of the rear portion of the trail there is a strengthening ring containing a hole for a securing key, and at the front portion of the trail are two holes for securing key corresponding to the "long" and "short" positions.

The traversing gear, for fine adjustment, is on the left side, and admits of 3 degrees of traverse either way. It is fixed under the rear of the cradle, and is actuated by a handwheel, the whole being supported by a bracket fixed on the head of the elevating screw and by two hollow arms with the axle.

The elevating gear consists of an inner and outer screw, bevel pinion, and handwheel, the whole being supported in a case, and works in bearings attached to the trail.

Fitted to the trail on each side is an arm, *V*, at the end of which is fitted a steel brake block. To each arm is fitted a steel tube, that on the right being screwed, which are connected by a cross arm over the trail in front. On the right side in front of the seat is a handwheel, *W*, and another in rear, *X*. On the left side in front of seat are spring disks, *Y*, by means of which both brake blocks can be put on together when either of the handwheels is turned.

Dimensions and other particulars.

Angle of trail when telescoped out.....	8½ degrees.
Angle of trail when short.....	12½ degrees.
Elevation, maximum, of carriage.....	16 degrees.
Depression.....	10 degrees.
Space required to turn in.....	26 feet, 4 inches.

Weights.

	Cet.	gr.	lb.
Gun with breech mechanism.....	6	2	9
Carriage without gun.....	12	2	0
Limber with 32 rounds ammunition.....	14	2	0
Wagon with 68 rounds ammunition.....	22	1	0
Approximate weight behind traces, gun, and limber, ammunition.....	33	2	9
Wagon and limber, ammunition.....	36	3	0
Pressure of trail on ground.....	141	0	0
Weight at end of pole.....	30	0	0

AMMUNITION AND BALLISTICS—SHRAPNEL SHELL.—Description of bursting charge in shell: F. G. powder in chamber and about ten cylinders of compressed F. G. powder in central tube. Lead bullets, 260; weight about 42 to the pound; diameter about $\frac{1}{2}$ inch; weight of shell filled and fuze, 14 pounds, 5 ounces; weight of empty brass cartridge case, 1 pound 7 ounces; charge in cartridge case, 15.2 ounces of ballistic in cords; maximum time of burning fuze, about twenty seconds; muzzle velocity, at a temperature of 60° F., 1,640 foot-seconds; pressure in the chamber of the gun, about 18 tons per square inch. An elevation of 6° 7' gives an approximate range of 3,600 yards, under the conditions quoted; while the extreme elevation of 16° gives an approximate range of 6,700 yards, or nearly 4 miles. These ballistics, if maintained on service, may be regarded as an admirable exponent of the value of the gun, and of the forethought of our war department authorities, and of their artillery advisers in securing such a powerful and effective field gun.

ITALY.**NEW ORGANIZATION.**

The new organization of the artillery which has been anticipated for a long time took place on the 1st of November. The dispositions fixed upon are the following:

1. Ten commands of field artillery, intrusted with questions of interest to the field and mountain artillery (Milan, Alexandria, Verone, Boulogne, Florence, and Naples). Three commands of coast and garrison artillery (Turin, Plaisance, and Rome), having jurisdiction over the coast and garrison artillery, the arsenals and the manufactories, the foundries and the manufactories of arms, etc.

2. These regiments of field artillery are composed of three groups (brigades) of three batteries each (the 9th battery will be formed at the moment of mobilization).

3. Two independent brigades will be formed, one of mountain artillery for Conegliano, the other of coast artillery for Sardinia in the Magdalen Islands.

4. The direction of the manufactory of arms at Turin will be abolished. This work will pass under the management of the artillery workshop at Turin.

All this will necessitate the nomination of about 40 new lieutenants and of 30 new higher officers.—*Revue Militaire Suisse*

THE NEW FIELD GUN.

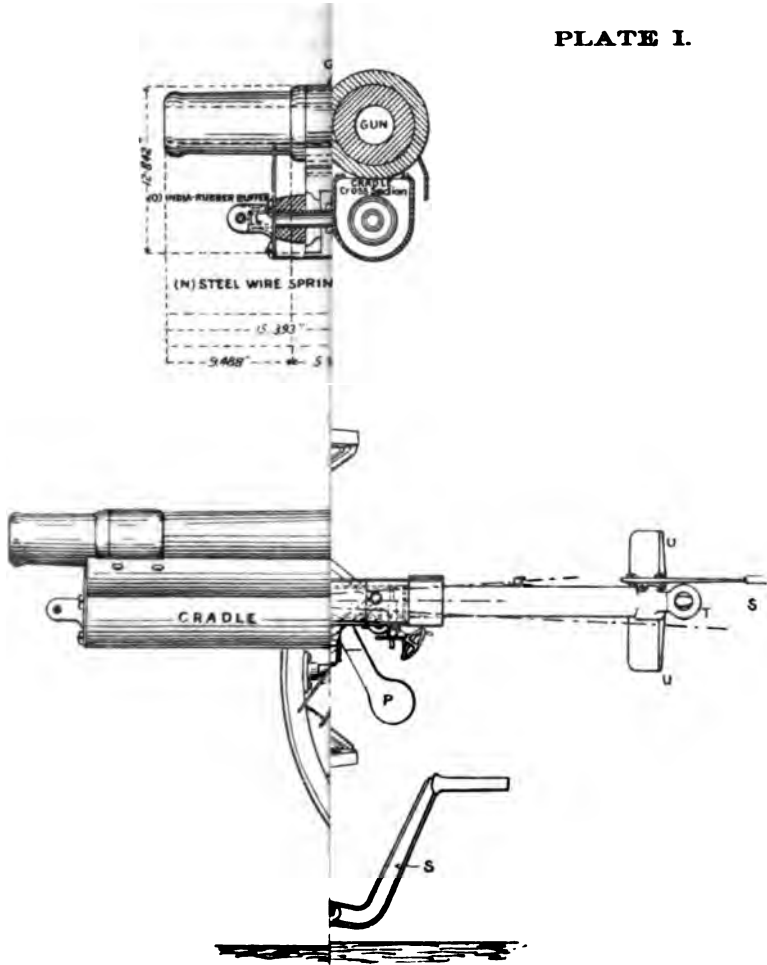
The various changes made in the old material and some data concerning the new material were given in M. I. D. Notes XXXII, 1900, and XXXIII, 1901. The following information is taken chiefly from articles by Captain Kenyon, R. A., in *Proceedings R. A. Institution*, July, 1902, and by Captain Curey, French artillery, in *Revue d'Artillerie* for May and June, 1902, the principal authorities quoted being the various Italian drill and equipment books.

Amid animated discussion, which is not yet ended, a gun with rigid top carriage has finally been adopted. The new material has been distributed to several batteries and officers have been assembled at Nettuno to receive practical instruction with the new pieces. *Corriere della Sera*, November 6, 1902, announces that the new material will be furnished to all the units until the present time equipped with brass 7-centimeter guns; that is to say, to 42 field batteries and 6 horse batteries of the first line, to 23 batteries of the "milice mobile," to 12 batteries of the reserve, and to 7 batteries of the "parc."

GUN.—The caliber is 7.5 centimeters. The gun is known as the "7.5 A" (7.5-centimeter acciaio, i. e., steel); it is of steel (nickel steel according to one account); it is composed of a tube, of a jacket with trunnions, and of an exterior hoop which is screwed to the jacket and on which is a small locking hoop. The powder chamber increases in size toward the rear. At the left the sight sheath *A* (fig. 3, Plate I) is fitted. Above this is a directing circle for use in indirect laying. The chase is truncated and is reenforced at the muzzle. The front sight, which is placed in front of the left trunnion, can be closed down; it is held either in a vertical or in a horizontal position by means of a spring. The grooves, 32 in number, are helicoidal and turn from right to left.

BREECH MECHANISM.—The closure is with a double-motion screw. The screw is truncated, but has a cylindrical rimbase;

PLATE I.



4. The direction of the work to be abolished. This work at the artillery workshop

All this will necessitate the employment of 30 lieutenants and of 30 men in Suisse

THE

The various changes in data concerning the new model XXXII, 1900, and XXXI are mentioned in *Proceedings R. A. Inst. Artillery*, Curey, French artillery, June, 1902, the principal changes in Italian drill and equipment

Amid animated discussion with rigid top carriage material has been distributed. The new pieces have been assembled at Netley. In 1902, announces that the new pieces are all the units until the 7-centimeter guns; that is the horse batteries of the first line, "mobile," to 12 batteries of the "parc."

GUN.—The caliber is 7.5 centimeters. The "7.5 A" (7.5-centimeter caliber) is made of nickel steel according to one model. It consists of a tube, of a jacket with trunnions which is screwed to the jacket by means of a locking ring. The powder chamber is at the rear. At the left the sight shield is placed. Above this is a directing circle. The chase is truncated and is retained in the front sight, which is placed in front of the sight and can be closed down; it is held either in the vertical or horizontal position by means of a screw. The trunnions, number, are helicoidal and turn freely.

BREECH MECHANISM.—The closing screw. The screw is truncated, but



it has two smooth sectors and two threaded sectors. On one of the smooth sectors is hollowed out the recess for the extractor; in the wall of the rimbase are two canals, one placed in front of this recess, the other diametrically opposite. The screw is manipulated by means of a lever, which is joined to a central nave having a notch and two mortises. In the notch is placed the sear, the trunnions of which turn in the two mortises. The sear has a nose and a tang upon which is placed a ring in which is fixed the lanyard. This latter has at its other extremity a wooden knob and a safety key, *S*, which serves to prevent the unscrewing of the breech lock in marching. The entire system (core, rimbase, and screw) is traversed by a groove in which the striker moves; this has at the rear a reenforce on which the nose of the sear works; it is furnished with two springs, one in front and one in back. The extractor has a claw, a tang, two trunnions, and a sheath in which slides a gudgeon controlled by a spring. On the anterior face of the carrier ring is the cylindrical recess of the stop bolt which serves to fasten the breech screw. On the posterior face is a helicoidal groove in which the tang of the sear revolves.

METHOD OF OPERATION.—Let us suppose that the breech is closed, the striker down, and the cartridge in the gun. The lever is shoved to the left and down until the movement is arrested, when it is drawn horizontally to the right, which has the effect of opening the cover, making it revolve around its hinge bolt. In this rotary movement the tang of the sear runs in the helicoidal groove, the sear turns on its trunnions, and its nose, grazing the reenforce of the striker, passes before the reenforce, which it clasps. When the cover is opened, the extractor, the claw of which holds the rim of the cartridge, rests at first immovable. Then the trunnions, running in their recesses, will strike against the bottom thereof, producing a shock which starts the cartridge case and prepares it for ejection. At the same moment that the cover is opened, the arresting clamp, pushed forward by a spring, occupies the space left by the tang of the extractor, and from this time on the cover and the screw are fastened to each other. When the breech is closed, the extractor touches the bottom of the recess of the screw, pressing back with its tang the arresting clamp in its recess, thus liberating the screw,

which can be then unscrewed. When the lanyard is pulled the tang of the sear penetrates to the helicoidal groove, but it is only when the closure is effected that it can be lowered so that the nose of the sear, pushing back the extractor, may escape the striker, which impinges against the primer.

CARRIAGE.—The body of the carriage proper consists of a trough of nickel steel, open above. The cheeks are parallel at the front but approach each other toward the rear. Though the body of the carriage consists of a single piece, the cheeks are strengthened by three stays, one of which is placed in front and has in the middle a reenforce pierced by a central hole; the other two form the framework of the trail chest.

A small carriage—a sort of stanchion of steel with cheeks, trunnion bed, and cap-square—supports the gun by its trunnions and turns about a truncated vertical axle which is fixed in the hole in the middle of the first stay noted above. The small carriage is prevented from being separated from the carriage by means of coupling pins. Besides, as we shall see further on, the small carriage is bound to the aiming system by a lever. The entire system is not without analogy to the German gun of 96.

POINTING MECHANISM.—The elevating gear is composed of: A crosshead elevating nut supported by two pads of steel fixed at the bottom of the trough which forms the body of the carriage; a brass cogwheel centered on the crosshead elevating nut and fastened thereto by a collar, which permits of a rotary movement; a pinion; a controlling shaft governed by a crank and turning in a wrought-iron projection forged on the crosshead elevating nut; a double screw (the female screw can turn in a crosshead nut, at the same time remaining in connection with the brass cogwheel; the male screw has at its upper part an axle and an oscillating support on which the breech rests; the two screws are threaded inversely); two rods fastened at one end to the head of the screw and at the other to the inside of the cheeks of the small carriage. The trunnions of the piece, the crosshead elevating nut, and the oscillating support form the three vertices of an articulated triangle, of which two sides have a constant length, and the third, formed by the double screw, may be varied at will as well as the angle opposite. The working of this mechanism, which is analogous to that of the German carriage of

96, is easy and is as follows: By moving the crank, the pinion is moved, then the cogwheel. In turn the latter works the double screw.

For aiming in direction, the left trunnion of the crosshead elevating nut has a nut in which is engaged a screw. This is governed by a handwheel at the left of the carriage, and which is furnished with a tooth which limits its displacement. By moving the handwheel the trunnions are forced longitudinally from their position in their pads; thus the elevating gear is forced above and the small carriage is made to turn according to the indications given by a level, which rests upon the pivot of the same, and which terminates at the rear in a fork, which embraces the upper and lower rims of the crosshead elevating nut.

RECOIL-CHECKING DEVICE.—In marching, a wheel brake is used; it is worked by means of a crank placed in the front of the carriage. In firing, a rope brake of the Lemoine sort is used, and an articulated cross spade which employs the force of a spiral spring to return the gun into battery. The recoil of the piece, which will be about 1 meter with the recoil brake alone, will be reduced to only several centimeters when the spade and the brake are employed at the same time.

The recoil brake is a combination of the road brake with two symmetrical rope brakes. On the axle, between the wheel and the carriage, is placed a friction apparatus as follows: An inside drum is fixed to the axle by means of a locking screw, which permits of a certain angular displacement. An outside drum, with a groove and a hook, is placed exactly opposite the inside drum, rubbing on four brass friction plates, which are supported by the inside drum and held back by springs. The rope of the brake is fastened at one end to the hook of the outside drum and at the other to the brake bar. To the outside drum is fastened a cylindrical sleeve extending on the nave, and in which glides a pawl pushed down by a spring. This pawl is governed by a lever with a spring handle. When the handle is pressed down the pawl catches in an indentation in the nave, without otherwise hindering the piece from being moved forward, for the pawl disengages itself constantly in this movement. On the contrary, the moment the recoil is produced, the two drums, on account of the pawl and the friction plates, commence to

revolve simultaneously. The recoil continuing, the inside drum is almost immediately stopped by the stop screw, while the outside drum is forced to turn against strong friction, also drawing more and more the cord which controls the shoe brake. It may thus be seen that the brake is brought into action, as it were, progressively.

LIMBER.—The limber is similar to that of the old material. It is, nevertheless, different in three respects: (1) In the adoption of a seat with an elastic support for those serving the piece; (2) in the form of the axle, which is of wrought steel with this cross section, I; (3) in the interior arrangement of the chest.

Each chest, divided into three parts, contains sixteen compartments (four in the middle, six on the right, six on the left) disposed in two horizontal rows. The cartridge compartments, in aluminum (in the limber of the piece) or in iron (in the limber of the caissons), contain each two projectiles and two cartridges. The four middle compartments are equipped with receptacles for the instruments, the tools, etc.

In exterior outline the rear carriage of the caisson differs but little from the model 9 B, 80-98. It has two chests. The ammunition compartments are similar to those of the chests of the limber.

AIMING DEVICES.

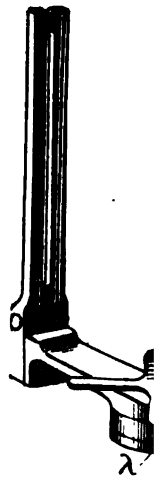
The aiming devices and the bench-marking instruments consist of: One spirit-level sight; one level with double graduations; one directing circle; one alidade; one tripod for the directing circle; the stakes.

THE SPIRIT-LEVEL SIGHT.—This instrument (fig. 1, Plate II) is of the Corrodi type, the bar is telescopic, the stem, *T*, being the arc of a circle centered on the point of the front sight, moves in a sheath, *G*, which can itself be moved in a case supported by the breech (fig. 3).

The bar is graduated on its rear face up to 5,600 meters for shrapnel and on its left side up to 4,600 meters for high-explosive shell. The elevations for the two projectiles are not the same, e. g., 5,000 meters for shrapnel corresponds approximately with 4,300 meters for shell. On the left side of the tangent bar are also the figures 1, 2, and 3, marked in bold type, representing hundred meters elevation for case shot.



Fig. 5.



B_1 and B_2 move the rear sight by means of pinions and ratchets. A small cylinder, C , supports the scale of lateral sight allowances (from 0 to 40), and in it glides the sight notch. The level N can move from 0 to 100 degrees in the plane of the rear and front sight, gliding on a cylindrical surface, the axle of which is parallel to that of the trunnions. The front sight and the level are manipulated by means of B_3 and B_4 . The drum on the axle B_4 has its surface divided into twenty equal parts, so as to permit the twentieth of a degree to be given. When the rear sight is driven home, the line of sight corresponding to division 20 of the front sight and division 5 of the level is parallel to the axle of the piece. The object of this disposition is to avoid negative numbers.

Corrections.—To correct for drift, it is sufficient to recall that the number of the lateral divisions of the rear sight is, up to 5,500 meters, equal to the number of kilometers of the range increased by 20. For a distance of 6,000 meters the index is placed at the division 30, and for that of 7,000 meters at the division 40.

To correct the effects of the inclination of the trunnions, the sight notch should be displaced one division per kilometer for a difference of level of 3 centimeters between the wheels.

A deflection allowance of one division displaces the point of fall to an extent equal to as many meters as there are kilometers in the distance.

LEVEL WITH DOUBLE GRADUATIONS.—This instrument permits the angle of sight and the angle of elevation to be separately given. It is composed (fig. 2) of a stand, B , of a movable plate, M , and of a level, N . At the left, the stand has a graduation in hundredths, G_1 ; at the right is a hole which receives the axle x (not represented), around which the plate M revolves. This is supported on the other side by the screw V_1 , the threads of which engage with δ_1 . The box of the level N is arranged in an analogous fashion as regards the movable plate M ; it revolves around the axle a and is controlled by the screw V_2 , which, engaging with δ_2 , forces it to move according to the graduations in hundredths, G_2 . The drums, t_1 and t_2 , supported by the screw V_1 and V_2 , permit the angles to be given in thousandths. For this purpose they are divided, the first in ten parts and the second in forty parts,

each turn of the screw V_1 , or the screw V_2 , corresponding respectively to an angular displacement of one or four hundredths. The drum t_1 has a helicoidal graduation h on which moves a slide. The movable plate and the level box each support an index (i_1 and i_2). The level N is adjustable by screw r .

Method of employment.—When this instrument is used it is placed on the directing plate, on the diameter 0° — 180° or 90° — 270° . When the piece is horizontal the indexes i_1 and i_2 should be opposite the divisions 20 and 0. This instrument completes the rear sight and takes its place in certain cases; by it may be given to the piece the angle of elevation and the angle of sight; the angle of sight may be measured and the angle of inclination of the trunnions; the level of the rear sight may be regulated and verifications may be made that this latter has not been displaced. (An allowance is made of one one-thousandth for the distances less than 4,000 meters and of two one-thousandths for distances above.)

DIRECTION PLATE.—Each piece has a directing plate (fig. 4) consisting of a metal disk fastened by four screws to the upper part of the breech. The periphery of this disk has graduations in degrees; the head of center stud is in the form of a mushroom. The line 0° — 180° is parallel to the axis of the cannon. An alidade (fig. 5) can be adjusted to the center stud where it is held by two spring levers. A pressure screw with a head having four branches allows it to be fixed in the azimuth indicated by the index.

DIRECTION CIRCLE.—In order to be able to determine the elements of initial aiming the commander of the battery has at his disposal a portable directing circle (fig. 6). The construction of this apparatus is analogous to that of the directing plate, but it has besides tables giving the distances corresponding to bases of from 25 to 50 meters for the subtending angles of $30'$, 1° , $1^\circ 30'$, and 2° . The alidade of the direction plate is simpler than that of the direction circle. It is fixed on the circle. The whole apparatus, comprising a tripod support with telescopic upright, can be swung in a shoulder strap. A disk painted black and red by quadrants is fastened above the joints.

USE OF THE AIMING AND LAYING DEVICES.—Usually direct aiming by means of the rear sight is the method which

is employed (in case of necessity, use being made of an auxiliary target), but when it is impossible to follow this course, or when a change of target is foreseen, recourse should be had to the apparatus which has just been described and which permits use to be made of targets situated any place in sight.

The angle between the target and the reference point is called the angle of direction. (The diameter 0° — 180° is always turned in a direction following the line joining the apparatus and the target; the angles are measured in the direction contrary to the movement of the hands of a watch.)

To be able to aim in direction it will suffice to determine this angle for each piece, to fix the alidade on the directing plate at the corresponding division, and to move the piece until the plane of collimation cuts the reference point.

In the determination of the angles of direction, different cases may present themselves:

1. When a distant signal, S , is distinctly seen, the direction circle C is stationed in the neighborhood of the battery, and the angle of direction α is measured and taken by all the pieces (fig. 12).

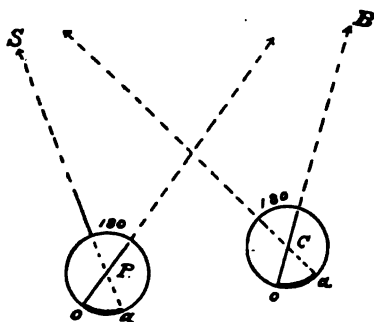


Fig. 12.

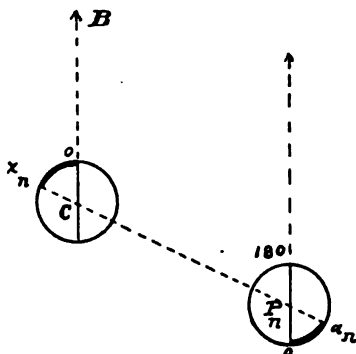


Fig. 13.

2. The vane of the direction circle C may serve as the aiming point. The direction circle being placed with the zero toward the target (fig. 13), the angles of direction α_n are determined for each of the pieces P_n , sighting successively from the station C , the rammers held vertically above each one of the directing plates. Each piece is then aimed with its special angle of direction, as has been indicated above.

3. In case some of the pieces can not be seen from the station *C*, the stake *J* is placed where it can be seen from all the pieces. The direction circle is then taken to *J* and oriented by back sights on *C*. The case is then the same as 2, and it is sufficient to measure the angles relative to each one of the

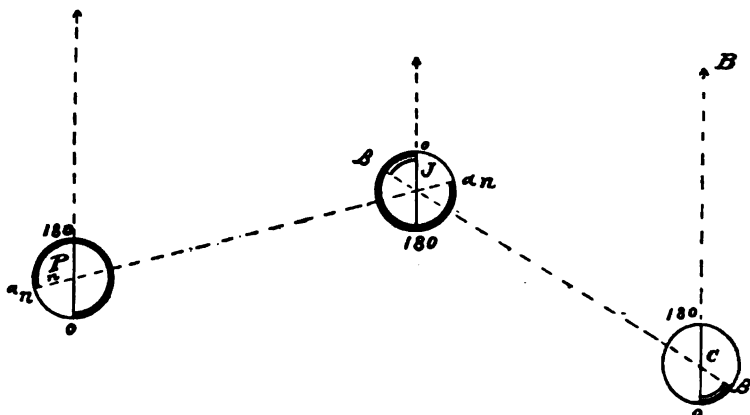


Fig. 14.

pieces. When this operation is completed, the apparatus is taken back to *C*, from which point the modifications which it is necessary to make with regard to the angles may be determined.

NOTE.—In using the angles of direction as they are given by the second or third process, the pieces are placed parallel to the line of observation *CB* (figs. 13 and 14). Since the pieces are all aimed at the target it is well to make a correction for convergence. This correction can be easily calculated by keeping in mind that a variation of 30' on the azimuth displaces the point of fall to a number of meters equal to the number of hectometers in the range. To avoid disorientation it is necessary, in aiming with reference marks, to always replace the piece in battery in the same place.

AMMUNITION.

SHRAPNEL, 6.7 kilograms, is with rear burster; the body is steel; the ogival head is fastened with a screw. The bursting charge, separated from the bullet chamber by a diaphragm, communicates with the fuze by a brass tube and a capsule widened at the upper part. The balls of antimony lead (of 3

to 100) are held in place by cast colophony. They are 320 in number (180 of 10 grams and 140 of 11 grams). The projectile has two copper bands, one of which is a forcing ring at the rear and a centering ring at the front; it receives a double-acting fuze, model 1900, held by a screw which passes through the ogive.

CASE SHOT consists of a zinc cylindrical body with a cover of the same metal and the bottom in steel. It is furnished with two zinc bands, one of which permits of a certain compression, and a lug of iron wire fixed to the bottom to facilitate transportation. The case shot consists of eight layers of hexagonal prisms of lead held in place by colophony. Each layer consists of 37 prisms. Each prism weighs 22 grains.

THE CARTRIDGE CASE (fig. 11, Plate II) of brass, is slightly truncated. The charge consists of two rectangular plates of flite rolled in a single package. The explosive substance is separated from the metal of the case by means of sack, *S*, of cotton, which forms a hood at one of the extremities, and with a band of hygroscopic cotton, *h*, which surrounds the cylindrical part. The case is closed by a plug of tarred pasteboard, *B*, in the form of a cup with a flat bottom, which is introduced by compression and which is held in place by means of a coat of gum lac.

FUZE.—The double-acting fuze, model 1900 (fig. 10), made almost entirely of aluminum, is a disk fuze with two rings, the one movable, *M*, the other fixed, *F*, in each of which is arranged a circular groove filled with the fuze composition. The movable ring *M* has an exterior spur, ϵ , a graduation in hectometers (from 0 to 56), and a cross which corresponds to the percussion burst of the fuze. It rests directly on the crown *K*, which has a fixed spur (not represented) and an indicating bar. The upper ring *F* is fixed to the body of the fuze by two fixed pegs; it has a cut, *e*, corresponding to the beginning of the fuze composition, and which is masked by a diaphragm of tin. The percussion system is near, the time system is in front. A cover, *C*, forms a continuation of the ogival head.

FUZE REGULATOR.—The movable ring is placed mechanically at the desired position by means of a key (fig. 7). A drum, *T*, in hectometers, turns on the cylindrical part, thus moving a tooth *d* which engages with the spur ϵ of the

movable ring of the fuze. A screw, *E*, enables the drum to be turned and to be fastened so that the index *x* shall correspond to the desired division. On the edge of the regulator is a corrector, *c*, each division of which corresponds approximately (up to kilometers) to a variation of 50 meters from the principal graduation. The index *i* of this corrector is fastened to a movable plate, *P*, which is manipulated by means of *B* and which can be clamped by *d*. This plate, *P*, in the interior fits on the fuze and has an arresting tooth (not visible on fig. 16) which in the rotation of the regulator on the fuze hits against the fixed spur *K*.

ADJUSTMENT of the fuze is made in the following manner: Time-fuze fire: After having placed the proper divisions of the drum opposite the indexes *x* and *i*, the cannoneer places the projectile with the left hand, and, holding the regulator with the right hand, he caps the fuze with it, then he makes the instrument turn from left to right with the handle *II*. By this movement the tooth engages with the spur of the movable ring *M* until the arresting tooth strikes the spur fixed to the ring *K*. The fuze is then adjusted. If in the course of fire a negative value is indicated by the corrector, it will be sufficient to turn from right to left, the tooth being able to move in both ways.

PERCUSSION-SHELL FIRE.—In the chests the fuzes are arranged so as to act without preparation as percussion fuzes, the cross of the movable ring being placed opposite the spur of the crown *K* (fig. 10). The communication between the ignited gas of the percussion and the inflammatory charge of the fuze is then intercepted by the solid parts of the two rings *F* and *M*.

CASE-SHOT FIRE.—The fuze is set at zero; the grooves for the passage of the flame of the rings *F* and *M* are thus one above the other and communicating with the chambers of the striking apparatus and with the inflammatory charge. The explosion of the projectile takes place at a distance from the piece varying from 40 to 60 meters.

NOTE.—It is sought to make shrapnel burst at a height in meters equal to a third of the number of hectometers of the distance. When the fire is adjusted in range and in height the horizontal distance from the target of the point of burst is about 90 meters up to range of 15 hectometers, 70 meters

between 15 and 35 hectometers, 60 meters above 35 hectometers. The axis of the cone of burst should pass through the target which is thus hit in the proportion of one ball per square meter of the surface normal to the trajectory. The point of burst is lowered when it is desired to obtain a superior efficacy. The corrections in height are always made by means of the regulator. A modification of one division on the corrector changes the point of burst, in range, 50 meters, and in elevation an amount equal to double the number of kilometers of the distance. A modification of a demihectometer in the rear sight makes the point of burst vary the same amount.

INFORMATION CONCERNING THE LOADING OF THE WAGONS.

In a general way the aiming devices and firing devices are carried by the limbers. The mechanical apparatus and spare parts are distributed equally to each section. Below are some details of the assignments of different objects to each wagon.

PIECE.—Outside: Rear-sight level in a case placed over the left axle seat; directing mark with vane. In the chest of the trail: The spare parts of the breech, the aiming instruments (alidade, level with double graduations), a regulator for the fuze, the tools, rags, etc.

LIMBER.—Outside: Pioneer tools, water buckets, picketing ropes, collapsible sponge (one per section). The limber of the first piece has, also, the tripod for the directing apparatus (fig. 6) and the two stakes of the commander of the battery. Inside: A directing circle (first piece), a Gautier telemeter, and an optical square (second piece); a Goertz field glass (third piece); a regulator and an ordinary field glass (pieces 2, 4, 6).

CAISSON, REAR CARRIAGE.—Outside, per section: Two collapsible poles, one wheel placed under the frame, two spare singletrees, one bill hook, two shovels, one saw, two trail handspikes, one rear-sight level, one staff with vane, two pulling-back cords of 40 meters. Outside, per caisson: One lantern with 350 grams of candles, two torches, two hay nets. Inside of the fore chest: Spare pieces for the breech (about two sets per section), one rammer per section, vaseline, oil,

rags, etc. Inside of the rear chest: Firing cord and brake, grease box, chains and springs of the spade (two per section), and in the tenth caisson only the key of the fuze and the primer box.

RUSSIA.

After a long delay, Russia has commenced the changes in her artillery material. Since 1901 many hundreds of pieces have been ordered from the Putilof arsenal. This is a cannon of 7.62 centimeters, firing a projectile of about 6.1 kilograms with an initial velocity of 610 meters. It is provided with a hydraulic brake and a caoutchouc recuperator. But the model is not definite; the construction goes on very slowly, and while the pieces are in the course of construction a study is being made of the improvements, particularly as concerns the employment of shields. The figures given above show that the Russian efforts are in the direction of great initial velocities, and, by way of compensation, of projectiles of light weight.—*Revue Militaire des Armées Etrangères*.

Von Löbell states that the maneuvering qualities of the guns sent to Manchuria have been exceedingly satisfactory.

INSTRUCTORS FOR THE QUICK-FIRING BATTERIES DESTINED FOR EASTERN ASIA.—On account of the rearmament of the artillery of the Amur district and the Kwangtung (Port Arthur) region with the new 3-inch quick-firing guns, model 1900, officers and men were detailed from all batteries stationed there to the Ust-Isjora polygon, near St. Petersburg, in order to grow familiar with the material and its use and to receive it for transportation to the far east. These 9 officers and 72 men will serve as instructors in their garrisons upon their return to them.

It seems that the distribution of the light guns on hand is being made according to the need in case of war.—*Militaire Wochenblatt*.

REORGANIZATION OF THE FIELD ARTILLERY.—The field artillery of Russia has until the present time been organized in the following manner: In Europe, batteries of eight pieces were united by twos or threes in groups, and two or three groups constituted a brigade. In Asia the batteries were grouped by brigades.

The introduction of rapid-firing pieces will bring about a slight reorganization which by an order of April, 1902, will be on the following basis: The battery will still contain eight pieces. Several batteries (three or four) will form a regiment and two regiments will constitute a brigade. To each army corps are attached two brigades.

The details of the transformation will be regulated by the subsequent orders.

Prikase No. 4, of January 4, 1902, ordered the transformation successively of the heavy batteries, which are not intended to be armed with rapid-fire guns in the first line, to light batteries. The local and movable parks will preserve their present organization and strength. The caissons of the movable parks are to be given the compartment divisions of the light batteries; as to the local parks, the ammunition of the heavy batteries will be withdrawn on account of the adoption of the rapid-fire guns.

TABLE "A"—Field artillery.

Line No.	COUNTRY.	AUSTRIA-HUNGARY. ^a		
		Gun.	M. 75-96 (field).	M. 75-90 (horse).
1	Caliber -----cm.(in.)--	8.7(3.42)	8.7(3.42)	10.4(4.1)
2	Length of gun -----m.(in.)--	2.06(81.1)	2.06(81.1)	
3	Number of grooves -----	24	24	
4	Twist-----	Right 4°	Right 4°	
5	Maximum elevation—depression	25°—10°	25°—10°	
6	Weight of gun-----kg.(lbs.)--	437(1074)	415(915)	395(870.8)
7	Weight of carriage -----do-----	621(1369)	540(1111)	550(1212.5)
8	Weight of limber, loaded -----do-----	824(1817)	732(1614)	
9	Wheels, height of -----m.(in.)--	1.37(53.9)	1.37(53.9)	
10	Width of track -----do-----	1.52(60)	1.52(60)	
11	Draft for one horse-----kg.(lbs.)--	322(710)	281(619)	
12	Weight of caisson, loaded ¹ -----do-----	2164(4771)	2196(4841)	
13	Number of men seated on piece ² -----	6	None.	
Battery on war footing:				
14	Guns -----	8	6	6
15	Caissons ³ -----	8(4) ^b	6(4)	
16	Other wagons ⁴ -----	5(1 res., 1 bg., 3 pr.)	6(1 res., 1 bg., 4 pr.)	
Ammunition on one limber:				
17	Shrapnel-----	20	10	
18	Shell -----	10	10	
19	Case shot -----	4 ^c	4 ^c	
Ammunition on one caisson:				
20	Shrapnel-----	50	50	
21	Shell -----	40	40	
22	Case shot -----		4	
23	Shrapnel, number of bullets in	250 M. 96A	250 M. 96A	
24	Shrapnel, total weight -----kg.(lbs.)--	6.69(14.75)	6.69(14.75)	
25	High explosive shell, weight -----do-----	6.83(15.1)	6.83(15.1)	
26	Common shell, weight -----do-----	6.36(14)	6.36(14)	
27	Case shot, weight -----do-----	7.5(16.53)	7.5(16.53)	
28	Powder used -----	2 mm.	M. '93	
29	Weight of charge -----kg.(lbs.)--	Nitroglycerin.	Nitroglycerin.	.125(.276) to .31(.68)
		.44(.97) +.08(.18)	.44(.97) +.08(.18)	
30	Velocity, muzzle -----m.(ft.) sec--	440(1443) ^d	440(1443) ^d	150(492) to 300(984)
31	Velocity at 4,000 meters -----do-----	229(751)	229(751)	
Maximum range (from fire table):				
32	Time fuze -----m.(yds.)--	3599(3936) ^e	3599(3936) ^e	
33	Percussion fuze -----do-----			
Danger zone for target 5.6 ft. high at:				
34	1,000 meters -----do-----	66(72.2)	66(72.2)	
35	1,500 meters -----do-----	37(40.5)	37(40.5)	
36	2,000 meters -----do-----	24(26.2)	24(26.2)	
37	3,000 meters -----do-----	13(14.2)	13(14.2)	
38	4,000 meters -----do-----	8(8.7)	8(8.7)	

See notes on page 90.

TABLE "A"—Field artillery—Continued.

Line No.	FRANCE.			GERMANY.		
	R. F. M. 97 (field).	M. 91 (short field).	8-cm. (horse). ¹⁰	M. 96 (horse). ¹⁴	M. 96 (field).	Howitzer M. 98 (light).
1	7.5(2.95)	12(4.72)	8(3.15)	7.7(3.03)	7.7(3.03)	10.5(4.13)
2	2.74(108)	1.7(66.93)	2.28(89.76)	2.78(109.1)	2.78(109.1)	1.25(49.21)
3		36		32	32	32
4	Increasing.	8°	2°	Right increas'g.	Right increas'g.	Right increas'g.
5	14°—5°	44°—12°		16°—12°	16°—12°	40°—10°
6	400(882) ⁹	690(1521)	415(902)	390(859.8) ¹⁴	390(859.8) ¹⁴	490(1080)
7	780(1676)	925(2038) ¹¹	500(1102)	454(1000)	504(1111.1)	580(1279) ¹⁴
8	640(1411)	890(1962)	634(1397)	795(1752.7) ¹⁷	795(1752.7) ¹⁷	860(1896)
9	1.55(61)	1.55(61)	1.42(56)	1.36(53.54)	1.36(53.54)	1.23(48.43) ¹⁹
10		1.49(57.5)	1.42(56)	1.52(60.2)	1.52(60.2)	1.52(60.2)
11	300(661)	394(869)		278(613)	287(633)	325(716.5)
12	2000(4400)	2360(5203)	2040(4498)	1765(3891)	1780(3924)	2050(4519)
13	3 on limber.	4 or 5	None.		5	5
14	4	6	6	6	6	6
15	12(6)	9(3)	9(3)	6(3)	6(3)	6(3)
16		3(1 res., 1 fl.)	3	4(2 res., 1 pr., 1 fo.)	4(2 res., 1 pr., 1 fo.)	4
17		16				
18	24		30	36	36	24
19						
20		48 or 0 ¹²				26 ²⁰
21	108 ⁹	0 or 48 ¹²	76	88	88	32
22						
23	256	627	120	300	300	500
24	7.03(16.5)	20.35(44.86)	6.46(14.25)	6.85(15.1)	6.85(15.1)	13(28.7) ⁹
25	6.99(16.4)	20.35(44.86)		6.85(15.1)	6.85(15.1)	16(35.3) ⁹
26						
27						
28	Nitrocellulose.	Nitrocellulose.	Nitrocellulose.	Nitrocellulose.	Nitrocellulose.	Nitroglycerin.
29	.58(1.28)	.55(1.21)	.56(1.23)	.57(126) + addit'l charge		Variable.
		+ .02(.034) blk ¹²		of .01(.022) em.-arm pwdr.		
30	500(1640)	285(928) ¹⁴	470(1542)	465(1525)	465(1525)	300(984.28)
31	267(876)		(at 4000 yds. 816 yds.)	257(843.2)	257(843.2)	
32	5500(6015)	4700(5140) ¹⁴		5000(5468)	5000(5468)	5600(6124)
33	9000(9843)	5700(6234) ¹⁴		8000(8749) ⁹	8000(8749) ⁹	7000(7655) ⁹
34	65(7.1)			56(61.2)	56(61.2)	
35				31(33.9)	31(33.9)	
36				21(23)	21(23)	
37				11(12)	11(12)	
38				7(7.7)	7(7.7)	

See notes on page 90.

TABLE "A"—Field artillery—Continued.

Line No.	COUNTRY.		GERMANY—	GREAT BRITAIN. #	
	Gun.		Continued. Howitzer (heavy).	15-pr. M. 84-95 (field).	12-pr. M. 84-57 (horse).
1	Caliber	cm. (in.)	14.97(5.9)	7.62(3)	7.62(3)
2	Length of gun	m. (in.)	1.646(64.8)	2.346(92.35)	1.685(66.75)
3	Number of grooves			18	18
4	Twist		4° to 12°	Right 0° to 6°	Rt. 1.7° to 6.4°
5	Maximum elevation—depression		65°	15.5°—8.5°	16°—8°
6	Weight of gun	kg. (lbs.)	1075(2370)	365(784)	324(715)
7	Weight of carriage	do.	1114(2458)	675(1485)	487(1073)
8	Weight of limber, loaded	do.		915(2016)	765(1686)
9	Wheels, height of	m. (in.)		1.52(60)	1.52(60)
10	Width of track	do.	1.52(60.2)	1.57(62)	1.57(62)
11	Draft for one horse	kg. (lbs.)		324(714)	263(579)
12	Weight of caisson, loaded ¹	do.	2775(6118)	2002(4413)	1585(3494)
13	Number of men seated on piece ²			4	
Battery on war footing:					
14	Guns		6	6	6
15	Caissons ³		6(12)	6(6)	6
16	Other wagons ⁴		6(1 ra., 1 fo., 1 ob., 1 ff., 1 bg.)	5(1 fo., 1 st., 2 bg., 1 m.c.)	5(2 bg., 1 ff., 1 st., 1 m.c.)
Ammunition on one limber:					
17	Shrapnel			48	46
18	Shell				
19	Case shot			4	4
Ammunition on one caisson:					
20	Shrapnel			110	88
21	Shell				
22	Case shot			2	2
23	Shrapnel, number of bullets in			200	156
24	Shrapnel, total weight	kg. (lbs.)		6.35(14)	5.67(12.5)
25	High explosive shell, weight	do.	39(85.98)		
26	Common shell, weight	do.			
27	Case shot, weight	do.		6.01(13.25)	5.85(12.88)
28	Powder used		Nitroglycerin.	Cordite (nitro- glycerin).	Cordite (nitro- glycerin).
29	Weight of charge	kg. (lbs.)	.85(1.87)	.447(.984)Ng. +.007(.016)Nc.	.355(.777)Ng. +.014(.32)Nc.
30	Velocity, muzzle	m. (ft.) sec.	276(905)	480(1174)	464(1523)
31	Velocity at 4,000 meters	do.		226(741)	211(692)
Maximum range (from fire table):					
32	Time fuze	m. (yds.)	6060(6616)	3750(4100)	3380(3700)
33	Percussion fuze	do.		5030(5500)	4755(5200)
Danger zone for target 5.6 ft. high at:					
34	1,000 meters	do.		57(62.3)	55(60)
35	1,500 meters	do.		29(31.7)	27(29.5)
36	2,000 meters	do.		19(20.8)	19(20.8)
37	3,000 meters	do.		10(11)	9(9.8)
38	4,000 meters	do.		6(6.6)	5(5.5)

TABLE "A"—Field artillery—Continued.

Line No.	GREAT BRITAIN —Continued.	ITALY. ²³	RUSSIA. ²⁷		
	Howitzer M. 96 (field).	M. 1900 (field). ²⁴	M. 1900 (field). ²⁵	M. 93-95 (horse).	Mortar (field).
1	12.7(5)	7.5(2.95)	7.62(3)	8.69(3.42)	15.24(6)
2	1.245(49)	2.26(88.97)	-----	1.7(66.93)	1.276(50.23)
3	20	32	-----	24	18
4	Right 6.4°	Left 5° 36'	-----	Rt. 0.5° to 7.15°	Rt. 4.5° to 11.82°
5	45°—5°	17° 13'—10°	-----	18°—10°	47°
6	489(1077)	351(774)	360(794)	335(740)	460(1014)
7	734(1619)	655(1444)	565(1245)	572(1261)	820(1808)
8	1143(2520)	696(1539)	700(1543)	815(1797)—M. 79	820(1808)
9	1 52(60)	-----	-----	1.394(54.8)	1.37(53.9)
10	1.57(62)	1.45	-----	1.56(61.37)	1.56(61.37)
11	294(869)	284(626)	271(597)	240(602)	355(783)
12	2353(5188)	960(2116) ²⁸	-----	1640(3616)	1870(4123)
13	2	-----	-----	-----	6(on lumber)
14	6	6	8	6	6
15	9	10 ²⁸	-----	12(6)	18
16	5(1 bg., 1 ff., 1 pr., 1 st., 1 m.c.)	3(1 st., 1 ff., 1 fo.)	-----	11(1 res. car., 2 res., 1 bg., 4 bg. c., 2 m.c., 1 fo.)	12(6 res. c., 1 res. car., 2 bg. 3 pr. + fo.)
17	-----	32	-----	10	-----
18	21	Unknown. ²⁶	} 40 [?]	7	} 12 ²⁸
19	-----	2 ²⁸		3	
20	-----	96	-----	25	16 or 18 ²⁹
21	45	Note. ³	-----	27	10
22	-----	0	-----	3	-----
23	368	320	-----	210	683
24	22.67(50)	6.7(14.77)	6.3(13.9)	8.011(17.7)	31.15(68.56)
25	-----	No data.	-----	-----	26.8(59)
26	22.67(50)	No data.	-----	6.41(14.31)	-----
27	-----	7.14(15.74)	-----	6.81(15.11)	-----
28	Cordite (nitro- glycerin).	Flite (nitro- glycerin).	Pyrocollodion (nitrocellulose).	Pyrocollodion (nitrocellulose).	Pyrocollodion (nitrocellulose).
29	.324(.715) ³⁰	.43(.95)	-----	.78(1.72)	4, 2, or 1 × .23(.5) +.017(.037)
30	239(782)	480(1575)	610(2001)	412(1352)	232(761) ³⁰
31	177(586)	265(290)	-----	207(679)	-----
32	3109(3400)	} 7000(7655) ³¹	} -----	3400(3718)	-----
33	4480(4900)			6400(7000)	3400(3718) ³¹
34	17(18.6)	-----	-----	37(40.5)	-----
35	10(11)	-----	-----	20(21.9)	-----
36	7(7.66)	-----	-----	15(16.4)	-----
37	3(3.28)	-----	-----	8(8.75)	-----
38	2(2.19)	-----	-----	-----	-----

See notes on page 90.

NOTES.

- ¹ Caissons of gun batteries as well as pieces are drawn by 6 horses each in all countries.
- ² Load of limber above does not include these men.
- ³ Figures in parentheses in this line give the number of caissons which with the number of guns in line above form a "fighting battery."
- ⁴ In this line, res.=reserve; bg.=baggage; pr.=provision; fo.=forage; fl.=field forage; st.=store; ob.=observation wagons; m.=medical; c.=cart; car.=carriage.
- ⁵ Austria-Hungary is experimenting with new artillery material. See page 51.
- ⁶ The case shot has been replaced by shrapnel M. '96-96A with fuse cut to burst at muzzle.
- ⁷ Velocity and other data given are for shrapnel M. '96-96A. Initial velocity for shell M. '75 is 448 (1470), for steel shell M. '75, 502 (1647).
- ⁸ For shell M. '75 maximum range is 4500 (4920); for steel shell M. '75 it is 1125 (1230).
- ⁹ Approximate.
- ¹⁰ The 38 four-gun batteries with the corps artillery have the new 7.5-cm. guns, the 14 six-gun batteries with the independent cavalry have the old 8-cm. guns.
- ¹¹ With cradle and recoil brake.
- ¹² 5 caissons carry 48 shrapnel each, the other 4 carry 48 shells each.
- ¹³ Reduced charges are .33 (.73) Nc. (nitrocellulose) +.01 (.022) blk. (black) and .22 (.48) Nc. +.01 (.022) blk.
- ¹⁴ Approximate. Fire tables not yet published.
- ¹⁵ Horse artillery same model as field, differing only in absence of gunner's seat.
- ¹⁶ With cradle, without equipment.
- ¹⁷ Without gun cradle.
- ¹⁸ Without equipment.
- ¹⁹ Height given is for carriage wheels, for those of limber and caisson it is 1.36 (53.5).
- ²⁰ 26 shrapnel are in the first reserve wagon.
- ²¹ The English are experimenting with new artillery material. For data on Ehrhardt gun see p. 64.
- ²² Reduced charges are .252 (.555) Ng. (nitroglycerin powder), .179 (.396) Ng., and .107 (.236) Ng.
- ²³ Lines 1 to 6 apply also to horse artillery, on which further data has not been published.
- ²⁴ For old field gun and horse artillery gun, which form part of the present armament, see M. I. D. Notes, 1901.
- ²⁵ Without load.
- ²⁶ The load of 10th caisson is shell (number not known, the *Patria* says 96) and case shot (6 in limber).
- ²⁷ The data given on this gun is from the *Schweizerische Zeitschrift*, which notes that the weights (lines 6, 7, 8, 9, and 11) are probably too low.
- ²⁸ One limber carries 12 shells and 18 cartridges.
- ²⁹ Twelve of the four-horse ammunition wagons carry each 10 shells and 16 shrapnel, 6 carry each 10 shells and 18 shrapnel. Each section has a two-horse cart for bringing ammunition from wagons to mortars; this cart holds 8 rounds.
- ³⁰ This number is for torpedo shell with full charge. For shrapnel it is 220 (722) with full charge, 170 (558) with half charge, 138 (453) with quarter charge.
- ³¹ This number is for shrapnel with full charge. For half charge it is 2150 (2351), for quarter charge 1200 (1859).

BELGIUM.

Though the first commission recommended the Cockerill-Nordenfelt rigid-carriage field gun, much discussion has resulted and the question is not yet settled. Recently a commission of general and staff officers of various arms has been appointed to consider from a tactical point of view the increase of the number of field batteries and the adoption of a new field gun.—*Revista di Artiglieria e Genio*, October, 1902.

BRAZIL.

In Brazil it was decided in 1902 to purchase a Krupp battery; but the minister has annulled this decision. He has decided that the experiments were insufficient and has required that they be resumed in April next with various types of rapid-fire guns, Krupp, Ehrhardt, Schneider, etc.

DENMARK.

Denmark has given an order for 128 field guns, 7.5-centimeter, with barrel recoil, and 192 caissons, together with the ammunition and harness, to be furnished by April 1, 1904. The competitors were Ehrhardt, Schneider et Cie, and Vickers. The Krupp system was unanimously chosen by the commission. (The ammunition is to be manufactured at home, according to one account.) The experiments in 1901 extended to three systems with barrel recoil—Krupp, Schneider-Creusot, and Ehrhardt; and to three with carriage recoil—Krupp with a spring trail spade, Cockerill-Nordenfelt with the well-known recoil-check construction with spring shoe drag, and the unaltered 8.7-centimeter field gun, L. 24 M. 76. In 1902 attention has been given to field guns with barrel recoil exclusively.—*Revue Militaire Suisse*.

SWEDEN.

After the completion of the comparative experiments between the spring spade and the simplified barrel-recoil guns manufactured by Krupp, they decided in favor of the barrel recoil for the artillery proper and gave the order for 72 guns and 66 ammunition wagons. The entire order to be given to Krupp will be 120 guns and 120 ammunition wagons with ammunition. Further constructions will follow in Sweden, as was agreed upon in the summer of 1901.

This gun is not the so-called type C, but a type D improved in several particulars with deviations in the cradle construction.

La Gazette de Cologne states that credit has been asked for the creation of a group of field howitzers and a battery of heavy howitzers.

SWITZERLAND.

Various periodicals announce that the Swiss committee has finally decided in favor of the Krupp gun, model 1902,

with barrel recoil and shields. The data concerning this gun differs but little from that of the model 1901 given in M. I. D. Notes, 1901: Weight of gun, 376 kilograms; weight of carriage with shield, 616 kilograms; without shield, 565 kilograms; velocity at muzzle, 485 m. sec.; at 3,000 meters, 276 m. sec.; range at 15° elevation, 5,610 meters. The tests showed that the gun was entirely immobile during firing. The endurance and maneuvering qualities over rough roads also proved satisfactory. The French system of sighting and laying was considered too complicated. A system proposed by Schneider & Co. was also rejected.

The rear sight tested with model 1902 is much more simple. Being fixed to the cradle, it does not move in the recoil. The aiming cannoneer can make the corrections in aim while the gun is returning into position. The apparatus is composed of a graduated curved rear sight regulated by a gearing. Inside of this rear sight is a second one, also controlled by a gearing, and to which is attached the spirit level and the sight head with lateral allowance and sight notch. On this rear sight are the graduations of the vertical angle. The algebraic sum of the vertical angles and the corrections due to the variability of the time of combustion of the fuzes are marked automatically.—*Revue Militaire Suisse*.

Notwithstanding the satisfactory results of the tests of the Krupp gun, several papers state that the 5-centimeter Reichenau gun is to be tested by Switzerland.

The Krupp mountain guns with barrel recoil were tested during the year. One alteration made consists in fastening the shaft to the fore carriage instead of, as formerly, to the rear carriage. The latter during journeys is always transported, and only when preparations are made for firing is it connected with the fore carriage. The distribution of the loads, as well as the manner of loading on the pack saddles, has been somewhat altered. The gun was received at the Sittin storehouse on May 19, and on the same day was begun the instruction of the six recruits who were designated to act as cannoneers. From the following day on, the new gun took part in all the marching exercises, firing, and practicing to which the two batteries of the recruit school were subjected. On four days of May firing instruction was held. In June the practice in other places began. At four places field firing was held. In marching the gun was usually placed between

the other batteries and its workings were just as satisfactory as that of the other guns. When it was being dragged over the ground, one single part of the carriage was injured by striking against a stone and had to be replaced. In firing the gunners were under less strain owing to the recoil carriage, the ability to hit the mark seemed to be superior to that of the ordnance guns.—*Jahrbucher, etc.*

TURKEY.

The turkish field artillery consists of 248 batteries, of which 18 are field, 178 horse, 46 mountain, and 6 howitzer batteries. It is said that 9 more batteries are in course of formation. In 1900 there was an intention to purchase 96 quick-firing field guns from Krupp, but the plan was abandoned so that the question of barrel-recoil guns might first be made clear. Now the commission for making experiments has decided in favor of the newest system of the Krupp barrel-recoil field guns. The closing of a contract for the delivery of 200 guns is awaited.

III.—SMALL ARMS.

[EXTRACTS FROM VON LÖBELL'S ANNUAL FOR 1902.]

GENERAL.

In the Annual for 1901 we were able to cite a number of opinions, based on war experience, against a reduction of the present rifle caliber; now many voices are being raised in advocacy of the adoption of automatic rifles. Especially interesting is the utterance of an Englishman on this subject in *Arms and Explosives*, which we quote as follows:

“The dawn of the day when automatic rifles shall be the practical armament of every civilized military power seems almost at hand. Hitherto the application of automatic action to shoulder arms has appeared to present exceptional difficulties, due in large measure to the length and weight of barrel and shape of ammunition, more or less common to all such weapons, as well as to the necessity for keeping the recoil-operated mechanism within reasonable limitations of space and weight for handling and balance. For several years past, however, numerous inventors have been at work on the problems involved, and at the present time it would be hard to name any first-class power, except, perhaps, our own, which is not engaged in considering and testing one or more patterns of automatic rifle. Thus Germany is experimenting with a rifle invented by one of the employees of the small-arm factory at Spandau, while Austria looks, and probably not in vain, to Herr von Mannlicher for a self-loading arm that shall stand well abreast of all rivals. It is rumored that the delay in providing an up-to-date successor of the Lebel rifle is due to trials now being conducted with an automatic rifle by the troops in Algeria. At the same time the invention of the Mexican military attaché is undergoing secret tests in Paris. Italy has at least two different types of self-operating shoulder arms under observation.”

Automatic pistols, on the other hand, have already been adopted in several countries.

Under the title of “Notes on foreign rifles in comparison with the Austro-Hungarian 8-millimeter model '88-'90 rifle,”

Capt. Erwin Preuss, instructor in the landwehr cadet school at Vienna, has published a pamphlet which gives a succinct view of the modern military rifles of the large European countries. The author not only describes the rifles, which differ from the Austro-Hungarian 8-millimeter model '88-'90 rifle, but also institutes comparisons with regard to trajectory, accuracy of fire, and weight, and pronounces the following judgment on the rifles mentioned below as compared with the aforementioned Austro-Hungarian model:

GERMANY.—*The 7.9-millimeter model '98 rifle, Mauser system.*—"The advantages cited show this rifle to be one of the most perfect as regards construction."

RUSSIA.—*The three-line (7.62-millimeter) rifle, Mossin-Nagant system.*—"The breech mechanism is too complicated. Clogging in the repeating mechanism is not very rare. The rifle is lighter than the Austrian model '88-'90, and has, generally speaking, the advantages of all loading-clip systems."

FRANCE.—*The 8-millimeter repeating rifle, model '86-'90, Lebel system.*—"This rifle is an improvised repeater, which can be regarded only as a single loader with a reserve of ammunition for rapid single fire."

ITALY.—*The 6.5-millimeter repeating rifle, model '91, Carcano-Mannlicher system.*—"The closing mechanism, including the peculiar safety device, is exceedingly simple. The rifle is perfect from a tactical standpoint and may be considered as a first-class weapon."

GREAT BRITAIN.—*The 7.7-millimeter repeating rifle, model 90, Mark II, system Lee-Metford-Speed.*—"This is an improvised repeater and is merely a single loader with an ammunition reserve of ten cartridges for important moments in battle. The locking of the rifle presents disadvantages and the magazine is said to catch in loading. The cordite causes erosion in the barrel after long firing."

The pamphlet, which also gives brief data on the rifles of other countries, contains a table on the trajectories of the foregoing rifles, from which it is seen that the French Daude-teau rifle, now under experiment, has the flattest trajectory at 600 paces.

Concerning the 7-millimeter Mauser rifle, which was the weapon carried by the Boers in the war of 1899-1902, the

well-known Boer general, Ben Viljoen, expresses himself as follows in his remarks on the South African war:

“As a result of my experience I am constrained to declare that the Mauser rifle is the best both for war purposes and target practice. Taken as a whole, the Mauser rifle is very carefully constructed. In battle more shots can be fired with it than with the British Lee-Metford, for during an engagement one no longer has time to refill the emptied magazine of the Lee-Metford with ten cartridges, but must be content to insert the cartridges into the barrel and fire them one after the other. It is true that the Mauser magazine is arranged only for five cartridges, but as soon as it is empty it can be quickly refilled.”

According to Ben Viljoen's statement the Mauser revolver (probably a self-loader), which he used during the whole campaign, is equaled by no other, not even the Webley.

Firing tests against knapsacks, packed as in war, were carried out in Austria, in 1902, by the army firing school. The results of these tests go to show that a knapsack laid in front of the marksman, although it be packed exactly as in war, does not protect the marksman from the effects of the hostile infantry fire, and that even at medium ranges it is absolutely necessary to lay three knapsacks in front of each other in order to attain this purpose. However, it was shown by the experiments, at 500 and 800 paces, that a knapsack laid before the marksman as a protection has the advantage of rendering him a less conspicuous target to the enemy. By this means the number of hits is diminished. Furthermore, the moral effect of such cover is likely to be very favorable, especially in the case of troops required to hold out long in a position exposed to hostile fire. In this manner the number of hits made by the troops thus protected may at any rate be increased. The army school commission, in charge of these experiments, therefore holds the view that the knapsack can, on many occasions, be used to advantage in battle for sheltering lines, notably in cases when it is possible to throw up a layer of earth in front of the knapsacks.

In order to prevent the mischievous discharge of ball cartridges at peace maneuvers, and also to keep accidents from occurring during fire with maneuver cartridges, Mr. Kussmann has patented a very simple and practical device which has the great advantage over many others of enabling the

ammunition on hand to be utilized, and of being capable of use as a cover for the muzzle and as a protection for the front sight. Further information in relation thereto can be found in a pamphlet published by H. L. Geck, Essen (Ruhr).

The military world was set into transient commotion during the past year by the appearance of three pamphlets, written in nervous haste by Lieutenant General von Reichenau, concerning the "influence of shields on the development of field-artillery material" and "steel projectiles and protective shields." Just as, however, most of Reichenau's bold suggestions regarding artillery material were unable to stand the test of sober criticism, so will his proposition to furnish the infantry either with solid steel or steel-bodied bullets also be unlikely to meet with favor from authoritative quarters. For if solid steel bullets are unable to penetrate the present shields of about 5 millimeters' thickness at long ranges, they have failed, and the possibility of making these bullets heavy and effective enough to accomplish this purpose is precluded by a number of other factors. A solid steel bullet of the same length as the steel-jacketed bullet of like caliber is about 25 per cent lighter than the latter and refuses to pierce 5-millimeter shields of the best hardened steel even at 500 meters' range. The ballistic qualities of the solid steel bullets must, moreover, be considerably less favorable than those of the jacketed bullets.

ARMAMENT IN THE VARIOUS COUNTRIES.

AUSTRIA-HUNGARY.

The infantry is armed with the model-'95 repeating rifle; the technical troops, the field and foot artillery, and the enlisted personnel of the subsistence branches carry the model-'95 repeating carbine (Repetier-Stutzen); the cavalry has the model-'95 repeating carbine (Repetier-Karabiner); caliber, 8 millimeters; system, Mannlicher.

In the Hungarian house of representatives a law was passed to arm the landsturm with 8-millimeter repeating rifles.

A rearmament has taken place in the pioneers, the enlisted men belonging to the fire brigade receiving the "Repetier-Stutzen," the drivers the "Repetier-Karabiner," and the officers, cadets, and sergeants revolvers. The pioneers are in this manner to be rendered independent and capable of

defending themselves. According to *Kriegstechnische Zeitschrift* the present thrusting bayonet is to be replaced by a new model (cutting bayonet).

The adoption of an automatic pistol for the mounted troops instead of the model-1874 revolver is to be expected in the near future.

Three systems are under test among the troops, namely, the Roth, Mannlicher, and Luger-Borchardt.

A so-called universal sight has been invented by Captain Kokotovic, consisting of an ingeniously arranged plate from which the front sight projects only 2 millimeters. Its chief purpose is to prevent overfiring.

The *Danzer's Armee-Zeitung* makes the following statement regarding a notice printed in *Le Temps* to the effect that the Austro-Hungarian war ministry had appointed a committee to test various models of 5 and 6 millimeter automatic rifles:

"Some newspapers have erroneously concluded from this report that an early rearmament of the infantry is imminent. We can authoritatively state, however, that the rifle question is, in the first place, not under discussion at present, and, secondly, that any change would be in a different direction than the above-mentioned report would lead to infer. A 5-millimeter caliber is still considered infeasible; there exists, however, a hope of obtaining the ballistic advantages of such a caliber and the advantages of the lighter weight of ammunition (enabling a greater number of rounds to be carried) by a different means, namely, by experimenting with the Roth-Krnka longitudinal-groove bullets. The above-mentioned notice furthermore intimates that the automatic rifle and the caliber question are being considered conjointly, but there has been no talk thus far of a test with an automatic rifle. The question of automatic pistols must be settled first."

BELGIUM.

The infantry, technical troops, cavalry, and civil guards are armed with the 7.6-millimeter, model-'89, Mauser rifle.

The noncommissioned officers and trumpeters of the mounted arms and the drivers of the field artillery have the Nagant revolver.

The officers of the whole army and the noncommissioned officers, "brigadiers," and enlisted men of the gendarmerie carry the Browning automatic pistol.

During target practice with the Marga system of target ammunition several defects became noticeable in the course of time, the rifle barrels becoming very dirty inside and the bullets frequently sticking in the barrel and causing it to bulge. The cause of the trouble was thought first to be due to the deterioration of the powder paper (poudre papier), which was supposed to be very hygroscopic and to absorb a great deal of moisture in spite of the air-tight packing. However, a firing test with powder paper which had been dipped in water and then allowed to dry proved the fallacy of this theory. Captain Marga now states that although the cartridges will stand a few full-charge shots, they are not adapted for use as target ammunition. It is said to have been demonstrated in a firing test that the cases of the shells undergo a deformation after a few shots with target ammunition, so that the firing pin no longer strikes the cap with sufficient force, the result being that the charge burns more slowly. As a consequence Captain Marga suggested that the cartridges for target practice be reenforced inside. With ten cartridges thus reenforced 1,000 rounds were fired from one rifle without the accuracy of the weapon being affected.

BULGARIA.

The infantry and cavalry are armed with the 8-millimeter model-'88 Mannlicher rifle and carbine, respectively, and with the 10-millimeter Smith & Wesson revolver.

DENMARK.

The troops are armed with the 8-millimeter model-'89 repeating rifle of the Krag-Jørgensen system. During the course of 1901 the Copenhagen militia was armed with 8-millimeter model-'89 rifles, having hitherto had the model-'67-'96 breech-loading rifles.

The *Armée et Marine* describes a machine gun invented by a Danish lieutenant and adopted in the Danish army and navy. As this weapon can also be used as a rifle, the following data may be of interest:

It has a caliber of 6.5 millimeters and a weight of 6 kilograms; the initial velocity is 720 meters. The rapidity of fire is attained by means of a loading frame holding 30 cartridges, which can be fired in two seconds. The rate of fire is

thus 300 rounds per minute, including the time required to substitute full loading frames for the empty ones.

According to the statements of Danish officers who have tested the new weapon, its advantages over other arms are as follows:

1. Its weight, which is reduced to 6 kilograms, and its form enable it to be used in cases where it is impossible to employ the heavier machine guns.

2. Inasmuch as the rate of fire depends entirely upon the frequency with which the trigger is pulled, it can be regulated at will, whereas in other machine guns it can not. As a consequence the rapidity of fire can be diminished after the range has been found, while with other similar weapons there is a danger of exhausting the ammunition supply.

3. As this machine gun can be used like an ordinary rifle, it is specially adapted for fire at moving targets, whose movements it can easily follow.

4. As the cartridge belts with which ordinary machine guns are fed are replaced by loading frames, the gun works easily and rapidly.

5. It costs less than any other machine gun.

FRANCE.

Nothing has been announced concerning a rearmament of the French infantry, which has been so much discussed in the newspapers for the past two years. It must therefore be assumed that the troops are still armed with the 8-millimeter model-'86-'93 rifle and carbine.

It does not even appear likely that a rearmament will soon occur, since a number of improvements are being made on the present weapon, concerning which the following has become known:

The piston of the magazine of the model-1886 rifle is to be replaced by a new one, to be designated as "model-1898 magazine piston." The instructions concerning it are printed in the *Bulletin Officiel*.

In April, 1902, the enlisted men of the forty-seventh infantry regiment in St. Malo were given a new Lebel rifle said to have a range of 6,000 meters. The sight is considerably different from the previous ones. The old rifles will be turned over chiefly to the territorial army.

At the normal firing school of the fortified camp of Chalons-sur-Marne experiments were made in the summer of 1902 for the purpose of improving the firearms of the infantry. The object was to do away with the exceedingly sensitive repeating mechanism and to substitute for it a loader which, without impairing the rapidity of fire, would preclude any possibility of the weapons being rendered unserviceable. The latest invention, which is said to have attained good results, is a new projectile called "bullet D." Very satisfactory experiments were carried out with this bullet under the direction of Lieutenant Colonel Souchier, commander of the normal firing school. With this bullet it is possible to fire at a range of 800 meters without raising the leaf of the rear sight.

La France Militaire reports that preparations are being made for the manufacture of 30,000 carbines of a new model for the colonial army. It is intended to substitute this new weapon for the model-1886-'93 rifle and the model-1892 carbine in the colonial infantry and artillery. The rifle has proved too heavy and cumbersome for the difficult and fatiguing service which these troops have to perform on their extensive expeditions. The old carbine has not shown itself equal to requirements. Not to mention its heavy recoil, in certain cases it does not produce sufficient intensity of fire and therefore does not inflict as heavy losses on the enemy as are necessary. It has, therefore, been decided to adopt a mixed model in which the ballistic qualities of the Lebel rifle and the present cartridge are retained but a different repeating mechanism is used. The magazine, situated underneath the breech mechanism, contains more cartridges than the model-'92 carbine, and the loading frame of sheet metal, fitted into the weapon, is replaced by a loading clip.

The experiments with automatic rifles are being continued uninterruptedly in France. In the spring of 1902 experiments were made with the Mondragon automatic rifle and carbine on the firing grounds of Hotchkiss & Co., at St. Denis, concerning which the *Armée et Marine* reports as follows:

The experiments, which took place in the presence of foreign military attachés, gave complete satisfaction and proved the superiority of the weapon over all others tested theretofore.

However much opinions may differ regarding the military utility of automatic rifles, there is certainly a manifest tendency toward increasing the rapidity of fire of small arms to

correspond with the improvements that have recently been made in rapid-fire cannon.

The first repeating rifle, although opposed at first by experts, was finally adopted everywhere, and the time has now arrived for it to be superseded by the automatic rifle.

Just as the repeating rifle to a certain extent corresponded to the breech-loading field gun with rigid carriage, so does the automatic rifle today correspond to the modern rapid-fire gun.

Concerning the weapons themselves, the author then continues as follows:

“Both of the weapons (rifle and carbine) invented by the Mexican Colonel Mondragon have a caliber of 7 millimeters and fire the Mauser cartridge (Spanish model). They have four rifling grooves and a muzzle velocity of 680 meters. The maximum gas pressure is 3,000 kilograms per square centimeter.

“The mechanism consists of two parts entirely independent of each other. One—the repeating mechanism—permits the use of the weapon as an ordinary rifle, while the other—the automatic device—enables the weapon to be used at will as an automatic rifle.

“The closing mechanism is unusually strong and its form absolutely original; at least it does not resemble any thus far known.

“The rifle, when used automatically, works very simply and in the following manner:

“A loading clip containing six cartridges arranged in two rows is inserted in the magazine; the rifle is closed by pressing the closing mechanism forward with the hand, and is then ready for firing. The gases escape from the inside of the barrel through a vent situated near the muzzle, and enter a cylinder underneath the barrel, in which operates a piston; this piston opens the breech, ejects the empty shell, and prepares the rifle for another shot by closing the breech mechanism. The marksman has nothing to do but press the trigger.

“The rate of fire attained in this manner without detriment to the accuracy is about 60 rounds per minute.

“In order to instantly convert the automatic rifle into an ordinary repeater it is merely necessary to push a lever situated near the muzzle.

“The repeating mechanism itself enables from 20 to 25 rounds to be fired per minute.

"The exterior form of this new weapon is almost the same as that of the present rifles. Its weight is 4.10 kilograms, but is to be reduced to 3.90 kilograms by shortening the closing mechanism. The length is the same as that of the Lebel rifle, and the position of the center of gravity is very favorable to a good balance."

Aside from the danger of wasting ammunition, which is incident to the use of all automatic weapons, there are but two objections to be made to this rifle in the opinion of the author, namely:

"Firstly, in spite of the simplicity of the mechanism the clogging which occurs in all repeating systems is to be feared, and this produces the worst possible results in war.

"Secondly, and especially when automatic fire is used, the firing detachment will be subjected to such a hail of empty shells that the accuracy of the fire can not help suffering thereby."

The author concludes with the following words: "In all other respects, however, such as construction, rapidity and accuracy of fire, and endurance, the weapon is really wonderful, and reflects great credit on its inventor."

La Patrie adds the following remarks to its discussion of these firing tests, from which it appears that Colonel Mondragon exhibited his invention himself to the foreign military attachés:

"The automatic rifle is obviously the weapon of the future. Germany and Italy already have a model which, according to a military attaché, is by no means inferior to the Mondragon rifle as a military weapon. These models, however, are being carefully preserved in arm depots. The authorities are ready to begin their manufacture and to arm the troops with them as soon as France has set the example.

"All foreign officers have unanimously acknowledged the superiority of the automatic rifle, but its adoption is being indefinitely deferred because it would entail an enormous burden on the military budgets of the European countries."

The above exceedingly favorable results do not coincide with those attained in Mexico, so that the conclusion must be drawn that the Mondragon rifle tested in France must be an improved pattern.

GERMANY.

The following were armed with the model-'98 rifle at the close of this year's report:

The marine infantry, the infantry regiments of the East Asiatic brigade of occupation, the guard corps, and parts of the first to seventh, ninth, eleventh, twelfth, fourteenth, and eighteenth army corps, and of the noncommissioned officers' schools.

The issue of the model-'98 carbine has been begun. A new weapon (a sort of carbine) will be purchased for the foot artillery as fast as the available means permit, after the re-armament of the infantry is completed.

All the remaining organizations of the German army now carry the model-'88 rifle or carbine.

The model-'98 rifles and carbines are being manufactured without haste in the government factories and in the Mauser works at Oberndorf. The model-'98 rifles and carbines necessary for Bavaria are to be manufactured exclusively in the royal Bavarian small-arm factory at Amberg.

In the competitive firing with army rifles at 300 meters' range in the presence of the emperor of Austria at Vienna in the fall of 1902 the Germans fired with the model-'98 rifle and original ammunition, winning with a score of 3,755 points against 3,713.

During the target practice with automatic pistols on the experiment grounds at Halensee the following maximum scores were obtained with the several pistols mentioned:

Parabellum pistol in 51 seconds.....	21 hits = 49.4 points.
Browning pistol in 70 seconds	19 hits = 32.6 points.
Mannlicher pistol, M. 1901, in 52 seconds ...	14 hits = 32.5 points.
Mauser pistol in 77 seconds	10 hits = 29.6 points.
Borchardt pistol in 120 seconds.....	20 hits = 20.0 points.

The Parabellum also surpassed the other types in the average scores by a number of points.

The small-arms and ammunition factory of Adolph Loesche at Magdeburg has placed a target rifle on the market which is said to be in use in several infantry regiments with the greatest success. Three kinds of cartridges are made for this rifle, as follows:

Cartridge No. 1 corresponds to the cartridge of the target rifle adopted in the German army; it gives excellent results at ranges up to 30 meters when fired from the Loesche

target rifle. Cartridge No. 2 fires well up to 100 meters and No. 3 to 150 meters, these two numbers being also furnished with smokeless powder. Nos. 2 and 3, which are of special importance for the German infantry, cost 1.50 and 2.50 marks per 100, respectively.

In the *Kriegstechnische Zeitschrift*, No. 10 of 1902, Captain von Neubauer, an instructor at the war school, makes a noteworthy suggestion relative to an improvement in the rifle sight under the designation of a "combat sight." We also find a tendency in other countries toward improving the sights of small arms in order to avoid too great longitudinal dispersions in battle (see Austria-Hungary).

GREAT BRITAIN.

The European and the greater part of the Indian native troops carry the 7.7-millimeter Lee-Metford rifle, model-'89-'91, and the model-'95 Lee-Enfield rifle; the remainder of the Indian native troops are still armed with various old models, among which are the Martini-Henry and Snider rifles, while certain select corps and the military police on the northwest frontier carry Mauser rifles captured in South Africa.

The unmounted officers of the foot troops carry the Lee-Enfield carbine, while the other officers are armed with the revolver.

The contemplated improvements in the Lee-Enfield rifle shown to be necessary in the South African war appear to be essentially as follows: The barrel will be shortened by 127 millimeters and will thus be the shortest barrel possessed by any rifle yet adopted. In order to compensate for the decreased stability of the projectile caused by this shortening of the barrel, the seven rifling grooves are to be given a somewhat higher pitch, so that the trajectory will remain similar to the previous one. The Mauser breech-closing mechanism has been adopted, with some improvements enabling it to be taken apart without the use of a screw-driver. It will be fed by means of a loading clip containing five cartridges. The sight has been improved and provides for an allowance for wind and temperature. A triangular dagger bayonet 35 centimeters long and slightly heavier than the present one has been adopted. In order to lighten the weapon holes are bored longitudinally through the handguard and transversely through the stock,

the butt plate being of aluminum. The total reduction of weight amounts to 0.530 kilogram, leaving the weight of the rifle 4.120 kilograms.

According to *The Army and Navy Gazette*, only a few of the new rifles have been issued to certain infantry regiments for experimental purposes. Concerning the results of the experiments, nothing is yet known. The National Rifle Association, which wished to participate in the tests during its shoot at Bisley, was refused on the ground that the new model was still in an incipient stage of development and that other changes besides those already made were to be expected, so that it is unlikely that the rifle will be issued very soon to the troops in great numbers.

The experiments with the Ross straight-pull breech closure, the Harris magazine, and the Hylard rifle do not appear to have resulted favorably. Canada has, however, decided to adopt the Ross rifle, and both rifle and ammunition are to be manufactured in a government factory at Quebec, the number of rifles to be turned out yearly being from 12,000 to 15,000.

The length of the Ross rifle without bayonet is 1.22 meters, and with bayonet 1.44 meters; the weight without bayonet is 3.43 kilograms; with bayonet, 3.74 kilograms. This weapon seems to bear a resemblance to the rifle mentioned in the Annual for 1901 as being under consideration along with others in England for adoption as a substitute for the Lee-Enfield rifle. It has, like that one, the Ross straight-pull breech mechanism and a simplified Harris magazine. A noteworthy feature is the provision of a loading frame for use in filling the magazine singly by hand, during which act it formerly frequently occurred that single cartridges would fall out; the cartridges are now pressed from above out of the loading frame into the magazine. The rate of fire of the rifle is about 20 rounds per minute. The weapon is claimed to be very handy.

The Australian colonies appear also to contemplate the adoption of the Ross rifle.

Major Woodgate, of the British army, is reported to have invented a new system of automatic rifle. The system is alleged to be very simple and capable of adjustment to rifles already in service, including the Lee-Enfield. The chamber of the Woodgate rifle is said to have a capacity for 20 cartridges (10 being the normal number), so that the number of

rounds per minute can be brought up to 200. The English war office, it is said, has already begun experiments with this model.

Concerning experiments with automatic pistols, nothing has yet been made public. According to the British press, the manufacturers are guided in their attitude in this matter by the prospects of eventual purchase on the part of the public. Inasmuch, however, as the models already known tend rather to comply with military requirements and therefore have too great a range and penetration for private use, the public and the manufacturers refuse to take interest in them and cling to the revolver, which answers their purpose. It is not known what attitude the military authorities take toward this tendency, whether they have begun to experiment with foreign models, or whether there is any prospect of their adopting the Mars pistol mentioned in the Annual for 1901.

Some excitement is being aroused in Great Britain by an instrument styled "hyposcope" by its inventor, which is said to enable the foreground to be observed from behind cover and fire to be delivered without the necessity of raising the head above the cover. The instrument is L-shaped, and in firing the horizontal limb is fastened to the rifle back of the sight so that the long limb hangs down. By means of suitably arranged mirrors it is rendered possible for the marksman to aim through an aperture at the lower extremity of the vertical limb, so that his eye is 23 centimeters lower than if he had to aim directly over the sight. The hyposcope can, of course, also be used for observing the foreground without being attached to the rifle. The instrument is said to have frequently been used with success in the South-African war, and the further experiments at Bisley are also claimed to have proven its practical utility. Special stress is laid on the fact that the hyposcope is not sensitive; that it can be adjusted to and removed from the weapon more quickly than the bayonet, although it sits perfectly solid; that it does not interfere with the marksman in firing, permits as accurate an aim to be taken as in direct aiming, and finally, that it can be conveniently carried in a leather sack fastened to the belt. Whether this report actually voices the sentiments of the experiment committee or whether it is merely a statement for advertising purposes can not be told yet from articles that have appeared in the press.

GREECE.

The infantry is armed with the 11-millimeter model-'71 Gras rifle.

No decision has apparently yet been made concerning a re-armament with a small-caliber rifle.

ITALY.

All the infantry of the line and the mobile militia are armed with the model-1891 rifle, the cavalry with the model-1891 carbine, and the special arms with the model-1891 carbine (Stutzen), all of 6.5-millimeter caliber. The territorial militia carries the modified Vetterli rifle, caliber 10.4 millimeters.

According to *L'Italia militare e marina* of March 6 and 7, 1902, a new pistol is about to be adopted for the officers of the army in place of the 10.35-millimeter model-'89 revolver now in use. This pistol was tested by a small-arms committee at Parma, and embodies all the latest improvements. It has an automatic mechanism, is of small caliber, and fires smokeless powder. The loading is done in the same manner as in the model-'91 rifle.

A law was passed authorizing the war minister to dispose of all the model-1870-87 rifles, together with bayonets and ammunition, as fast as they are replaced by new ones. According to a government report this would affect 600,000 rifles, model-1870-87, and 48,000,000 cartridges.

JAPAN.

All the infantry is armed with the 6.5-millimeter 30 Meiji rifle, and the cavalry with the 30 Meiji carbine.

The weight of projectile of the new rifle is 10.3 grams, and the velocity of the bullet at 25 meters from the muzzle is 706 meters.

LATIN AMERICA.**ARGENTINA.**

The infantry and engineers carry the 7.65-millimeter model-'91 Mauser rifle, the officers, cavalry, and artillery being armed with revolvers.

BOLIVIA, BRAZIL, CHILE, COLOMBIA, URUGUAY.

These countries have the 7-millimeter model-'93 Mauser rifle.

According to the *La Plata Post*, Uruguay has purchased a considerable number of Mauser rifles and carbines, with ammunition, from German arm-factories.

MEXICO.

The infantry is armed with the 7-millimeter model-'96 Mauser rifle, and the cavalry with the 7-millimeter Mauser carbine. There are, moreover, probably about 10,000 modified Remington rifles (arranged for Mauser ammunition) and 15,000 Remington rifles of larger caliber on hand.

This Annual has frequently announced of late years that Mexico is likely to proceed to a re-armament with new rifles of the Mondragon system. Exhaustive experiments have, in fact, been made with this end in view, and French newspapers have even announced with assurance that the introduction of the 5-millimeter Mondragon rifle had been decided on. The final decision, however, was against the Mondragon rifle. According to recent information it is doubtful whether the rifle, which was first manufactured in the French rifle-factory at St. Étienne, really possesses the qualities attributed to it by the French press, namely, absolute reliability, accuracy, and a rate of fire of 60 rounds per minute when used automatically. According to trustworthy reports a rate of fire of 13 to 15 shots per minute was attained during experiments made in Mexico with the Mondragon rifle used as a repeater in aimed fire; in filling the magazine the marksman has to place the rifle against his thigh, probably in order to overcome a strong resistance of the lock mechanism. When used as an automatic arm a rate of 31 shots per minute was attained only once, which resulted in injuring the breech mechanism. The latter is said to get out of order very easily, and, moreover, the muzzle jumps at every shot, so that the accuracy can not be very great during automatic rapid fire.

In the competitive trials participated in by the Mondragon and Lebel rifles as well as other systems, the Mauser model was victorious. It is said that this Mauser rifle closely resembles the German model-'98 rifle in its design. The Mexican government is said to have placed a preliminary order for 40,000 rifles and 10,000 carbines of this model in Germany.

MONTENEGRO.

This principality has 30,000 Russian three-line repeating rifles and 80,000 rifles of various other systems, principally Berdan and Werndl rifles.

The enlisted men of the first seniority class are armed in peace with one new and one old rifle each.

NETHERLANDS.

The troops are armed with the 6.5-millimeter model-'95 Mannlicher rifle and the 9.4-millimeter model-'73 revolver, Chamelot-Delvigne system.

According to recent information the 6.5-millimeter rifle fires a bullet weighing 10.15 grams with an initial velocity of 723 meters.

NORWAY.

The infantry is armed with the 6.5-millimeter model-'94 Krag-Jørgensen rifle, which fires the model-'96 cartridge.

PORTUGAL.

The infantry of the active army and of the first reserve is armed with the 6.5-millimeter Mannlicher rifle; the infantry of the second reserve is armed with the 8-millimeter model-'86 Kropatschek rifle; the colonial infantry and artillery and the cavalry carry the 6.5-millimeter Mannlicher carbine.

RUSSIA.

The active and reserve troops are all armed with the "three-line rifle (7.62-millimeter) model-'91," and the cavalry with the 7.62-millimeter "model-'96 Cossack carbine." Whether the old 11-millimeter Berdan rifles have begun to be replaced in the militia by the three-line rifle is not known.

According to *Razviedchik* the commander of the machine-gun companies recommended that the enlisted men discard their rifles still carried by them, claiming that the rifles hindered them in their duties and in the movement of the machine guns, and as a result were detrimental to rapidity of fire.

The reply of the war minister was that the question of armament of the enlisted machine-gun personnel had not yet been submitted to sufficiently exhaustive trials and that the matter would not be definitely decided until after the maneuvers of 1902.

According to a pamphlet entitled "the 7.62-millimeter Nagant patent 6-shooter non-gas-leaking revolver," this weapon has been officially adopted by the Russian government. It is manufactured in the Belgian arm-factory by Léon Nagant at Lüttich.

SERVIA.

The infantry carries the 7-millimeter model-'99 Mauser rifle. It was decided to purchase 45,000,000 rounds of ammunition for this rifle.

SPAIN.

The Spanish army is armed with the 7-millimeter Mauser rifle.

SWEDEN.

The infantry is armed with the 6.5-millimeter model-'96 rifle and the cavalry with the model-'96 carbine, both of the Mauser system. In order to replenish the supply, 350,000 rifles and 50,000 carbines of the above-mentioned models are to be purchased for the Swedish army.

SWITZERLAND.

The troops are armed as follows:

The infantry has the 7.5-millimeter model-'89-'96 Schmidt-Rubin rifle; the cavalry carries the 7.5-millimeter model-'93 rifle, with Mannlicher breech closure; the position artillery, fortress troops, telegraph companies, balloon company, and cyclist detachment are armed with the 7.5-millimeter model-'89-1900 short rifle; the cadets have the 7.5-millimeter model-'97 cadet rifle; the officers carry the 7.65-millimeter model-1900 pistol; the noncommissioned officers and buglers of the élite cavalry and artillery are provided with model-1882 revolvers; the remainder have the model-1878 revolvers.

The experiments for the purpose of devising a blank cartridge which should prevent the introduction of ball cartridges into loaders designed for blank ammunition and thus hinder the wanton or malicious manipulation of the ammunition were carried out with three different patterns of cartridge with the following results: Cartridges with doubly fastened wooden bullet are well adapted for machine guns; cartridges without a wooden bullet cause trouble in the magazine rifles, although they work all right in single loaders and have already

been adopted for cadet rifles; the cartridges with shortened doubly fastened wooden bullet appear to be the best adapted for rifles and carbines. It is impossible to insert ball cartridges into the loaders designed for this class of ammunition. The experiments are being continued.

The weapons adopted in the service have been subjected to considerable adverse criticism during the past year.

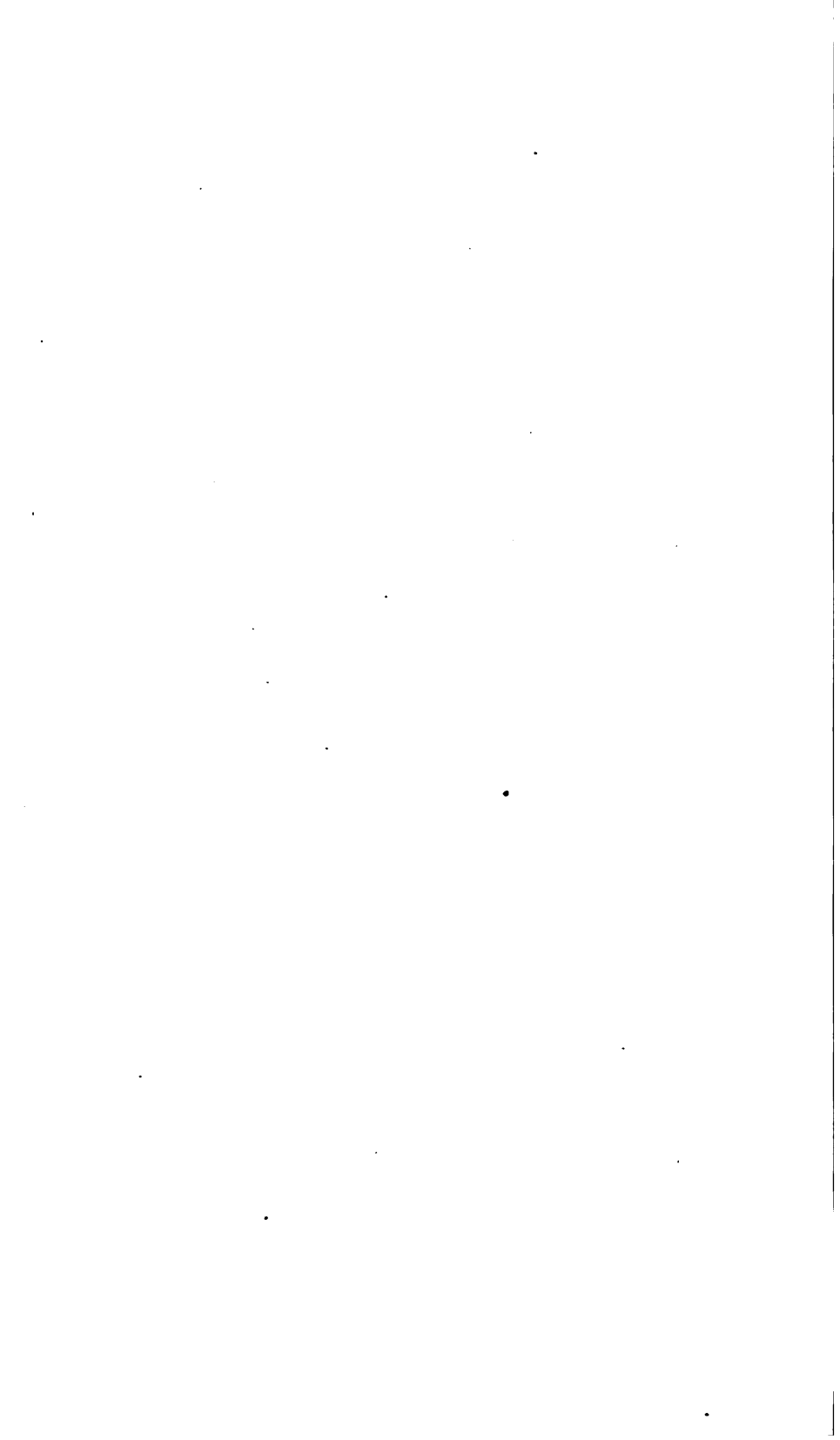
In a pamphlet awarded a prize by the Swiss officers' society, Captain Schibler maintains that the Schmidt-Rubin rifle has too complicated a mechanism.

A spirited controversy has also arisen in regard to the qualities of the recently adopted model-1900 automatic pistol (Parabellum). The arguments advanced are specially worthy of interest as affording an idea of how the Parabellum pistol behaves in actual service, Switzerland and Belgium being the only countries that have thus far adopted an automatic pistol to any great extent. The general impression gained is that in changing from a revolver to a pistol the troops did not perhaps receive adequate instructions as to the management of the latter, so that a number of accidents occurred which were rather due to the ignorance of the possessors regarding the weapon than to any inherent defect in the weapon itself. From a circular issued by the chief of artillery forbidding the making of any changes in the pistol by private armorers it appears probable that the accidents which have occurred are attributed to such changes.

TURKEY.

The cadres of the European army corps (first, second, and third) are armed with the 7.65-millimeter Mauser rifle, the fourth corps (Asia Minor) has the 9.5-millimeter Mauser magazine rifle, and the troops of the other corps carry the 11.4-millimeter Martini-Heury and Peabody rifle.

It appears that the manufacture of the 7.65-millimeter Mauser rifles in Turkish shops has encountered difficulties, for, according to authentic reports, 200,000 rifles were ordered in Germany at the end of 1902



IV.—EXPLOSIVES.

[COMPILED BY FIRST LIEUT. H. B. FERGUSON; CORPS OF ENGINEERS.]

During the year there have been no reports of any change or special improvements made in the service smokeless powders of the various powers. One innovation has been Krupp's substitution of a powder cloth and thread for the materials formerly used in the manufacture of cartridge bags. "Normal" powder, made in Sweden, though not new, has received exceptional notice from the French experts. Experiments in France with Lucciani's comb powder and special bullet have given some noteworthy results. Nothing very definite has been published as to the success of "cordite M. D.," substituted for cordite by Great Britain over a year ago; however, intimations have appeared that the navy is not satisfied with the new powder.

As none of the bursting charges for shells, including the British lyddite and the French melinite, have proven entirely satisfactory in warfare or in peace experiments, investigations in this line have been continued. Most promising results have been obtained with "ammonal" in Austria; with wet gun cotton, using a special détonator, in England, and with "schneiderite" in France. The "schneiderite" experiments began in 1900, the results were published in 1902.

POWDER CLOTH FOR CARTRIDGE BAGS (KRUPP).

[REPORTED BY CAPT. W. S. BIDDLE, JR., FOURTEENTH INFANTRY, U. S. MILITARY ATTACHÉ AT BERLIN.]

In place of silk or other material, this powder cloth forms the entire cartridge bag and is sewed together and tied with the sewing thread and cord.

The advantage of this cloth appears at once in that, being woven of the spun threads of smokeless powder, it is entirely consumed in the discharge of the piece and can leave no burning residue.

The cloth but increases the quantity of useful gases, and it results of course that the total weight of powder and bag is appreciably reduced.

Krupp says in this connection:

"Regarding the mechanical durability of the cloth, it equals entirely that of the silk cloth and can therefore be worked

into bags for all calibers that are to be considered and will stand all the strains of transportation in every respect. As to its chemical qualities, it meets all requirements exacted of the smokeless powder and therefore can be packed, shipped, and stored under the same conditions as the latter. The absolute reliability of the powder cloth has been proved by extensive trials as to durability, shooting, keeping in hot storage, and by chemical analysis. In order to avoid every possibility of residue being left in the gun barrel, twist or cord made out of powder threads is used for sewing and tying the cartridge bags.

“Five grades of this material are manufactured. No. 1 is light powder cloth which is used for manufacturing cartridge bags for field guns, field howitzers, and field mortars. No. 2 is medium powder cloth and can also be used for the guns, etc., mentioned above, and can be worked into cartridge bags for guns, howitzers, and mortars up to a caliber of about 12 centimeters. No. 3 is strong powder cloth and can be used for manufacturing cartridge bags from 15-centimeter caliber up. No. 4 is powder sewing thread and serves for sewing all cartridge bags. No. 5 is powder cord, braided or twisted, and serves for tying cartridge bags and for bundling up charges of long-tube powder.”

“NORMAL” POWDER (SWEDEN).

Referring to *Memorial de Poudres et Saltpetres* for 1902, *Arms and Explosives* comments as follows:

“‘Normal’ rifle and artillery powders receive by far the longest notice; and if the report may be taken as fair, then it is difficult to understand why these powders have not been adopted by other countries as well as Sweden, Finland, Norway, and Switzerland. From the results quoted, normal powder, which does not contain nitroglycerin, has little or no erosive action. In field artillery, 800 rounds may be fired without injury to the efficiency of the piece, whereas with nitroglycerin products 100 rounds are said to ruin a similar gun. In small arms, as many as 30,000 rounds have been fired from one rifle without injury to its accuracy; but 1,000 rounds are given as the life of the same rifle firing a nitroglycerin compound. Immediately below these statements, as if to give a reason for them, it is stated that 100 rounds of ballistite fired under certain conditions raise the temperature

of the rifle 432° F., and under the same conditions 100 rounds of normal cause the temperature to rise only 252° F. It is also set forth that very large quantities of this powder have been stored in magazines for four years without deterioration in ballistics or the injury in any way of the metal cartridge case.

“The above and more to the same effect make it impossible to understand why one or other of the greater powers has failed to discover the merits of this product.”

“*Nitro Explosives*,” by P. G. Sanford, gives the following data concerning this powder:

The Swedish powder known as “normal” smokeless powder, and manufactured by the Swedish Powder Manufacturing Company of Landskrona, Sweden, and used for some years past in the Swiss army, is made in four forms. For field guns of 8.4-caliber it is used in the form of cylindrical grains of a yellow color, of a diameter 0.8 to 0.9 millimeter and density of 0.790; about 840 grains of it go to one gun. For rifles it is used in the form of gray squares, density 0.750, and 1 gram equals about 1,014 grains. One hundred rounds of this powder, fired in eighteen minutes, raised the temperature of the gun barrel 284° F. A nitroglycerin powder, fired under the same conditions, gave a temperature of 464° F.

This powder is said to keep well—a sample kept three and one-half years gave as good results as when first made—is easy to make, very stable, ignites easily, not very sensitive to shock or friction, is very light, etc. Eight hundred rounds fired from a heavy gun produced no injury to the interior of the weapon. Samples kept for eleven months in the moist atmosphere of a cellar, when fired gave a muzzle velocity of 1,450 feet per second and pressure of 1,312 atmospheres, and the moisture was found to have risen from 1.2 to 1.6 per cent. After twenty-three months in the damp it contained 2 per cent moisture, gave a muzzle velocity of 1,478 feet per second, and pressure of 1,356 atmospheres. In a 7.5-millimeter rifle, 13.8-gram bullet, and charge of 2 grams, it gives a muzzle velocity of 2,035 feet per second, and a pressure of 2,200 atmospheres. In the 8.4-centimeter field gun, with charge of 600 grams and projectile of 6.7 kilograms, muzzle velocity was equal to 1,640 feet per second, and pressure 1,750. A sample of the powder for use in the 0.303-meter rifle, analyzed by Mr. P. Gerald Sanford, F. I. C., F. C. S., gave

the following result: Gun cotton, 96.21 per cent; soluble cotton, 1.80 per cent; nonnitrated cotton, trace; resin and other matters, 1.99 per cent.

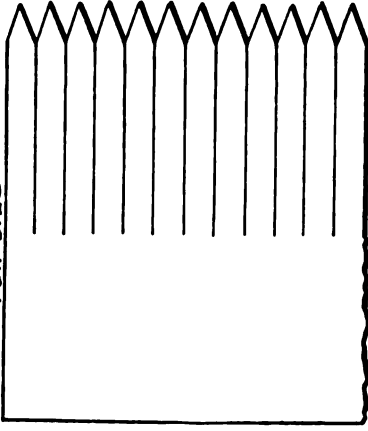
A NEW GUNPOWDER (FRANCE).

[FROM THE ENGINEER, NOVEMBER 21, 1902.]

A correspondent informs us that the French military authorities are engaged in carrying out experiments on several artillery firing grounds with a new kind of gunpowder. The greatest secrecy is being observed with regard to this new powder, but an expert who has been present at several experiments with it has published the following important details: The new powder is distinguished from that now in use by the fact that it can increase, as desired, the initial velocity of the projectiles without thereby increasing the pressure in the barrel of the rifle or big gun. The properties claimed for this powder are so astounding that it was said to be proved during its trials that the velocity of a projectile could be increased from 25 to 40 per cent without the pressure in the gun barrels being increased. Repeated experiments made with the rifles now in use in the different European armies gave the following results: The Mannlicher rifle, which has an initial velocity of 525 meters with Russian powder, and 585 meters with the German powder, attained at the same pressure with the new powder a velocity of 710 meters per second. The English rifle, Lee-Metford, which has a velocity of 560 meters with cordite, attains a velocity of 725 meters with the new powder, and under the same pressure. Similar results were obtained with other rifles, notably with the French weapon, Lebel. Although the results with the Lebel rifle can not be divulged, yet it may be taken for granted that the general excellence of the new invention, even when used with cartridges prepared according to the new method, is confirmed. The increase of the velocity, and, consequently of the rifle's range, thus becomes immense. But this is not all. By adapting the principles of this new form of ammunition to the infantry rifles, such accuracy of aim has been obtained that it is claimed that, without any exaggeration, every bullet fired can hit a 1-franc piece at a distance of 68 yards. The main point which distinguishes this powder from that now in use is the physical condition of the former, which undergoes a change at the

Plate III.

Lucciani Comb Powder.
Full Size



Lucciani's Modified Lebel Bullet.
Full Size

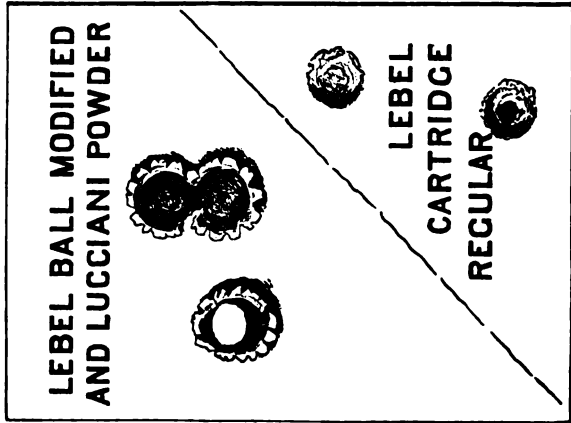
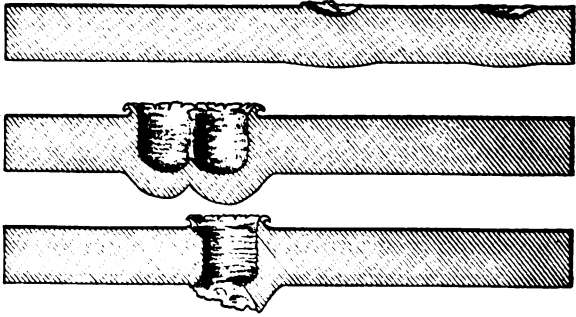


Lucciani Bullet
Full Size



Steel stem to give stiffness.
Lead middle to give weight.
Copper or alloy ends for taking the grooves.

Chrome Steel Plate.
Half size.



very moment of firing the shot. This powder resembles rolled leaves cut into small pieces, which produce just as many results as there are pieces without one atom of the chemical composition being affected thereby. Thus, by using this new powder, it is possible by a simple contrivance to regulate and to alter the pressure at will, while, by the same means, the ignition can be either retarded or accelerated. In this way the moment of ignition and the pressure can be regulated like a watch, and the initial velocity can be increased with mathematical precision, while the pressure in the gun barrel is lessened, and thus the recoil of the rifle reduced almost to nothing.

LUCCIANI'S COMB POWDER (IN FRANCE).

[REPORTED BY CAPT. T. BENTLEY MOTT, ARTILLERY CORPS, U. S. MILITARY ATTACHÉ AT PARIS.]

Lucciani's invention bears on two things, the shape of the bullet and the form of the powder charge, and that the somewhat extraordinary results he obtains are solely due to these factors is proved by his using any given rifle with the powder and bullet designed for it but modified in form only, according to his theories. At the test before me the Lebel rifle was used, firing Lebel bullet and a powder of approximately the same ballistic qualities as the regulation French small-arms powder but more malleable and cut into "Lucciani's comb."

Before going into the theory it seems best to examine the powder and the ball. The samples sent show (A) the powder in sheets as rolled out and ready to be cut up into charges [see sketch], (B) a powder of the same chemical composition and same form in every particular as "A" except the thickness of the sheet; (C) the cartridge as Lucciani prepares it for the regulation shell; this sample has the same chemical composition as the others, the same thickness of sheet as "B," but the teeth of the comb are longer and narrower than the other samples.

To prepare a cartridge using "C" Mr. Lucciani makes a roll (as it stands), wraps it in a cigarette paper, inserts it in the empty Lebel shell, base down, rams in a wad and then the bullet; the cartridge is then ready for firing.

The crudity of this method is due to two causes; first, Mr. Lucciani has up to a few months ago worked by himself and with very little money, as he explained to me; second, the fact that all rifles as now constructed are chambered. The

result of the latter is that his cartridge must be the size of the cartridge-case neck and ideal conditions of loading are impossible, the density of loading is necessarily irregular, and these rough methods are only small irregularities in the midst of great ones.

Mr. Lucciani desires to construct a rifle without chamber as presenting ideal conditions for developing the full effect of his theory; the cartridge would then be practically cylindrical and the charge of comb powder would be carefully and evenly rolled by machinery and would fill the cartridge case exactly, the rubber bands, of course, being omitted, but the paper wrapping being retained.

Such a rifle has not yet been constructed, due to lack of money and also because Mr. Lucciani believes that a convincing demonstration of the value of his invention can be made with any rifle and the comparison of the results will be more striking than with a special rifle.

The modifications made in the shape of the bullet is shown in "D" and "E." "D" is a Lebel bullet whose exterior form has been altered by cutting the cylindrical channel shown. "E" is an ideal bullet made for experimental purposes and showing Mr. Lucciani's idea of what a bullet should be; the central stem is of steel to give stiffness to the projectile, the body is of lead for density, the copper ends are to give a bearing surface that will best grip the lands and not foul the bore. In practice this copper would be replaced by a nonpoisoning substance such as the nickel alloy of which jackets are usually made. The copper has been used simply because of ease of manipulation in making a small number of bullets by hand.

The theory on which Mr. Lucciani works is this: Reduce the friction in the bore by giving the bullet the form seen in "D" and "E;" that is, cause the bullet to grip only at its base and near the ogive, the rest of the surface running flush with the lands. Give the powder the comb form in order to produce progressive burning, slow at first and quick later.

The comb form is used as furnishing a ready mechanical means of changing the rate of burning according to formula. This rate is changed for a given powder in three ways: (1) By changing the thickness of the comb; (2) by changing the length of the teeth; (3) by changing the width of the teeth. "A" and "B" samples have what he calls normal-size teeth,

but the comb is of different thickness in the two samples; "C" has teeth one-third the size of "A" and "B" and longer.

Another point made by Mr. Lucciani is that in his bullets the center of gravity coincides with the center of volume, thereby increasing the accuracy of flight. In the bullets of any system which he modifies, he accomplishes this coincidence by the form and location given to the part he cuts away.

He has constructed empirical formulas for velocity and pressure in terms of length, breadth, and thickness of the comb teeth, length and weight of bearing surface of the bullet. He did not give me these formulas and I can not say what terms enter them, but he is able to take exactly the same "comb" and bullet and by changing the teeth change the velocity to a predicted amount while the pressure is unaltered; again, with the same comb having the same teeth, by altering the amount cut away on the bullet, he can change pressure while the velocity is unaltered; by combining the two he produces variations in pressure and velocity, one or both, within limits, at will, the weight of powder and of bullet remaining the same.

These variations are calculated beforehand and predicted with considerable accuracy.

During the firing I was permitted to examine and verify everything that was done; the comb powder was prepared before me by Mr. Lucciani, the teeth being altered for the various cases with a pair of scissors. I watched him load the empty cartridge cases and saw inserted the common Lebel bullet or the Lebel bullet modified by Mr. Lucciani, as the case demanded. I read the chronograph and pressure gauge, and I believe the test was a perfectly fair one. The results can be seen in the table below. The variation in pressure and velocity for given elements of loading do not seem to be great in view of the crudeness of the methods employed in preparing the cartridges, and especially in view of the fact that the rolled-up charge was inserted in a bottle-shaped cartridge case, and anything like constant density of loading was out of the question.

The facts established are interesting and seem to bear out Mr. Lucciani's contention that he can, with his methods, get a much higher velocity without a corresponding increase of pressure.

Table showing the firing of December 5

Rifle, Label.		Weather, fine.												
Powder, Lucciani comb.		Bullets, regulation transformed.												
Thickness of the comb, in 14g mm.	Width of uncut part of comb, in mm.	Length of teeth, in mm.	Length of teeth points, in mm.	Thickness.	Total dimension.	Weight.	Observations.	Front band.	Base band.	Part cut away.	Weight, in grams.	Nature of bullet.	Pressure.	Initial velocity.
45	25	30	6	4	55	2.20	Teeth, entire	8.17	8.17	8	15	R. T. K.	2192	572
45	25	30	6	4	55	2.20	do	8.17	8.17	8	15	R. T. K.	2192	584
45	25	30	6	4	55	2.20	Teeth in fourths	8.17	8.17	8	15	R. T. K.	2203	610
45	25	30	6	4	55	2.20	do						2214	609
45	25	30	6	4	55	2.20	do						2203	629
45	25	30	6	4	55	2.20	do						2203	620
45	25	30	6	4	55	2.20	do						2214	625
55	25	30	6	4	55	3.25	Teeth, entire	8.17	8.17	8	15	R. T. K.	2337	780
55	25	30	6	4	55	3.25	do	8.17	8.17	8	15	R. T. K.	2371	780
55	25	30	6	4	55	3.25	Teeth in halves						2428	744
55	18	37	6	4	55	3.25	Teeth in thirds						3248	802

Mr. Lucciani had rifles of all the different countries of Europe and he has experimented with each to determine the best form of powder and bullet to give the highest ballistic results. He did not have a Krag rifle.

Mr. Lucciani believes his invention is even more useful in cannon than in small arms, especially as the reduction of pressure for a given velocity would make possible field guns of much less weight and suddenness of recoil. I have it on pretty good authority that the French Government has taken up his invention as applied to cannon, and one proof of this is that he makes no offer to sell his rights as concerns cannon. The French law prohibits such sale except by its consent and so long as it is experimenting with a view to adopting any invention.

Lucciani's process has been patented all over Europe and in the United States.

The chrome-steel plate sent herewith was fired at in my presence with the Lebel rifle, using first the regulation Lebel cartridge and then the Lucciani cartridge (comb powder and modified Lebel bullet.)

SMOKELESS POWDER AND BURSTING CHARGE IN ITALY.

Captain Anton Cascino, Italian artillery, instructor in the military school at Modena, is the author of a book called "*Il tiro, gli esplosivi e le armi,*" which is intended as a text-book for the above school, but which gives some information as regards explosives used in Italy.

SOLENITE (SMOKELESS POWDER).

Soon after the introduction of ballistite (see M. I. D. Notes, 1901) several imperfections were discovered, the most important of which were a too great explosive tendency, a too great tendency to corrode the weapon, and the lack of stability owing to the exuding of the nitroglycerin. It was attempted to prevent the exuding of the nitroglycerin by means of an additional ingredient, and from this resulted Amid ballistite, which, however, did not give satisfaction and the fabrication of which was abandoned.

Later the English cordite powder (in the form of threads, with hollow grains and cylinders) was tested in comparison with ballistite. From cordite there was less pressure (about 600 atmospheres less) but greater corrosive effect and it was abandoned.

On the 14th of September, 1894, Colonel Bazzichelli, of the artillery, who was director of the powder manufactory at Fontana Liri, took out a patent upon the invention of solenite. In order to lessen the temperature of explosion he lessened the nitroglycerin to 33 per cent, increased the collodium to about 66 per cent, added 1.1 per cent of vaseline, and gelatinized the substance by means of acetone, which was afterwards liberated. The compression produced by a rolling process was done in the cold by a machine similar to that by which macaroni is made. The granules were in the form of hollow cylinders of 2 millimeters diameter on the outside and 0.7 millimeters diameter on the inside, a height of 2 millimeters being given; each gram of solenite contains 120 to 140 granules.

In a long series of comparative experiments solenite showed itself always the superior, presenting the following advantages:

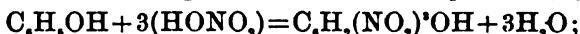
1. With a like charge there is less pressure, about 600 atmospheres.
2. Less corrosive action, on account of which the tube can be used longer.
3. It completely fills the shell model '91, whereby overloading is made impossible.
4. It possesses more stability, is more easily preserved, and can be more safely handled.
5. More safety in the manufacture, because the compression being made in the cold, no nitrose vapor is generated and it is not necessary to use aniline.

Solenite is harder than ballistite and has a darker color owing to the absence of aniline. It has the disadvantage of soiling the barrel more than ballistite, without, however, giving out more smoke; the cleaning of the rifle after use becomes harder. The flame of solenite is more visible than that of ballistite. On account of the good results obtained from solenite it was resolved to adopt it in the month of February, 1896, for the 6.5-millimeter cartridges, model '91 (the charge as compared with ballistite being 2.28 grams against 1.95 grams).

The effort is now being made to introduce solenite instead of ballistite for cannon.

PERTITE (BURSTING CHARGE).

The picric acid introduced in Italy for bursting shell has received the name of pertite. Pertite is precipitated when concentrated nitrosulphuric acid acts on phenol (C₆H₅OH).



the water which is set free is absorbed by the sulphuric acid.

CHARACTERISTICS.—Pertite crystallizes in needles of a bright yellow, and has a very bitter taste. It is soluble in cold water in the proportion of 1 : 160; it is even more soluble in warm water, but most soluble in ether and benzine; it attacks metal, forming picrates; melts at a temperature of 122.5°, which is one of the special proofs of its purity; at an ordinary temperature it emits some vapors, which increase with the temperature. A small quantity can, with the greatest precaution, be brought to 200° without danger, the pertite being slightly decomposed and becoming black; brought suddenly to a temperature of 300° degrees it explodes violently. It is but slightly poisonous; the vapor or dust excites sneezing, and if breathed for a length of time might be injurious to the health.

The physical state (crystalline) is favorable for its stability; it is not effected by great alterations in temperature.

Pertite absorbs but a small amount of water, and even though immersed in water does not lose its explosive quality, but simply becomes a doughy mass.

Pertite has an explosive force at least equal to a charge of equal weight of gun cotton, but when the great density of the charge which may be obtained with it is taken into consideration, it is easy to comprehend how much greater effect

a load of equal volume may have. The density of melted pertite is 1.70, while that of gun cotton in cakes is 1.10 to 1.15.

The equation according to which the decomposition of picric acid occurs is not yet known. The following is accepted :



thus the result is obtained that, according to the thermodynamic laws, from 1 kilogram of pertite is obtained 750 calories, whereby a gas volume is evolved, which reduced to 0° and 1 atmosphere of pressure equals 829.1, with a theoretical pressure of about 11,000 atmospheres. This data must be verified, however, by experiments.

Pertite exploding produces white smoke. The explosion is incomplete if a dense yellow vapor is evolved.

In order to determine the safety of a pertite charge against blows, the following experiment was made: Four charges were made fast to a table and were fired into from a distance of 25 meters with a 6.5-millimeter repeating rifle, model '91. Four shots went through and shattered the charges without causing any explosion or igniting the material. Other experiments demonstrated that of all known explosives, black powder included, pertite is the least susceptible.

Pertite ignited in the open air burns quietly, without exploding, if not more than from 8 to 10 kilograms is set on fire; in larger quantities the great heat and the effect of the gases cause explosion. A charge of pertite without fuze may be regarded as an almost inactive substance.

In a hollow projectile with the walls made to resist shock, pertite explodes under the simple influence of a strong impulse; it has, however, been found more satisfactory to use a 2-gram explosive cap, which is a detonating charge of picric acid in a steel case.

USE.—Pertite may be used either in a state of agglomeration obtained by fusion and molding, or as a compressed powder. In these two cases the density varies from 1.70 for the fuzed pertite to 1.3 or 1.5 for the pressed, on account of which the first explodes less rapidly than the second; but, on the other hand, the effect of the latter seems to be limited to the place where the explosion occurs. These peculiarities of picric acid are made use of by the Italians in the following manner: The pulverized pertite is inserted as a detonator between the fuzed mass and the 2-gram fuze cap, where the

use of a weaker detonator is made possible. In high-explosive shell either fuzed pertite or compressed powder is used, the former more commonly.

"AMMONAL" (AUSTRIA-HUNGARY).

[REPORTED BY CAPT. FLOYD W. HARRIS, FOURTH CAVALRY, U. S. MILITARY ATTACHÉ AT VIENNA.]

"Ammonal" is the name of a new high explosive, claimed to be powerful in its effect and safe in its use. This explosive contains no nitrified substance, but is a mechanical mixture of aluminum, nitrate of ammonia, saltpeter, and charcoal. It is less liable to absorb moisture than are other powders of its class and it keeps well when properly packed.

The explosive is not only a blasting compound for industrial and mining purposes, but also a military high explosive of rare excellence. When used either in mines or in ordnance, both safety and enormous power are obtained. So far as its industrial use is concerned, the most striking feature of the explosive is the total absence of noxious gases, for which reason it is most fit for blasting in pits and quarries.

Picric acid and wet gun cotton, explosives most commonly used in shells and torpedoes, require a strong detonator (about 2 grams of fulminate) for thorough detonation. It is claimed that "ammonal" is the only high explosive that can be brought to complete detonation by a simple black-powder priming, producing the same effect as if a fulminate cap were used. But, when a fulminate detonator is considered preferable to a black-powder priming, as, for example, in torpedo charges or submarine mines, one gram of fulminate is all that is required to detonate the charge.

During the course of the year a series of experiments was made before officers of the Austrian navy and before a foreign officer (Captain Tulloch of the royal artillery, England), in order to demonstrate the high efficiency of "ammonal" for military purposes. From 100 to 500 fragments were obtained by bursting a 12-centimeter steel service shell (12½ kilograms) with a bursting charge of 1,300 grams of "ammonal." It must, however, be borne in mind that the absolute number of fragments obtained signifies nothing, if the ratio of the weight of the charge to the weight of the projectile as well as the nature of the steel are unknown. Experiments made with 10.4 centimeter howitzer shells (11.2 kilograms) on the proving grounds of the Austrian ordnance board

within the last two months, in order to ascertain the fragmentation in sand and the effect of the firing against earth cover, showed that "ammonal" is undoubtedly much stronger than the Austrian "ecrasite," a picric-acid compound.

Steel shells were also fired from a 4.7-centimeter Skoda rapid-fire gun against a 30-millimeter steel plate, with a 60-gram charge of "ammonal" and a small black-powder priming. Perfect explosion was obtained behind the plate. There was no fuze in the shell, the black powder being exploded by the shock against the plate, the fire transmitted to the "ammonal" and retarded.

Advantages (claimed by manufacturers) of the new explosive "ammonal," which will result in its superseding picric acid and wet gun cotton for military use and dynamite for industrial purposes, are:

"Ammonal" is the strongest among the existing explosives that are of practical use. The calorimetric calculation of its power, according to the formula of the "Annales des Mines de Belgique, 1896, Tome I," gives the following results:

Maximum of work done by—

1 kilogram of "ammonal"	698,000 meter kilograms
1 kilogram pure nitroglycerin	570,000 meter kilograms
1 kilogram dynamite No. 1	450,000 meter kilograms.

"Ammonal" is perfectly safe in manufacture, transportation, storage, and handling. It is not liable to freezing, even at the lowest temperatures. It absorbs less moisture than do the other explosives of the nitrate of ammonia class, and can be stored, if properly packed, without the least deterioration.

I have just witnessed some tests of this explosive and the following are the results of my observation:

The expansion of the lead mortar by—

20 grams of "ammonal" was	300 cubic centimeters.
20 grams of dynamite No. 1 was	100 cubic centimeters.

In the crushing test, the height of the lead cylinder was reduced by—

100 grams of "ammonal"	20 millimeters.
100 grams of dynamite No. 1	13 millimeters.

Charges of "ammonal" in steel service shells of 12 centimeters were detonated by means of a black-powder priming and with a fulminate cap. In the first case the shell was well fragmented and in the second case perfectly fragmented.

Two perfectly similar bombproofs had been constructed, and I was asked to select one for a test of an "ammonal"

shell and one for a test of an "ecrasite" shell. The "ammonal" shell completely destroyed the bombproof in which it was exploded, and anyone who might have sought protection under this bombproof would have been crushed to death. The ceiling of the other bombproof remained intact, and anyone who might have been sheltered under it would have suffered no injury and probably no discomfort beyond the concussion caused by the explosion.

It was next demonstrated that this explosive is perfectly safe in handling; that it can not be detonated by shock or friction; that it burns in the fire without exploding, and that when exploded it produces no noxious gases. It is claimed that it is perfectly smokeless. On account of the large amount of dust accompanying each test witnessed, I was not able to verify this claim absolutely, but it was evident that the explosive is at least practically, and possibly entirely, smokeless.

A thorough and practical test of "ammonal" and of dynamite was then made in a quarry for the purpose of comparing the strength of these two explosives in blasting. It was clearly proven that in this application of explosives "ammonal" is considerably stronger than dynamite. When, in addition to the greater strength of the former, its quality of producing no noxious gazes or offensive odors is considered, its advantages for use in tunnels, mines, or other confined spaces are obvious.

It is not practicable to test the other qualities claimed for this explosive, but on account of the reputation of its proprietor, I am inclined to believe that they are all founded on fact. The proprietor is G. Roth, esq., of Vienna, one of the most important manufacturers of cartridges and explosives in Europe. He is said to employ 26,000 persons.

It is reported that "ammonal" has been adopted by Austria-Hungary, in place of "ecrasite," and by Germany, and that it is undergoing study and trial in England and in France. Mr. Roth's agent informs me that a long series of experiments with this explosive used as a charge for torpedoes and submarine mines has been made by the Austro-Hungarian navy at Pola, and that the most satisfactory results have been obtained; and that, after having been kept in water for nine months, it was found that the explosive had not deteriorated.

**WET GUN COTTON AS THE BURSTING CHARGE FOR SHELLS
(GREAT BRITAIN).**

[REPORTED BY CAPT. E. B. CASSATT, THIRTEENTH CAVALRY, U. S. MILITARY ATTACHÉ AT LONDON.]

Naval and military authorities have for years past, and are still, seriously occupied with the question of high explosives as the bursting charge for shell. Wet gun cotton is known to be, in its wet state, a perfectly safe, unflammable, and inert explosive in the absence of a detonating force. It may consequently be stored aboard ship, or conveyed and used with land forces, without any special precautions and without the slightest risk from any cause whatsoever. It is absolutely under control. It will keep in any climate unimpaired for an indefinite period. Wet gun cotton is not so locally violent as lyddite; its disruptive effect and ensuing damage are therefore much greater. Lyddite, too, is not employed in shell of a smaller caliber than the 4.7-inch gun, owing to the uncertainty of its detonation in smaller bodies. Wet gun cotton, on the other hand, may be detonated in small as well as large quantities with perfect certainty. The only obstacle to its general use for shell purposes hitherto has been the circumstance that to insure complete detonation a primer of dry gun cotton and a fulminate of mercury detonator have been required, and both of these agents are too sensitive to premature ignition by friction heat or concussion to permit their employment under the conditions of shell firing at the present day, owing to the high pressures and great velocities attained with modern artillery. The combination, however, is still the most useful and successful form for torpedo work and constitutes the latest practice method of charging and exploding these submarine "shells" by all navies.

The means, therefore, of adapting the wet gun cotton successfully for general shell work has long been sought, and, after many years of experiment and research, the New Explosives Company, Ltd., of London, have at last been able to place before the war authorities a new safety exploder, the composition of which contains neither dry gun cotton nor fulminate of mercury, but which will detonate wet gun cotton with certainty under the safest conditions. The composition itself will not detonate under a temperature of 360° C., and can not be ignited by friction or shock, but at the same time is brought instantaneously into action with an ordinary detonating pellet such as is commonly employed in all percussion

or time fuzes of general service to-day. The force then exerted will detonate in its turn any charge of wet gun cotton without leaving any traces of unburnt explosive or residue. The composition is very stable and stands an excellent heat test, and it is not affected by any climatic changes, and in cost of manufacture it is less than gun cotton.

On Tuesday, the 8th instant, some extensive official trials were carried out by the New Explosives Company, Ltd., at the Ridsdale Range of Sir W. G. Armstrong, Whitworth & Co., Ltd., in the presence of several war office officials and foreign attachés.

The main bursting charges were made by the company's new method of forming and compressing wet gun cotton, whereby it is now possible to produce charges of compressed gun cotton in one whole solid block of any dimensions mechanically true and of theoretical and uniform density throughout.

With the old method of work certain practical difficulties have prevented the direct formation of "shaped" blocks such as are required to form the bursting charges for shell and for torpedoes, and it has hitherto been the practice to build up such a charge from a number of disks and to reduce them to the required shape and size in a lathe. By the new process such charges can be formed in a single block without any subsequent turning or other shaping being necessary.

There is no space wasted as is the case with built-up charges through slightly imperfect contact between the individual blocks, and thus, either a heavier charge (i. e., about 15 per cent more gun cotton) can be got into the same space, or less space will be occupied by a charge of given weight.

The first experiment consisted of firing 10 rounds from a 6-pounder quick-fire gun. The total weight of each shell as fired was 5 pounds 10½ ounces, the weight of the wet gun-cotton bursting charge being 100 grams and that of the explosive in the safety exploder 9 grams.

The shell was fitted with the ordinary Hotchkiss fuze, Mark IV. The target was a ¾-inch steel plate at a range of about 150 feet. In the rear of this were two heavy steel coils forming a cell 7 feet long backed by a 12-inch plate to confine the fragments, which were afterwards collected, counted, and weighed. The propellant employed was ordinary government cordite, service charge 7¼ ounces. The following table

gives the fragmentation of the shell and the chamber pressures and muzzle velocities for each round :

Round.	Chamber pressure.	Muzzle velocity.	Recovered of shell.		Recovered of brass.		Recovered of gas check.		Largest piece recovered	Total weight of shell recovered.	
			Pieces.	Lbs. Oz.	Pieces.	Oz.	Pieces.	Oz.		Oz.	Lbs. Oz.
1-----	Tons. Not taken.	Foot-seconds. Not taken.	102	4 4	7	13 $\frac{5}{8}$	3	1 $\frac{1}{2}$	4	4	5 $\frac{1}{2}$
2-----	Not taken.	Not taken.	143	3 15	14	8 $\frac{5}{8}$	9	5 $\frac{1}{4}$	8 $\frac{3}{4}$	3	15 $\frac{1}{2}$
3-----	11. 28	1, 800	67	3 9	14	5 $\frac{3}{4}$	None.	None.	6 $\frac{1}{2}$	3	9 $\frac{3}{4}$
4-----	12. 26	1, 827	104	4 4 $\frac{1}{2}$	6	5 $\frac{3}{4}$	None.	None.	6 $\frac{5}{8}$	4	5 $\frac{1}{2}$
5-----	12. 39	1, 838	154	4 2 $\frac{1}{2}$	10	1 $\frac{1}{2}$	6	1 $\frac{1}{4}$	6 $\frac{7}{8}$	4	4 $\frac{1}{2}$
6-----	Not taken.	Not taken.	135	3 14 $\frac{1}{2}$	8	1	None.	None.	6 $\frac{1}{4}$	3	15 $\frac{1}{2}$
7-----	Not taken.	Not taken.	84	4 3	10	3 $\frac{1}{2}$	None.	None.	7 $\frac{1}{4}$	4	3 $\frac{3}{4}$
8-----	Not taken.	Not taken.	222	4 3 $\frac{3}{4}$	9	5 $\frac{3}{4}$	None.	None.	7 $\frac{3}{4}$	4	4 $\frac{1}{2}$
9-----	Not taken.	Not taken.	306	8 6	31	2 $\frac{1}{2}$	None.	None.	6	8	8 $\frac{1}{2}$
10-----	Not taken.	Not taken.									

The second experiment was the bursting of a 6-inch shell at rest. This was done in a closed cell of wrought iron 7 $\frac{1}{2}$ inches thick by 3 feet 6 inches in diameter by 5 feet deep, weight 6 $\frac{1}{2}$ tons, from which none of the fragments could escape. The main object in this instance was to demonstrate that the wet gun-cotton charge and safety exploder would act equally satisfactorily without the assistance of the shock of impact at a short range, and detonate as instantaneously and energetically (1) as if fired from a gun, and (2) in large as well as in small quantities. The results here obtained were also very much appreciated by all present. The force of the explosion burst the coil open. There were no traces of unconsumed explosive; the fragments recovered numbered 2,122 pieces, the largest weighing 10 $\frac{1}{2}$ ounces and the total 65 $\frac{1}{2}$ pounds.

The shell was an ordinary cast-steel one, weighing fully loaded as fired 119 $\frac{1}{2}$ pounds.

The wet gun-cotton charge weighed 6 pounds 9 ounces and the explosive composition in the safety exploder 300 grams. The fuze employed was of the ordinary service direct-acting pattern, and was fired electrically.

Before the trials commenced it was convincingly proved that the gun-cotton charges contained the usual amount of moisture, viz, about 18 per cent of water, and that there was no dry gun cotton or fulminate of mercury employed in the composition of the safety exploder, and in view of the very excellent results obtained, it seems highly probable that gun-cotton shell charges will become more generally employed,

The three then exerted the pressure on the wet gun cotton with-
 out the aid of any explosive or residue. The
 three then tested the gun stands an excellent heat test.
 and the three different in the ultimate charges and in cost of
 the three types of gun cotton.

The three then conducted some extensive official trials
 with the use of the New Explosives Company, Ltd., at
 the Royal Ordnance Factory, Walthamstow, and the
 three then tested the three different and foreign
 charges.

The three bursting charges were made by the company's
 new method of forming and compressing wet gun cotton.
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 maintaining the same of the normal and uniform density
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The three all methods of work remain practical difficulties
 have prevented the use of normal "shaped" blocks such
 as the ordinary shell and the bursting charges for shell and for
 bursting charges. It has therefore been the practice to build up
 such a charge from a number of blocks and to reduce them to
 the required shape and size in a lathe. By the new process
 such charges can be formed in a single block without any
 subsequent turning or other shaping being necessary.

There is no space between the case with built-up charges
 through slighting the contact between the individual
 blocks and thus a heavy charge (i. e., about 15 lb.)
 can be put into the same space as a charge of given weight.
 The space will be occupied by a charge of given weight.

The first experiment consisted of firing 10 rounds
 of pounder quick-fire gun. The total weight of
 shell was 5 pounds 14 ounces, the weight of
 bursting charge being 100 grams and the weight
 in the safety exploder 9 grams.

The shell was fitted with the ordinary
 IV. The target was a 4-inch steel plate
 150 feet. In the rear of this were two
 ing a cell 7 feet long backed by a 10-foot
 fragments, which were afterwards
 weighed. The propellant employed was
 ment cordite, service charge

gives the fragmentation of the shell and the chamber pressures and muzzle velocities of the rounds.

Rounds.	Chamber pressure.	Muzzle velocity.	Fragmentation of shell.			Largest piece of shell.	Total weight of shell fragments.
			Pieces.	Dist. from muzzle.	Pieces.		
1.----	Tons.	Foot-seconds.	Pieces.	Dist. from muzzle.	Pieces.		
2.----	Not taken.	Not taken.	162	4 7	7		
3.----	11.28	1,800	67	3 1	14		
4.----	12.26	1,827	104	4 4 1/2	8		
5.----	12.39	1,838	154	4 2	10		
6.----	Not taken.	Not taken.	135	3 14 1/2	2		
7.----	Not taken.	Not taken.	84	4 3	5		
8.----	Not taken.	Not taken.	222	4 3 1/4	5		
9.----	Not taken.	Not taken.	306	8 6	31		
10.---	Not taken.	Not taken.					

The second experiment was the bursting of a shell at rest. This was done in a closed cell 12 inches thick by 3 feet 6 inches in diameter and weight 6 1/2 tons, from which none of the shell escaped. The main object in this instance was that the wet gun-cotton charge and shell should be equally satisfactorily without the shell being impacted at a short range and burst energetically (1) as if fired from a gun, and (2) well as in some other instances. The results were also very interesting. The shell was broken into the same number of pieces as when fired from the gun, and the fragments were of the same size. It strikes the target as if it were a solid mass, and after the explosion it is found to be in the same position as when it was fired from the gun.

below.

SECTION CHAMBER.

containing 1.13 pounds of gun-cotton, and furnished with the Schneider-Bellord on a steel plate 30 millimeters thick, and two angle irons fixed to an

especially in armor and deck piercing projectiles, for which purposes it appears to possess advantages which can not be claimed for any other high explosives. With a delay-action fuze wet gun cotton with this new safety exploder can be fired through the thickest armor plate that the shell itself will penetrate without exploding until it has passed through; this can not be accomplished with lyddite or any other known high explosives.

"SCHNEIDERITE" (FRANCE).

[FROM REVUE MILITAIRE SUISSE.]

"Schneiderite" is the exclusive property of MM. Schneider et Cie., and is a powder, light yellow in color, quite oily to the touch, and forming lumps readily when pressure is applied.

Considered alone, "schneiderite" is a wholly inert substance, of perfect stability and containing in itself no explosive substance whatever. The elements of which it is composed only combine to form an explosive at the very moment of the explosion under the influence of a detonating primer.

When the detonator is not used "schneiderite" may be submitted to the most violent shocks with impunity. It is not influenced by fire. Thrust into a fire, it burns with difficulty, and when it is withdrawn the flame dies out. It is also uninfluenced by the most extreme cold. It is sensitive to but one single alteration, which, instead of rendering it more dangerous, diminishes its explosive qualities. This is the alteration which may result under bad conditions of preservation from its hygroscopicity. To avoid the absorption of moisture, it is necessary to make sure of the imperviousness of the cases or of the projectiles in which the "schneiderite" is contained. It is easy to restore all its properties by drying it in a stove or simply in the sun.

The handling or the transportation of projectiles charged with "schneiderite" and not furnished with their detonators, or of "schneiderite" in cases, is not dangerous under any circumstances or under any conditions of preservation.

In France the commission on explosive substances has obtained as results of experiments in closed vessels made with

gun cotton, picric acid, dynamite, and "schneiderite," the following figures:

	Pressures with density of loading of—	
	0.2.	0.3.
Picric acid.....	1,744	3,504
Dynamite No. 1.....		3,279
Gun cotton.....	2,430	3,297
"Schneiderite".....	2,051	3,628

A firing experiment made by the same commission, in a proof mortar, gave the results below:

	Range in meters with a shot of 14 kilograms.	
5 grains of dynamite No. 1.....	72.50	75.00
5 grains of gun cotton.....	83.00	92.00
5 grains of schneiderite.....	85.50	95.00

The investigations of MM. Schneider et Cie. for the purpose of determining the best means for the adaptation of "schneiderite" in the loading of projectiles, have necessitated a long series of experiments. The cause of the difficulties encountered is precisely the great stability of "schneiderite," and that the purpose of the investigations was to insure the complete detonation at the point where the projectile strikes the ground, and not as with the other explosives, to hinder it at the point of departure.

These investigations have resulted in the invention of a special detonator, system Schneider-Canet, and in the employment of an appropriate method of loading, which insure the complete explosion of the projectile under all the conditions actually existing as regards shell charged with high explosives. A special arrangement of the detonator makes it possible, if desired, to postpone the explosion until after the obstacle has been penetrated.

Certain results of the experiments are given below.

I.—EXPERIMENTS OF EXPLOSIONS AT REST IN AN EXPLOSION CHAMBER.

FEBRUARY 24.—Shell of 12 centimeters containing 1.13 kilograms of "schneiderite" and furnished with the Schneider-Canet detonator. The shell is lying on a steel plate 30 millimeters in thickness, supported on two angle irons fixed to an

armor plate. The walls of the explosion chamber are protected by armor plates. The firing is done by means of the Bickford lanyard. The explosion is of the first degree and produces considerable effect. The 30-millimeter plate is broken into small pieces without bend. The angle irons which support it are wrenched and twisted. Two armor plates superposed vertically before the projectile are struck by the fuze plug of the latter. The first is broken in three pieces, the second is split with three radiating fissures in the center, and with a strong imprint of the plug. One of the splinters of the projectile struck an armor plate of 60 millimeters thickness placed parallel to the axis and at a distance of 1.05 meters with such force that this plate was split. The projectile is in small pieces.

DECEMBER 4, 1901.—High-capacity shell for 10.5-centimeter field howitzer containing 1.84 kilograms of "schneiderite" and furnished with the Schneider-Canet detonator. The shell is placed upright on a plate of 30 millimeters thickness; this plate rests on two supports 300 millimeters apart. The firing is done with the Bickford lanyard. The explosion produces all the effects which characterize a complete explosion of the first degree. The projectile is reduced to minute pieces; 156 of the fragments found weigh together 4.570 kilograms, an average weight of at least 28 grams for each fragment found. The plate of 30 millimeters is broken into 16 pieces, with cracks radiating toward the center of the bottom of the projectile. The bottom is itself reduced to pieces. The place where the projectile was placed on the plate is hollowed out, forming a spherical depression.

II.—EXPERIMENTS AT REST IN A COMPACT CLAYEY SOIL.

AUGUST 23, 1900.—High-capacity shells for a 15-centimeter field mortar containing 3.40 kilograms "schneiderite" and furnished with a Schneider-Canet detonator. The shell is placed horizontally at a depth of 1.50 meters in a compact clayey soil. The explosion produced a funnel-like path 2.80 meters in diameter and 1.25 meters in depth. The bottom of this funnel is formed of earth thrown up, which makes an explosion chamber of 1 meter in diameter.

DECEMBER 4, 1901.—High-capacity shell for 105-millimeter field howitzer containing 1.74 kilograms "schneiderite" and furnished with the Schneider Canet detonator. The shell is

placed vertically at a depth of 1.50 meters. The explosion produces an excavation in the ground, an excavation in an amphoral form of which the superficial diameter is 2.6 meters and the depth 1.80 meters. The maximum diameter is 3.20 meters.

III.—FIRING EXPERIMENTS.

For the purpose of testing by practice the value of the contrivance decided upon for the latest methods of loading and as regards the detonator, a practice fire was held on the firing grounds of MM. Schneider et Cie., at Harfleur (near Havre), in August, 1900, of 300 rounds of shell of high capacity, of which—

100 rounds were with a 15-centimeter field mortar.

100 rounds with a 12-centimeter field howitzer.

100 rounds with a 12-centimeter siege gun.

The high-capacity shell of the 15-centimeter field mortar weighed 32 kilos. It contained 3.400 kilograms of "schneiderite" and was thrown with an initial velocity of 200 meters.

That of the 12-centimeter field howitzer weighed 16.400 kilograms, of which 1.600 kilograms was of "schneiderite." The initial velocity was 315 meters.

Finally, the explosive shell of the 12-centimeter siege gun was of weight of 18 kilograms and contained 2 kilograms of "schneiderite." It was thrown at an initial velocity of 575 meters.

On the other hand, 15 shells of high capacity in the 15-centimeter field mortar and 15 of the 12-centimeter field howitzer were fired at a reduced velocity, the first at a velocity of 120 meters, the second at a velocity of 150 meters.

A great number of other tests with "schneiderite" shell have been made. The result of one of these precision practice fires executed with this type of projectile was to demonstrate their holding to their trajectory. The test was made with the rapid-fire 105-millimeter field howitzer, of which the high-capacity shell had a weight of 16 kilograms, with 1.840 kilograms of "schneiderite." The weight of 16 kilograms, which is considerable for a caliber of 105 millimeters, renders necessary the extreme length of the "schneiderite" shell, which is 4.6 caliber. It is thus particularly interesting to verify the precision in like projectiles in howitzers when fired with a reduced velocity.

The test was made with an initial velocity of 215 meters and at a distance of 2,500 meters. The results are as follows:

Maximum range, 2,481 meters; minimum range, 2,431 meters; maximum deviation in range, 50 meters; probable deviation in range, 14.50 meters; maximum deviation in direction, 4 meters; probable deviation in direction, 0.80 meter.

To conclude, the results of the experiments noted above show that the safety in employment and the power of "schneiderite" make it a war explosive of the first class; and, besides, that the loading contrivances and the sort of detonator adopted by MM. Schneider et Cie. entirely assure the proper action of the "schneiderite" projectiles under all the circumstances actually presented in the employment of high explosive shells.

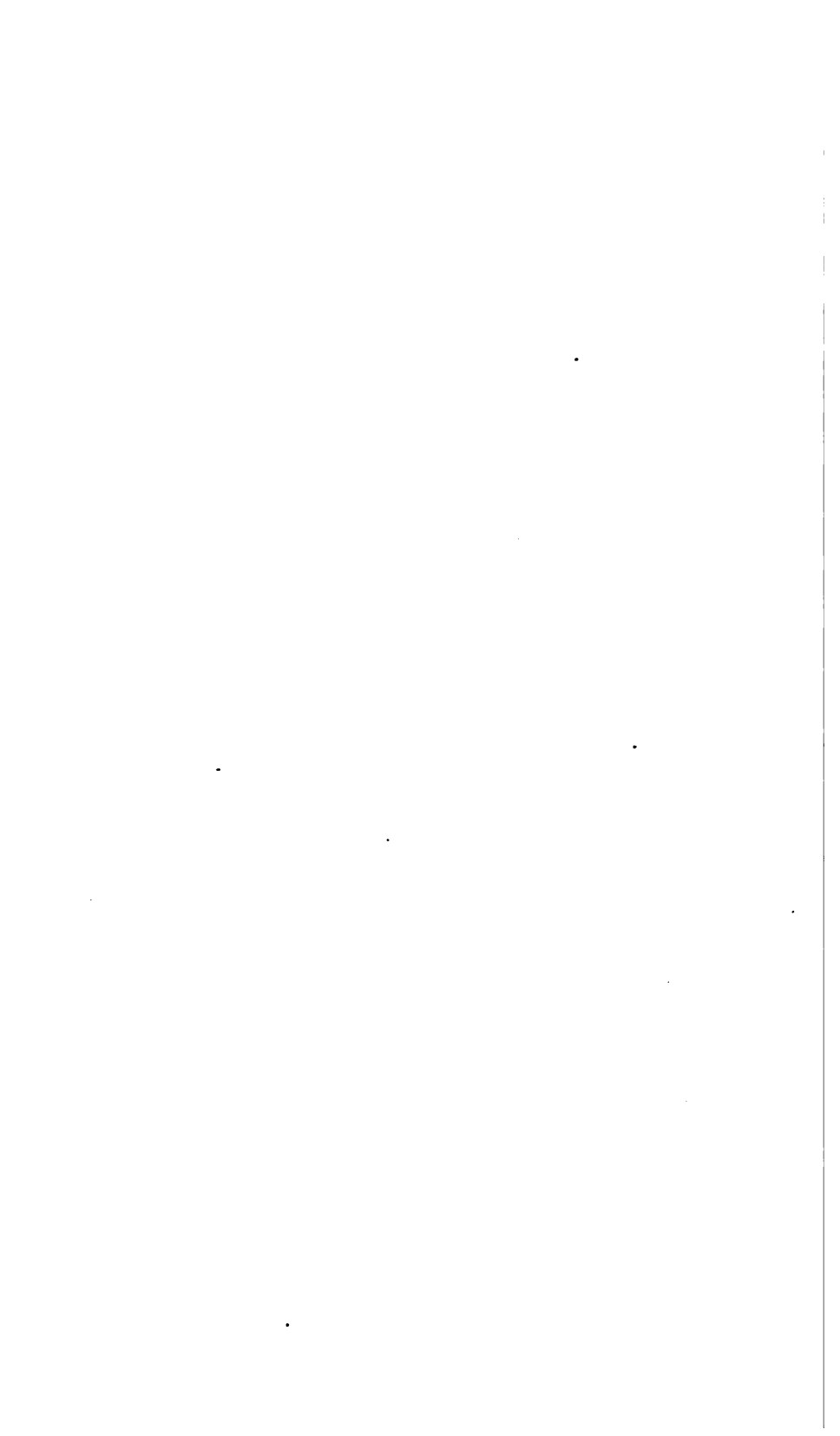
TORPEDO EXPERIMENTS (FRANCE).

Ueberall states that the results of the experiments on the caisson representing a section of the coast-defense ship *Henri IV* have only recently been made public. The caisson was anchored and a torpedo charge was attached to its side, about 10 feet below the surface of the water, the depth at which a torpedo is calculated to strike a vessel. The discharge was made by means of an electric current worked from a barge at some distance away. The result exceeded all expectations, as a hole of $21\frac{1}{2}$ square yards in extent was made in the side of the caisson, which immediately sank. Internally the damage extended to three longitudinal partitions which were in the position of the coal bunkers in war ships. The hole in the first partition covered nearly 11 square yards, the second partition was shattered, and the third, which has no corresponding partition in the *Henri IV*, had two oval holes in it, one 5 by $2\frac{1}{2}$ feet and the other $2\frac{1}{2}$ by $1\frac{1}{4}$ feet. The torpedo charge was the ordinary one of from 176 to 220 pounds.—*London Times, July, 1902.*

MELINITE VS. GUN COTTON.—Experiments with torpedoes designed for defending harbors have just taken place off Lorient, France, before a board of naval and engineer officers.

The purpose of the experiments was to make some comparative explosions of electric torpedoes anchored in 20 meters of water in the open sea, part of the torpedoes being charged with melinite and the remainder with gun cotton.

Strict secrecy is maintained regarding the results. However, we were enabled to ascertain that the explosions of the torpedoes charged with gun cotton were the more beautiful and more terrible. A sheath of water, or, rather, a water-spout, rose at least 80 meters above the surface of the sea at each gun-cotton-charged-torpedo explosion. The sheath of water rising at the melinite explosions was only about 40 meters high.—*La Patrie*, September 5, 1902.



V.—COMMISSIONS, PROMOTIONS, AND RETIREMENTS OF OFFICERS.

[COMPILED BY FIRST LIEUT. R. S. CLARK, NINTH INFANTRY.]

AUSTRIA-HUNGARY.

[FROM REPORT OF CAPT. F. W. HARRIS, 4TH CAVALRY, U. S. MILITARY ATTACHÉ AT VIENNA; "ORGANISATION DE L'ARMÉE AUSTRO-HONGROISE," BY MAJOR DEBAINES, OF THE FRENCH ARMY; "L'ÉTAT MILITAIRE DES PRINCIPALES PUISSANCES ÉTRANGÈRES," BY MAJOR LAUTH, OF THE FRENCH ARMY, AND VARIOUS NOTES FROM THE MILITARY PERIODICALS.]

COMMISSIONS.

Commissions as second lieutenants are given as follows: (a) To graduates of the military schools (the Maria Theresa school for the cavalry and infantry and the technical school for the artillery and engineers); (b) to officer aspirants (graduates of one of the cadet schools) who have served one year satisfactorily in the ranks; (c) to one-year volunteers who have successfully passed the examination required at the end of a year's service in order to become officers of the reserve, and after entering the reserve having applied for transfer to the active army, have successfully passed the additional examination required for a commission in the active army.

It is difficult to state what proportion of the officers of the army comes from each of these sources, but it is pretty safe to assume that twice as many officers come from the officer-aspirant class as do from the military schools, and there are a great many that come from the reserve.

No commissions are given to enlisted men or civilians.

PROMOTIONS.

Promotion is based upon seniority in the arm of the service through the grade of lieutenant colonel; by seniority in the army for the grades of colonel, general of brigade (major general), and general of division (lieutenant general); by selection for the grade of general "commanding an army corps," and field marshal.

Generals "commanding army corps" are all selected from among all the general officers of the army without regard to seniority. The office of field marshal exists, but since the

death of the Archduke Albert it has been allowed to remain vacant, and it will probably not be filled during the lifetime of the present emperor.

The emperor, however, has the right to promote officers of any grade out of their turn. He avails himself of this prerogative to the extent of about 20 per cent of the vacancies. Officers promoted out of their turn must have shown special ability and have been recommended by the commanders of their respective corps, and must have been adjudged likely to become exceptionally efficient colonels and generals. Company officers to be so promoted must be able to speak another language besides German. In promotion by selection, officers who have graduated from one of the military schools are preferred. Promotions in time of peace are made twice each year, namely, on the first of May and the first of November.

There is one incident connected with promotion by selection that may be of interest. For the purpose of illustration, let it be supposed that in the present month of November there are thirty vacancies in the grade of major in the infantry. Under the existing ruling of the minister of war, who seems to have unrestricted authority in this matter, twenty-four of these vacancies would be filled by promotion according to seniority, and the remaining six, or 20 per cent of the total number, by promotion by selection. The lineal rank of the six majors who have been promoted out of their turn would generally be determined by their former rank as captains; but, if the junior of the six can pass the examination required for admission to the general staff, he immediately becomes the senior of the six majors in question. Suppose the fifth in lineal rank successfully passes the examination required for the promotion of a captain of artillery, he immediately becomes second in lineal rank of these six majors.

RETIREMENTS.

There is no fixed age for compulsory retirement, but an officer may be retired at any age if he be found physically or mentally incapacitated for active service. The customary method of procedure is to intimate to the officer that his application for retirement is desired. If he declines to submit his application he is ordered before a retiring board, which is unrestricted in its recommendations for the retirement of undesirable as well as incapacitated officers.

Officers incapacitated in the line of duty in time of war may retire with a pension, and in time of peace after ten years' service with a pension.

Officers 60 years old, or who have served forty years, are allowed to retire on application.

Officers of the active army may retire at any time passing into the reserve, provided that they have served the time required by law and that they engage to answer any call to the colors up to the age of 60.

As long as an officer remains fit for active service he is allowed to serve with the active army. The average age of the present chief of the general staff and of the three inspectors general of the army is about 72 years.

RANK.

Generally speaking, there is no other kind of rank in the active army but substantive. Each regiment, however, has its honorary colonel, who is usually one of the royal families of Europe or some distinguished general, but this rank confers no material advantages. Brevet rank may be conferred on an officer upon his retirement from active service, but this confers no advantages in pay or allowances. Brevet rank is never given to an officer while in the active army.

NOTE.

Attention is invited to the meaning of the following titles employed in the Austro-Hungarian army:

"Feldzeugmeister," means a general appointed from any arm of the service other than the cavalry.

"General der Kavallerie," means a general appointed from the cavalry.

"Feldmarschall-Lieutenant," means lieutenant general.

The first two correspond to the meaning of our word general.

The grade of brigadier general does not exist. Brigades are commanded by major generals, divisions by lieutenant generals, and army corps by generals.

FRANCE.

[CONDENSED FROM A REPORT OF CAPT. T. BENTLEY MOTT, UNITED STATES MILITARY ATTACHÉ AT PARIS.]

COMMISSIONS.

Second lieutenants come from the cadets of the military colleges St. Cyr (cavalry and infantry) and the Polytechnic

(artillery and engineers), or from noncommissioned officers who have served two years and then passed through (one year) St. Maixent, Saumur, Vincennes, or Versailles. The ratio of officers from both these sources is about the same.

PROMOTIONS.

Promotion of all officers is by the arm of the service, and not regimentally.

Promotion in the various grades is made as follows :

To first lieutenant by seniority. All second lieutenants are promoted after two years' service.

To captain, two-thirds by seniority and one-third by selection.

To major, half by seniority and half by selection.

To lieutenant colonel and all higher grades by selection.

In time of peace all officers must have served in the various grades before promotion to the next higher, as follows :

Second lieutenant, two years.

Lieutenant, two years.

Captain, four years.

Major, three years.

Lieutenant colonel, two years.

Colonel, three years.

General of brigade, three years.

In war the time limit is only half what it is in peace.

The time provision for promotion may be waived in the case of an "action d'éclat."

Although the second lieutenants come equally from the ranks and the military colleges, promotion to the grade of captain and higher is preferably given to the graduates of the military colleges. Promotion to the grade of lieutenant colonel and to superior grades is almost wholly given to the graduates of the military colleges.

PROMOTION LIST.

In January of each year the promotion list for that year is published. This list, in its final form, is established by the minister of war, who has authority to place a name upon it at any time. For each arm of the service there is, however, a "classifying commission" composed entirely of general officers, which draws up the list for its arm, decides what names shall be proposed for promotion by selection, and submits the

list to the minister of war. He makes such alterations as he sees fit and gives the list its final form. Of course, for the higher grades, the minister alone prepares the list. The names of the officers composing the "classifying commissions" are kept secret until the list is published.

In the list for 1902 the officers selected for promotion to the various grades were between the following ages:

Infantry—

- For promotion to the rank of—
- Captain, 27 to 39.
- Major, 36 to 50.
- Lieutenant colonel, 39 to 54.
- Colonel, 45 to 56.

Cavalry—

- For promotion to the rank of—
- Captain, 29 to 41.
- Major, 38 to 50.
- Lieutenant colonel, 44 to 55.
- Colonel, 46 to 56.

Artillery—

- For promotion to the rank of—
- Captain, 30 to 38.
- Major, 37 to 51.
- Lieutenant colonel, 43 to 53.
- Colonel, 50 to 57.

Engineers—

- For promotion to the rank of—
- Captain, 26 to 31.
- Major 41 to 50.
- Lieutenant colonel, 48 to 55.
- Colonel, 44 to 56.

RETIREMENT

Officers are compulsorily retired at the following ages:

- Lieutenants, at 52.
- Captains, at 53.
- Majors, at 56.
- Lieutenant colonels, at 58.
- Colonels, at 60.
- Generals of brigade, at 62.
- Generals of division, at 65.

GERMANY.

[COMPILED FROM "L'ÉTAT MILITAIRE DES PRINCIPALES PUISSANCES ÉTRANGÈRES" BY MAJOR J. LAUTH, OF THE FRENCH ARMY, AND "DIE HEERE UND FLOTTE," BY VON ZEPPELIN.]

COMMISSIONS.

Noncommissioned officers can never become officers except as a reward for distinguished service in the field, and it is the exception when this reward is given.

Officers are recruited from two classes, namely, the "fahnenjuncker" and "cadets."

The "fahnenjuncker" are such young men, between the ages of 17 and 21, as possess a high-school diploma and have passed the examination before the ensign commission at Berlin.

The "cadets" are such young men as have been educated at military high schools.

The candidates from both the above classes present themselves to the colonel of the regiment in which they wish to serve, and are either accepted or rejected by him. If accepted, they serve in the ranks as privates for five months, at the end of which time they receive the title of "honorary ensign." They next receive the title of "titulary ensign," and finally that of "ensign." Having received the title of ensign, they are required to pass through the imperial war school, a course of thirty-five weeks, at the end of which time they receive their commissions as second lieutenants.

PROMOTIONS.

Promotion is according to seniority in the arm of the service from the grade of second lieutenant to that of first lieutenant; by regimental seniority from the grade of first lieutenant to that of captain; by seniority in the arm of the service from captain to major, and by seniority in the army for all higher grades. However, an officer who is not considered capable of rendering good service in the next higher grade is mercilessly passed by. Officers about to be passed are warned unofficially to that effect, and they usually ask to be retired before an officer is promoted over them. Their retirement is made more easy by being presented with a decoration, by an honorary promotion, by being placed in some sedentary employment, or by being allowed to wear the uniform of their old regiment.

The emperor has the right to promote to any grade by

selection, but he rarely avails himself of this prerogative, except in the case of members of the royal family.

RETIREMENTS.

There is no law of compulsory retirement in the army.

GREAT BRITAIN.

[COMPILED FROM ROYAL WARRANT AND VARIOUS OTHER SOURCES.]

Commissions in the regular army are given on the recommendation of the commander in chief to persons qualified under the regulations approved by the secretary of state for war.

A commission as second lieutenant in the cavalry or infantry may be given to a cadet from the royal military college at Sandhurst; to a cadet from the royal military college at Kingston, Canada; to an officer of the militia, yeomanry, or volunteers; to an officer of the local forces of the colonies, or to a second lieutenant or lieutenant of the royal Malta artillery; to a duly qualified candidate from a university; to a warrant or noncommissioned officer.

A commission as second lieutenant in the royal artillery (except on the list of district officers) or in the royal engineers (except in the coast battalion) may be given to a cadet from the royal military academy at Woolwich, or to a cadet from the royal military college at Kingston, Canada.

A commission as second lieutenant in the royal artillery (except on the list of district officers) may also be given to an officer of the militia artillery.

A commission as second lieutenant in the army service corps may be given to a qualified officer of the regular army, or the royal marines with not less than one year's commissioned service; to a cadet from the royal military college at Sandhurst; to a cadet from the royal military college at Kingston, Canada; to an officer of the militia or a duly qualified candidate from a university by open competition; to a warrant or noncommissioned officer.

Before final appointment to the army service corps, all candidates must pass a probationary period of one year.

A commission as second lieutenant on the unattached list of the Indian staff corps may be given to a cadet from the royal military college at Sandhurst.

A commission as second lieutenant in the army may be given to a bandmaster of specially meritorious service.

A commission as lieutenant in the cavalry or infantry may be given to a quartermaster or riding master not over 32 years of age.

A commission as lieutenant on the list of district officers of the royal artillery, or in the coast battalion of the royal engineers, may be given to a quartermaster or riding master, warrant or noncommissioned officer of the royal artillery or royal engineers, not over 40 years of age. This limit may be extended in case of promotion for distinguished service in the field.

A commission as quartermaster or riding master may be given to an officer, warrant or noncommissioned officer not over 40 years of age.

A commission as inspector of army schools may be given to an army schoolmaster not over 45 years of age.

A commission as subadar or jemadar may be given to natives in the Hongkong regiment, Hongkong-Singapore, and Ceylon-Mauritius battalions of the royal artillery, or in the Hongkong, Singapore, Ceylon, or Mauritius companies of the royal engineers.

Officers of the regular army may be appointed to the Indian staff corps under such regulations as may be laid down from time to time by the secretary of state for India in council.

Vacancies among the European officers of the Hongkong regiment in the subaltern ranks are filled from the British line regiments or the Indian staff corps. Candidates must have passed the higher standard of Hindustani. Their appointments are for a term of five years. They then revert to their former regiments, or if recommended they are given the option of renewing their service for a further term not exceeding five years.

Officers appointed to the West Indian regiment are permanently gazetted to that regiment, the same as the British line regiments.

SECONDED OFFICERS.

Officers (other than officers of the royal engineers) below the rank of major are seconded on the strength of their regiment or corps when serving in a staff appointment, in a civil appointment, or in the Hongkong regiment. All these appointments are for a term of five years, at the end of which

an officer reverts to duty with his regiment or corps. Under very special circumstances this period may be extended by the secretary of state for war to ten years.

Officers of the royal engineers under like circumstances are kept on the establishment of their corps, and officers of the army service corps are seconded only within such limits as may be prescribed by the secretary of state for war.

If a major holds an appointment in which he would have been seconded had he been below the rank of major, his regiment is entitled to an additional captain.

On reverting from the seconded list an officer rejoins his regiment as a supernumerary, retaining his regimental rank and position. In the case of a major, referred to above, the additional captain becomes supernumerary, and is absorbed in the first available vacancy.

SUPERNUMERARY OFFICERS.

An officer is supernumerary on the strength of his regiment or corps, while awaiting a vacancy or in case of the reduction of the establishment of his regiment or corps, when his retention is authorized by the secretary of state for war.

PROMOTIONS.

Every promotion is made upon the recommendation of the commander-in-chief, with the approval of the secretary of state for war.

Promotion up to and including the grade of major (in the cavalry and infantry) is by seniority in the regiment; in the artillery, engineers, and staff corps by seniority in the corps.

A vacancy in any rank above that of second lieutenant in a regiment or corps is filled by the absorption of a supernumerary officer, if there is such, otherwise by the selection of a *qualified officer.

A supernumerary or seconded officer, or an officer on the reserve list of the royal engineers, provided he keeps himself efficient for duty, is eligible for selection for promotion, precisely as if he had remained on the establishment of his regiment or corps.

An officer below the rank of major is promoted to the grade next above his own to fill a vacancy on the establishment of

* A qualified officer means one who has qualified mentally and physically for the grade for which he is a candidate.

a regiment or corps, provided that a captain is not so promoted unless he has had at least nine years' service.

A lieutenant, the senior of his grade in his regiment or corps, who holds the appointment of adjutant, may be promoted in the absence of a vacancy, provided that he has had nine years' service.

A second lieutenant of the royal artillery, royal Malta artillery, royal engineers, or army service corps is eligible for promotion to the grade of lieutenant, in the absence of a vacancy, on completing three years' service.

A lieutenant of the royal engineers or army service corps is eligible for promotion to the rank of captain, in the absence of a vacancy, on completing eleven years' service.

A captain of the royal engineers is eligible for promotion to the grade of major, in the absence of a vacancy, on completing twenty years' service.

The service of an officer counts from the date of his first permanent commission. Only full-pay service counts.

The service of an officer commissioned from warrant rank includes not only his full-pay service as an officer, but also his service as a warrant officer, and half of any time he has served in any lower rank.

An officer below the rank of lieutenant colonel must have passed such professional examination as may be laid down from time to time, before he can be recommended for promotion to a substantive rank.

Promotion to the grade of lieutenant colonel to fill a vacancy on the establishment of a regiment or corps, or an appointment carrying the rank of lieutenant colonel, is conferred by selection. Such are arbitrarily selected by the commander in chief. In principle they must have served as major in the appointment called "second in command."

Brevet rank is conferred for distinguished service in the field, or for distinguished service other than in the field. Brevet rank is not regimental rank, but is called army rank; for example, a major in a regiment, even though only commanding a company, may be given the brevet rank of lieutenant colonel, but this means nothing while he is serving in the regiment and while the regiment is serving alone; if, however, the regiment be temporarily or permanently brigaded with other regiments, this brevet lieutenant colonel with substantive rank of major assumes his army rank of lieutenant colonel,

and if his brevet lieutenant colonelcy antedates the lieutenant colonelcy of the officer commanding the regiment, the brevet lieutenant colonel assumes command, and in the same way if his brevet lieutenant colonelcy antedates the substantive lieutenant colonelcies of all the officers commanding regiments in the brigade, the brevet lieutenant colonel assumes command of the brigade.

An officer is promoted to the rank of field marshal at the will of the sovereign, without regard to seniority. Retired officers are eligible for promotion to the grade of field marshal. If a general officer on the active list is promoted to the grade of field marshal on the paid establishment, such promotion creates a vacancy on the establishment of generals. The number of field marshals on pay as such will not exceed ten, including two in the Indian army.

Promotions to the grade of major general or lieutenant general are made by selection to fill an appointment, or as a reward for distinguished service in the field. Promotion to the rank of general is by seniority (except in the appointment of the commander in chief or commander in chief in India, who, if below the rank of general, receives that rank on appointment). Promotion may be conferred, under special circumstances, on a colonel, major general, or lieutenant general for distinguished service in the field, or for distinguished service other than the field, without regard to vacancies on the establishment. An officer so promoted is held as a supernumerary, pending a selection to fill an appointment.

Temporary or local rank as major general, lieutenant general, or general, for the convenience of the service, may be conferred on an officer of the next lower rank (whether he holds such rank permanently or temporarily) without regard to seniority. The rank of brigadier general is temporary or local only.

The appointment of a colonel of a regiment or colonel commandant of the royal artillery, of the royal engineers, of the king's royal rifle corps, or of the rifle brigade, is filled by selection from the field marshals, from the establishment of general officers on the active list, or from retired general officers of the same branch of the army in which the vacancy occurs. Such selections are made upon the recommendation of the commander in chief, with the approval of the secretary of state for war, and are purely honorary.

An army or brevet colonel, or a lieutenant colonel having three years' service with that rank, if selected for the command of a regimental district, or of a regiment of the foot guards, for appointment as principal ordnance officer, or for an appointment approved by the secretary of state for war as carrying the rank of colonel, may be granted such rank.

RETIREMENT.

VOLUNTARY.—Officers may retire at the following ages:

Second lieutenant, lieutenant, or captain—After fifteen years' service, or twelve years' service in the West Indian regiment.

Major (having substantive rank as such), with three years' service in his substantive rank—After fifteen years' service, or twelve years' service in the West Indian regiment.

Lieutenant colonel (having substantive rank as such, or, in the case of an officer of the foot guards, regimental rank, not below that of lieutenant colonel), with three years' service in his substantive rank—After fifteen years' service.

COMPULSORY.—Officers are compulsorily retired at the following ages:

If holding the rank of—	Age.	Period of non-employment.
Second lieutenant, lieutenant, or captain If of the royal garrison regiment.....	45 50	Five years.
Major If of the royal garrison regiment.....	48 53	Five years.
Lieutenant colonel.....	55	Five years.
Colonel.....	57	Five years.
Major general.....	62	Three years.
Lieutenant general or general.....	67	

OFFICERS OF THE INDIAN STAFF CORPS.

ADMISSION.*

A candidate for the Indian staff corps, before arriving in India, is gazetted as second lieutenant on the unattached list

*Previous to being gazetted to commissions, cadets of the royal military college, who have secured appointment to the Indian staff corps, are called upon to state officially, through their parents or guardians, what claims (if any) they have on any particular command in India through the service of near relatives in that command, and to what command they would prefer to be posted. The services of near relatives in the Indian service entitle them to consideration.

of the British army, and after arrival in India is attached to a British regiment serving there.

At the expiration of one year's duty he is admitted to the Indian staff corps with the rank of second lieutenant and appointed to a native regiment.

At the expiration of two years and three months from the date of his first commission he is promoted to the grade of lieutenant, provided he has passed the lower standard of Urdu.

Within three years from the date of his admission to the Indian staff corps he must have passed the higher standard examination of Urdu and the professional examination required under the Indian regulations. Should he fail to pass these examinations, he is removed from the Indian staff corps and provided with his passage to Europe.

Officers who are required to supplement the direct supply from Sandhurst are drawn from the infantry, cavalry, and artillery of the British line serving in India. They must have completed one year's regimental duty in India, be under 25 years of age, and have passed Urdu by the lower standard at the date of application. Officers of less than two years and three months' service are appointed to the Indian staff corps as second lieutenants, and of more than two years and three months' service as lieutenants. They must have passed the higher standard of Urdu within three years of admission to the corps.

Officers once appointed to the Indian staff corps can not revert to the British line except by transfer, and then only when they are below the grade of major.

PROMOTION.

Officers after nine years' service become captains; after eighteen years' service, majors; after twenty-six years' service, lieutenant colonels.

No officer can be promoted while on the half-pay list, but service on half pay not exceeding one year is allowed to reckon as service toward promotion.

After three years' service in his grade a lieutenant colonel is eligible for promotion (by selection) to the rank of colonel.

Promotion to the grade of major general, lieutenant general, or general is made by selection or as a reward for distinguished service.

Officers in civil employment, after ten years' absence from military duty, are removed from the effective list of the army and are placed on a supernumerary list, rising thereon, under the regulations in force, to the grade of lieutenant colonel, but no higher. This does not apply to general officers, or officers taken for temporary civil or political duties in the field or in newly acquired territories.

BREVET PROMOTION.

Officers above the grade of lieutenant are eligible for brevet promotion as a reward for distinguished service in the field.

A lieutenant colonel becomes eligible for promotion by brevet to the rank of colonel after four years' service in command of a regiment or battalion.

TEMPORARY OR LOCAL PROMOTION.

Temporary or local promotion may be made to the grade of general officer. A major, substantive or brevet, may be granted the temporary rank of lieutenant colonel, and a captain the temporary rank of major, if holding the permanent appointment of commandant of a native regiment.

RETIREMENT.

Officers may retire voluntarily at the following ages:

In any grade at 60 years of age;

Lieutenant general or general at 65 years of age.

Officers are compulsorily retired at the following ages:

Any grade at 62 years of age;

Lieutenant general and general at 67 years of age.

RUSSIA.

[FROM "RECRUTEMENT ET AVANCEMENT DES OFFICIERS," BY MAJOR DUCARNE OF THE BELGIAN ARMY; "L'ÉTAT MILITAIRE DES PRINCIPALES PUISSANCES ÉTRANGÈRES EN 1902," BY MAJOR LAUTH OF THE FRENCH ARMY; "DIE ORGANISATION DER RUSSISCHEN ARMEE," BY CAPTAIN VON DEYGALSKI OF THE GERMAN ARMY; AND "DIE HEERE UND FLOTTEN, RUSSLAND," BY MAJOR GENERAL VON ZEPELIN OF THE GERMAN ARMY.]

Officers are recruited in four ways: (a) From the college of the corps of pages of the czar; (b) from the military colleges; (c) from the "junker" schools; (d) directly from the non-commissioned officers.

Officers of the guard come exclusively from the first two categories, as well as the greater part of the officers of the artillery and engineers.

Officers of the cavalry and infantry of the line come chiefly from the "junker" schools.

According to the order in which they graduate, cadets of the college of the corps of pages of the czar are assigned in the four following categories: (1) As second lieutenant in the guard (officers of the guard rank with officers of the next higher grade in the line); (2) as second lieutenants in the line with their commissions antedated one year; (3) as second lieutenants in the line with their commissions bearing the date of graduation; (4) as noncommissioned officers, but they may be made second lieutenants after six months' service.

Cadets of the military colleges, on graduation, are assigned to categories (2), (3), and (4). A few, however, who show exceptional ability, are gazetted to the guard.

On graduating from the "junker" schools, the graduates are assigned to categories (2), (3), and (4), with the exception that in class (4) the graduates must serve one year as non-commissioned officers before they can be made second lieutenants.

Noncommissioned officers who have rendered faithful service for five years or who have distinguished themselves in the field are sometimes made officers, but they are usually assigned to garrison troops in remote stations.

PROMOTIONS.

The lower grades of officers are promoted to the next higher grade after fixed periods of service, which periods are as follows:

For promotion to lieutenant, four years' service.

For promotion to second captain, eight years' service.

For promotion to captain,* twelve years' service.

In the cavalry and infantry of the line, in promotions from the grade of captain to that of lieutenant colonel,† half are made by seniority and half by selection. To the grade of colonel all promotions are made by selection.

In the guard, artillery, and engineers all promotions are made by seniority in the arm.

*A second captain is brevetted captain after twelve years' service, but he can not be commissioned until a vacancy exists in his regiment (in the field artillery, horse artillery, and engineers seniority in the arm), when his commission is antedated to the date on which he had served twelve years.

†In the Russian army the grade of major does not exist.

The grade of lieutenant colonel does not exist in the guard, so promotions are made direct from captain to colonel.

Promotion to the grade of general officer is by selection. To be eligible for promotion to the grade of major general a colonel must, as a rule, have served eight years in his grade; a major general for lieutenant general, eight years in his grade; a lieutenant general for general, twelve years in his grade. In making general officers preference is shown for officers of the general staff.

There are, however, numerous exceptions to the general rules governing promotions. Officers of the general staff have a great advantage, and promotions out of the usual order are made for distinguished services.

RETIREMENTS.

Officers are compulsorily retired at the following ages in the lower grades:

Sabalterns, 53 years.

Captains, 53* years.

Lieutenant colonels, 58 years.

* Under special circumstances captains are allowed to remain until 55.

VI.—MISCELLANEOUS NOTES.

The following notes on military matters are collected from various sources:

GENERAL.

DURATION OF MILITARY SERVICE IN THE PRINCIPAL COUNTRIES.

With the exception of England all countries have recognized the necessity of reducing, more or less, the time passed with the colors.

It is evident that modern armies should be able to satisfy the following requirements: In time of war to place in line as large a number of men as possible; in time of peace to give instruction to as many citizens as the financial conditions of the country will allow, so that in the event of mobilization the units of combat may consist exclusively of trained soldiers. But since the financial resources of the richest states are limited, it is a matter of necessity to keep each class with the colors only for the time recognized as indispensable to make a soldier, so that another class may be summoned for training immediately afterwards.

In Germany the question has been solved by placing it in two lights. Since the German government could not enroll in the army even half of the conscripts at its disposal without exceeding the limits of its budget, it prefers to keep the men a shorter time with the colors, admitting each year a larger number. With a population of 57,000,000, Germany furnishes an annual contingent of 540,000 men, which is reduced to 413,000 after the withdrawal of those who are exempt from service for one reason or another.

It goes without saying that Germany could not hope to enroll the whole 413,000 men, a number too large even though the revisory commission were very severe in eliminating all those who showed the least physical or moral defect; a very considerable part of these 413,000 men is, therefore, attached immediately either to the landsturm or to the

recruiting reserves, so that the number of men actually enrolled annually in the active army is only 220,000. This number is sufficient to maintain the present effective of 495,000 men. Officers, surgeons, military officials, noncommissioned officers, and volunteers are not included in the latter number.

Besides, the men are not kept with the colors longer than is absolutely necessary to give them the requisite training. Hence the duration of active service is: Two years for infantry troops, one year in the train troops, and three years in the cavalry and horse artillery. The Prussian war ministry is of the opinion that if, in 1904, the service of two years, which at present is only on trial, is definitely adopted, the number of reenlistments in the infantry would be augmented and credits demanded in consequence.

In Russia, where military service has been obligatory for thirty years, men are obliged to serve five years in the active army, thirteen years in the reserve, and five years in the *opolchenie*, which corresponds to the reserve of our territorial army. With its population of 132,000,000, Russia furnishes annually 980,000 conscripts, of whom about 860,000 are fit for service. It is plain to be seen that under such conditions the government may display great generosity in granting exemption from service. The number of men who are exempted from service is, in fact, 400,000, of whom one-half are completely exempt, and the other half conditionally.

In reality, even the latter number is never enrolled. The number of men really enrolled each year averages about 290,000. This number reached 308,000 in 1900, and about 318,000 in 1902.

We have said that the duration of active service is five years, but with the exception of the men of Turkestan and Siberia, who actually serve that term, the others are usually liberated at the end of four years.

We may add that young men having followed the course of certain schools have the benefit of a reduction of service, which is: One year for those coming from the elementary schools, two years for those who have gone through the intermediary schools, finally, three years for those young men who have finished their studies in the superior schools.

To recapitulate, the larger part of the Russian recruits have four years of active service, a large number three

years, a certain number two years, finally, a few one year only.

In Austria-Hungary exemption from obligatory military service may be attained in many ways. The annual contingent, which consists of 470,000 conscripts, falls to 417,000 on account of the exemptions from service. The contingent is divided into three categories, the first, which contains 103,000 men, is incorporated in the active army for three years, but it is generally liberated during the course of the third year; the second, 24,000 men, is enrolled for two years in the landwehr of the provinces of Cisleithania and Transleithania and of the Tyrol, which form the permanent nucleus of an army of the second line. The third category, which is the most important, as it contains 290,000 men, serves only eight weeks. It may be seen that actually the duration of active service does not exceed two and one-half years.

In Italy, of an annual contingent of 315,000 conscripts, 205,000 are declared fit for service. The number of recruits enrolled in the active army varies from 95,000 to 105,000 men yearly. The duration of active service is legally three years, but, with the exception of the cavalry, where the men are retained with the colors for that period, the other branches of the service are held for only two and one-half years. The recruits are taken into the service on the 1st of March instead of on the 1st of December, and they are liberated during the course of the third year.

It is seen that with the exception of Russia, the principal governments do not generally keep their men in the active army longer than two and one-half years.

The cavalry generally serves three years.

In his work on the Russian army, Von Drygalski gives certain interesting figures upon the exemption from military service. According to him the percentage of individuals exempt from military service for one cause or another (physical unfitness, domestic situation, etc.) are, in the following countries: Austria-Hungary, 50 per cent; Germany, 37 per cent; Italy, 27 per cent; France, 21 per cent; Russia, 19 per cent.

The percentage of men released from military obligations for family reasons are: France, 0; Germany, 2 per cent; Austria, 3 per cent; Italy, 37 per cent; Russia, 48 per cent.

Those actually enrolled are: In France, 78 per cent; in Germany, 51 per cent; in Austria-Hungary, 40 per cent; in Italy, 33 per cent; in Russia, 29 per cent.

Those exempted on account of unfitness for service: France, 21 per cent; Germany, 37 per cent; Austria, 50 per cent; Italy, 27 per cent; Russia, 19 per cent.

Those forced to service: France, 78 per cent; Germany, 51 per cent; Russia, 29 per cent.

Of every 1,000 individuals who are of age to gain their livelihood, from 21 to 60 years of age, there are in service: In France, 58.4; in Germany, 48; in Russia, 43; in Austria, 34; in Italy, 30. Of 1,000 men of the same age available in time of war there are: In Germany, 139; in Austria, 96; in France, 171; in Italy, 107; in Russia, 81.

These figures show that military service is most onerous in France and least so in Russia.—*Revue du Cercle Militaire*, September 6, 1903.

PROGRESS IN AÉRONAUTICS.

A brief description of the general dimensions and construction of the Santos-Dumont No. 6, with which the successful trial was made, may be given here. The balloon itself was a cylinder of 6 meters in diameter, terminating in two cones, the total length being 33 meters, and the displacement being 622 cubic meters. This is equivalent to 800 kilograms of air, against which there was to be charged the weight of the balloon, 120 kilograms; of the motor, 98 kilograms; of the hydrogen itself, 120 kilograms; of the aéronaut, 50 kilograms; and of various accessories; there being left an unopposed buoyancy of 150 kilograms. The balloon was made of the finest white Japanese silk, this being very close mesh, and rendered impermeable by means of five coatings of linseed oil. Within this main gas reservoir there was placed a secondary balloon of 60 cubic meters capacity, this being capable of distension or contraction by the admission or discharge of air, thus maintaining the outer main balloon in its proper shape.

The motive power and propelling machinery were carried on a trussed girder, which was attached to the balloon by a system of piano wires. The rudder, which was of triangular form, was attached to the rear, behind the propeller, and braced and stayed to the frameworks and the balloon by wires. One of the novelties of the apparatus consisted of the

use of two reservoirs of very thin brass, containing about 100 pounds of water, which might be discharged at will, forming a more controllable ballast than the usual sand bags.

The motor, upon which the principal success of the apparatus depends, was constructed by M. Buchet, and contains no special features differing from the well-known machines of Daimler, de Dion, Panhard, Mors, and others, for automobile service.

Although steam engines have been greatly reduced in weight in the endeavor to secure power and speed in torpedo boats, they are as yet unavailable for use in flying machines. M. Serpollet has designed a motor, using his instantaneous system of steam generation, which, for 30 horsepower, weighs but 191 kilograms, or 6.4 kilograms per horsepower. It is, however, necessary to carry 22 pounds of water per horsepower, which adds too much to the load for aëro-nautical purposes. The principal method by which the weight of a steam motor may be reduced is by increasing its speed, and in this respect the steam turbine offers possibilities.

M. M. Renaud and Krebs used a battery and motor of 9 horsepower, with a weight of 55 pounds per horsepower, and this was a great advance over the 68 kilograms per horsepower of M. Tissandier, or the weight of the eight men (400 kilograms) employed by M. Dupuy de Lome.

In order the better to show the reduction in weight per horsepower which has been attained in the more recent internal combustion motors, M. Armengaud gives a diagram in which the curves show the results of various makers. Without going into details, it may suffice to state that for motors of 50 horsepower the weight has been reduced to 5 kilograms per horsepower, while for motors as large as 100 horsepower this may be reduced to 3 kilograms per horsepower.

Referring to the points to be observed in the construction of future dirigible balloons, it will be interesting to note the rules laid down as long ago as 1886 by Colonel Renard, as a result of his practical experience. In order to obtain successful results it is desirable to—

1. Give the balloon an elongated form, similar to that of a boat.
2. To maintain the form of the balloon by the use of an internal vessel, permitting the replacement of the gas by atmospheric air.

3. To maintain the longitudinal stability by connecting the car to the balloon by a rigidly braced framework.

4. To use a propeller of suitable dimensions, actuated by a motor of great power, and relatively light weight as possible.

5. To place the rudder in the rear, in a manner similar to that employed in steering boats.

To these rules M. Armengaud adds some of his own, based upon the most recent experience:

1. Employ an internal-combustion motor having at least four cylinders, in order to permit the best degree of balancing, and to use electric ignition, in order to avoid interruptions in the action of the cylinders.

2. Bring the propeller shaft as close as possible to the longitudinal axis of the balloon, that is, to the line passing through the center of pressure.

3. Provide sufficient distance between the center of pressure and the center of gravity of the system to maintain operative stability.

4. Provide in the case of small aërostats an auxiliary couple for stability by the use of a guide rope or a movable weight.

5. Provide an easily regulated motor in order to enable the sudden variations in resistance to be met promptly.

6. In the case of large machines provide two propellers, one in front and the other in the rear, each propeller being actuated by an independent motor.—*The Engineer Magazine*, April, 1902

AFGHANISTAN.

ARMY STRENGTH.

The Afghan army was created by the Emir Shir-Ali, who in 1897 formed 48 battalions, 27 squadrons, and 17 batteries of artillery and laid the first foundation for the military organization of the country.

Emir Abdurrahman, who died last year, continued the work of Shir-Ali, and at his death left an army of 67,000 infantry, 12,000 cavalry, and 300 guns.

Troops on the Russian frontier are stationed as follows: At Maimané, 2,000 infantry, 5 platoons of cavalry, and 12 guns; at Ankhoa, 800 infantry, 2 platoons of cavalry, and 8 guns; at Blak and Musar-i-Sherif, 15,700 infantry, 13 platoons of cavalry and 56 guns; at Kunduz, 4,300 infantry, 12 platoons of cavalry, and 24 guns; and at Rustak, 1,360 infantry.

7 platoons of cavalry, and 8 guns; a total of 24,160 infantry, 39 platoons of cavalry, and 103 guns.

A great military activity reigns, especially at Kabul, where from 8,000 to 10,000 men are garrisoned.

The horses have no stables, but at all the stations they are kept in the open, assembled in long files of 100 head and tied so as to have only the necessary liberty to seek food.

There are no uniforms for the army, except the guard of the Emir, consisting of 500 men. The remainder wear the national dress, a "burnous" as head wear and a kind of sandal as foot gear.

The infantry is armed with Martini-Henry rifles and the cavalry with lances. Both branches, though not trained in the European sense of the word, are noted for good marching and fighting. The artillery possesses 100 Krupp guns, for the transportation of which there are 100 elephants. This branch enjoyed the greatest care of Emir Abdurrahman, and is the object of the highest solicitude of the present ruler.

There is an arsenal at Kabul in which 300 workmen are employed under the direction of an Englishman, Frank Martin, and a German engineer, Schneider. The present Emir is often present at the artillery firing exercises, as he wants to learn how the guns are manipulated. Thirteen new guns have been recently brought from Peshavur to Kabul, to be sent to Herat, and 12 more have been ordered from the Indian government.

It seems that the present Emir, Habid-Ullah, has turned his attention toward the construction of fortified works, which the preceding ones have overlooked.

It seems that the erection of these works is being actively carried on, not only at Herat, but also on the whole Amu-Daria line, in the vicinity of which fortified camps will be constructed at Akhtchi, Chibirkhan, and Maimané. Earth-works are being erected at Erdewana and Kuschk-Robat, evidently for the purpose of opposing a first resistance to Russian troops crossing the frontier. The road Kabul-Herat is likewise to be defended by forts of a modern type, with the construction of which the English engineer, Frank Martin, will be intrusted.—*Revista Militare Italiana, March 16, 1902.*

ARGENTINA.**PERMANENT ARMY OF THE REPUBLIC.**

The composition of the Argentine army for 1902, according to the organization approved by the congress and modified by the president, is as follows:

Officers	1,597
Enlisted men:	
8 companies of engineers	900
2 battalions of chasseurs	800
2 battalions of mounted infantry	680
14 battalions of infantry of the line	5,520
2 regiments of gendarmerie	700
10 regiments of cavalry	3,300
5 regiments of field artillery	1,950
3 regiments of mountain artillery	1,050
2 train companies	200
Total	16,697

Among the 15,100 enlisted men there are to be 2,448 volunteers, 9,453 conscripts, 3,199 sergeants and corporals.

The effective strength, according to the report of the minister of war, is 18,839 men, including officers and privates.

The general total is divided as follows:

Conscripts	12,735
Volunteers	4,629
Reserves	92
General officers	81
Officers	671
Detailed to various corps (officers and privates)	631
Total	18,839

This effective strength is distributed among 44 tactical units, and these can be recruited up to a strength of 35,000 combatants.

In April 11,000 conscripts will be mustered out, leaving 7,000 men in the cadres, the effective strength in winter.

In July 8,000 men of the class of 1881 are to be called to the colors, from which a little over 1,000 will be detailed to the navy, the remainder being distributed among the cadres of the army.

The rest of the class of 1881 are to be called to the colors in October, making an effective strength of 22,000 men with the colors. These will remain in quarters and in maneuver camps until the autumn of 1903.—*Revista Militar (Brazil)*, April, 1902.

AUSTRIA-HUNGARY.**ARTILLERY PRACTICE IN FIRING AT A CAPTIVE BALLOON.**

[REPORTED BY CAPT. FLOYD W. HARRIS, FOURTH CAVALRY, U. S. MILITARY ATTACHÉ AT VIENNA.]

Some exercises in estimating distances and elevations of balloons, and in artillery fire with blank ammunition against captive balloons, were required in the autumn maneuvers of 1902. As no projectiles were employed, of course no material results could be accomplished. To ascertain the accuracy and effect of artillery fire against such objectives, some practical exercises, with service shells, were carried out some time ago on the Steinfeld, an artillery proving ground near Wiener-Neustadt. A captive balloon, 3 meters in diameter, was sent up, and its distance from the firing point and its elevation were not given to the artillerymen charged with the firing. Twenty-two shots were fired without hitting the balloon. All were too low.

The gunners were then given the horizontal distance of the balloon from the firing point, which was 4,900 paces, and the elevation of the balloon, which was 2,500 meters. The firing was now resumed, but 64 shots were fired before the balloon was touched. After the sixty-fourth shot, the balloon began slowly to sink. A straw man had been placed in the balloon to ascertain whether or not such a figure would be set on fire when the balloon was hit. When the balloon reached the ground, it was found that the bundle of straw had not been ignited.

The firing was executed by a detachment of the school of fire of the fortress artillery.

BOLIVIA.**GENERAL ARMED STRENGTH.**

The military rolls of the republic show that there are 80,500 men liable to military service, among them 22,000 men between 18 and 25 years of age, 26,500 between 25 and 30 years of age, and 32,200 between 30 and 40 years of age. The first group furnishes the troops of the first line, and are trained, uniformed, and equipped in cadres in the provinces of Cochabamba and Oruro. A similar skeleton organization in the remaining provinces has been proposed and the plan is soon to be carried out. There is a testing ground at La

Paz, as well as four large firing grounds. Great interest in target practice has lately manifested itself among all classes of the population. In addition to the international firing club, there are in Oruro alone six rifle associations which have their own firing grounds. The army on peace footing amounts in rounds numbers to 3,000 men—infantry, artillery, and cavalry. The armament on hand is the following: Seventy-six guns—machine guns and mortars; 27,000 modern rifles; 26,000 old Mauser rifles; 69,000 Remingtons. The military school located at La Paz has a staff of German teachers.—*Militär-Wochenblatt, September 20, 1902.*

GERMAN OFFICERS AS INSTRUCTORS.

It may be seen from the president's message that Bolivia has again enrolled German officers for her war academy, special arms, and the technical section of the general staff. The German major, Plotho, has served a long time already as instructor of the Bolivian troops. The Bolivian Government appointed in 1900 several Argentine officers, including Colonel Enrique Rostagno, as instructors for the army. They were replaced, however, within one year by German officers, for whose pay 80,000 marks were voted. The German captain, Gutmann, who was until then in Chile, was appointed in place of Colonel Enrique Rostagno and was afterwards succeeded by Major Plotho.—*Ueberall für Armee und Marine. No. 5, 1902.*

CHINA.

THE TROOPS OF PECHILI.

Yüan Shi-kai, the commander in chief of the Chinese troops in Pechili, has presented to the emperor the following recommendations with regard to the organization of the army:

1. Soldiers are recruited for the purpose of defending the country and protecting its subjects. A soldier's responsibility is great and important. None but good men are to be allowed to wear the uniform. In recruiting for the army, which I am to organize according to the decree of the government, I deem it is best to adopt the principles in practice in foreign armies. Orders have been issued to all the prefects and chiefs of districts in the province of Pechili to make a census of the settlements and inhabitants in their districts. They are directed to require officials of the settlements to submit lists of certain numbers of men for recruits for the army. All men proposed by the officials must have good characters and possess relatives. In case an official submits the name of a man of bad

character, or that of a dishonorably discharged soldier, he shall suffer severe punishment.

2. All men proposed are to remain in the place of their residence and await the recruiting officers.

3. The local authorities must post proclamations at each recruitment of a new draft of men. All such proclamations must contain the military orders, so that the people may understand their contents. The dates on which officials are required to submit names of recruits must likewise be posted beforehand. The local authorities must render it impossible for officials to accept presents under any pretext whatever.

4. When the number of recruits obtained is sufficient for the formation of a "shao" ($\frac{1}{4}$ battalion), each recruit will receive 100 "cash" (20 cents) per day for rations, and will then be quartered at a designated place until the date of the formation of a battalion, from which time the regular military service begins, and the soldier then receives 150 "cash" (\$0.30, Mexican) per day as subsistence money.

5. As soon as a battalion has been attached to a regiment, each non-commissioned officer receives a monthly pay of 5 taels (\$7 Mexican, \$3.50 gold) and each private a pay of 4.50 taels (\$6.80 Mexican, \$3.15 gold) as an addition to the above-mentioned subsistence money. The general will give the family or the nearest relatives of the recruit a certificate for the following purpose: Beginning with the fourth service month of each soldier, the general makes a monthly deduction of 1.50 taels (\$2.30 Mexican) from the pay of a noncommissioned officer and 1 tael (\$1.40 Mexican) from that of a private. This money is placed in the intendency and is sent every six months to the local magistrate of the district to which the soldier belongs, who pays it to the nearest relative of the soldier upon presentation of the above-mentioned certificate. The amount and date of the payment are entered on the certificate. In case such a certificate is lost, the local authorities shall be informed of the fact two days before payment is made; a new certificate is made out and the invalidity of the old one noted. In case the intendant or the magistrate commit a fraud in the payment of the money, the family must inform the soldier of the fact and he will bring it to the knowledge of the commander of his battalion. The guilty will be severely punished.

6. It is expected of every soldier in the army that he give his entire time and attention to his military duties. This is possible only when he is free from family cares. For this reason the family and relatives of the soldier will be protected from evil influences of the locality, and in all judiciary matters the same privileges will be given them as to scholars of the first grade, so that they may be able to present any petition to the court on the day of the hearing of the case. This privilege does not extend to discharged soldiers, who are to be treated as civilians.

7. A soldier after three months' service is exempt from the tax imposed upon the population of the province of Pechili by the government. If it be ascertained that he abuses this exemption by helping others to avoid taxes, he will be severely punished.

8. The commander of each battalion will report at the end of each month to the commander in chief the number of soldiers furloughed, discharged, or absent without leave, during that period. The general shall

from time to time furnish the local authorities the names of dishonorably discharged soldiers to prevent these being reenlisted.

9. When a soldier deserts and returns to his home, the chief of police of that place will be notified for the purpose of causing the arrest of him and his relatives. Should the officials conceal him, or refuse to deliver him up, they will be severely punished. In case the place of abode of the deserter is not found out after a month's search, the mandarin of the locality will institute proceedings against his relatives.

10. If the mandarin of the locality is careless in his search for the deserter, he will be punished according to law.

11. When a soldier is promoted to the grade of officer, the local mandarin will be informed of the fact for the purpose of putting him on the officers' roll.

12. The following qualifications are required of a recruit:

(a) He must not be under 20 and not over 25 years of age.

(b) He must be strong enough to be able to lift a weight of 100 pounds to the height of his chest.

(c) He must be at least 4 feet 8 inches tall.

(d) He must be capable of covering on foot the distance of 20 li (13,080 yards) in one hour.

(e) He must have a good character and not have undergone imprisonment.

(f) He must have no physical defect.

—*Internationale Revue*, August, 1902.

CUBA.

LAW FOR INCREASING AND REORGANIZING THE RURAL GUARD OF CUBA.

[REPORTED BY LIEUT. M. E. HANNA, U. S. MILITARY ATTACHÉ AT HAVANA, CUBA.]

The law providing for the increase and reorganization of the rural guard of Cuba is as follows:

GENERAL DISPOSITIONS.

ARTICLE 1.—The rural guard is a corps with a military organization, the character and nature of which shall be civil, and has for its object care and preservation of public order, principally in the country districts, for which it shall be distributed in posts and detachments.

ART. 2.—The corps shall consist of a total number of 3,008 individuals, organized in the following manner: A headquarters and three regiments; each regiment shall consist of eight squadrons of cavalry and two companies of infantry, distributed according to the necessities of the service.

ART. 3.—The headquarters shall consist of a brigadier general, chief of the guard; a lieutenant colonel, quartermaster; a major, adjutant general; a captain, auditor; a captain, aid-de-camp; and three second lieutenants, attached to headquarters.

ART. 4.—The headquarters' staff of each regiment shall consist of a colonel; a lieutenant colonel; a major, quartermaster; a captain, adjutant; a captain, surgeon; a lieutenant, paymaster; a lieutenant, veterinary;

a second lieutenant, aid; two sergeants, clerks; a corporal, orderly trumpeter; a corporal, armorer.

ART. 5.—Each squadron of cavalry shall consist of a captain; two lieutenants; a second lieutenant, quartermaster; four sergeants; eight corporals; two buglers; 80 privates.

ART. 7.—The armament, supplies, implements, and forage for the mounts of the corps, as well as the equipment, clothing, and amount for purchasing rations for the noncommissioned officers and privates, will be supplied by the state in the manner prescribed in the regulations.

ART. 8.—The lieutenant colonel, quartermaster general, will receive from the state the allotments for the provisioning and supplying of the corps, in accordance with the regulations, and shall render accounts to the auditor general or the revising auditor that may fill his place, and shall be responsible for the property of the republic in the hands of the corps.

ART. 9.—The quartermasters and paymasters shall give sufficient bond to the state. The paymasters shall be elected by the officers of the respective regiments.

ART. 10.—The chiefs and officers of the rural guard shall be mounted, and shall furnish, at their own expense, their horses, uniforms, and equipments.

ART. 11.—The mounts shall be the property of the individuals, but the state shall supply them at enlistment, in the manner established in this law and in the regulations.

CHAPTER II.—SALARIES AND ALLOWANCES.

ART. 12.—The individuals of the corps shall receive the following salaries, payable in monthly installments: Brigadier general, \$4,000 annually; colonel, \$3,300 annually; lieutenant colonel, \$2,700 annually; major, \$2,100 annually; captain, \$1,500 annually; lieutenant, \$1,200 annually; second lieutenant, \$1,080 annually; sergeants employed as clerks, \$840 annually; cavalry sergeants, \$384 annually; farriers, \$240 annually; trumpeters, \$240 annually; privates of cavalry, \$240 annually; sergeants of infantry, \$360 annually; corporals of infantry, \$288 annually; buglers, \$216 annually; privates of infantry, \$216 annually.

ART. 13.—For each noncommissioned officer or private of cavalry the following allowances are provided: For daily subsistence, 25 cents; for four complete uniforms, \$25 per year; for a rain coat, \$10 per year; for two pairs of leggins, \$4 per year; for three pairs of shoes, \$6 per year; for two hats, \$3 per year; for grain and forage for his horse, \$60 per year; for horseshoes, brush, and currycomb, \$1.50 per year.

ART. 14.—For each noncommissioned officer or private of infantry the following allowances are provided: For daily subsistence, 25 cents; for four complete uniforms, \$25 per year; for a cape, \$6 per year; for two hats, \$3 per year; for two pairs of leggins, \$4 per year; for four pairs of shoes, \$8 per year.

ART. 15.—For rent and light, \$18,000 per year; for office material and printing, \$10,000 per year; for traveling expenses when necessary for the public service, \$5,000 per year; for sanitation of barracks, \$5,000 per year; for incidentals, \$3,500 per year; for forage for each horse of chiefs or officers, \$60 per year; for forage for each mule, \$60 per year; for horseshoes,

brushes, and currycombs for each mule or horse of chiefs or officers, \$1.50 per year.

CHAPTER III.—REIMBURSEMENT FOR MOUNTS.

ART. 16.—The state shall be reimbursed the purchase price of the mounts in the following manner: (a) Two dollars shall be deducted monthly from the pay of each noncommissioned officer and private, until the cost of his mount has been covered; \$5 from each officer and \$10 from each chief. (b) The state loses the horses that become useless in the service, but those that become useless through carelessness or other cause dependent on the will of the owner will be charged to his account. (c) The state reserves the right to keep the horse on the completion of the term of enlistment, subject to the conditions fixed in the regulations.

CHAPTER IV.—ENLISTMENTS.

ART. 17.—The enlistment of noncommissioned officers and privates shall be binding for four years, and to enlist the following qualifications are required: (1) To be a Cuban; (2) to know how to read and write the Spanish language; (3) to have good habits and good antecedents; (4) to be more than 21 and less than 45 years of age; (5) to weigh as a minimum 120 pounds, and as a maximum 170 pounds; (6) to be at least 5 feet 4 inches high; (7) never to have received a criminal sentence, and never to have been separated with a bad record from any civil or military office.

ART. 18.—There shall be established in each provincial capital a commission for the enlistment of the personnel that corresponds to that province.

ART. 19.—Vacancies in the positions of officers shall be filled by examination.

ART. 20.—The appointments of chiefs and officers shall be made by the president of the republic, and those of officers in accordance with the marks received at the examination.

ART. 21.—One hundred points shall be taken as a maximum in the marking, with 50 per cent for fitness for the service and the other 50 per cent for general information.

ART. 22.—No individual of the rural guard shall be discharged from the corps without a trial by a competent court in the manner prescribed in the regulations.

ART. 23.—Individuals that have belonged to the liberating army shall, in equal conditions, be preferred for enlistment in the corps.

TRANSITORY ARRANGEMENTS.

1. The following amounts are appropriated for expenses of installation, purchase of arms, equipment, implements, horses, and mules: For each cavalry equipment for a noncommissioned officer or private, \$22; for each bed and bedding for the same, \$5; for each horse of a noncommissioned officer or private, \$70; for each horse of an officer or chief, \$100; for each machete with its scabbard, \$3.50; for each cartridge belt, \$0.75; for each cavalry carbine with magazine, modern system, \$15; for each infantry rifle with magazine, modern system, with its bayonet, \$16; for each thousand cartridges, \$30; for furniture, \$3,000; for seventy mules, at \$70 each; for seventy pack saddles and equipments for the mules, at \$20 each.

2. The rank of the officers of the present rural guard will be recognized, provided they submit to the examination provided for herein and are approved.

3. The horses of the present rural guard that fill the conditions required by the regulations shall be utilized, and from the surplus allotted for the purchase of animals the executive is authorized to arrange for the purchase of a number of horses, equivalent to 2 per cent of the total number of mounts of the corps, which shall be used for remounts and shall be under the care of the respective regiments.

DENMARK.

STRENGTH AND EMPLOYMENT OF THE DANISH ARMY.

The peace strength of the Danish army is 10,000 men. In the infantry a majority serve only six months on active duty. One hundred and fifty men of each regiment of infantry are retained on active duty eight months longer in order to be trained as noncommissioned officers. A term of service is thirteen to nineteen months in the cavalry, thirteen to fourteen months in the field artillery, and five to eighteen months in the pioneers, according to the various categories. The employment of the first line of the army in war will be confined to the defense of the fortified camp of Copenhagen. The remainder of the army will be for the defense of the rest of the country. There will be no offensive operations outside the country. The army has established a reputation for skill in firing, coolness, and stubbornness.—*Allgemeine Schweizerische Militärzeitung*, March 22, 1902.

EQUADOR.

ARMY NOTES.

A new military law was accepted by the legislature of this republic and entered into force on January 15, 1902.

According to the new regulations the minister of war, who is at the same time minister of the navy, is intrusted with the publication of the laws, orders, regulations, etc., accepted and sanctioned by the congress. He is responsible for the discipline and the uniformity of training of all arms, the promotion of officers of the standing army, the national guard, and the navy, the mapping and surveying of the separate provinces, and projects plans of fortified places, fortresses, and forts. He supervises the instruction in the war college and the naval school.

The standing army consists of the active troops and the reserve. The men serve three years in the active army and five in the reserve. The reserve service is with the militia of their respective localities.

The chief of the respective corps of the national guard must present monthly rolls to the minister of war, giving the names of the national guard men, their grades, age, occupation, corps, etc.

The units are called "battalions" in the infantry, "regiments" in the cavalry, "brigades" in the artillery.

Each infantry battalion is formed of three companies. The headquarters consists of 1 colonel or lieutenant colonel as commander, 1 lieutenant colonel, 1 major, 1 captain, 1 lieutenant (adjutant), 1 ensign (color bearer), 1 surgeon of the second or third class, 1 drum major, and 1 noncommissioned officer (bugler). Each company consists of 1 captain, 3 lieutenants, 3 ensigns, 1 sergeant major, 19 noncommissioned officers, 9 corporals, 3 musicians, and 100 men.

Each cavalry regiment has the same organization as an infantry battalion, except that there is a bugler and a farrier added to each squadron. To the noncommissioned officers are added for each squadron 1 staff bugler and 1 farrier.

The artillery brigade consists of three batteries and a staff—1 colonel or lieutenant colonel as commander, 1 lieutenant colonel, 1 major, 1 captain (adjutant), 1 lieutenant (adjutant), 1 noncommissioned officer as color bearer, 1 surgeon, 1 bandmaster, and 2 sergeants. The battery consists of 1 captain, 3 lieutenants, 3 sublieutenants, 1 sergeant major, 18 noncommissioned officers, 9 corporals, 3 buglers, and 100 men.

In case of mobilization the national guard occupies the garrisons of the active troops; the units of the latter are brought to double their peace footing by calling the reserves to the colors. The same is applied to the active battalions and the national brigades of Quito, Guayaquil, and Cuenca.

Horses and mules are either requisitioned or voluntarily given by landowners. At the end of a war the animals are given back and the missing ones replaced by others.

Each battalion has one reserve company composed of recruits, convalescents, etc. The battalions of the active national guard are brought to their full quota from districts other than their own.

The territorial depot troops, in case of war, form battalions of from two to eight companies. The corps of the national

guard are commanded during mobilization by retired army officers. Each division has a reserve ammunition park and a reserve train column. The sanitary corps in the field consists of a chief surgeon, surgeons, priests, employees, litter bearers, and servants. The chief surgeon is detailed to the headquarters of the army.

According to some sources the total strength of the active army is 5,500 men, distributed among three artillery brigades, ten infantry battalions, etc. The national guard is said to consist of eighty-eight infantry battalions, eight artillery brigades, and nine cavalry regiments. The total armed strength is said to be 80,000 men.—*Militar-Wochenblatt*, September 17, 1902.

FRANCE.

CHANGES IN THE FRENCH ARMY IN THE YEAR 1902.

[REPORTED BY CAPT. T. BENTLEY MOTT, ARTILLERY CORPS, U. S. MILITARY ATTACHÉ AT PARIS.]

There have been no changes of great importance during the year as regards the strength, organization, or administration of the army.

The activity as regards colonial defense continues, the colonial party in the chamber urging constant attention to it. It is fully realized that in the event of war the French colonies would form an object of attack. The colonial party continue to urge more submarine boats for colonial harbors, and on these great reliance is placed to meet the attack of a foreign fleet.

In April three new native companies were formed for the occupation and defense of the oases of Gourara, le Touat, and le Tidikett. These are called the companies of the Saharan Oases. Each comprises, besides infantry, a squad of cavalry and a squad of camelry, a section of artillery, and a transport outfit. They are under the control of the general commanding the nineteenth corps in Algeria. The French contingent for the companies is recruited from troops stationed in Algeria, the natives from local sources.

The effectives of these three companies are as follows:

French, 20 officers, 110 men.

Natives, no officers, 900 men.

Horses, 133; riding camels, 156; camels, 300; mules, 18.

The policy of stationing zouaves in France has been renewed; they will be relieved every two years.

AUTOMOBILES.

The minister of war intimates each year the use which will be made of automobiles during maneuvers and during "staff journeys."

In principle the automobiles and their drivers are recruited in the region of the corps d'armée which is called upon to use them.

The description of the automobiles acceptable for this service is set down in the circular; automobile owners and drivers desirous of having their services accepted with or without their machines, make their applications through military channels which are decided upon by the generals commanding corps.

The compensation given to proprietors of machines for the time in which they are used, including journey to and from headquarters, is as follows:

Motorcycles: Compensation, 86 centimes per horsepower per day and 0.048 centime per kilometer per horsepower.

Carriages of six places are offered a compensation of 86 centimes per horsepower per day and 0.026 centime per kilometer per horsepower.

Heavy transports, 1.72 francs per horsepower per day and 0.0162 centime per kilometer per horsepower.

The drivers are entitled to their rations and the allowances given to men on detached service.

SWIMMING RIVERS.

In April a circular was issued on this subject, and the following observations are extracted therefrom:

On account of the difficulty which horses have when saddled and swimming any distance, only those which are particularly good swimmers should be permitted to attempt it when saddled. The employment of trestles should not be encouraged. The cavalry have no time to construct them. Cavalry should not try to construct bridges for horses and wagons. They should limit themselves to light foot-bridges exclusively for men, the horses swimming alongside. Horses should not be let loose in herds. Such a proceeding does not accustom them to the calm which is indispensable alongside foot bridges. A herd of horses should not be attached to a rope and made to swim together, as they do not swim at equal paces. Men who can not swim should not be allowed to cross

rivers by means of buoys. All cavalrymen should, as far as possible, be taught to swim.

The following precautions should be taken in all swimming exercises for cavalry: A lookout should be established for watching the waterways and signaling men and horses in danger. On each bank and in boats near dangerous points men who are good swimmers should be stationed with life buoys. A number of men crossing simultaneously by means of rafts should not exceed the number held in readiness in case of upset. A doctor should always be present to render assistance in case of need.

COLONIAL ARMY.

In June an agreement was come to between the ministers of war, marine, and the colonies as to their respective shares in the expenses of the colonial and home troops.

All charges connected with troops, colonial or otherwise, outside of France, Algeria, and Tunis, which are employed in the colonies or protectorates, or placed at the disposal of the minister of marine for coast defense or other purposes, shall be covered in the budgets of the ministers of colonies and marine, respectively. These expenses commence with the embarkment for their destination and continue until their return to a post under the control of the minister of war.

In May two new mounted batteries of colonial artillery were created for Madagascar. This carries the colonial artillery to the following effective:

Three groups—

First group—Three foot-batteries at Diego Suarez.

Second group—Three mountain-batteries at Emyrne; one company of conductors.

Third group—Two mounted batteries at Diego Suarez.

In June a corps of native infantry was created for the occupation of Cambodge under the designation of "tirailleurs Cambodgiens." This force starts with one company on the lines of colonial troops. New companies will be created according to the requirements of the service. Men will be recruited by voluntary engagement in Cochin-China and Cambodge. A similar force of troops was created for Indo-China in June, under the title of "bataillons des tirailleurs Chinois." The battalion starts with two companies only, to

be increased according to the needs of the service. The men are expected to be recruited from among Chinese born in Indo-China.

Until August last the squadron of spahis stationed in Senegal belonged to the first regiment of Algerian spahis. The designation is now changed to first squadron of Senegal spahis, whose effective is given below.

The squadron of Soudanese spahis stationed in French West Africa takes the name of second squadron of Senegal spahis. It forms a distinct corps from the first squadron. These troops are quartered, in theory, in French West Africa, but they may be sent anywhere outside.

First squadron: 8 officers, 10 noncommissioned officers (French); 10 noncommissioned officers (natives); 110 privates (natives).

Second squadron: 8 officers (French); 12 noncommissioned officers (French); 12 noncommissioned officers (natives); 169 privates (natives).

In October, for the first time, a brigade of colonial infantry was sent to Paris, forming part of the first colonial infantry division.

In October a decree abolished "compagnies disciplinaires" in the colonies. The "disciplinaires" of these companies were distributed according to origin among the "compagnies de discipline" of home troops and African troops. The disciplinary companies in Senegal, Martinique, etc., were abolished under this decree also.

In October a decree placed the strength of the French in the Kongo as follows: A regiment of native cavalry of two battalions, a mixed mountain battery with a detachment of artisans, a squadron of native cavalry, men of the ordnance, commissariat, and medical services.

Of the three battalions of Senegal tirailleurs, four companies each, one is on the Ivory coast, one in the territory of Zindoo, and the third at Diego Suarez.

In November a decree fixed the strength of the "garde républicaine" at four squadrons of cavalry and three battalions of infantry of four companies each.

In December a circular reorganized the colonial infantry and artillery, as follows:

Infantry:

First division, colonial infantry—headquarters, Paris.

Third brigade—headquarters, Rochefort.

Third regiment—Rochefort.

Seventh regiment—Rochefort.

Fifth brigade—headquarters, Paris.

Twenty-first regiment—Paris.

Twenty-third regiment—Paris.

Second division, colonial infantry—headquarters, Toulon.

Fourth brigade—headquarters, Toulon.

Fourth regiment—Toulon.

Eighth regiment—Toulon.

Sixth brigade (new formation)—headquarters, Toulon.

Twenty-second regiment—Toulon.

Twenty-fourth regiment (newly formed), staff, first and second battalions—Toulon.

Third battalion—Cette.

The staff of the twenty-fourth regiment and the first and second battalions will be transferred to Perpignan early in 1903.

Third division—headquarters, Brest.

First brigade—headquarters, Cherbourg.

First regiment—Cherbourg.

Fifth regiment—Cherbourg.

Second brigade—Headquarters, Brest.

Second regiment—Brest.

Sixth regiment—Brest.

The fourth battalions of the third and seventh regiments are suppressed.

The fourth battalion of the fourth regiment becomes the third battalion of the twenty-fourth regiment.

Colonial Artillery—headquarters, Paris:

First regiment—Lorient, 9 batteries.

Three mounted batteries—Lorient.

Three mountain-batteries—Lorient.

Two foot-batteries—Lorient.

Two foot-batteries—Rochefort.

Colonial Artillery—headquarters, Paris—Continued.

Second regiment—Cherbourg, 15 batteries.

Three mounted batteries—Cherbourg.

Two mountain-batteries—Cherbourg.

Four foot-batteries—Cherbourg.

Six foot-batteries—Brest.

Third regiment (newly formed)—8 batteries.

Two mounted batteries (newly formed).

Two mountain-batteries—Toulon.

Four foot-batteries—Toulon.

The staff will be quartered at Toulon.

Two mounted batteries provisionally at Nimes.

DECREE CONCERNING ORGANIZATION OF TELEGRAPH SERVICE IN TIME OF
PEACE AND WAR (JUNE, 1902).

ARTICLE 1.—The battalion of telegraphists created by the law of July 24, 1900, is recruited partly from the personnel of the administration of posts and telegraphs compelled to military service by the law of recruitment.

ART. 2.—Inasmuch as the effective of this battalion in non-commissioned officers, corporals and men can not be brought up to the war strength by the reservists of the battalion or from other arms and at the latest until January 1, 1910, the administration of posts and telegraphs will place at the disposal of the minister of war the necessary complement from the personnel.

This will be composed of men of the youngest class of recruits engaged in the service of posts and telegraphs accomplishing an active military service.

ART. 3.—The minister of war will substitute progressively military telegraphists for civilians in fortified places. This transformation will be completed before January 1, 1907, except as regards officers and functionaries.

ART. 4.—Inasmuch as the minister of war will not be able to find officers of the active army or reserve in sufficient numbers to form the cadre of the telegraphists in the first line and fortified places in war time, the administration of posts and telegraphs will place a sufficient number at his disposal. They will be taken from volunteers or from men compelled by their age to the obligations under military law. Those who will be incorporated in this battalion will be chosen as much as possible in the reserve of the active army. They

will be treated as reserve officers. The functionaries called upon to serve in the telegraph troops are appointed reserve officers.

ART. 5.—The administration of posts and telegraphs furnishes the necessary personnel for the formation of the second line, besides the regulation number of effectives it holds at the disposition of the minister of war for the formations mentioned above.

NEW ORGANIZATION FOR THE CAVALRY.

The last of the year brought a decree reorganizing the larger units of the cavalry. It was at one time a question of placing all the cavalry in divisions, but this was abandoned upon the representations of the corps commanders, who all wished to preserve under their orders the brigade of corps cavalry belonging to each of them.

Some of the army corps have three divisions of infantry instead of two, and the principle has been adopted of giving to the brigade of corps cavalry as many regiments as the corps has cavalry divisions. Thus, the sixth and seventh brigades of cavalry attached respectively to the sixth and seventh corps have each three regiments.

There are eight so-called independent divisions of cavalry formed, some of cuirassiers and dragoons, others of light cavalry and dragoons. Two divisions have six regiments, four of cuirassiers and two of dragoons; three divisions have five regiments. One of these has three regiments of cuirassiers and two of dragoons, the other two have three regiments of light cavalry and two of dragoons.

Three divisions have four regiments; one of these has two regiments of cuirassiers and two of dragoons; the other two have a brigade of dragoons and a brigade of light cavalry.

In June last a decree was published announcing the following places in the colonies as "points d'appui" for the fleet and classifying them as fortified "places:"

Saigon and Cape St. James, in Cochin-China.

Diego Suarez, in Madagascar.

Dakar, in Senegal.

Fort de France, in Martinique.

Nouméa, in New Caledonia.

Hongey, at Tonkin.

The general designated in time of peace to command one of these "points d'appui" is responsible for the organization of the works he will command in war and is designated "commander of the defense." He has under his command the whole of the military forces and auxiliaries in his zone.

At each "point d'appui" of the fleet there is also stationed a naval officer having immediate authority over the personnel and material belonging to the navy. He is designated "commander of the marine."

In all that concerns the technical part of his work—provisioning the fleet, arsenal work, etc.—he is exclusively under the navy department; but in matters relating to the defense of the place he is held to cooperate, but in the capacity of a subordinate, with the "commander of the defense."

In the absence of the latter he may succeed him or not, according to his rank as compared with the other officers.

All his correspondence relating to the colony or the defense of the "point d'appui" passes through the commander of the defense.

At all times the commander of the defense owes an attitude of large consideration to commanders of naval forces or isolated vessels calling at the station; nevertheless a distinction is established by the minister of marine between those means of naval defense which can in no case leave the area of action of the "point d'appui" and those liable to orders for distant service under naval commanders; the former are under the direct control of the general commanding the place, the latter are not.

THE FRENCH GENERAL STAFF.

[REPORTED BY CAPT. T. BENTLEY MOTT, ARTILLERY CORPS, UNITED STATES MILITARY ATTACHÉ AT PARIS.]

The words "staff," "staff departments," "officer of the general staff," have recently grown in use in the United States, and they seem to lack that sharpness of definition which in other services they possess. It may therefore be interesting to define these terms as used in the French army before outlining the duties of the staff, general staff, general in chief, and war board.

Command of any military unit implies certain prerogatives and certain duties. As the command increases in importance, the chief can no longer personally exercise all the prerogatives nor fill all the duties. Thus, according to the size of

the unit commanded, there are assigned to the chief a number of other officers to direct, under general instructions from him, the special services which insure the discipline, supply, instruction, and well-being of the troops. These officers do not belong to the general staff, nor to the staff, nor to a staff department; they belong to what is known as "les services," and they are called "officers of the medical service, officers of the engineer service, of the intendance (quartermaster and commissary) service, of the artillery (ordnance) service, of the veterinary service, of the signal service, of the pay service," etc. They are never spoken of individually as staff officers nor said to belong to the staff; they belong to the "services."

This organization of aids to the commanding officer is not sufficient; there is lacking a most important element, the one which coordinates all that relates to the work of the troops and all that relates to the work of the various "services;" this element is furnished by a number of officers selected and trained for the purpose, known as the "état-major" or staff. In large units the commander is given several officers of the staff and one is named as chief of staff. The members of the staff have a function shared by no "chief of service"—the power to order in the name of the general.

An "officer of the staff" is therefore officially defined as an "agent of command," which distinguishes him from an officer of the administration, supply, or auxiliary services, who has no command of combatant troops and whose sole functions consist in furnishing troops with the means of marching and fighting. These latter are not of the staff.

However, the totality of all the assistants of the commanding officer of any organization, including the commander himself, is called the staff of that organization. Thus the staff of a regiment consists of the colonel, the lieutenant colonel, the regimental adjutant, the surgeons, the veterinary, the paymaster, the bandmaster, etc., the noncommissioned staff of the drum major, an engineer corporal, some engineer soldiers, and the band. In speaking of one of these officers, the colonel might say "he belongs to my staff;" he would not say "he is an officer of the staff, or an officer of a staff department."

Except officers of artillery and engineers detached from their regiments to assure the "service" of the artillery and

engineers of a corps, division, etc., who retain their line titles, the officers of the services are not addressed officially or otherwise as captain, colonel, etc.; they have all the privileges and obligations of "officers of the army," which they are, but they are addressed as "monsieur" or "monsieur le directeur," "monsieur l'intendant," "monsieur le payeur," etc. Their titles indicate their functions, but they are not the titles given to officers who command combatant troops. They have an assimilation or a correspondence of grade for purposes of pay and which entitles them to precedence immediately following the combatant grade to which assimilated. This assimilation of grade goes from second lieutenant to major general. An "intendant" addressed as "monsieur l'intendant" has the assimilated grade of brigadier general; an "intendant général" that of major general. Comptrolleurs, really inspectors of accounts, have not the title of officers. They are high functionaries of the war department holding permanent appointments, but they remain civilians.

GREAT GENERAL STAFF, GENERAL STAFF, STAFF.

These terms have been conveniently adopted in English from the German gross-generalstab, generalstab, stab, but in France, the nomenclature is not so simple. However, it is ideas and not terms that interest, though it seems useful to clear up a few confusing words.

In France the word "état-major-général" is loosely used to mean either the great general staff of an army or to mean the whole body of general officers. Strictly speaking, "l'état-major-général" means the staff of an army, and "état-major-général de l'armée" means the 330 major and brigadier generals of the line. In time of war only, a "grand état-major" or "grand état-major-général" is created, which is simply the staff of the general in chief of all the armies.

To resume the French organization. There is no such thing as a permanent staff in the French army. Each year about 80 officers of various arms are admitted to the high war school; upon successful graduation, at the end of two years, they are given the staff brevet (brevet de l'état major). Then they serve two years in some staff, and then either are continued on staff duty or returned to their regiments, whence they may be afterwards taken and retaken to serve on the staff of a general officer or at the ministry of war.

There is no other kind of staff in the French army, except the special staffs of the artillery and of the engineers, consisting of officers of those arms detached from their regiments for technical ordnance, artillery, and engineer work.

From the body of officers having the staff brevet there are detailed the following staffs: Those of brigades, divisions, corps, and fortresses; those of the president and minister of war (general officers are also included in these last two); the general staff of the army.

This latter is nothing more than the body of detailed officers charged with certain functions at the war department, chief of which is the study of plans for national defense and the preparation of the army for war. Its chief duties may be thus grouped:

Mobilization of the army in case of war.

Employment of railways, military telegraph, etc.

Organization of the services in rear of the army in war.

Organization and instruction of the army; maneuvers.

Study of foreign armies and theaters of war.

Collection of statistical and historical documents.

Missions abroad.

Preparation and coordination of the work of the high war board and of the members having special missions.

A general officer is appointed chief of the general staff, whose work he directs, as he does the selection and instruction of the officers of the staff.

It is thus seen that the staff has nothing to do with the routine work of administration, such as falls to our adjutants general who alone have functions resembling those of the staff of France. At least this is the theory, but in practice (and much complaint is made of it) officers who should be occupied chiefly with questions looking to preparations for war are kept busy with details of administration which properly belong to the "officiers d'administration" and "archivistes," who are really chief clerks and have all routine at their fingers' ends.

At the war department in Paris the administrative work is taken care of by nine "directions", namely, (1) Auditing; (2) Law; (3) Infantry; (4) Cavalry; (5) Artillery; (6) Engineers; (7) Supplies; (8) Powder works; (9) Health.

Routine matters of personnel and material are settled in the "direction" concerned, with or without reference to the chief

of the general staff or the minister, according to their nature and importance.

For example, in the intendance or supply direction there are 28 officers occupied with the central administration of all that concerns the pay, clothing, transportation, food, forage, fuel, and furniture.

In the artillery direction there are 52 officers to administer the personnel and instruction of the artillery, and to supply ordnance material and ammunition to all arms.

The infantry direction comprises 22 officers.

The schools of each arm come under the "direction" of that arm for various purposes.

Also at the war department there sit the technical boards of artillery, of infantry, of cavalry, of engineers, of intendance, of the staff, each composed of nine members, all general officers. Their functions are all advisory.

The conseil supérieur de guerre, or war board, is composed of no more than ten members, usually generals of the highest rank and reputation. The minister of war is the president of the board, and the chief of the general staff is of right a member; the other members are appointed by decree.

This board is the highest consultative authority in France, and any action recommended by it is considered to have the sanction of the best military talent. It is charged with examining all large questions relating to preparation for war and the national defense.

The law requires that the minister of war shall consult this board on matters affecting:

Plans of mobilization and concentration, establishment of new strategic communications, general organization of the army, general methods of instruction, adoption of new engines of war, the creation or suppression of fortified places, coast defense.

The board meets when necessary, and at least once a month. It gives its advice to the minister on all subjects laid before it, but he is not bound to act accordingly.

The minister of war appoints from the members of the conseil supérieur de guerre a vice president, and of late years this position has come to be of great importance and has provoked considerable discussion. This office is not recognized by law as having any special prerogative, but by fact or perhaps from some secret letter of service, the holder

is the general named in advance to take command of the principal army in the field upon the outbreak of war. His work is to fit himself for this responsibility, and the minister is expected to provide him with the means. He prepares (with the aid of the war board and the chief of the general staff) the annual maneuvers, supervises and attends the minor ones, and takes active command of the maneuvers of one or more armies. He is popularly called the generalissimo. The chief of the general staff acts as his chief of staff at the maneuvers. With regard to this arrangement there are varying opinions; some maintain that the chief of the general staff in time of war as of peace should remain in Paris, where his knowledge and experience would aid the minister of war and keep the fighting armies up to a high state of efficiency from the rear.

Some think that such a designation in advance is impracticable; others that it is wise, but that the officer selected should be given more power in time of peace than the mere inspection of the corps on the northeastern frontier and the vague attributes of vice-president of the war board; that he should inspect and virtually command the whole army, though he need not administer it.

RÉSUMÉ.

The minister of war, acting for the president, actively commands the whole army.

The high war board, presided over by the minister, is the source of authoritative military opinion on all great questions of army policy.

The vice-president of this board is the officer selected beforehand to command the principal army, or group of armies, upon the declaration of war. He does not command the army in time of peace, except that part of it assembled for maneuvers.

The chief of the staff of the army directs the work of the central or general staff at the war department and the staff duties in general of those officers holding the staff brevet, whether employed on a staff or with their regiments. When the army is mobilized he becomes the "major général," that is, chief of staff of the principal army or group of armies in the field.

The departments which feed, clothe, pay, and doctor the troops are not part of the staff of the army; they constitute the services of supply. The chiefs of these services in Paris

deal directly with the minister or with the chief of the staff of the army, according to the nature of the case; the subordinate officers of these services are strictly subject to the general officer to whose headquarters they are assigned.

Ordnance stores for the whole army are furnished by the artillery service; medical stores by the medical service; fortifications, barracks, and telegraph supplies by the engineer corps; the audit department is separate and its members are not army officers, but functionaries. Practically all other supplies, including pay, clothing, rations, transportation, etc., are furnished by the intendance department.

Officers of this department have a correspondence of grade with line officers from second lieutenant to major general, but have not the same military titles. Once appointed, an officer remains and is promoted in this department. The position offers certain advantages, but it is not sought for any superiority of pay, rank, or promotion which it offers, as these are probably inferior to those enjoyed by most line officers of similar length of service.

THE RECRUITMENT OF THE ARMY.

The ministry of war has just published the recruiting statistics of the army for 1901. It is of great interest to examine the results at the time when the project of law on the two-year service is being so earnestly discussed.

There were only 309,332 young men having reached 20 years of age to draw lots.

Here are the figures beginning with 1893:

1893	343,651
1894	330,138
1895	337,109
1896	331,638
1897	338,327
1898	331,179
1899	324,538
1900	314,334
1901	309,332

The number of young men drawing lots continually diminishes, as may be seen. It is the consequence of the insufficiency of births.

Among the recruits 25,526 young men were exempted as unfit for service. It is about the usual number, which has

varied between 25,000 and 30,000 for the last 20 years. It is very similar to that of Germany.

There were 44,337 postponements for reasons of health. It is likewise the usual number, which varies between 40,000 and 50,000. In Germany the authorities are more liberal and do not hesitate to postpone as many as 170,000 men whose health is doubtful or who are not sufficiently developed physically. This army thus avoids hospital expenditure and especially compulsory retirements.

Germany may be less severe because the number of births continually increases in great proportions (40 per 1,000, while they have fallen to 20 per 1,000 in France). In spite of this the Germans call the classes one year earlier than the French and incorporate recruits at the age of 20, which allows them to grant many postponements.

The number of men exempted was 46,044 according to article 21 (supports of families), 3,625 according to article 23 (liberal professions), and 593 according to article 50 (Frenchmen residing abroad). Total, 50,262 men exempted from service.

If the number of recruits diminishes it is not so with that of those liberated from service, as may be seen by the following figures:

1892.....	36,890
1893.....	43,997
1894.....	47,287
1895.....	47,445
1896.....	51,370
1897.....	52,813
1898.....	55,696
1899.....	50,858

The infantry received a large number of the men with exemptions; the results are that in 1901 there were 59,227 one-year men and 93,027 two and three year service men.

More than half of the infantrymen serve only one year and under, the remainder serves only two years. The artillery received 8,670 men serving only one year and 18,820 men serving two or three years, constituting almost one-half.

The land army has incorporated a total of 72,482 men serving one year and 141,616 men serving from two to three years. More than one-half of the contingent serves only one year.

Moreover, 18,627 young men have been appointed to auxiliary services and have thus escaped all military service.

The number has varied from 20,000 to 27,000 in the last ten years.

In 1901, 7,222 noncommissioned officers have reenlisted, that is, 449 more than in 1900. Only 657 reenlistments of corporals and privates have been made in spite of the privileges granted by the law of July 9, 1901. There were 506 in 1900.—*Echo de Paris, January and August, 1902.*

STATISTICS OF DISEASES IN THE ARMY.

The medical report of the preceding year shows considerable increase in cases of sickness. There were no less than 332,322 men treated in hospitals and lazarets, that is, 612 per 1,000, while for all former years the number never passed 580 per 1,000. Each man passed an average of 10.2 days in the hospital or lazaret, while formerly the average number of days was 9.5. Every sick man was ill during an average of 17.2 days, while during the former years the average number of days was 17.5. The statistics show that among officers there were 48 per 1,000 sick, while in the preceding years there were only 43 per 1,000; among the noncommissioned officers for 207 per 1,000 of the preceding years there were 214 per 1,000 sick in 1901; among soldiers serving over one year there were, in 1901, 494 sick ones per 1,000, while there were only 466 and 491 during the preceding years; among those serving less than one year there were 650 sick per 1,000, while in the preceding years there were 615. The small number of officers treated is accounted for by the fact that the greatest part of them did not go to the lazarets, but remained in their homes. The arms and units vary greatly in the number of the sick. Foot artillery had 494 sick per 1,000, while the infantry of the line had 577, the mounted artillery 675, the cavalry 741 sick men per 1,000, while the African troops which are not native ones counted 818 to 967 sick men per 1,000. Among the native troops the Turcos have 518, the spahis 538 sick men per 1,000. The number of deaths was likewise increased. They averaged 5.43 per 1,000, while in preceding years the average was 4.98 and 5.23 per 1,000. Among these there were 158 suicides. The number of deaths varies likewise greatly as to arm and unit. Thus the first corps, stationed in the north of France, counted only 2.35 deaths per 1,000. The Oran division, on the contrary, numbered 11.62. The troops stationed in Paris count 6.97 per

1,000. According to arms, the foot troops have the least cases of deaths, that is, only 3.29 per 1,000; the foreign regiments count the greatest number, 14.56. While the number of sick men has increased, the number of deaths has decreased, thus, in central France, from 1872 to 1899, the cases have decreased from 8.97 to 4.72, in Algeria and Tunis from 11.98 to 9.78 per 1,000. The greatest number of deaths occur during the month of March—319, and the least in November—90 per 1,000. The total number is 3,288. The decrease in the number of deaths comes from the progress of medical science and the good care taken of the sick by the surgeons and the administration, the improvement of hospital installations, while the increase of diseases in the army comes from the lesser resistance of the recruits—lesser fitness on account of less rigid physical standard at the time of enlistment.—*Ueberall für Armee und Marine, 1902, No. 47.*

THE SAHARAN SPAHIS.

The squadron of Saharan spahis, legally instituted on December 8, 1894, consists at present of three troops of 45 men each mounted on camels. At the beginning of 1901 the whole squadron was stationed at Fort MacMahon, and only some 20 men had been left in the desert to garrison Fort Miribel and Hassi-Inifel. In September Hassi-Inifel was evacuated and Fort MacMahon counted only 24 men commanded by one officer, and the rest of the squadron retired to El Goléa as there were located the two pastures for their animals. At the present time the whole squadron is at In-Salah and reconnoitering the Tidikelt.

The cadres of the squadron are French, and consist of men of all the arms of the service physically fit to bear the extraordinary fatigues of serving in the Sahara. The men are naturally taken from troops who have already been stationed in the Sahara. The cadres consist of 2 captains, 3 lieutenants, 9 noncommissioned officers, 6 corporals, 6 lance corporals, and 3 buglers; a veterinary surgeon belongs likewise to the squadron, while the sanitary service is intrusted to a surgeon belonging to the nearest Saharan rifle battalion. The native camel riders are never promoted; however, for extraordinary good service, some are intrusted with the supervision of one of several squads. These leaders of squads wear as marks of distinction corporal's galloons on their sleeves.

The French soldiers serving in the Saharan squadron receive increased pay, and according to a late decree the noncommissioned officers have the right of transfer as quartermasters to a cavalry regiment of the line after having served six years in the Sahara and having been two years on the promotion roll. The campaigns count double. The privates are mostly recruited from the warlike tribe of Chaambas, who have waged a continuous war against the Tuaregs and consequently are best acquainted with their mode of living and fighting. The enlistments are generally made for four years, but the commander of the squadron has the right to discharge an enlisted man for bad conduct. There are also a few negroes in the squadron, but they are discharged whenever it is feasible, as experience has proved that these negroes are escaped slaves and possess no military qualities, and least of all personal courage. The Chaamba resembles but little the Arabian inhabitant of coasts. He is courageous and proud. The pure-blood Chaamba is tall and extraordinarily strong. His skin has been made so brown by the sun and the dust that it equals bronze in color. Though indolent by nature, he is generous and will divide his property readily and even give to the needy all he has. Among his excellent qualities not the least praiseworthy is his abstinence; with some sweet coffee and a handful of dates he can live through long days, and only the richest owners of cattle allow themselves to eat meat from time to time. Very enduring, indefatigable even when necessary, he can do on foot what he does mounted on the camel, yet on foot he knows no other gait than the walk; it is not possible to induce him to run.

The clothing of the Saharan spahis is white and consists of the same garments as those of the Arabian nomadic tribes, that is, a shirt, a wide tunic, and sandals made of camel's-hair. These sandals are excellent for walking in the Sahara. He wears on his head a kind of turban of white material kept together by a camel's-hair cord and which protects the head very efficiently against heat and wounds. The uniform of the noncommissioned officers of the Saharan spahis is similar to that of the Algerian spahis, with the difference that the burnous is black and the helmet, carrying a large star, is white.

The natives are paid 100 francs a month (\$19.30) and the leader of squads 180 francs (\$34.74). All the men receive a

premium at enlistment, the amount of which is fixed each year. They get, likewise, money for clothing and equipment, but they are under obligation to bring along two camels and to provide their own food and dress. The state gives them only their arms and small articles of equipment. It has already been mentioned that the French soldiers of this organization have some increased pay; among others, they receive a higher premium and a considerably larger allowance for provisions; the officers receive a daily allowance of 50 francs (\$9.65) and 63 francs (\$12.16) per month indemnity for provisions. They are paid, moreover, 600 francs (\$115) at the beginning of each campaign and 200 francs (\$38.60) allowance for equipment upon entering the camel corps. Each French Meharist must have two camels, the officers and noncommissioned officers three. The second camel is used for the transportation of the baggage and provisions.

The camel was employed for warlike purposes even in antiquity, as has been stated by Xenophon, Titus Livius, and Tacitus. It was recognized even then that this was the only animal that could be used as pack and transportation animal in regions so poor in water. The Mehari is an ordinary camel and is the same in that race as a thoroughbred is among horses. It is the best of its kind. It possesses only one hump. The Mehari differs from the other camels only by its stature, the fineness of its limbs, its slender neck, and the color of its coat, which is specially light. While the pack camel goes very slowly, the Mehari trots quite rapidly for hours. It is probably for this reason that quite fabulous things are said about it. Many believe that a good Mehari can cover distances in one day which a caravan makes in six to eight days. This is not true, and only a few excellent Meharis can make 100 kilometers without stopping, yet it is a fact that they can perform such marches for many days. They grow very thin in such cases, especially during great heat, and need afterwards much rest and good feed in pastures. This is one reason why the spahis must always keep two camels each.

The camel can make at a walk $5\frac{1}{2}$ kilometers per hour and during the night even 6 if the ground is good. If the sand is very deep the camel can not make over 4 kilometers per hour. The camel walks easily over stony and rocky ground. He remains erect while his feet find naturally trails and paths without stones. Its fleshy foot is very sensitive and bleeds

easily, so that it is often necessary to protect the feet by leather shoes. The foot, on account of its size, sinks very little in sandy ground, and on declines the hooked nails prevent it from sliding. The Mehari covers less ground at gallop than at trot, yet the fleetest and most enduring camel will never equal a horse in speed. The gait of the camel is not disagreeable to the rider, yet he receives bad jolts when galloping and even the trot is rather hard, especially when the saddle is not well padded. The consequences of these extraordinarily painful movements often result in hernia, although special bandages belong to the military equipment of camel riders. The best quality of the camel is its endurance. In this it is far superior to the horse, for it can live several days in summer without feed and in winter it can stay weeks without water. When a Mehari must be kept running for several days in summer, it must be watered every three or four days, while only a few hard plants and roots are sufficient to feed it, and of these there is an abundance in the Sahara. Like all ruminants, the camel has four stomachs, the first of which is divided into two pouchy partitions, one of which is surrounded by a number of cells filled with water; this comes from a never-stopping interior segregation of water and thus forms a filled reservoir.

The breeding and training of camels is given by the Tuaregs the greatest attention. The same may be said of the Chaambas, who pass their days caring for the Meharis, which they honor so highly that they declare them as "shaher," that is, clean domestic animals, and maintain that they do not dirty the house.

Great prudence must be used with young animals while training them for military purposes. The training must be gradual and based on certain principles, and punishments and rewards must be distributed very justly. The "breaking in" of the animals is begun very early by piercing their right nostril with an iron ring which is worn through life. They are then taught to kneel and rise, and turning to the right and left is imparted to them by means of the bridle and a riding whip. The camel is taught to trot by a loud outcry, and after the animal has learned all this with the man on foot, it is gradually made to get used to its rider. Great importance is given to the prompt kneeling, and a pressure of the feet against the neck of the animals must

suffice to make the camel trot. In order to urge the camel to its fullest speed, the Chaambas use an iron hook with which they tickle the animal under the belt. The riding camel gets quickly used to the saddle, as well as to the employment of arms. It does not fret in close formation, is very willing, does not shy, and never bites.

The saddle used by the Mehari riders is very peculiar. It consists of a hollow seat, which has the shape of a champagne glass and has a button in front of the shape of an artistically made cross. In the back there is a high pad ending in a point. The saddlecloth is of red leather, on which several black crosses are burnt with a hot iron for ornamentation. The reins consist of a kind of strap and cord which is fastened to a ring in the nose of the camel; the cord and the strap are crossed on the neck of the animal, and are then taken in the rider's hand, who uses them as those of a horse. On the fore part of the bridle is a kind of metallic spur, partly for the holding of the strap, partly as a signaling instrument, for which purpose it is provided with small bells or rings.

The armament consists of sabers and cavalry carbines. As to the tactics of the Mehari riders, they are, as has already been mentioned, in conformity with the fighting mode of the Tuaregs, which consists in ambuscades and sudden attacks. Hence it comes that rapidity and mobility are the principal features, and that excellent reconnoitering and security service are likewise necessary. The fighting of the camel riders takes place on foot, for no Mehari rider, however skillful, could oppose a man with a lance. On the other hand, as has already been mentioned, the essential enemies in the Sahara are only rebellious tribes and hordes of robbers against whom a good firearm is the best weapon. This is often used by the Mehari riders by forcing their camels to kneel and then by firing over their backs.—*Internationale Revue, Beiheft No. 28, April, 1902*

THE SAHARAN OASIS TROOPS.

In the 1902 budget the chambers laid down a new organization for the Saharan troops in the oases of Gurara, Tuat, and Tidikelt. This provides for the formation of three native companies, called "des Oasis Sahariennes."

The object of this formation is to replace by natives recruited from the Sahara the present Saharan troops, which

will be disbanded in six months. These will be able to live on the resources of the country, and will largely obviate the necessity for the transport of supplies, which at present have to be kept up by frequent convoys. The three companies, consisting of infantry, cavalry, and mountain guns, will be substituted for all the European troops now occupying this region, and will keep only such a proportion of Frenchmen as are absolutely indispensable for the cadres. The natives will be enrolled by voluntary enlistment and by reengagements for periods of two years each. They will continue to live in accordance with their usual habits, namely, grouped with their families around the chief centers, and will be allowed, at the same time that they give their military services, to occupy themselves with agricultural pursuits.

The French cadres will receive a special rate of pay and bounty, exclusive of all issues in kind. The officers will be intrusted with the duties both of commanding the troops and with the administration of the country. Thus in ordinary times all distribution of food, forage, harness, and clothing may be dispensed with. Finally, each company will be given camel transport, by means of which they will be able to transport supplies when they have to travel over the country or to move rapidly to some threatened point. The companies will be administered by the general commanding the nineteenth army corps, under the supervision of the governor general of Algeria. They are not liable for service outside the region of the Saharan oasis, except in very exceptional cases, which must be decided upon by the governor general with the concurrence of the home government. Each company will be commanded by a captain in the colonial service, responsible for the administration of the corresponding oasis group; the lieutenant will be taken from the same service. The French rank and file will be recruited from the Algerian corps of all arms. The companies will be placed under the immediate orders of a field officer, with the rank of "chef de battalion." With regard to the French soldiers, every year passed in the Sahara district will be reckoned as a double campaign; nothing is changed with regard to the general conditions for admission to pension. As regards natives, these conditions will be similar to those at present in force for the Algerian tirailleurs; each year's service will count as one campaign only. In the first formation the rank

and file, French and natives, will be drawn from the present battalion of Saharan tirailleurs and from the Saharan spahis squadron about to be disbanded.

The tables attached to the decree show that each company will consist of 1 captain, 4 lieutenants, 1 surgeon, 12 French and 6 native noncommissioned officers, 12 French and 14 native corporals or lance corporals, 4 French gunners, 9 French workmen and clerks, 8 native buglers and trumpeters, and, finally, 232 infantry, 20 cavalry, and 20 dromedary corps, all natives. The company possesses also 43 horses, 52 dromedaries, 100 draft camels, 9 mules, and 2 mountain guns. The three companies, including the staff, make up a total of 20 officers with 37 horses, 100 French soldiers, and 900 natives, 96 troop horses, 156 dromedaries, 300 camels, 18 mules, and 6 guns.—*Journal Royal United Service Institution, May 15, 1902.*

CHARI COLONY.

The region of Chari, this newest acquisition of France, is divided into three districts by the commanding officer, Lieutenant Colonel Destenave. They are the Upper Chari, composed of the Krebedje (Fort Pospel) and the Gribingui (Fort Crampel) sections; Central Chari, composed of the Thunia (Fort Archambault) and Bousso (Fort Bretonnet) sections; and Lower Chari, composed of the Koussouri (Fort Lamy) and Goulfei (Fort de Cointet) sections. The names of the forts are those of men who have met death in the field. The garrison of the colony is composed of a battalion of Singalese rifles, a company of yacomas, a squadron of spahis, and one battery. The captains represent France before the native rulers Gaourang and Senoussi. Great difficulties arise in the supply of the troops with provisions from the enormous distances between the posts and the sources of supply. The Chari falls into Lake Chad, but is navigable only between December and April, and so far only one steamer and five chalanoes (native flat-bottomed boats) are there for this purpose. From Lake Chad to Bangui, where the Ubangui ceases to be navigable, there are 1,500 kilometers to be made by land — *Militär-Wochenblatt, February 1, 1902.*

CHEVALLIER ELECTRIC TARGET.

Capt Charles Chevallier, of the French army, collaborating with M. Eugène Cadet, has invented a most ingenious

target, which is so constructed that the hits are registered by an annunciator. By means of this device the marksman, simply by referring to the annunciator, can ascertain at a glance what his success has been without walking several hundred yards to the target.

The target itself consists of two sets of metal panels of segmental form, arranged in different vertical planes. One series of segments overlaps to a certain extent the next series of segments, in order that an entirely full surface may be presented to the marksman. Behind each series of segments lies a fixed disk, serving as a guide and support for rods secured to the segments. Coiled springs are placed between the segments and the disk, in order to return the segments after they have been driven in by a projectile.

Opposite each rod, secured to the segments, an electric-contact device is placed, which consists of a screw mutilated for about $\frac{1}{8}$ of an inch. In its normal position, an insulated plate having threads of a corresponding pitch to those of the screw lies opposite the neck thus formed in the screw, and is therefore out of contact with the screw. The mutilated screw turns in a fixed nut or support. The upper part of the mutilated screw is fitted with a cross piece provided with counterweights at its ends so as to form a balance member. The plate constitutes one terminal of the circuit, the wires being secured to the other terminal. The wires are equal in number to the segments of the target, and are assembled together in a cable leading to an annunciator of ordinary construction, placed near the marksman.

When a projectile strikes one of the segments, one or more of the springs coiled about the rods are compressed, and the corresponding rod or rods are driven in through the perforations of the disk and strike the counterweights of the balance member. The impulse thus given to the balance member causes the mutilated screw to turn and rise. The lower threaded part of the screw is then engaged in the screw threads of the plate and the circuit is completed. When the circuit is completed the annunciator near the marksman indicates the exact spot of the target which has been struck.

Instead of disks, portions representing the human figure can be used.—*Scientific American*, June 28, 1902.

GERMANY.

THE ARMY, A RETROSPECTIVE VIEW OF THE YEAR 1902.

TRANSLATION OF AN ARTICLE APPEARING IN "UEBERALL," 1902, No. 14, BY CAPT. W. S. BIDDLE, FOURTEENTH INFANTRY, U. S. MILITARY ATTACHÉ AT BERLIN.]

The year 1902 brought no great changes in organization, such as that of the field artillery in its time. The new organization of the third principal arm, cavalry, is still impending, after the infantry and artillery have completed theirs. Only the establishment of seven new machine-gun detachments on October 1 and of six companies of foot artillery is to be noticed in the nature of an increase.

With the adoption of machine guns a new arm of the service has been created which, occupying an intermediate status between infantry and artillery, appears destined to become highly effective in certain cases. At present it has found its principal employment with the cavalry, to which it is attached; it seems, however, that it is certain to play otherwise an important part. It is yet so new that its use has been brought under no fixed rules. With its final adoption an increase of its strength is to be expected.

The increase of the strength of foot artillery has long been recognized as necessary in view of the ever-increasing importance of heavy guns for the siege of fortresses and outer forts. We regret to say the reichstag, in place of the required ten companies with the necessary staffs, allowed only six companies without these, so that the remainder is likely to be required again soon.

By the increases now, on October 1, the German army has reached a strength of 495,000 men under the statute of March 25, 1899. To these are to be added in round numbers 29,000 officers and officials, 81,000 noncommissioned officers, and 8,000 one-year volunteers.

There exist at present the following tactical units: 625 battalions, 482 squadrons (including 17 squadrons of mounted orderlies), 583 field batteries, 39 battalions of foot artillery with 163 companies, 13 machine-gun detachments, 29 battalions of pioneers, 11 battalions of verkehrstruppen (railroad, balloon, and telegraph troops), and 23 battalions of train.

Regarding the establishment of the higher commands (kommando-behorden) is to be mentioned the creation of a new fourth engineer inspection and a new eighth fortress inspection. Further has begun the changing of the former festungsbau-personal into the festungsbau-offizierkorps, with rank of

the old zeug and feuerwerks officers corps and with its suitable uniform. This change will be gradual, according to the means at disposal.

The intended creation of a military technical institute for educating a staff of officers for the institutes has been refused by the reichstag. By the increased development of all technical requirements of war the preparation of officers in this department has become more and more difficult; a makeshift is in detailing to the artillery and engineer school for a longer time and consequent longer attendance at the technische hochschule. A greater uniformity in this department has been obtained by the formation of a closed officers corps of the technical institutes with uniform of their own.

In improvement of arms or technical innovations the last year has opened no new paths nor brought further development. The fight for the coming new field gun has been confined to the limits of military literature. After the adoption of the German field gun, 1896, was answered by France with the introduction of a barrel-recoil gun with armor shields, an active movement for such guns set in in Germany; for the present, it is true only in military literature. The largest German gun factory for a long time resisted the new principle, as many weak points for field service seemed to be associated with it, and as in the spring-spade (federsporn) gun, an excellent arm was created. Many countries after extensive tests had already decided in favor of the latter, when by continual efforts the Krupp factory succeeded in bringing the barrel-recoil gun into a really serviceable form for war, so now the countries which were arming with the spring-spade gun, such as Switzerland and Italy, have none the less adopted the barrel recoil. Even little Denmark recently ordered her entire equipment of field guns in Krupp barrel-recoil guns. In Germany the fight therefor has been confined to military literature, as nothing is published about the tests which, of course, are extensively made by the artillery-testing commission (artillerie-prüfungs-kommission).

The fight for and against protective shields has been now the less severe, and even the recent Krupp trials on the penetration of armor shields by steel balls, instead of leaden balls contained within the shrapnel, were not able to remove the decided advantages of shields, as such change in projectiles would entail other disadvantages. The trials made by another

factory, the Ehrhardt works, to carry the fight against armor shields in a different manner, namely, by adopting a light field gun firing only shells, met with a stout resistance, as its adversaries quite correctly objected that the engagement of the hostile artillery is by no means the main task of artillery, and, further, that artillery has in shrapnel its most effective weapon against infantry. It is, therefore, uncertain whether the movement will be decided in favor of the barrel-recoil gun with armor shield. In South Africa the experiences were under peculiar conditions and only partial advantage can be taken.

Aside of this question of a new principle for field guns, which sooner or later will become a burning one with us also, other technical questions receded into the background, as, for example, the use of mechanical draft for army vehicles. The favorable experiences of the English in the Transvaal war with road locomotives has in England already resulted in a special department in the war ministry.

In Germany, also, the trials with automobiles and road locomotives have been diligently continued, and especially noteworthy must be the competition permitted by the ministry of war for making road locomobiles with alcohol burners (spiritusheizung) suitable to army needs.

Wireless telegraphy has made further progress in its use for land war, and it seems here the system of Professor Braun, as arranged by Siemens and Halske, will have a great future. A wagon, constructed after this system, took part in the kaiser maneuvers, and succeeded in sending long orders from headquarters to the cavalry divisions distant three to four German miles, and these in turn could forward reports in this manner.

The distribution of the rifle, M.-'98, with which the expeditionary corps to China was equipped, and which then was given only to the guard corps, has been extended to a number of other army corps, so that perhaps this year the entire German army will be furnished therewith.

For the training of the army a number of new regulations and orders have been issued, as also for the machine-gun detachments and balloon troops. New garrison-service regulations have brought important changes of garrison service, especially of guard duty. New regulations for the administration of troop kitchens give proof of the solicitude of the administration for the bodily welfare of the soldiers.

Horse-levying regulations control this important business, and they are made much simpler for the horse owners required to appear by the newly created positions of commissaries of prior horse inspection (pferdevormusterungs-kommissare).

As highly important may be considered the issuance of the new articles of war, as they have been materially simplified, conformed to the understanding of soldiers, and better fitted than the old to show them their high duties.

The new naming of a large number of regiments, which the emperor decreed on his birthday, is associated happily with the old traditions of the army, and not only brings the old Prussian provinces, as formerly, into close connection with the regiments coming therefrom, but also gives pleasant expression to the incorporation of these ancient German countries to their mother country and its army by attaching the designations of "Lorraine" and "Upper and Lower Alsacian" to the troops there stationed. Thus, also, many places, which by degrees fell to Prussia, for instance, the countries of Berg and Mansfeld and others, have come to existence in the army.

On the morale of the army for a short time the court-martial case in Gumbinnen, last year concluded, seemed to cast a shadow; foreign countries, especially France, believing with a certain malignity that it paralleled the notorious Dreyfus case. But the proceedings, held in fullest publicity and with great impartiality, have shown that it was but an individual act of revenge, the authors of which, to the present, have eluded the arm of justice, and that in no manner any typical conditions existed. Also English papers now believed that they could take revenge for the criticisms which the English conduct of the war in South Africa received in many ways in the German press, and they attacked the German discipline; this brought forth the most spirited defense. Above all, the case at Gumbinnen had furnished the first great test of the new court-martial procedure, and this test it has splendidly withstood. The perfect administration, especially in the last instance, has been acknowledged by high civilian jurists and such parties as are otherwise not friendly to the new statute.

The training of the army during the last year was affected by the "Boer attack." This occupied the widest space in military literature. A new method of attack was tried also

on the exercise grounds, then the public press took hold of the question; its elucidation was not thereby helped.

The mere name of Boer attack led to a misunderstanding, as most people thought it was a question of how the Boers attacked the English. Rather it is to be remembered that the Boers, excepting their numerous surprises, seldom attacked, and then observed no fixed rule. It would be nearer the fact if one designated thereby the manner in which the positions of the Boers were attacked by the English; but also this is not yet correct unless one said "the manner in which these positions should have been attacked." When the first news of the repelled English attacks came, it was regarded as a necessary result of the new arms; it was said to have caused enormous losses, and that special means must be found to oppose the new arms successfully with smaller losses. This was to be obtained by taking advantage of ground cover and by advancing gradually with thin skirmish lines. The detailed reports, however, showed that the English losses had not been so considerable, and failed to reach the German losses in their great successful assaults in 1870; that partly improper formations had been used, and that in the main a disconnected system of attack and lack of energy of leadership were the principal causes of failure. Soon, therefore, a certain reaction came up against the tendency to lighten the skirmish lines, and it was recognized that the influence of the leaders was rendered thereby more and more difficult. The question became not so much "how do I get my skirmishers to the enemy with fewer losses?" but rather "how do I get my skirmishers to the enemy in any event?"

Thus the last kaiser maneuvers, as a matter of fact, almost nowhere showed any trace of the much-mentioned Boer attack; the dispatches of the press reporters that "the Boers' tactics had here proven excellent" was an empty phrase to play upon popular credulity.

In the development of the other arms nothing new has appeared. The great cavalry maneuvers led by the emperor himself, near Alten Graben, as well as the cavalry attacks during the kaiser maneuvers, proved that the German cavalry in closed masses, if put to the task of rushing a shaken enemy, will be able to ride in a manner worthy of its old fame of Mars la Tour. In spite of quick-fire guns and magazine rifles, this may occur again.

The present practice of attaching only three squadrons as divisional cavalry will, however, in war probably prove insufficient. With the artillery the change of subordination which placed it under the superior commanders (kommandobehörden) in consequence of its new organization has given rise to different ideas about the manner of its employment which awaits settlement.

The intellectual side of the army has been encouraged by military literature also during the last year. The general staff has led with its numerous war historical and tactical publications. It would pass the scope of this retrospective review to even approximately mention the abundance of the most important publications.

Finally, as regards our troops in the far Asia, it is to be reported that the East-Asiatic garrison brigade twice in the last year has been decreased, and at present numbers only two regiments of infantry of two three-company battalions, one squadron, one battery, and one company of pioneers.

THE TRANSPORT OF THE EAST-ASIAN EXPEDITIONARY CORPS.

On July 7, 1900, the emperor gave orders for the formation of an expeditionary corps to consist of volunteers from the army to be composed of eight battalions of infantry, three squadrons of cavalry, four battalions of field artillery with the necessary complement of ammunition columns, transport, etc.

On July 19, the staff were able to report to the commander of the expeditionary corps that the formation of the various units was completed, and between July 27 and August 4 the expeditionary corps was constituted as follows: 500 officers and officials, 10,894 noncommissioned officers and men, 559 guns and vehicles, 21,294 cubic yards of stores, embarked on ten steamers.

On August 12, 1900, a reenforcement, consisting of 269 officers and officials, 7,430 noncommissioned officers and men, 303 guns and vehicles, 18,241 cubic yards of stores, was formed, and embarked on eight steamers between August 31 and September 7.

The transport by sea of such a large body of troops was quite a new experience for Germany. Everything had to be improvised, as there were no previous preparations nor precedents to work on. It is true that as an experimental measure

it was intended during the imperial maneuvers in 1900 to transport a mixed brigade consisting of four battalions, one squadron and one battery, from Dantzic to Swimmund, and with this idea in view, regulations for the movement of troops by sea were about to be framed. However, the sudden turn of events in China, and the unforeseen necessity of quickly dispatching a strong force to that quarter, put an end to all experimental measures and necessitated hasty action.

The arrangements for carrying out the transport were intrusted to both the military and naval authorities and no exact data were laid down with regard to their respective duties, as it was impossible to distinguish between the two interests.

In order to quickly transport a large force across the sea the most important factor is the possession of a good mercantile marine, and in this respect Germany was fortunate in having at its disposal the two largest steamship companies in the world, namely, the North German Lloyd and the Hamburg-America Packet Company.

The military and naval authorities, in conjunction with representatives from the two companies, made the necessary arrangements for the combined transport, and after personal inspection agreed to the following conditions.

The following were the requirements demanded in each transport:

1. The companies had to provide the following accommodation:

(a) All field officers and those above that rank and officials of corresponding rank, with a completely furnished cabin, which was to contain a commodious chest of drawers, provided with locks and writing table.

(b) All other passengers in the first saloon, as far as possible, with a completely furnished cabin (eventually three and four people had to share one cabin).

(c) For second saloon passengers a cabin for every two or four and a common mess room.

(d) The passengers between decks with bunks in a separate place between decks, with sufficient portholes and good ventilation.

2. The cabins contained the following: A strong bunk for each individual, and, as far as possible, a washstand and camp chair for each passenger. The bedding consisted of a horsehair

mattress, a horsehair pillow, two woolen blankets, with linen or cotton sheets, a counterpane, and a pillowcase.

3. For the disposal of valuables, uniforms, etc., each saloon passenger was to be provided, as far as possible, with a chest and lock; valuables could be handed over to the paymaster for safe custody, on the understanding that the company would be responsible for any damage and loss.

4. All the cabins, etc., in the saloons and between decks were to be provided with hot-water pipes.

5. The men's bunks were to be numbered consecutively. For every two bunks two to three hooks were to be provided for hanging clothes.

6. All the bunks not actually required for the accommodation of the men were to be removed and tables and forms put in their place. In addition, the companies had to provide a number of tables and benches for use on deck. All the tables between decks were to be numbered consecutively, showing also the ship's numbers of the men for whom they were intended, for example:

No. I Mess.
Nos. 1-12.

No. II Mess.
Nos. 13-24.

The electric lights between decks were to be provided with screens to keep the glare from the bunks.

7. To provide against accidents, broad gangways were to be made leading from below to the deck.

8. Each porthole was to be provided with a scuttle, and at each hatchway windsails in the following proportions:

(a) In the lower troop deck: One windsail for every 200 cubic meters of space occupied by men; for every 200 to 400 cubic meters, two windsails; for every 400 cubic meters, three windsails.

(b) In the upper troop deck: For space up to 300 cubic meters occupied by men, one windsail; over 300 cubic meters, two windsails.

9. Arm racks were to be provided in places not occupied by the troops and were to be numbered consecutively, and on the wall above each rack the contents of each was to be shown, as, for example, Nos. 40-57.

10. Special cabins were to be set apart for the storing of officers' and men's kits. Each officer and man was to be allowed 3 cubic meters and 1 cubic meter of space, respectively, which was to be accessible during the voyage.

Special spaces were to be set apart as saddle and harness rooms, which were also to be accessible during the voyage.

11. Shelves on the walls over the mess tables for the storing of eating utensils, as well as plates, knives, books, etc., were to be provided by the companies.

12. The companies were to provide utensils for the purpose of cleaning cooking pots, etc., as well as soap, dishcloths, etc.

13. There were to be from one to two cabins set apart on each steamer for use as offices; these cabins were to be provided with locks.

14. There was to be a hospital on each ship capable of accommodating $2\frac{1}{2}$ per cent. of the troops on board; a bathroom and latrine was to be attached to the hospital. The hospitals were to be supplied with heating apparatus, and were to be airy and well lighted. There was to be, as far as possible, sitting accommodation for non-lying-down patients, and also a table in each hospital.

On the doctor's requisition, all the hospital washing was to be done gratis by the ship.

15. Every precautionary measure was to be taken by the companies for the extinction of fire. A sufficient number of boats, life buoys (including a night life buoy), and material for the construction of rafts was to be provided. Life belts were to be supplied for the troops.

16. The companies were to arrange for one steam launch per transport; the *Rhein* was to have two.

17. The upper decks were to be sheltered by awnings, and were to be kept free of all baggage or stores.

18. Clotheslines were to be provided for the purpose of drying the men's washing.

19. Latrines were to be provided in proportion to the strength of the troops, and arrangements made to have them disinfected and cleaned daily.

20. Each ship was to be provided with one or two post boxes.

21. Each ship was to have three places specially set apart to serve as military prisons.

In addition to the terms of the contract, there were laid down clearly all the details with regard to the interior economy of the ship, including the prices of stores, the care of the sick, the length of stay at the port of disembarkation, etc. It will thus be seen that the troops were to be considered by the

ship's authorities solely in the light of passengers. The officer commanding the expeditionary corps was also empowered to detain any ship, after the troops and stores had been disembarked, for any such period as he might consider necessary with regard to the military situation. Every ship was to be provisioned for 150 days, and at the end of the voyage any surplus provisions were to be at the disposal of the commissariat department. The embarking of stores and materials at the port of embarkation had to be arranged for by the companies, while at the port of disembarkation they were only required to provide their steam launches to assist in the disembarkation.

On July 13, 1900, the ministry of war issued the necessary detailed orders for the dispatch of the East-Asian expeditionary corps, among which we may mention the following:

1. As it was considered expedient that all the transports should sail from one German port, so as to admit of greater unity of action in the embarkation arrangements, Bremerhaven was selected as the port of embarkation. In coming to this decision, as a matter of course, only Bremerhaven and Hamburg were taken into consideration, as these were the headquarters of the two steamship companies which had to make all the necessary arrangements for the fitting up and loading of the transports. Of these two ports Bremerhaven appeared more suitable than Hamburg, with its enormous trade and its extensive docks, not only on account of its more compact harbor admitting easier supervision and simplification of the necessary arrangements, but also on account of its more complete railway communications, which facilitated the transport of troops and stores to any selected wharf or quay, and there would also be a lesser crowd of sightseers to interfere with the progress of work.

One objection to the selection of Bremerhaven as the one port of embarkation was that the resources of the Hamburg-American line as regards dock hands, labor, etc., could not be fully utilized; however the Lloyd Company undertook to load the Hamburg steamers by means of its own personnel.

2. With regard to the actual embarkation the following orders were issued:

- (a) The staff troops, etc., carts, ammunition, as well as all the baggage which the troops would require in their immediate possession, such as officers' kits and men's kits, were to go by rail to Bremerhaven.

- (b) All other stores, etc., were to be sent to the Bremer Weser railway station and be there shipped onto lighters and

sent alongside the transports at Bremerhaven. This important arrangement was at the express wish of the Lloyd Company so as to admit of the simultaneous loading of the transports from the wharves and from the lighters in the short time at their disposal. By this means the ordinary traffic was not greatly interfered with; all possible advantage was taken of Bremen's resources as regards labor and store sheds, which are lacking in Bremerhaven; it was also possible to make simultaneous use of the cranes on the ships and on the wharves.

With regard to the loading of the transports, from a military point of view, two main principles were laid down: Firstly, the complete field equipment of every unit, that is, arms, ammunition, uniform, transport, etc., was to be carried on the same ship as the unit itself, and in addition a sufficient supply of stores, etc., to last for some time after disembarkation, so that in the event of only one ship being unloaded at a time, the unit would be in every way complete. Secondly, all stores, etc., were to be stowed on each ship in the order that they would be required—all reserve stores at the bottom of the hold and those that would be first required at the top; also all the component parts of different stores were to be stowed together, and all stores stowed together according to the respective units to which they belonged.

This latter principle proved difficult, almost impossible, to carry out, owing to the extreme difficulty of separating reserve stores, etc., from other stores before embarkation; therefore the military authorities decided to send all the heavy baggage not apportioned to any particular unit, such as reserve provisions, etc., to Bremen.

The authorities came to this decision because it was found impossible in the short time available to stow everything systematically and in the order that it would be required, and without also sacrificing a great amount of space. The stores, etc., would also, in any case, require to be sorted at the port of disembarkation, and therefore the advantages gained by shipping them in lighters to Bremen appeared dubious.

However, in order to insure the troops having their most important necessaries immediately at hand, both during the voyage and on disembarkation, it was decided that the officers' baggage and men's kits were to accompany the troops to

Bremerhaven, and that all other stores, such as ammunition, medicine chests, and hospital carts, were to be stowed on board immediately, and where every access would be had to them.

3. In order to facilitate the loading and unloading of the transports, all stores were to denote what ship and what corps they were destined for, and also the contents of all packed stores were to be noted on the outside.

4. Depots were formed at Bremen and Bremerhaven, each under the command of a railway commandant, with a staff of officers, officials, and men, where all the stores, baggage, etc., arriving by train were stacked and arranged.

The Bremen depot included the railway-station staff, a collecting station, a clothing depot and goods depot, and in addition a depot where all gifts intended for the troops were collected.

The Bremerhaven depot included the railway-station staff, an ammunition and a goods depot. These depots had the same duties in connection with them as they would have on mobilization.

An embarking staff was formed at Bremerhaven, the senior officer of which had charge of the embarkation of troops.

The regulations with regard to the distribution of the troops were embodied in the "plan for the embarkation of the East-Asian expeditionary corps," which was made use of, in slightly altered form, for the second dispatch of troops. The number of first, second, and third class passengers that each transport had to carry was fixed beforehand. Owing to the long voyage through the tropics, the hardships of which our troops were unaccustomed to, and the necessity of disembarking the expeditionary corps in the best possible health, the troop decks were only to accommodate 75 per cent of their normal complement, which proved a very wise precaution. The distribution of the troops presented many difficulties, as the different units and their equipment stores had to be together absolutely, and the steamers were not constructed to meet this contingency. It thus happened that some ships had plenty of accommodation for the men but very few cabins and others had plenty of cabins but very little space between decks, while some were cargo ships and had comparatively small accommodation for passengers.

It is not intended to imply that the companies supplied inferior or unsuitable ships as transports; on the contrary,

the ships were excellent, perhaps better than ever provided for this purpose before, but owing to the suddenness of the demand and the large number required, it was impossible to have a large choice, and those ships had to be taken which happened to be in port. As a consequence, extensive alterations and fittings had to be made, such as the construction of cold stores for fresh provisions, gangways, the laying down of electric light and hot-water pipes, etc. By means of such alterations it was proved that any good ship can be converted into an efficient transport.

Three fast ships were selected to sail first and left on the 27th of July with the following troops, etc., on board:

Staff of first infantry brigade.

First infantry regiment.

Staff and two squadrons of cavalry (as the horses were being dispatched direct to China from America and Australia and would arrive there before the troops, it was especially desirable that the latter should arrive as early as possible).

Second section of the field artillery regiment—a battery of heavy field howitzers (whose early arrival enabled it to take part in the storming of the Peitang forts).

Detachment of the telegraph corps.

Field hospitals 1-4.

The officer to command on the lines of communications and all the "technical" troops went by the first ship in order to be able to assist in the disembarkation arrangements. An advance party consisting of 21 officers, officials, etc., and 120 men, had left Genoa on the 24th of July in order to make the primary arrangements.

The commander of the expeditionary corps, whose early arrival on the scene of operations was very desirable, could not leave for very important reasons until the 2d of August, but the *Rhein*, which steams 13 knots and on which he traveled, did the journey in the shortest possible time by avoiding all unnecessary delays at the intermediate ports.

The embarking officers and their staffs started on their work in Bremen on the 12th of July. Their duties consisted in sorting all the baggage and seeing that it was properly packed and labeled; badly packed things had to be repacked and those incorrectly labeled had to be put right. All the baggage had then to be shipped onto the different lighters

and dispatched in good time to their respective ships in Bremerhaven. Some idea of the extent of the work that was done may be judged from the fact that between the 12th and 30th of July 7,270 tons of stores, etc., arrived at the Weser railway station in 1,419 trucks.

The railway-station staff at Bremerhaven had similarly to transport all the carts, ammunition, etc., alongside the quay. The arrangements for loading were rendered all the more difficult on account of the fact that all available space had to be utilized in order to stow away all the stores, etc. As much heavy baggage as possible was to be stowed away in the hold, and at the same time sufficient space was to be left for the transport, tents, stores, etc., which were to accompany the several units, and the space required for these latter could only be approximately estimated.

As far as possible all stores, etc., were brought alongside the steamers in the order that they would be stowed on board. but this measure was only partly a success, as in many cases there was not room for them and they had to go on the next steamer.

The difficulty of loading was very much increased by rainy weather, and also by the late arrival of a number of the ships. Originally the 1st of August had been fixed as the first day of sailing, and the companies had made their arrangements accordingly, and when all the dates of sailing were altered to five days earlier it was in many cases too late to alter the original plans. In some cases ships had only two days in which to unload their original cargo, make the necessary fittings for the transport of troops, and to load up. The embarkation of the troops was carried out under the direction of officers of the headquarters staff. As soon as each train drew up on the platform in front of the ship all the companies were formed up and each man was given a number showing the number of his bunk and his armrack. The men were then marched on board and the packs stowed in their bunks and the rifles in the armracks. In the meantime a party of marines unloaded the train, and all the remaining officers' and men's kits were laid out on the quay. Each man then searched for his own kit bag and took it on board and stowed it away. The embarkation of a battalion took on an average from an hour to an hour and a half.

On the whole, it may be said that the transport arrangements for the expedition were satisfactory. The health of

the troops during the forty-eight days' voyage through the tropics in the hottest time of the year was excellent. There were only seven deaths en route, namely:

Two from sunstroke.

One from peritoneal inflammation.

One from apoplexy.

One from fracture of the skull.

Two from alcoholism.

—*Journal United Service Institution of India, April, 1902.*

ARMAMENT, EQUIPMENT, AND CLOTHING OF THE GERMAN EXPEDITIONARY CORPS.

Lieut. Col. Bernhard von Haine published lately in the *Berliner Kreuz-Zeitung* his remarks on the German troops in China. The expeditionary corps was armed with the newest models of rifles, guns, carbines, and lances. Colonel von Haine observes that the length of the bayonet of the infantry rifle was not always proportionate to the solidity and durability of the fixing device. He states that in case of a hand-to-hand fight the men seem disposed to use the butt to a great extent, and that the stock is not strong enough for this. In many instances the small-caliber bullets, though hitting vital parts of the body, did not place the wounded immediately hors de combat. The lance was feared most by the enemy. Since the small flags attached to the lances may be seen in the field from afar it would be advisable to take them off before combat.

The greatest need was felt in cooking apparatus on wheels in which the food could be cooked while on the march, especially as the water was not drinkable when not boiled. Part of the Russian troops were furnished with such cooking vehicles, in which the food of a company was being prepared on the march and which could also supply the troops with fresh boiled water. The advantages of this system are apparent and it is worthy of imitation. The men get warm food immediately upon arriving into bivouac. The food by this method is better prepared than that which each individual soldier prepares for himself and consequently more wholesome. Much time is thus gained for the rest of the individual soldier, which influences favorably the efficiency of the whole. The distribution of provisions and condiments among the individuals is thus dispensed with.

The expeditionary corps was equipped with helmet, field cap, cloth uniform, coat, high boots, and laced shoes. Each man was, moreover, equipped for the sojourn in the hot zone with a yellowish-green drill uniform and a straw hat. After the first laundering this yellowish-green became a color which was anything but attractive, and the straw hat did not give any protection against the rays of the sun nor the rain, not to mention that this head wear gave the troops not only a far less attractive but even a nonmilitary aspect, it did not fulfill its purpose in any way. The blue color of the cloth uniform was also unpractical. Dust, grease, and dirt soon made this uniform look very shabby, too. The gray-green color of the mounted troops' uniform is far more practical. The shoes of the men are likewise not to the purpose. The uppers are far too short to protect the feet from dust and dirt. When this boot has been wet through it is very hard to put on. When the blacking or polish is not at hand, the shoes soon take a most offensive aspect. The most practical foot gear is a strong shoe of natural yellow color fastened at the ankle by buckles. The leg is best protected by puttees of flannel which are easily cleaned and dried. All leather ought likewise to be of natural yellow color. Taken all in all, the uniform, which renders the German army so conspicuous in Europe and distinguishes it among all other armies and which is so essential a means in the training of the individual man, was not only the least attractive, but also the least practical of all.—*Die Uniform*, May, 1902.

MACHINE-GUN DETACHMENT.

On October 1 a machine-gun detachment was assigned to the first Bavarian army corps. Before that time the "abtheilung" had been assembled on the great exercise ground of Lechfeld and taken a preliminary course of training. It takes station at Augsburg and is composed of men taken from the infantry, cavalry, and field artillery in the strength of 1 captain, 1 first lieutenant, 2 second lieutenants, and 12 noncommissioned officers, 65 men and 54 horses with 6 machine guns, 83 (sic) ammunition wagons, and 4 administration wagons.

They wear the Jäger uniform with Roman figure on the epaulets and shoulder straps. The detachment does not at present receive its own recruits, but will be attached for training to the third battalion of the third infantry regiment.—*Ueberal*, No. 4.

MOBILIZATION FROM A FINANCIAL STANDPOINT.**THE MILITARY PRINCIPLES—ARMED FORCES IN WAR.**

The military principles of mobilization rest first upon the numerical determination of the forces for war, that is, upon the war strength of land and naval forces. This war strength is developed by the constitution of the army.

The strength and distribution of the active army and fleet, which form the frame for war formations, and the reserve of the land and naval forces are important for these. The latter comprises in a larger sense military service in the active army and fleet and of the men on furlough, and in a narrower sense the recruiting of the land and naval forces by themselves.

Regulations with regard to the armed strength and the composition of the German army and fleet are determined by the following laws:

The law of November 9, 1867 (law of military service); of May 2, 1874 (imperial military law); February 15, 1875 (law of control); May 6, 1880 (additions and modifications of the latter), March 31, 1885 (modifications as in the former); February 11, 1888 (changes in military service); January 27, 1890 (modifications of the imperial military law); July 15, 1890 (effective strength on peace footing); May 26, 1893 (distribution of reserves), August 3, 1893 (effective strength on peace footing); March 25, 1899 (effective strength on peace footing); orders for the fleet of April 10, 1898, and June 14, 1900.

The armed strength consists of the army, the navy, and the landsturm.

The army is divided into (1) the standing army, (2) the landwehr; the navy into (1) the fleet and (2) the naval reserve.

Each German capable of carrying arms is, as a rule, from the time he completes his twentieth year until March 31 of the year on which he completes his thirty-ninth year, under obligation to serve in the army or navy. For men obligated to serve in the army who have entered it before they are 20 years of age, the obligation expires on March 31 of the year in which he completes six years' service in the second ban of the landwehr.

The obligatory service in the army (or navy) is subdivided as follows:

(a) **ACTIVE ARMY AND (b) RESERVE.**—Service in the active army (or fleet), seven years. The active service—service with

the colors—lasts, according to the law of August 3, 1893, in the standing army, for cavalry and mounted artillery, three years, for all the remaining privates, two years.

(c) **LANDWEHR (OR NAVAL RESERVE).**—First ban, five years; second ban, 7 years; in all, twelve years. The privates of foot troops, horse artillery and train, the volunteers, the privates of cavalry and mounted artillery who have served three years in the standing army, serve in the first ban of the landwehr only three years.

(d) **"ERSATZ" RESERVE.**—Twelve years. The "ersatz" reserve serves for the recruitment of the army (or navy) in time of mobilization and for the formation of "ersatz" troop units. It is composed of persons who have drawn high numbers or who are physically unfit to be incorporated into the standing army, but who may be fit for service in the future. After the expiration of twelve years' service in the "ersatz," those who have been trained enter the second ban of the landwehr and the remainder the first ban of the landsturm.

The obligation of taking part in exercises lasts during service in the reserve, the landwehr of the first ban, and the "ersatz" reserve.

(e) **SERVICE IN THE LANDSTURM.**—The landsturm consists of all men under military obligation, beginning with seventeen years completed and ending with the forty-fifth year completed, and who do not belong either to the army or navy; it is divided into two bans. The men belong to the first ban until March 31 of the year in which they complete their thirty-ninth year, and to the second ban from the above-mentioned period until the end of landsturm service.

The landsturm is under obligation, according to Article II. section 23, of the law of February 11, 1888, to take part in the defense of the country in case of war. In extraordinary cases it may be called to complete the army and navy.

(f) **ONE-YEAR VOLUNTEERS.**—According to article 11 of the law on military service, educated young men, who furnish their own clothing, equipment, and subsistence, and who have given proof of knowledge obtained according to regulations, may be entered into the reserve after one year's service. They may, according to capacities and qualifications, be proposed for posts of reserve and landwehr officers. The officers of the reserve may, throughout the duration of their service in the reserve, be called to four to eight weeks'

exercises three times. The officers of the landwehr are called only to the line exercises of their troops and to exercises necessary for promotion examinations. In time of war officers of the landwehr may be appointed to the regular army in case of need.

With regard to the effective peace strength of the German army, it has developed gradually, so that from October 1, 1899, the effective strength of the enlisted men (with the exception of the one-year volunteers) will gradually be increased so as to reach 495,500 men in 1903, and this number will be kept up until March 31, 1904. According to statistical reports for 1900, the effective strength for that year is the following:

Effective strength of the German army.

Officers	28,850
Noncommissioned officers.....	80,556
Enlisted men	491,136
Surgeons and officials.....	4,974
One-year volunteers.....	10,000
	<hr/>
Total.....	610,516
	<hr/>
Horses	102,929
Guns drawn by horses.....	2,822
Ammunition wagons drawn by horses	71

Effective strength of the German navy.

(Officers, surgeons, and paymasters.....	1,458
Aspirants to naval officers.....	425
Warrant officers, noncommissioned officers, sailors, cabin boys, etc	26,448
	<hr/>
Total	28,326
	<hr/>
War ships.....	97

The combined strength of the army and navy for 1900 amounts to 638,842 men, about 1.14 per cent of the whole population of 56,000,000.

It must be remarked that all mobilization affairs are kept, in Germany, in the strictest secrecy. The information given by authors must consequently be accepted with great discrimination.

Information is given in the reports of the war administration with regard to the effective strength of the neighboring

states. Thus in the report of 1892-93 on the project of a law, the effective strength of France and Russia is calculated by means of multiplying the annual number of recruits by the number of the service years and by deducting therefrom 25 per cent for various losses during the year. The quota of recruits for France was given at 230,000 men for 1890. Thus the number of trained men according to twenty-five years, that is, the number of service years according to law of July 15, 1889, amounted for the end of 1914 to 4,053,000 men. This is an effective strength which does not yet exist. However, a sharp-sighted administration must take account of such circumstances because the time of its reaching that point is relatively not so far away.

Moreover, this calculation has been made without taking into consideration the increase of the men capable of carrying arms as based upon the increase of the population.

(This, however, if things remain as they are, could not refer to France.)

The above-mentioned method of calculation may also be applied to Germany. According to statistical data for 1900, page 175, table 5, of "Die Herkunft und Schulbildung der im Ersatzjahr 1898 eingestellten Rekruten," their number amounts to 252,464.

Adding to these 252,464 men the 8,000 one-year volunteers of the North-German land army, we get a yearly contingent of 260,500 men.

According to this, within twenty-five years (seven years in the standing army, twelve years in the landwehr, and six years in the landsturm), that is, toward the end of 1922, the number of trained men for Germany will amount to—

$$\begin{array}{r} 25 \times 260,500 = 6,512,500 \\ - 25 \text{ per cent for losses} = 1,628,125 \end{array}$$

There remain, in round numbers, 4,884,000 men.

To this enormous mass of trained German fighters must be added new masses of "ersatz" reserves and persons who have been assigned to the first ban of the landsturm (less fit). There must be counted, moreover, three years of the landsturm (17, 18, and 19 year old men), as the landsturm consists of all men capable of carrying arms, beginning with 17 years and ending with 45 years of age, and who belong neither to the army nor the fleet. Taking as a basis the figures of

the year 1898, without calculating the increase of the population, we obtain, according to the above-mentioned report for 1900 :

(a) "ERSATZ" RESERVES (FIT FOR SERVICE IN THE FUTURE).—In 1898 there were in the "ersatz" reserve 87,700 men.

After twelve years' service in the "ersatz" reserve, those who are trained are incorporated in the second ban of the landwehr and the remainder into the first ban of the landsturm. Their total duration of service ends as that of the other men with their completed forty-fifth year of age, and lasts, consequently, twenty-five years.

In these twenty-five years are comprised :

$$\begin{aligned} 25 \times 87,700 &= 2,192,500 \\ - 25 \text{ per cent for losses} &= \underline{548,125} \end{aligned}$$

There remain, in round numbers, 1,644,000

(b) FIRST BAN OF THE LANDSTURM (LESS FIT).—According to the statistics for 1898 the number for this year amounts to 110,000 men.

With obligatory service of twenty-five years, there will be at the end of that period :

$$\begin{aligned} 25 \times 110,000 &= 2,750,000 \\ - 25 \text{ per cent for losses} &= \underline{687,500} \end{aligned}$$

There remain, in round numbers, 2,062,000

(c) LANDSTURM MEN OF THE FIRST THREE YEARS.—Their number can be given only approximately and indirectly.

According to the Statistical Annual for the German empire for 1900, page 3, the male population was fixed on December 1, 1890, at :

Between the ages of 18 and 20	870,869
Between the ages of 20 and 21	450,084
Total	<u>1,320,903</u>

The total population of Germany amounted to 49,000,000 in 1890, and has increased to 54,000,000 in 1898, that is, 10 per cent. It is, consequently, permissible to increase the above-mentioned number of 1,320,903 by 10 per cent, and we obtain for the year 1898: $1,320,903 + 130,090 = 1,450,993$.

Their increase can not be calculated from 1898 to 1922 by years, as for the "ersatz" reserves and those forming the first ban of the landsturm. They fall under the law of the general increase of the population. Since the population of Germany

amounted in 1900 to 56,000,000, the increase lately, if further development is not impaired some way or other, shows that the population increases in ten years by 9,000,000, and Germany would have thus in 1922 a population of 76,000,000. This would show between the years 1898 and 1922 an increase of from 76,000,000 - 54,000,000 = 22,000,000, or 41 per cent. Consequently the men liable to military service in the land-sturm for the three first years will be subject likewise to an increase of 41 per cent, and in twenty-five years, that is, in 1922, amount to:

	1,452,998 + 595,780 = 2,048,778
To be deducted:	
Undiscovered ones, such as have remained away without excuse, such as have been excluded, and those mustered out, 16 per cent in round numbers	327,795
Those who have voluntarily entered the army before reaching the regulation age (number of the one-and-more year volunteers almost doubled since 1898)	66,000
Total to be deducted.....	393,795
Total remaining.....	1,655,000

The three posts of (a), (b), and (c) give: (a) 1,644,000, (b) 2,062,000, (c) 1,655,000, a total of 5,361,000 of partly trained, for the greater part entirely untrained, but mostly very fit men who form a powerful source of supply for the defense of the country.

Adding to these the completely trained contingents, there will be 4,884,000 completely trained, and 5,361,000 for the greater part untrained men, a total of 10,245,000 men available for Germany at the end of 1922 in case of war. This amount makes up 13.5 per cent of the total population calculated for 1922 of 76,000,000, and 27 per cent of the 38,000,000 of male population approximately calculated for that year. For the population of 1900 of 56,000,000 in round numbers, among them 27,500,000 of male population, this would make 18 per cent and 37 per cent.

With regard to the officers, their need will be quite extraordinary at the time of mobilization.

According to Von Löbell's Reports, XXIV Year, Part 1st, Berlin, 1899, page 41, the extra number of officers was calculated for 1874 at 12,000, and this number has greatly increased since.

Only a comparatively small number may be covered by calling to active service officers at the disposal of the government (zur disposition) and of those on the retired list. The remaining posts are filled by officers on furlough (beurlaubtenstand)—reserve and landwehr officers. These officers are mostly taken from the one-year volunteers and other men who leave active service with qualifications of reserve officers and enter the furloughed class (beurlaubtenstand).

In order to get an idea of the number of officers, health officers, and officials necessary, the following may be taken into consideration.

The number of officers, surgeons, and officials on peace footing for 1900 amounted to:

Land army	28,824
Marine	1,883
Total	<u>30,707</u>

The budgetary strength for enlisted men on peace footing (including the one-year volunteers) was in 1900:

Land army	581,692
Navy	26,443
Total	<u>608,135</u>

Thus, in round numbers, there are 20 men falling to each officer, surgeon, etc.

According to the publication of the military historical division of the great general staff, Berlin, 1874, Appendix 197, page 865, "The German-French war, 1870-71," the combined strength of the German officers, surgeons, and officials amounted to:

(a) Such as had passed the French frontier	88,101
(b) Such as belonged to the army and remained at home	9,319
Total	<u>42,420</u>

Thus, in round numbers, there were 35 men falling to each officer, surgeon, etc.

Should this number likewise be adopted for the future wars, there would be necessary: (a) For the trained enlisted men, $4,884,000 \div 35 =$ in round numbers 139,000 officers, surgeons, etc.; (b) for the whole possible contingent, $10,245,000 \div 35 =$ in round numbers 293,000 officers, surgeons, etc.

According to the latest rolls the number of officers, surgeons, etc., in the German reserve and landwehr, in round numbers, amounts to 37,400 (army and navy).

Adding to these the above-mentioned number of officers on active duty of 30,707 we get, in round numbers, 68,000 officers, surgeons, and officials.

**FUNDAMENTAL FIGURES AND COMPUTATION OF THE COST OF A FUTURE WAR
PER DAY, PER MONTH, AND PER YEAR.**

The following elements are to be considered for a future war:

- (a) The effective strength of the armed forces.
- (b) The first cost of mobilization.
- (c) The means for actual warfare.
- (d) The payment of war damages and military operations.
- (e) The assistance of families of men who have entered the service.

The ordinary cost of war, as computed according to data of the Franco-Prussian war, amounts to 6,330,000 marks per day, or 5 marks per man per day.

Further figures of 2,700,000,000 marks = 11,000,000 marks daily in round numbers and of 8.80 marks per man include all cost of warfare.

All these figures are taken from the Franco-Prussian war.

For the computation of the prospective cost of a future war the figures of ordinary war expenditure seem too small and those of the total expenditure too high.

At the breaking out of war the law of June 13, 1873, and that of February 28, 1888, with regard to the aid of families of the men entering the service, come into force.

To the ordinary war expenditure of Germany during the Franco-Prussian war should be added the numbers given by Wagner for reserve and landwehr, the payment of war damages and military operations, as far as these are not included in the military expenditure proper, thus obtaining 14,800,000 thalers in round numbers, or 44,400,000 marks.

To this should be added natural requisitions in France until the conclusion of peace to the amount of 150,000,000 marks. as it can not be calculated if, and how, the German troops will be able to live on the enemy in a future war. All other elements can not be determined in advance and are not

available at the breaking out of war. It should be considered according to this:

	Marks.
Ordinary war expenditure	1, 551, 000, 000
Additional expenditure	44, 400, 000
War requisitions in the hostile country	150, 000, 000
Total	1, 745, 400, 000

According to this the total expenditure per day amounts to 7,120,000 marks or 5.70 marks per man per day.

Adding to this for unforeseen expenditure 0.30 mark per day, a daily expenditure of 375,000 marks, the daily expenditure per man will amount to 6 marks.

As the above-mentioned figures, prove the German empire can assemble with the colors (in 1922) in case of a future war:

Completely trained men	4, 884, 000
Mostly untraine men	5, 361, 000
Total	10, 245, 000

there arises the question if Germany will ever have to mobilize these important figures.

Will it be possible to train these masses for war, to provide them with commanders, to systematically divide them among the units, to transport, to lead them, and to furnish them with the necessary means of subsistence, etc.?

These are questions which can be only partly answered and determined.

One thing is certain, and that is, that the Germans have to be prepared to wage war against two opposite fronts and that they will have to count upon their own forces only. Should this happen it would be necessary that all those who can carry arms should hasten to the colors; for as it is quite improbable that the whole force should be at once required, yet the empire ought, as soon as possible, to create as large a source of supply as could be formed, for new formations as well as for the completion of those drawn in the beginning and which will have suffered losses.

It must not be forgotten that several weeks at least will be needed for a most superficial training.

During this relatively short period, as shown by the experiences of the campaign of 1870-71, large operations will be already in full swing.

At any rate it will not be possible to avoid a simultaneous call to arms of all available masses. Financial considerations

would have to be immediately considered. Thus, in a future war, there would arise for Germany the necessity of disbursing:

$$\begin{aligned} 6 \times 10,245,000 &= 61,500,000 \text{ marks per day.} \\ 30 \times 61,500,000 &= 1,845,000,000 \text{ marks per month.} \\ 12 \times 1,845,000,000 &= 22,000,000,000 \text{ marks per year.} \end{aligned}$$

It is not possible to foresee how long the need of such expenditure will last.

The general opinion is that continental European wars can not be of long duration. It is supposed that the modern civilized nations will not be able to bear for a long period the cost of modern war operations.—*Die finanzielle Mobilmachung der deutschen Wehrkraft.* By Col. Joseph von Renauld. Leipzig 1901.

NEW FORMATIONS IN THE ARMY.

There will be created in Prussia for October 1, 1902:

1. Seven sections of machine guns: One guard, attached to the rifles' battalion (Schützen); two in the first corps, attached to the forty-fourth and one hundred and forty-sixth infantry regiments; one in the third corps, attached to the third battalion of chasseurs; two in the fourteenth corps, attached to the fourteenth and eighth battalions of chasseurs. The twelve sections belonging to the Prussian army will be distributed as follows: Two to the guard, three to the first corps, one to the third, one to the sixth, two to the fourteenth, two to the fifteenth, and one to the seventeenth. The personnel of the five sections which existed formerly has been increased and brought to the same strength as that of the newly created sections: 1 captain, 3 lieutenants or second lieutenants, 12 noncommissioned officers, 1 a farrier and 1 an armorer, 1 bugler, and 63 privates, including 1 workman, 1 noncommissioned officer or reenlisted man of the sanitary corps, 54 horses, including 18 saddle horses, 3 of which are for the lieutenants or second lieutenants. Each section comprises 6 machine guns, 2 caissons, 1 baggage wagon, drawn by 4 horses each.

2. Six companies of foot artillery grouped by twos under the orders of a field officer and attached to the foot artillery regiments Nos. 1, 11, and 8. These groups will be garrisoned at Feste, Boyen, Marienburg, and Thionville, and the company

of foot artillery of the eighth regiment, stationed in the latter, will go to Metz.

In Saxony:

One squadron of mounted chasseurs (meldereiters), attached to the nineteenth corps; the number of such squadrons for Germany has been increased to 17.

The law, March 25, 1899, completed its execution by the creation of this squadron.

In Bavaria:

A section of machine guns, almost of the same composition as that of the Prussian, attached to the first battalion of infantry. It is projected to create two new sections in 1903 for the purpose of attaching one to each of the three Bavarian army corps.—*Bulletin de la Presse et de la Bibliographie Militaire*, September 30, 1902.

THE MAUSER AUTOMATIC PISTOL.

Professors Crauz and Koch, of the technical high school at Stuttgart, have recently been making exhaustive experiments, by the aid of photography, into the behavior of the Mauser automatic pistol during the action of firing. No fewer than fourteen separate photographs were taken in the time elapsing between the fall of the hammer and the arrival of the projectile at a point 78 inches in advance of the muzzle, and from these photographs the learned professors have obtained data which may prove of some assistance to designers of automatic arms. It was discovered that at the moment when the base of the bullet was clear of the muzzle there was an escape of powder gas at the rear end of the barrel. This could not arise from the opening of the breechblock, since at that moment the recoil of barrel and breech backwards was only 0.033 inch, whereas the unlocking of barrel and breechblock does not take place until they have recoiled about 0.1875 inch. It would, in fact, be due to incomplete obturation, and would not necessarily be dangerous or practically detrimental to the ballistics of the weapon. The muzzle velocity of the Mauser is 1,400 f. s., and these photographs demonstrated that the backward motion of the breechblock in recoil is about 19.7 f. s., the entire distance traveled being about $2\frac{1}{4}$ inches, of which all but the first $\frac{3}{16}$ inch is made

after the separation of barrel and breech. The return movement is at the rate of 7.5 f. s. until the breechblock encounters the new cartridge, when it, of course, diminishes in rapid gradation. It was found that the actual time elapsing from the beginning of the recoil until the breechblock was at rest again, ready for the second shot, was only from 0.46 to 0.69 of a second, altogether beyond the utmost capabilities of a marksman to respond with a triggerpull. In addition to showing the behavior of the pistol, these photographs revealed some phenomena which took place after the bullet left the muzzle. Among others, there was an escape of powder gases past the bullet before it filled the grooves of the rifling, and the photographs further showed that after leaving the pistol the bullet was overtaken and surrounded by the powder gases until it had traveled 15 inches. This phenomenon is already well known, and was reported on several years ago. Other data with regard to the ejecta, in the shape of unconsumed powder, were also to be gleaned from the experiments, which seem to have been of a most painstaking and interesting nature.—*Arms and Explosives, October, 1902.*

GREAT BRITAIN.

REORGANIZATION OF THE BRITISH ARMY.

[COMPILED BY MAJ. E. A. EDWARDS, TWENTY-THIRD INFANTRY.]

Activity and progress in every branch of the British military service has been the rule during the year 1902, in carrying out plans for army reform outlined by Mr. Brodrick in 1901.

ARMY CORPS.

An elaborate special order issued March 4, 1902, designed to give effect to the army corps scheme, deals with the area of commands, the distribution of the troops, numbers and duties of staff and departmental officers, and the relations between army headquarters and general officers exercising command. A revision of the order relating to methods of administration, defining more clearly the duties of all concerned, was approved by the secretary of state for war in October, 1902.

The order fulfills the promise of reform made by Mr. Brodrick in 1901, in the matter of decentralization, by giving a

larger measure of authority to the corps commanders on points connected with military discipline and financial expenditures in their respective commands.

The army corps system is now firmly established and is regarded as the bed rock of the army scheme. Barracks are being built and training grounds obtained in every district. They have also the commanders, the troops, including the various proportions of the auxiliary forces, stores, transportation, etc., for each district.

The commanders of the first, second, and third corps have been designated and a system of staff administration arranged. The first three corps will each have two colonels on the staff, a director of supplies, and a director of transport, respectively, while in the fourth, fifth, and sixth corps one colonel on the staff, called the director of supply and transport, will supervise the duties of both branches. These officers will be stationed at the headquarters of the corps, will take instructions from the chief of staff in each corps, will be the advisers of the commanding general, and the medium of communication on matters relating to supply, transport, and barrack service, within the army corps area.

The active administration of the duties of supply, transport, and barrack services in the different districts of the army corps territory will be carried on by the officer commanding the army service corps, who will be responsible that the regulations are strictly complied with. In local matters he will be the adviser of the commanding general, the medium of communication on matters relating to his department, and will also command the personnel of the army service corps within the district. Senior officers of the army service corps have been selected to perform these duties in the different corps.

The first army corps, which is intended to be composed of troops mobilized for immediate service, with headquarters at Aldershot, consists of three infantry divisions, a brigade of cavalry and certain corps troops. The divisions are made up of two brigades of infantry, each of four battalions of eight companies, and the following divisional troops: a squadron of cavalry, two brigade divisions of artillery, an ammunition column, a field company of engineers, a company of the army service corps, and a field hospital.

The cavalry brigade will be composed of three cavalry regiments, a battery of horse artillery, an ammunition column, a field troop of engineers, a company of army service corps, a bearer company, and a field hospital.

The corps troops will be a regiment of cavalry, a brigade division each of horse and field artillery, a field company of engineers, field park, telegraph, pontoon, balloon and railway units, a battalion of foot guards, army service corps supply column, field bakery, etc., and a field hospital.

The second army corps, with headquarters at Salisbury Plain, has had assigned to it for duty the various general staff officers, aids, and officers of the supply and transport departments, and a corps order recently issued shows the artillery, engineer, and army service corps units duly posted to brigades, divisions, etc.

In the southern (Salisbury) command, consisting of the second army corps and the second cavalry brigade, are included the fortresses of Portsmouth, Plymouth, Portland, Milford Haven, and Dover, and the defended ports of Falmouth, the Scilly Isles, Newhaven, Bristol, Cardiff, and Swansea.

The third army corps, with headquarters at Dublin, consists of the troops stationed in Ireland. The only fort is at Cork—Berehaven, Lough Swilly, Belfast, and Dublin being defended ports.

The formation of the fourth, fifth, and sixth army corps under the new organization will be commenced on January 1, 1903.

To the eastern command, the fourth army corps and the household cavalry brigade are allotted. The Thames and Medway approaches are classed as fortresses. The defenses of London have recently been strengthened by the mounting of several new batteries on elevated positions commanding the principal roads between London and the south coast, and an expenditure of £5,000 has been authorized for the construction of a mobilization center at Woldingham, Surrey, as a part of the scheme of defense.

The headquarters of the fourth army corps, originally fixed at Colchester, has been changed to London, as being more central, and the *London Times* of December 28, 1901, states that it will consist of 1,500 officers, 35,304 noncommissioned officers and men, 11,863 horses, and 90 guns. These will be

made up approximately of the following: Staff and departments of all ranks, 4,296 men and 2,462 horses; 21 battalions of infantry, 23,037 of all ranks, 1,218 horses; 6 regiments of cavalry, 3,918 men and 3,690 horses; artillery, 3,992 men, with 3,651 horses and 90 guns; engineers, including pontoon train and telegraph troops, 1,262 men, 582 horses; four troops of military police, 300 men, 260 horses. The headquarters will be at the new barracks to be erected near the houses of parliament, to be called St. Stephen's barracks.

At first it was intended to station 7,000 of the above-mentioned troops at Woolwich, but later, on the advice of Lord Roberts, it was decided to continue Woolwich as a separate military command on account of its exceptional facilities and accommodations.

The northern command consists of the fifth army corps and the fourth cavalry brigade, with the Mersey, Tyne, Sunderland, Tee and Hartlepool, and the Humber as defended ports.

The sixth army corps makes up the Scottish command with the Forth, Tay, Aberdeen, and the Clyde as defended ports.

TRAINING.

The government has recently acquired a tract of country in Teviotdale, Roxburyshire, in Scotland, which will make, with proposed additions, a total of 25,000 acres, to be used as a military training ground like those at Aldershot, Salisbury Plain, and the Curragh in Ireland.

The importance of musketry instruction has been most strongly insisted on by the military authorities. The commander in chief in September, 1902, published a long special order on the subject giving the course of instruction to be followed. He dwells therein upon the importance of officers becoming experts in the use of the rifle, enjoins upon all the most painstaking and conscientious effort in the instruction of the troops, and states that general officers commanding will be held personally responsible for the exercise of every endeavor to stimulate the interest of officers in the attainment of a standard of the highest efficiency by the troops.

At the Hythe school of musketry a special course of instruction, lasting from November 26 to December 23, 1902, was established for the benefit of officers and noncommissioned officers of the regular forces lately returned from South Africa.

A new drill book—Infantry Training, 1902—has been adopted, and in a note to the preface it is ordered that no books or pamphlets in explanation or amplification of the new regulations are to be used. Drills and field training were sedulously pursued during the year whenever practicable, the prescribed object in the field training being mainly to develop initiative and resource in the junior ranks of officers, and among non-commissioned officers and men, to call into play the personal interest of the private soldier in his own fighting efficiency, so that in emergencies he may be accustomed to use his wits and act upon his own judgment, and be able, on necessity, to cope with troops trained to rely on collective discipline and individual intelligence.

Cyclists are trained in cavalry, artillery, and infantry units for duty as orderlies in peace times at home and abroad, and machines are furnished by the government for their use. The question of training British soldiers for railway duty in India, engine drivers, firemen, etc., has been considered by a committee, which recommends the formation of such corps in the British army in India.

TERM OF SERVICE AND RATE OF PAY.

The reduction of the term of service with the colors is declared by Mr. Brodrick to be the greatest change that has taken place since the days of Mr. Cardwell. Prior to April 1, 1902, enlistments in the line of the English army were generally for twelve years, seven with the colors and five in the reserve. In practice, however, any deserving soldier might, if circumstances permitted, pass into the reserve after five years' service, and there were many other provisions modifying the length of service with the colors and with the reserve.

In March of 1902 a royal warrant issued and was promulgated in a special order providing that from April 1, 1902, enlistments for cavalry, artillery, and infantry of the line, and for other specified branches of the service, should be for a period of three years with the colors and nine years in the reserve, with the option for noncommissioned officers and men of good character of extending their color service to eight years. The inducement to extend their color service consists of an increase in pay of 6d. a day after April 1, 1904, for all noncommissioned officers and soldiers of good character enlisted for more than three years' color service, or who have

been permitted to extend their service, who have served for two years with the colors, and are efficient in the duties of their arm of service, including in the infantry such standard of musketry instruction as may be prescribed. These men are of Class I. Other men who are permitted to extend their color service but are not up to the required standard of efficiency are of Class II and receive 4d. a day increase. A man of Class I who fails to maintain his efficiency is relegated to Class II until he regains the required standard. The failure to reach the prescribed standard in musketry in any year will entail a reduction for twelve months. In both classes, after five years' service, an additional 1d. a day is given to those having good-conduct badges. This is stopped or restored as men lose or regain their good-conduct rating. After April 1, 1904, the increase for good-conduct rating will be discontinued, but a reduction of 1d. a day will be made if it be lost.

An immediate increase of 2d. a day is allowed from April 1, 1902, to all men who have passed the recruiting drill and are certified to be 19 years of age. This is intended to make good the average stoppages for maintenance of kit, washing, haircutting, etc., and to give them 1 shilling a day clear.

MEDICAL CORPS.

The medical department of the British army has been reorganized and given such increase of rank and pay that, as stated by Mr. Brodrick, instead of as heretofore having but one candidate for two vacancies, there are now two or three candidates for one vacancy.

Instructions published in March, 1902, provide that medical officers duly qualified shall be eligible for promotion to captain after three and one-half years' service, and to the rank of major after twelve years' service. Promotion to the rank of lieutenant colonel is by selection from officers who have served at least twenty years, but this time may be reduced in the case of an officer who passed his examination for promotion to a majority with distinction. Promotion to colonel, and to surgeon general with the rank of major general, is by selection from the next lower grade. The surgeon general holding the appointment of director general at army headquarters ranks as lieutenant general and has an annual salary of £2,000.

About the same time the army nursing service was reorganized as the "Queen Alexandra's imperial military nursing

service." Appointments therein of duly qualified persons are made by the secretary of state for war. It comprises for 1902-03 a matron in chief, 2 principal matrons, 27 matrons, 50 sisters, and 150 nurses.

VARIOUS.

In the debates in parliament on army reform, stress was laid on the necessity for the improvement of the service conditions of the enlisted force, in order to attract a better class of recruits to the army.

Among measures to this end may be mentioned that the quarters of married men in barracks will be plainly but comfortably furnished at public expense, so as to minimize the inconvenience incident to changes of station. The Inkerman barracks at Woking, in Surrey, have been altered and arranged on the cubicle system, which system will be generally adopted if found to be satisfactory, and reported on favorably by the regiment occupying the barracks.

An army order dated September 1, 1902, abolishes all roll calls, except at reveille, and when specially ordered for recruits, boys, defaulters, etc. Men will be warned for all duties by daily orders posted in a suitable place in the quarters of each unit, the men being held responsible that they make themselves acquainted with all orders affecting them. Kit inspections for trained men and recruits will be held only when commanding officers consider them necessary. Inspections of barracks, stables, etc., will not, except in case of necessity, be held on Sunday, and parades will as far as possible be avoided on that day.

Guard duty is the hardest duty a soldier is required to perform in time of peace, and is especially trying for young soldiers of from 18 to 20, of which the British army at home has a large number. The order above referred to directs that a system of police shall, wherever possible, replace garrison and regimental guards, which will be mounted only when specially ordered by the commanding officer of the station or camp. It also permits men to smoke in the streets when not on duty.

A recent memorandum from the commander in chief calls attention to the necessity of officers using the power given them in the king's regulations to keep the ranks free from worthless characters who deter respectable young men from

joining, bring disrepute on the service, and cause a waste of public money.

AUXILIARY FORCES.

The volunteer infantry has been rebrigaded, so as to make the brigades of more uniform strength, and as a rule to be formed from troops of the same regimental district. About 216 battalions are formed into 46 brigades. The volunteers' regulations have been revised with a view to securing greater efficiency as soldiers of enrolled members. Efficiency is measured by attendance at prescribed camps, inspections, parades and drills, by which a capitation allowance from the state is earned. This constitutes a fund from which the expenses of maintenance are paid.

As a spur to the gaining and maintenance of efficiency, the whole or any part of the capitation allowance may be withheld in the discretion of the secretary of state for war when any organization has been insufficiently trained in any year.

Instruction and training is the same as for the army and is prescribed by the military authorities, the standard of musketry instruction not being as high as for the regular forces. In field training, the new volunteer regulations, to determine efficiency, lay the greatest stress on the attendance of organized units at camps and battalion drills, and on that of individuals at the annual inspections.

A special-service section is composed of men who engage to serve in case of emergency when called on by the secretary of war, in such fortress or district as may be specified, for a period not exceeding one month. Additional grants are made for such service partly to the corps and partly to the man, who receives, while on special service, the pay and allowances of the corresponding rank in the regular army, besides a substantial gratuity on reporting for duty.

Designations and titles in militia and volunteers have, in many cases, been assimilated to those of the army; thus the militia field artillery is to be known as the royal field artillery (militia), militia artillery and volunteer artillery as royal garrison artillery (militia), and royal garrison artillery (volunteers), respectively. The militia and volunteer medical staff corps are now designated as royal army medical corps, militia, or volunteers.

In the war office the division of military intelligence has been greatly strengthened. The chief is now in the inner

circle of the office and practically discharges many of the duties performed by the chief of staff in foreign armies.

Instruction and training in the auxiliary services of militia, volunteers, and yeomanry are carefully arranged for by the military authorities. About 27,000 volunteers were encamped at Aldershot during the summer of 1902, that being only one of a number of training grounds. Each year militia officers are encouraged to serve with line regiments to get the benefit of the training and to give additional officers to the line regiments at these periods.

Mr. Brodrick is authority for the statement that the average annual cost of a private in the army (presumably at home) is approximately as follows: Infantry of line, £52 6s. 4d.; cavalry of line, £58 16s. 9d.; militia (infantry), £18 12s. 6d.; imperial yeomanry, £19 13s. 6d.; volunteers, £6. The cost of infantry and cavalry, respectively, after April 1, 1904, when the increased pay takes effect, will be £59 6s. 1d. and £65 16s. 6d.

DEMOBILIZATION OF THE ARMY.

A special army order was issued from the British war office on June 25, 1902, directing the demobilization as soon as practicable after June 30, 1902, of all soldiers serving at home who had completed their first period of service with the colors, except reservists or time-expired men of cavalry and drivers of the army service corps. Soldiers not entitled to furlough to be at once transferred to the reserve, those entitled to furlough, or to a furlough gratuity, to be passed to the reserve on the expiration of their furloughs, or of the periods covered by the gratuity.

All soldiers serving at home, on original enlistments or as mobilized reservists, in their thirteenth year of service (seventeenth year in case of men mobilized from Section D), who have not reengaged, will be discharged as soon as practicable after June 30, 1902. Reengaged men in twenty-second year of service who have not given notice to continue in service will be similarly treated.

Men already on furlough will be notified to report at the nearest military station for medical examination and preparation of the necessary papers for their transfer or retransfer to the reserve.

The same action will be taken in the cases of soldiers not now in the foregoing categories as soon as they fulfill the above conditions.

Soldiers serving abroad, who fulfill the conditions above noted, will be similarly disposed of on their return to England, subject to the provisions of the regulations for demobilization.

The following table from the *Montreal Gazette* of October 2, 1902, shows the forces in or sent to South Africa, from August, 1899, when war began to threaten, till May 31, 1902, when peace was signed :

Garrison on August 1, 1899	9,940
Sent from United Kingdom:	
Regulars	228,171
Militia	45,566
Yeomanry	35,520
Scottish horse	833
Volunteers	19,856
South African Constabulary	7,287
Total from United Kingdom	<u>337,183</u>
From India:	
Regulars	18,229
Volunteers	803
Total from India	<u>18,534</u>
From the colonies:	
Contingents	29,090
South African Constabulary, Canada	1,288
Total from colonies	<u>30,828</u>
Raised in South Africa	52,414
Grand total	<u>448,399</u>

DISTRIBUTION OF THE ARMY IN SOUTH AFRICA.

Lieutenant General the Hon. Sir Neville Lyttelton, commanding in South Africa, has sent home particulars of the distribution of the forces which have been told off to form the garrison of the four colonies, as decided upon for present requirements.

It is proposed that Ladysmith should be abandoned as a large military station for Natal, and Newcastle substituted. Under the scheme drawn up by the local authorities the principal military centers will be Bloemfontein, Pretoria, Potchefstroom, Standerton, and Newcastle. At each of these

places a regiment of cavalry, units of royal artillery, and a brigade of infantry will be stationed until further orders.

Another important post is Middleburg, Transvaal, held by 1 regiment of cavalry, 1 battery of field artillery, and 2 battalions of infantry. The other places in the Transvaal chosen for military posts, with their garrisons, are:

Krugersdorp (held by 1 regiment of cavalry, 1 battery of horse artillery, and 1 battalion of infantry).

Lydenburg (1 battalion of infantry).

Machadodorp (1 battalion of infantry).

Barberton (1 battalion of infantry).

Pietersburg (1 battalion of infantry).

Johannesburg (1 battalion of infantry).

Garrisons of Orange River Colony and Natal:

Kroonstad (1 regiment of cavalry, and 2 battalions of infantry).

Harrismith (1 regiment of cavalry, 1 battery of field artillery, and 2 battalions of infantry).

Ladybrand (1 battalion of infantry).

Middleburg (1 regiment of cavalry, 3 batteries of field artillery, and 1 battalion of infantry).

Stellenbosch (1 regiment of cavalry and 1 battery of field artillery).

Naaupoort (2 battalions of infantry).

Burgersdorp (1 battalion of infantry).

Wynberg (1 battalion of infantry).

Mafeking (1 battalion of infantry).

Maritzburg (1 battalion of infantry).

Modder River (1 battery of field artillery and 1 battalion of infantry).

It is hoped eventually to do away with many of the smaller stations, but there is no immediate prospect of any considerable reduction of the forces now at Sir Neville Lyttelton's disposal.—*United Service Gazette, December 27, 1902.*

TARGET PRACTICE.

The following is an extract from a special army order by Lord Roberts, dated war office, September 19, 1902:

MUSKETRY TRAINING.

Considerable as has been the improvement in the shooting of the army during the last few years, our experience in South Africa has brought

come to us the fact that our soldiers can not as yet take the fullest advantage of the admirable weapon which has been placed in their hands, or use it with that skill and precision which are so essential to success in war.

While I deeply regret that this should be the case, I am not surprised, for I know from many years' anxious watching over the progress of rifle shooting in our army how comparatively few officers take any real interest in this—by far the most important part of the soldiers' training, particularly to those who belong to the cavalry and infantry branches of the service. Too frequently the musketry course is still looked upon as a somewhat irksome business which has to be got through as quickly as possible, and sufficient consideration is seldom given as to whether the results achieved are satisfactory or not.

Success or failure in rifle shooting depends entirely upon the officers, and I now most earnestly desire to impress upon them the imperative necessity for their becoming experts in the use of the rifle themselves, and for assisting me in carrying out a far more complete and finished system of instruction than exists at present.

As a first step in this direction it is essential that young soldiers should be more carefully prepared to profit by the lessons of the rifle range, and that they may be able so to profit they must be taught everything which concerns the rifle, and how to handle it with ease and confidence before they are introduced to the ranges.

As an aid to musketry training, the following points should be carefully considered and given effect to:

1. **INSTRUCTION.**—The value of the instruction imparted to the men is entirely dependent on the ability of the officers to teach, and on the zeal with which they enter on a task which demands careful preparation, patience, and energy.

I expect, therefore, that all officers will do their best to become competent instructors, and that commanding officers will assure themselves of the fitness of their officers to teach, by watching them when at work with their noncommissioned officers and men, and will impress on them that keenness in musketry, and good results, will be the first claim for advancement.

In the same way subordinate officers will be held responsible that the noncommissioned officers under their command are capable instructors, and will not recommend any for promotion whom they do not consider as such. It is to be borne in mind that, after the first broad principles of instruction have been communicated, nothing but constant practice in teaching can make the perfect instructor; all noncommissioned officers should therefore be frequently practiced as instructors, and the plan of depending upon a few of the most capable, which is detrimental to the rest of the noncommissioned officers of the battalion, should be discontinued.

2. **ELEMENTARY TRAINING OF RECRUITS.**—I consider it essential to every man's efficiency as a soldier that his elementary education as a recruit should be conducted with the greatest patience, sympathy, and judgment, and that it should be of the most thorough and finished description. I regard the present short period of recruit training in musketry as insufficient, and I direct that a system of training be established which will

insure that no recruit is pronounced qualified until he has acquired a thorough knowledge of musketry, and can handle his rifle with skill and confidence under all conditions and in all positions.

The recruit's training in musketry should commence 14 days after his arrival at the depot, and should be continued daily until he leaves to join his corps. During this time the instruction will be limited to care of arms, aiming, and the firing exercises.

When recruits join their corps daily instruction will be at once resumed.

The following will be the course:

- (a) Care of arms.
- (b) Instruction in aiming.
- (c) The firing exercises, both in drill order and field-service order—
one exercise at least to be performed daily.
- (d) Instruction and practice in judging distance. A short exercise daily.
- (e) Instruction in firing from behind cover and in snap shooting.
- (f) Instruction in the theory, powers, and mechanism of the rifle and its ammunition.
- (g) A course of lectures and examinations on the whole of the above subjects.

N. B.—Squads are not to consist of more than ten men, but eight would be better.

8. ELEMENTARY INSTRUCTION OF TRAINED SOLDIERS.—When a proper system of recruit training is established, the soldier may be expected to be so expert with his rifle that repetition of elementary lessons will seldom be necessary. As yet this has not been achieved, and until it has been, all soldiers now in the ranks must be exercised as frequently as possible in the same course as that laid down for the recruit.

4. RANGE PRACTICES.—The sole object of the range practices is to produce good marksmen, and this can not be arrived at hurriedly, or without due deliberation. The aim should not be to expend a certain quantity of ammunition, but to make every shot fired a practical lesson; this can only be done by careful marking of each shot, and explaining to the men the causes of failure. In cases, therefore, where time has to be considered, it will be better to do a part of the course thoroughly, than to try and get through the whole in a hurried and perfunctory manner. In such cases general officers commanding will sanction the omission of shooting at the longer ranges when they consider that the whole course can not be advantageously carried out.

Exercise with blank ammunition, miniature cartridges, or merely "snapping," on the lines of the rapid magazine and snap-shooting practices of the regulation course, should be frequently practiced in quarters throughout the year. It is by snap shooting at short ranges that battles in the future will probably be decided, and the few rounds which can be fired on the rifle range are not sufficient to enable a soldier to attain that high standard of shooting which will henceforth be needed.

5. AUXILIARY FORCES.—These instructions apply to the auxiliary forces so far as it may be possible to carry them out under the different conditions of service. Officers commanding regimental districts must at once take up the question as to how they can be applied. They must in the

first instance especially concern themselves with the training of the permanent staff, and must satisfy themselves that they are kept up to a high standard of instructional ability under the direction of adjutants of auxiliary forces, of whose qualifications they must make themselves cognizant. It is only by district commanders' personal interest and inspection of corps while at musketry training that the desired end can be gained.

Officers commanding regimental districts must also give their special attention to the musketry training of militia recruits, including that of officers. This is at present most unsatisfactory.

6. COURSE OF MUSKETRY PRACTICE FOR 1903.—The official instructions for the musketry practice for 1903 will embody, as far as possible, the principle that skill at short ranges is of the utmost importance, and that it is useless to allow a man to shoot at the longer ranges, or in advanced practice until he has become a reliable shot at the shorter distances.

Commanding officers are hereby empowered to keep back such men as they consider require further instruction, in order that they may expend their ammunition at the shorter ranges.

7. I am convinced that straight shooting, which is the result of careful training is at least as important on the modern battlefield as tactical combinations, to the practice of which so much time and trouble are now devoted. It will be well for all to recollect that the best tactics may fail if, when the climax of the struggle is reached, a superiority of fire can not be established.

I can not, therefore, too strongly impress on every general officer commanding that it is his most important duty to attain and maintain a high standard of efficiency in musketry throughout all ranks in his command, and, being convinced that this can only be attained by the exercise of constant personal interest and supervision on the part of the senior officers, I shall hold every general officer commanding personally responsible that he, by whatever means he may consider best, will endeavor to attain a standard which can only be considered satisfactory when it has attained the highest efficiency. With this view he should satisfy himself by frequent and close observation, that a well-ordered and progressive system of elementary instruction in musketry is established in all corps in his command on the lines here indicated, and should specially endeavor to stimulate the interest of officers in their men's shooting and in recruit training. He should endeavor to overcome any difficulties which may arise in complying with the spirit of this order, and in regard to such as he may be unable to cope with, he should at once bring them to the notice of the adjutant general.

The "Provisional Course of Musketry for the year 1902" for the British army, a synopsis of which appeared in "Target Practice and Remount Systems Abroad," published last year, was supplemented in September, 1902, by instructions contained in a special army order signed by Lord Roberts prescribing the steps in the course of instruction for recruits and trained men both in the regular and auxiliary

forces, urging and requiring the most active personal interest of all officers in this important branch of the soldier's training, and directing general officers commanding to report on the system of training adopted, and the progress made up to date. Also to make suggestions for useful changes, to report on the action of subordinate officers, and on the general effect of Lord Roberts's order.

A revised edition (provisional) of the musketry regulations for the regular and auxiliary forces has been approved and will be issued in February, 1903.

The following is the latest table giving annual allowances of small-arms ammunition for instruction purposes and for funerals:

Corps.	Rounds.					
	Trained soldiers.	Trained soldiers, rank and file only.		Recruits (officer or man).		
	Ball.	Blank.	Aiming tube, sub-caliber.	Ball.	Blank.	Cartridges, aiming tube.
Cavalry -----	200	30	*25	200	20	*25
Artillery :						
Garrison -----	20	20	25	20	20	
Horse, field, and mountain -----	10	10		20	20	
Engineers armed with :						
Rifle -----	100	40	*25	150	20	*25
Carbine -----	100	30	*25	150	20	*25
Infantry -----	300	40	*25	200	20	*25
Infantry reservists -----	†50					

* 10 rounds per recruit may be drawn at depots, or the allowance may be exchanged for ball ammunition of equal value.

† In case of failure to reach the prescribed standard, 50 rounds additional may be drawn for purposes of repetition.

Allowances are also made to men of ordnance, army service, and medical corps.

Every soldier in his first year of service may fire the ammunition allowed for a recruit, together with that allowed for the trained soldier. If a recruit of infantry or cavalry is put back for further training the number of rounds already expended by him will not be deducted from the allowance, but will be in addition thereto.

Ball ammunition may be drawn at the following rates for squadron and company officers of units specified below :

Cavalry, 110 rounds per officer.

Engineers, 90 rounds per officer.

Infantry, 150 rounds per officer.

The following addition may be made to the above-mentioned proportions of ball ammunition:

For field inspections, on the order of the general officer commanding a station or district—

Cavalry, regiment of, 1,000 rounds.

Infantry, battalion of, 4,000 rounds.

and the following to the proportion of blank ammunition:

For use at district rifle meetings—

Three rounds ball, 0.303-inch, per officer and man (regulars and militia) on the effective strength of districts at home on June 1 of each year, and at stations abroad on January 1 of each year.

For training remounts—

Horse and field artillery, 10 rounds per remount, to be drawn by batteries when required.

Engineers, 400 rounds, to be drawn by the field depots.

Army service corps, 1,780 rounds, to be drawn by station staff as follows: Aldershot, 540 rounds; Devonport, 480 rounds; Woolwich, 480 rounds; Curragh, 140 rounds; Dublin, 140 rounds.

Annual allowance of pistol ammunition for officers, warrant and noncommissioned officers, and men armed with the pistol in time of war.

Corps.	Ball.		Blank, every year.
	First year.	Subsequent years.	
Cavalry.....	100	50	20
Artillery (horse, field, and mountain)	100	100	10
Infantry and engineers	100	50	10
Army service corps	100	50	10
Military mounted police	100	50	10

If on hand for the purpose, officers may purchase for their own use 36 rounds additional per annum, and for noncommissioned officers and men may be drawn annually additional ammunition, not exceeding 72 rounds for infantry and 36 rounds for cavalry, horse and field artillery, for each authorized pistol.

General officers commanding may authorize the purchase of ammunition for competitions, not exceeding 130 rounds per annum for each competitor.

Units joining the army rifle association may purchase 0.303 ammunition at half rates, not exceeding 7 rounds per rifle or carbine.

Aiming tube (subcaliber) cartridges, for private practice, may be purchased from the army ordnance department.

Annual allowance of machine-gun ammunition for practice and exercises.

	Cartridges, ma- chine- gun.	
	Ball.	Blank.
For each unit of cavalry, mounted infantry, and infantry having machine guns actually in possession, not forming part of the armament of a station:		
Cavalry and mounted infantry.....	1,100	} 1,000
Infantry.....	1,700	
For stations: For each gun actually in possession, forming part of armament.....	366	50

THE FORBES RANGE FINDER.

The folding range finder consists of two parts: the base and the binocular.

1. The base is a tube of rectangular section 1 by 1½ inches and is 6 feet 3 inches long. It consists of two half bases 3 feet and 3 feet 3 inches long, respectively, hinged together at the middle of the whole base; the hinge is at the top when opened out. On the left half base at the hinge there is a vertical slot facing the range taker to receive the tongue of the binocular. On the two halves of the hinge, facing the range taker, are the middle openings (¾ inch square), closed and opened by the middle shutters, which expose to view the glass faces of the middle prisms, which are mounted in the tubular base.

At the two outer ends of the base are two cylindrical shutters called the outer shutters, which are opened or closed by rotating them about the axis of the base, and expose the glass faces of the two outer prisms, mounted in the tubular base. The distance between the centers of the outer prisms is 72 inches. These outer prisms face the target. The middle prisms face the range taker. A rubber ring is attached to the longer half base. When the base is folded, this rubber ring is passed also over the end of the shorter half base to keep the two together. Each half base has a wooden leg hinged to it and kept in place when out of use by a rubber ring.

No adjustments of the base of any kind whatever need ever be made after leaving the maker's hands.

The base when folded is carried in a sling case, with a folding flap at the lower or hinged end and a strap to fasten it.

2. The binocular consists of two telescopes, having two black ebonite eye caps. The distance between these can be varied to suit different people by opening or closing the binocular hinge between the telescopes. Between the eye caps is a horizontal rod attached to the left telescope, sliding in a horizontal tube attached to the right telescope. On the rod there is a distance of eyes scale, graduated from $2\frac{1}{8}$ to $2\frac{3}{4}$ inches, showing the distance between centers of eye caps. The binocular hinge is gripped by a support with 6 boltheads, and this support ends in a flat tongue, pointing downward, to slip into the slot on the base hinge.

On looking through either telescope at the sky, a balloon is seen with tail rope hanging down. The bottom of the tail rope is at the middle of the field of view. There are really two balloons seen as one, by the two eyes; that one seen with the left eye has the letter L on its left side, and the one seen with the right eye has the letter R on its right side. Each eye cap can be revolved to focus the telescope to suit each eye, and the left focal scale and right focal scale are marked for the focus of each eye, from +10 to -10 divisions. Behind the tongue is a clamp for securing the two telescopes at the right distance apart, called the binocular-hinge clamp. Above the left eye cap there is a square pin, worked by a key, to raise or lower one balloon relatively to the other. On the right side of the binocular there is a drumhead carrying a dial on the right side, with a flat spiral distance scale registering the number of 100 yards, from 500 yards upward. The scale is turned by the milled head, 1 inch diameter. The scale is read by the pointer, which moves along the spiral radially, to read successive revolutions. It is attached to the cover inclosing the drumhead. There is also a pointer clamp for fixing the pointer in any position. On the left side of the dial is a divided circle divided into 100 parts, with a fixed pointer. On the distance scale, beyond the 10,000-yard mark, there is a mark ∞ for practically infinitely distant objects when the angle to be measured is zero. The reading on the divided circle, when the pointer is at this mark, is called zero, or the infinity reading.

Fig. 1 shows the shape of the prisms and the path of the two beams of light from the target entering the two outer prisms, suffering a double reflection at each prism, passing along the tubular base, passing through the middle prisms, and entering the binocular, parallel to their original direction.

These two beams of light pass through the object glasses $G'G$ of the binocular, and form two images of the target at

Plate IV.

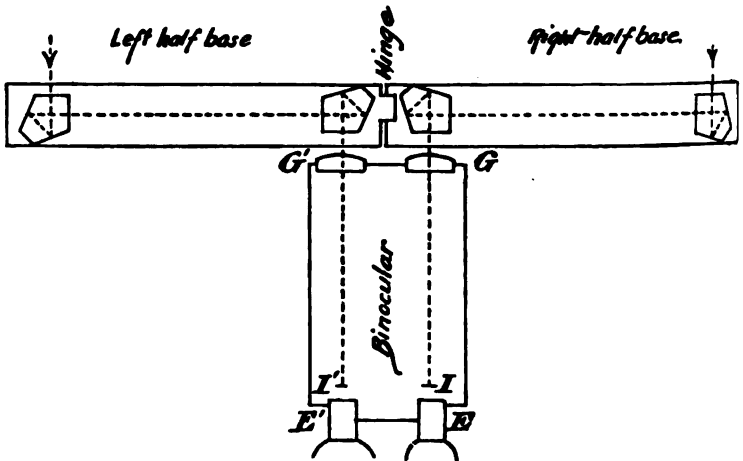


Fig. 1.—Diagram showing path of light rays from target.

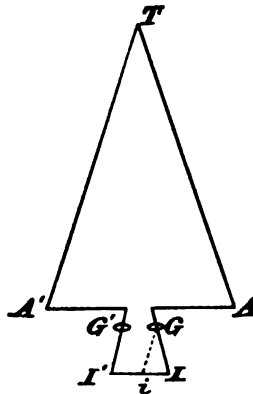


Fig. 2.

I and I' , on the line of the beam of light passing through the center of the object glass. These images are examined by eyepieces E .

In fig. 2, if T be the target, AA' the base, then II' are the images of the target. Draw Gi parallel to $G'I'$, then the moon or any other very distant object, if its left image were at I' , would have its right image at i , where $I'i = GG'$, the distance between the centers of the object glasses. Here the two eyes look in parallel directions. But for the target T , which is nearer, the eyes must converge to look in directions $IG, I'G'$. The muscles of the eye tell us of the comparative effort required to converge the eyes when two objects at different distances are seen at the same time. If two balloons, photographed on glass, be placed at I' and i , or at the distance $I'i$ apart, the balloons are seen as one balloon at the same distance as the moon. But if we are looking at the target the balloon i must be moved to I , to make the two balloons look like one balloon at the distance of the target. We measure this distance Ii by the drumhead, which works a micrometer screw.

$$\text{Now } AT = \frac{GI}{Ii} \times AA'$$

$$\begin{aligned} \text{or distance of target} &= \frac{GI}{Ii} \times \text{length of base} \\ &= \frac{GI}{Ii} \times 2 \text{ yards.} \end{aligned}$$

$$\text{In my binocular } \frac{GI}{Ii} = \frac{810}{\text{number of revolutions of drumhead.}}$$

So, for any distance of target D , we have to mark that distance on the spiral scale when it and the micrometer screw have turned through a

$$\begin{aligned} \text{number of revolutions} &= \frac{810}{D} \times 2 \text{ yards} \\ &= \frac{1,620}{D} \text{ yards.} \end{aligned}$$

For 1,000 yards it is 1.620 revolutions. For 2,000 yards it is 0.810 revolution, and so on.

In this way the graduations for different distances have been calculated.

METHOD OF CARRYING THE EQUIPMENT.

1. BY A MOUNTED MAN.—A mounted man attaches the strap of the sling case of the base to two D 's on the near side of the saddle. He has another strap fixed to the D at the back

of the saddle. He passes this around the upper part of the sling case and buckles to keep it steady when trotting or galloping. He places the binocular in the left of the two wallets in front of the saddle.

On the order being given to take a range, the binocular is removed from the wallet. The man dismounts and drops the reins on the ground. He then takes out the base, puts the binocular tongue through the base slot, straightens out the 6-foot base quietly, not to injure the hinge, opens the four shutters, sits down facing the target, with the legs of the base gripped between the knees, and takes the distance of the target.

2. BY A FOOT SOLDIER.—A foot soldier uses the same sling for the base as the mounted man. He passes the strap over the right shoulder and under the left arm, with the flap and also the hinge of the base downward. The binocular is carried in a leather binocular case with the strap passing over the left shoulder and under the right arm.

To take a range he goes through the same operations as the mounted man, except as regards the horse.

TO DETERMINE THE RANGE-TAKER'S OPTICAL CONSTANTS.

Every man in the army has his optical constants determined and these are given to him on a card, thus:

L	— 1
R	0
D	66

This means that the left focal scale should, in this man's case, be at -1 ; the right focal scale at 0, and the distance of eyes scale at 66 divisions.

1. TO FIND *D*.—The binocular hinge clamp is loosened. The base is not used. The man grasps each telescope body with one hand. He points it to the sky and sees a balloon. He alternately opens out and closes in the telescopes by working the binocular hinge until he sees an *R* on the right side and an *L* on the left side of the balloon. He moves the hinge until he sees them most distinctly, when there should be an increased brightness of the picture. The binocular

hinge clamp is then made tight and the distance D read off on the distance of eyes scale.

2. **TO FIND L .**—The observer again looks at the sky and sees the balloon. Revolving the left eye cap to right or left, the letter L becomes more or less distinct. When most sharp, L is read off on the left focal scale.

3. **TO FIND R .**—The same operation is performed, except that the right eye cap is revolved until R is quite sharp. Then R is read off on the right focal scale.

TO TAKE A RANGE.

Directing the binocular and base toward the target and looking through the binocular, a man is virtually seeing the target by means of eyes placed at the two ends of the base, 6 feet apart. He can then judge the relative distances of objects. He also sees a balloon at some distance. He lays the tail rope of the balloon just above the target, and not, on any account, on it. He notes that he sees both R and L on the balloon, else he is using only one eye and can not work. Then, by twisting the milled head one way or the other, he moves the balloon away from him or brings it nearer to him. He should begin with the balloon nearer than the target (by setting the distance scale at 500 yards) and watch the balloon going away as he turns the milled head, always keeping the tail rope above, and never on, the target. He stops turning when the balloon is over the target, and then he reads the distance on the scale in hundreds of yards.

TO SET THE ZERO.

When a range taker starts using a binocular which he has not been the last to use, he must first set the zero.

1. He sets the focal scales and the distance of eyes scale to the numbers on his card. If he has lost his card and can not remember the numbers, he must reset them by trial, as explained already.

2. He then slips the tongue of the binocular into the slot of the base and looks to see if the object glasses are both at the same height as the middle prisms. If he finds it necessary to twist the binocular about its hinge, the six boltheads may be loosened to enable him to do this.

3. Next, taking the binocular off the base, he observes any distinct object of unknown distance somewhere between 500 and 1,000 yards. He sets the balloon over the target and reads off on the divided circle. He does this five times and takes the mean and sets the divided circle to this mean.

4. The pointer clamp is then loosened, and the drumhead cover is turned until the pointer on the distance scale reads ∞ . The pointer clamp is then tightened.

5. The binocular and base are now used on the same object and five readings taken on the divided circle, and the circle is set to the mean reading. The distance on the scale is now read and one-thirtieth subtracted to give the true distance. The pointer clamp is loosened and the pointer turned to point to the true distance. The pointer clamp is tightened, and the scale reading will now be correct for all distances.

SUGGESTED REGULATIONS FOR INFANTRY.

1. Every man in the army should at least once a year have a course with the range finder lasting one day.
2. The present course of distance judging to be abolished.
3. Every section of every company of infantry, whether mounted or on foot, to be supplied with a range finder.
4. Ten men in each company to be selected to act as range takers for the day or to replace range takers who are disabled.

These suggestions are thrown out with all modesty, the result of discussions in South Africa, merely as a preliminary basis for discussion.

PRACTICAL TRIALS OF THE RANGE FINDER IN SOUTH AFRICA.

I arrived in South Africa on January 28, 1902. The first trials were made during ten days at the royal observatory, Cape Town. The distances had been surveyed by one of the astronomers. During this period I found that in all conditions of the weather I generally could obtain 2 per cent accuracy at 3,000 yards, often much closer. This was not new to me, as I had thoroughly tested for accuracy at home.

One day, February 5, my observations happened to be witnessed by Maj. Gen. Sir John Ardagh, Lieutenant Colonel Edmonds, R. E., and Sir David Gill, K. C. B., F. R. S., who drew up and signed a certificate. The binocular had been dismantled the day before and the zero hastily determined, and Sir David Gill pointed out that the correction for zero

could be made. When this was done the results were as follows :

	Distance in yards.	Observed by range finder.	Error.
1	1,859	1,830	+ 29
2	3,036	3,039	- 3
3	852	857	- 5
4	1,432	1,422	+ 10
5	1,711	1,717	- 6

February 6, 1902. Range-finder tests. Range finder observed by Prof. George Forbes, F. R. S. Range finder read off by Mr. Levinger, astronomer. Certified by Sir David Gill, K. C. B., F. R. S., H. M. astronomer.

	Range finder, observed.	Range finder, mean.	Survey.	Error.						
	Yards.	Yards.	Yards.	Yards.						
1	1,860 1,885 1,825 1,430	1,857	1,859	- 2						
2	1,410 1,405 1,715				1,415	1,432	- 17			
3	1,735 1,706							1,718	1,711	+ 7
4	861 858 850 701									
5	702 711 751	705	686	+ 19						
6	744 733 1,910*				743	749	- 6			
7	1,950 2,060 1,350	2,000	1,994	+ 6						
8	1,395 1,380							1,375	1,388	- 13

* A violent gust of wind interfered with this observation.

SUMMARY OF RESULTS ARRIVED AT BY MY VISIT TO SOUTH AFRICA IN 1902, TO TEST THE RANGE FINDER FOR USE WITH RIFLES.

1. Distance judging is known to be very difficult, but the range finder enabled me to find out what few people know, that the most experienced and trusted of our officers who have been serving throughout the war will sometimes give a distance as 2,800 yards when it is under 700 yards, and at other times will give a distance as 500 yards when it is over 1,200 yards.

2. There is no service range finder ever used with infantry or cavalry in the field, and if the mekometer be ever used with artillery our officers seldom rely upon it. The time taken is excessive; the exposure of the men is objectionable; the errors

introduced by two men dependent on each other are fatal, and the ground often does not admit of a mekometer being used. The new range finder is not to replace the mekometer. It will replace nothing, because there is nothing to replace.

3. Our officers and our men in the field are unanimous in the opinion that the universally recognized want, which has often nullified the strategy of our leaders and the endurance of our men and made us often helpless for offense before the enemy, was the want of a quick, handy, reliable, one-man range finder. The want has in every action reduced the casualties we inflicted to a fraction of what it should have been.

4. I have tested the range finder for accuracy against the mekometer and against surveyed distances under most competent generals and others. Every one agreed that its accuracy was all that could be desired.

5. As to speed, I could always give the range long before the two men occupied with the mekometer had concluded their preliminary consultation as to the exact point to be observed.

6. I have trekked with a column 300 miles in eleven days, the ranger finder being always slung to my saddle. Each day I was at different times called on for distances. It never took one minute to dismount, set up the range finder, and give the first range, subsequent ranges being given in a few seconds.

7. I was in action two days and gave the ranges quickly and accurately and undoubtedly improved the shooting.

8. No amount of jolting in long gallops ever put the range finder out of order. It never needed adjustment of the prisms, though no more care was taken of it than of a rifle, and once my horse rolled on it.

9. Every officer who has seen the range finder in use or in action has told me that, so far as he can judge from what he has seen, it is the very thing the army needs.

10. These officers have described their experiences in scores of battles in which disaster would have been converted into victory, or a partial success into complete surrender of the enemy if my range finders had been freely used as they saw me use one in action.

11. Even among the troopers of our column the range finder was an object of keen interest, and when they saw its performance they agreed that it was just what they had been longing for.

12. I have instructed scores of officers, noncommissioned officers, and men in the use of this range finder. I have not had a single failure. Many became better in its use in five minutes than I am. A day or two would suffice to make an accomplished range taker of almost any man in our army.—*Extract from lecture by Professor G. Forbes, F. R. S., M. A., etc., taken from the Journal Royal United Service Institution, November 15, 1902.*

MACHINE GUNS DETAILED TO INFANTRY REGIMENTS IN INDIA.

All infantry regiments of the Indian field army will soon be supplied with Maxim machine guns. The officers and men of the Maxim detachments will be selected with the utmost care and will receive technical instruction so that they will be able to repair the ordinary defects in the functioning of the machine guns.

These Maxims will be carried on pack mules.

The personnel of each gun will consist of one noncommissioned officer and three privates, with an equal number of reserve trained men capable of taking their places in case of need. Each group of machine guns will be commanded by an officer. To each gun will be allotted for firing exercises 1,000 blank cartridges and 2,200 ball cartridges. In the field and at maneuvers the Maxim guns will march with their respective units unless the brigade commander orders them to assemble in a body. The officer in command will give the chief of the machine gun group a general idea of the part which these shall take in action, leaving him full liberty in the execution of the orders received.—*Revue du Cercle militaire, August 16, 1902.*

MILITARY MECHANICAL TRANSPORT.

A special army order contains the following royal warrant and instructions for the establishment of mechanical transport companies in the army service corps:

1. The following shall be inserted among the daily rates of pay laid down for our army service corps in article 787:

	s.	d.
Sergeant, mechanical transport companies.....	8	3
Corporal, mechanical transport companies.....	2	6
Second corporal, mechanical transport companies	2	2
Private, appointed paid lance corporal, mechanical transport companies	1	6

2. The following shall be substituted for the rates of corps pay laid down for our army service corps in article 788:

First rate (mechanical transport companies only).....	1	8
Second rate (mechanical transport companies only).....	1	4
Third rate	1	2
Fourth rate (mechanical transport companies only).....	1	0
Fifth rate.....	0	11
Sixth rate.....	0	8
Seventh rate	0	6
Eighth rate	0	3

SELF-PROPELLED WAR CAR.

The accompanying illustration represents the latest departure in automobilism, and, as will be seen, consists of the combination of offensive weapons with an armored motor wagon, the whole forming a novel appliance, the scope and utility of which may prove of far-reaching character. The machine is the invention of Mr. F. R. Simms, and has been built to the order of Vickers' Sons & Maxim, Limited. Its principal object is to act on the defensive on the coast roads of this country, but if successful in this departure there are many other obvious uses in warfare to which the car can be applied. For instance, it is suggested that for quelling street mobs it might be adopted. It weighs complete about 5½ tons, and the 6-millimeter Vickers' steel armor completely encircles the car frame. The wheels are wood with iron tires. The armor is of crinoline shape, flattened longitudinally and having a ram fore and aft. The extreme length is 28 feet, the beam 8 feet, and the height 10 feet. One of the chief difficulties which was encountered in the armor plating was the method of securing it to the frame of the car, as it was found that the constant vibration due to running over ordinary road surfaces loosened the riveting. This has, however, been remedied by attaching the armor to the frame by means of semielliptical springs, onto which it is hung by means of brackets. The four semielliptical springs are mounted on steel trestles, suitably braced and stayed to the main frame. By this it will be seen that the armor is not rigidly fixed to the frame. It is claimed, moreover, that this system of mounting increases the impenetrability of the armor by allowing a certain amount of lateral movement when hit by projectiles. This movement is limited by distance links.



Fig. 5.—Motor war car.

The armament on the car shown at the crystal palace last Friday includes two automatic quick-firing Maxim guns and a pompom, with their turret mountings. The ammunition is carried in boxed-in stores situated at the extreme ends of the armor.

The frame of the vehicle is rectangular, and is built up of heavy steel channels of U section—tied, stayed, and braced so as to be perfectly rigid. The motive power is supplied by a 16-horsepower four-cylinder hydrocarbon engine of the Daimler type, with Simms-Bosch magneto-electric ignition. The cylinders are 90 millimeters diameter and 130 millimeters stroke. The transmission of power is effected by friction cone direct through a short length of shafting to the speed-changing gear, the male part being movable, and operated by means of a foot lever throwing the engine in and out of gear. The speed gear is on the Cannstall principle, and has four definite speeds, i. e., $1\frac{1}{2}$, 3, 5, 9 miles per hour. With the accelerator, however, the speed of the car may be increased by 25 per cent. By means of the speed gear, which is controlled by two levers, each commanding two speeds, the friction clutch is automatically released before the change of speed is effected. The third lever controls the forward or backward movement, the gear being so arranged as to give all four speeds either forward or backward, which is attained by means of a shifting double-bevel pinion. The transmission of power to the driving wheels is by means of a countershaft, on which is fitted the differential gear; at either end of this shaft is fixed a sprocket wheel, and these sprocket wheels drive, by means of chains, the road wheels.

The steering gear is designed on the well-known Ackermann principle, and is controlled by handwheel and worm gearing, which renders the maneuvering easy and safe for heavy vehicles of this type. Ample brake power is provided. There is one foot-brake, throwing the friction cone out of gear simultaneously with acting on a powerful double-acting brake clutch, mounted on the first gear-wheel shaft. There is also a very powerful handwheel brake putting into action, first, two powerful hand brakes on the hubs of the two driving wheels, and, if turned still further, engaging two powerful circumferential brakes on the driving wheels.

Four persons are said to be sufficient to man the machine, but there is ample platform area for a further number of riflemen.—*The Engineer*, April 11, 1902.

ALLOWANCE OF MOUNTS, OUTFITS, FURNITURE, AND REGULATIONS TO OFFICERS.

Army orders dated war office, December 22, 1902, provide allowances to officers as follows: Two horses are supplied to each line cavalry officer or royal horse artillery officer (except quartermasters) and one horse to every other mounted officer in the army, including quartermasters, except those officers serving with the staff, schools, household cavalry, medical service, or the departments. Subject to certain conditions, an allowance of about \$500 is paid to an officer promoted from the ranks to aid him in purchasing his first outfit.

At home stations the quarters of all unmarried regimental officers, except commanding officers, riding masters, and quartermasters are furnished. All officers' messes are furnished with furniture, china, glass, and cooking utensils. The only payment required is to cover ordinary depreciation and is as follows:

Officers' quarters, 2 cents per day.

Field officers' quarters, 4 cents per day.

Officers' messes (each member) 2 cents per day.

Every officer also receives copies of each of the books of army regulations.

HORSES SHIPPED TO SOUTH AFRICA.

[COMPILED FROM THE EVIDENCE SUBMITTED TO THE COURT OF INQUIRY ON THE ADMINISTRATION OF THE ARMY REMOUNT DEPARTMENT, THE REPORTS OF VARIOUS OFFICERS, AND OTHER SOURCES BY FIRST LIEUT. R. S. CLARK, NINTH INFANTRY.]

During the South-African war, between October 22, 1899, and May 30, 1902, the total number of horses shipped from the various countries, including the British empire, was 331,456, and the total number which arrived in South Africa was 316,072.

GREAT BRITAIN.

From October 22, 1899, to May 3, 1902, 81,401 horses were shipped (23,178 with units and 58,223 remounts), and, of the total, 73,888 arrived in South Africa. The losses en route were 9.23 per cent. All were shipped under admiralty arrangements at the average cost of freight of £18 14s. 3d. The average cost of horses in Great Britain was, for cavalry and artillery, £45, and for cobs £30.

UNITED STATES.

From March 17, 1900, to May 19, 1902, 100,986 horses were shipped (66,911 under admiralty arrangements and 34,075 under arrangements of the inspector general of remounts with Messrs. Houlder Brothers), and of the total 97,871 arrived in South Africa. The losses en route were 2.17 per cent, admiralty, and 4.88 per cent, Messrs. Houlder Brothers, the average cost of freight being £17 17s. 2d., admiralty, and £21 8s. 7d., Messrs. Houlder Brothers. The average cost of horses was, for cavalry, £25 10s., and for cobs £15.

CANADA.

From May 29, 1900, to April 12, 1902, 13,612 horses were shipped (9,874 under admiralty arrangements and 3,738 under arrangements by the inspector general of remounts with Messrs. Houlder Brothers), and of the total, 12,999 arrived in South Africa. The losses en route were 4.18 per cent, admiralty, and 5.34 per cent, Messrs. Houlder Brothers, the average cost of freight being £17 12s. 9d., admiralty, and £22 8s., Messrs. Houlder Brothers. The average cost of the horses was, for cavalry, £28; for artillery, £30; for cobs, £25.

AUSTRALIA AND NEW ZEALAND.

From October 30, 1899, to May 23, 1902, 25,000 horses were shipped, partly under admiralty arrangements and partly under arrangements by the inspector general of remounts with Messrs. Houlder Brothers, and of the total, 23,797 arrived in South Africa. The losses en route were 4.81 per cent. The average cost of freight was £17 15s., admiralty, and £15 4s. 5d., Messrs. Houlder Brothers. The average cost of horses was, for cavalry, £15; for artillery, £20; for cobs, £12.

AUSTRIA-HUNGARY.

From May 16, 1900, to May 30, 1902, 58,141 horses were shipped (42,802 under admiralty arrangements, 11,534 under arrangements by the inspector general of remounts with Messrs. Houlder Brothers, and 3,805 under imperial yeomanry arrangements), and of the total, 56,051 arrived in South Africa. The losses en route were 1.60 per cent, admiralty; 9.91 per cent, Messrs. Houlder Brothers; 6.89 per cent, imperial yeomanry. The average cost of freight was £15 1s. 4d.,

admiralty; £21 1s. 5d., Messrs. Houlder Brothers; imperial yeomanry not given. The average cost of the horses was, for cavalry, £30; for artillery, £35; for cobs (Austrian) £20, (Russian) £26 10s.

ARGENTINA.

From November 14, 1899, to October 2, 1900, 25,872 horses were shipped under arrangements by the inspector general of remounts with Messrs. Houlder Brothers, and of these 25,701 arrived in South Africa. The losses en route were 0.62 per cent; the average cost of freight being £14 9s. 8d. The average cost of horses was, for cobs, £8.

INDIA.

From October 17, 1899, to December 23, 1901, 8,539 horses were shipped under admiralty arrangements (3,124 remounts and 5,415 with units), and of these 8,431 arrived in South Africa. The losses en route were 1.77 per cent remounts, and 0.999 per cent with units. Neither the cost of the animals nor the freight is obtainable.

COLONIAL CONTINGENTS.

(Presumably from Canada and Australia. The information at hand does not state.)

From October 20, 1899, to April 5, 1901, 17,905 horses were shipped (7,200 under admiralty arrangements and 10,705 under colonial government arrangements), and of these 17,334 arrived in South Africa. The losses en route were 2.43 per cent, admiralty, and 3.7 per cent, colonial governments. Neither the cost of the animals nor the freight is at hand.

According to the evidence given by the quartermaster general on March 1, 1902, there were then on the ration list in South Africa 243,000 horses and mules; that of these 20,000 were on the sick list, and that of these no less than 1,000 a week were being destroyed as incurable, irrespective of the numbers which were lost in action or died of disease. This came from the extremely hard work which had to be done on insufficient rations, due to the conditions prevailing in a sparsely settled country and a very active enemy. The following figures show some instances in which there was a

very great wastage, and may be taken to illustrate extreme cases:

1901.	
Strength of unit.....	492
Subsequently drawn (in five months).....	556
Total	<u>1,048</u>
At the end of five months:	
Handed in	<u>391</u>
Condition of those handed in—	
Fit	13
Fit in ten days	30
Unfit	34
In hospital, chiefly sore backs and African mange	208
Destroyed	106
Total	<u>391</u>

One column 2,900 strong lost 960 horses in one month.

1900.	
Column B (original strength)	<u>3,631</u>
Sent back in six days.....	369
Died or destroyed	679
Missing	202
Sent to sick-horse farm.....	394
Present sick or wounded	544
Total unfit in one month	<u>2,178</u>

STAMP OF HORSES PREFERRED.

The consensus of opinion was that horses from 14 hands 2 inches to 15 hands, of a cobby stamp, were the best suited to the country. Of the larger horses, the English and American horses were preferred, and the Hungarian, Argentine, Canadian, and Australian horses were generally condemned. After the Basuto ponies the American cobs were preferred. The English, Irish, Canadian, and Australian cobs and the few Arabs used were considered good. Except the survival of the fittest, the Argentine and Hungarian cobs and Indian country breeds were condemned.

MULES.

During the South-African war, between October 22, 1899, and May 30, 1902, the total number of mules shipped from

the various countries, including the British empire, was 104,071, and the total number which arrived in South Africa was 101,265.

UNITED KINGDOM.

From October 22, 1899, to May 3, 1902, 248 mules were shipped under admiralty arrangements, and of the total, 245 arrived in South Africa. The losses en route were 1.29 per cent. The cost of freight is not given.

UNITED STATES.

From May 17, 1900, to May 19, 1902, 77,158 mules were shipped under admiralty arrangements, and of the total, 75,015 arrived in South Africa. The losses en route were 2.79 per cent, and the cost of freight was £14 16s. 7d.

CANADA.

From May 29, 1900, to April 12, 1902, 3,197 mules were shipped under admiralty arrangements, and of the total, 3,116 arrived in South Africa. The losses en route were 2.52 per cent. The cost of freight is not given.

INDIA.

From October 17, 1899, to December 23, 1901, 1,107 mules were shipped under admiralty arrangements, and of the total, 1,104 arrived in South Africa. The losses en route were 0.25 per cent. The cost of freight is not given.

ITALY.

From October 11, 1899, to November 30, 1899, 7,004 mules were shipped under admiralty arrangements, and of the total, 6,984 arrived in South Africa. The losses en route were 0.28 per cent, and the cost of freight was £18 10s.

SPAIN.

From October 15, 1899, to July 19, 1900, 15,229 mules were shipped under admiralty arrangements, and of the total, 14,673 arrived in South Africa. The losses en route were 3.65 per cent, and the cost of freight was £15 15s. 5d.

CYPRUS.

One shipload of mules, 128 in number, was shipped March 17, 1900, and arrived in South Africa without any losses en route. The cost of freight is not given.

As will be seen by the above, almost all the mules came from the United States. This came from the mules not only being cheaper, but from their being of a much better quality than elsewhere and from the large quantities that the markets of the United States were capable of supplying. Gen. Sir R. Stewart and Lieut. Col. E. Holland, R. A., reporting on the remount operations in the United States, say: "We are of the opinion that they (mules) are first-class. In our experience nothing approaches them except the gun mules in the mountain batteries in India, and we see no fault to find with them as a class." The mules purchased for the South-African war in the United States were as a rule somewhat smaller than those purchased for use in the United States army. Their height varied from 13 hands $3\frac{1}{2}$ inches to 15 hands 2 inches, and the price from \$75 to \$100.

**CONDITIONS OF SERVICE OF TROOPS STATIONED IN AFRICA,
NOT UNDER DIRECT CONTROL OF THE WAR OFFICE.**

[COMPILED FROM OFFICIAL REGULATIONS BY FIRST LIEUT. R. S. CLARK, NINTH INFANTRY.]

(1) The protectorates under the control of the foreign office in which troops are stationed are as follows:

The British Central-African Protectorate.

The East-African Protectorate.

Uganda.

The Somaliland Protectorate.

The troops are:

First and second battalion, Central-African regiment.

Third battalion, East-African rifles.

Fourth battalion, Ugandan regiment.

Fifth battalion (Indian), Ugandan regiment.

Sixth (Somaliland) battalion.

These 6 battalions are known as "The King's African rifles."

Officers applying for service must address their applications to the war office. When selected they are posted to the battalion in which there are vacancies at the time, but any wish they may have expressed for any particular battalion is respected so far as the exigencies of the service permit. Officers, while serving, are liable to be transferred from one battalion to another.

Officers are seconded for three years, with the option of extension to five years, in the event of its being considered

desirable to retain their services, the first year being "on probation." Officers are liable to removal from the King's African rifles on the completion of one year's service, or earlier, if considered unfitted for employment with native African troops.

Appointments are to the post of subaltern (and in occasional exceptional cases to that of company commander), with consolidated pay at the rate of £400 per annum and no allowances.

Officers rank in their battalion, and in the King's African rifles, according to the date of their appointment to or promotion in the King's African rifles. If two or more officers are appointed on the same date, their seniority is governed by their respective army rank.

Promotion to the command of companies, pay £500 per annum, will be by seniority, provided the officer has earned thoroughly satisfactory reports.

Promotions to commandant and second in command, pay £900 and £700 respectively, is by selection.

Leave is granted under special rules.

Passage to and from stations in Africa is granted subject to the regulations in force in the various protectorates.

(2) "The West African frontier force" is administered by the colonial office, and comprises the military forces of the colonies of Gambia, Sierra Leone, the Gold Coast, and Lagos, and the protectorates of Northern and Southern Nigeria. There are included in it not only the force raised on the Niger in 1897-98 under the name of the West-African frontier force, but also the local forces formerly known as the Gold Coast and Lagos constabularies (Hausa forces), the royal Niger constabulary, the Sierra Leone frontier police, the Niger-Coast Protectorate force.

The force consists of the following units:

Name of unit.	Number of Europeans.	
	Officers.	Non-commissioned officers.
Northern Nigerian regiment (2 infantry battalions, 2 batteries of artillery, and 1 engineer company).	100	58
Southern Nigerian regiment (1 infantry battalion, and 2 batteries of artillery).	45	24
Gold-Coast regiment (2 infantry battalions and 2 batteries of artillery)-----	61	13
Lagos battalion -----	15	-----
Sierra Leone battalion (including 1 company stationed in the Gambia)-----	19	2

The Northern-Nigerian regiment represents the first and second battalions of the original West-African frontier force, and is stationed in Northern Nigeria. Its headquarters are at present at Jebba. The greater part of the royal Niger constabulary was incorporated into this regiment.

The southern Nigerian regiment represents the former Niger-Coast Protectorate force and the remainder of the royal Niger constabulary, and is at present stationed in Southern Nigeria, with headquarters at Old Calabar.

The Gold-Coast regiment represents the former Gold-Coast constabulary, or, as it was termed locally, the Gold-Coast Hausas. One battalion is stationed in the Gold-Coast colony and Ashanti, with headquarters at Coomassie, and the other in the northern territories of the Gold Coast, with headquarters at Gambaga.

The Lagos battalion represents the former Lagos constabulary or, as it was termed locally, the Hausa force, and is stationed in the Lagos Colony and Protectorate, with headquarters at the town of Lagos.

The Sierra Leone battalion represents the former Sierra Leone frontier police and, with the exception of one company stationed on the Gambia, is quartered in the Sierra Leone Protectorate. The headquarters are at present in Freetown.

N. B.—The West-African regiment, which is quartered in Sierra Leone, is not part of the West-African frontier force, but is under the officer commanding the troops in Sierra Leone, and is administered by the war office.

Establishment of officers.

Rank.	Northern Nigerian regiment.	Southern Nigerian regiment.	Gold-Coast regiment.	Lagos battalion.	Sierra Leone battalion.
Lieutenant colonels.....	2	1	2		
Majors.....	3	1	2	1	1
Adjutants*.....	2	1	2		
Captains.....	19	9	14	3	6
Lieutenants.....	65	27	40	11	12
Pay and quartermasters †.....			1		
Or quartermasters.....	3				

* In the Sierra Leone and Lagos battalions one of the captains or lieutenants is selected to act as adjutant, and while so acting draws the duty pay attached to the performance of the duties of the post.

† In the Sierra Leone and Lagos battalions one of the captains or lieutenants is selected to act as pay and quartermaster, and while so acting draws the duty pay attached to the performance of the duties of the post.

For the Northern-Nigerian regiment there is, in addition to the officers already mentioned, a headquarters staff, consisting of:

- 1 colonel commandant.
- 1 lieutenant colonel, second in command.
- 1 brigade major.
- 3 brigade transport officers.

N. B.—The authorized establishment of officers in the different units of the force is liable to alteration from time to time. It may be found, together with the lists of the officers actually employed, in the monthly "Army List."

INSPECTOR GENERAL.

There is also an inspector general for the whole force, with the local rank of brigadier general, and he has a staff officer, with the local rank of major, attached to him. The inspector general, whose headquarters are at the colonial office, visits West Africa periodically for the purpose of inspecting the several divisions of the force, and, when in England, acts as military adviser to the colonial office on all questions connected with the force. In the case of an expedition in which the expeditionary force is composed of portions of the West-African frontier force drawn from more than one colony or protectorate, the inspector general will, as a general rule, be employed to take command; but in ordinary circumstances he does not, when in West Africa, take command of the force or of any portion of it. Among his chief functions are the following; to assist in maintaining a satisfactory and uniform standard of efficiency and training, to ascertain the comparative merits of the various officers, and to advise the governors and high commissioners and the secretary of state on questions concerning training, discipline, equipment, etc., and the promotion of officers from one portion of the force to another.

PAY OF OFFICERS.

The following are the rates of pay per annum for officers:

Inspector general.....	£1, 300
Staff officer	650
Lieutenant colonel, commanding regiment	900
Lieutenant colonel, commanding battalion.....	700
Major, second in command of regiment	600
Other majors	500
Captain.....	400
Adjutant	400
Lieutenant of six years' service in the force*	350
Lieutenant of three years' service in the force*.....	325
Lieutenant of less than three years' service in the force*.....	300
Pay and quartermaster or quartermaster.....	350

The rates of pay peculiar to the Northern-Nigerian regiment are as follows:

Commandant	£1, 000
Second in command	800
Brigade major	500
Captain, engineer company	450
Captain, artillery.....	450
Brigade transport officer:	
First	450
Second and third.....	400
Lieutenant, engineer company.....	400
Lieutenant, artillery, of six years' service in the force*.....	360
Lieutenant, artillery, of three years' service in the force*.....	336
Lieutenant, artillery, of less than three years' service in the force*	312

On first appointment, half pay will, in accordance with the colonial regulations, be allowed from the date of embarkation from England, and full pay from the date of arrival in the colony or protectorate in which the unit is stationed to which the officer has been appointed.

* Previous commissioned service in the regular army counts toward service in the force for purposes of pay, but previous service in the militia does not. Thus, an officer of the regular army with three years' service at the date of appointment as a lieutenant in the West-African frontier force draws £325 per annum from the date of appointment, and one with six years' service, £350; and, similarly, on completing three or six years' combined service in the regular army and the West-African frontier force an officer becomes entitled to the appropriate increment. A captain of the regular army, serving as a lieutenant, draws £350 per annum.

In the event of an officer being selected for employment in the West-African frontier force while serving abroad, he will be allowed half West-African pay from the date of his departure from his foreign station to the date of his arrival in the colony or protectorate in which the unit is stationed to which he has been appointed; provided that he does not stay in England longer than is necessary for the purpose of providing himself with uniform and equipment. Any leave which may be granted on the ground of private affairs will be without pay.

DUTY PAY.

Duty pay at the following rates is given to the officer actually performing the duties of the post or command to which he is attached:

	Per annum.
Commander of regiment	£156
Battalion commander, Northern Nigeria.....	144
Battalion commander, Sierra Leone and Lagos battalions	96
Second in command of battalion, Northern Nigeria, and second in command of Southern-Nigerian and Gold- Coast regiments.....	96
Adjutant (according to locality).....	96 or 48
Company commander	48
Pay and quartermaster or quartermaster (according to locality)	60 or 48

Rates of duty pay peculiar to the Northern-Nigerian regi-
ment:

	Per annum.
Commandant	£192
Second in command	156
Brigade major	132
Commander, engineer company	100
Battery commander.....	96
Brigade transport officer	60
Lieutenant, engineer company.....	48

N. B.—The officers of the engineer company receive also corps pay at the rate of £50 per annum.

Duty pay is payable only to the officer actually performing the duty; but, if in any case it is necessary in the interests of the public service that the holder of a post to which duty pay is attached should be detailed for special service requiring exceptional qualifications, a special allowance equivalent to the duty pay which he loses may be granted to him at the discretion of the governor or high commissioner for the period during which he is employed on such service.

ALLOWANCES.

(1) A field allowance at the rate of 5s. a day is paid to officers when detached from their stations on duty.

At present all officers in Northern Nigeria and the northern territories of the Gold Coast are treated as if they were in the field and draw this allowance, but when permanent quarters have been built it will be paid to officers only when detached from their stations on duty. It does not become payable until an officer takes up his duties with the force, and stops when the officer is admitted into hospital.

Field allowance is not payable during leave of absence, or sick leave, or for the period of the voyages to and from the colony or protectorate.

(2) An outfit allowance of £30, as a contribution toward the cost of providing uniform, etc., is given to each officer on first appointment.

(3) An officer serving in Accra, the northern territories of the Gold Coast, Lagos, the Gambia, and Northern Nigeria, may be required to provide himself with a horse, and to maintain a horse throughout his period of service. In that event, he will receive a forage allowance of 2s. 6d. a day for each day for which a horse is kept.

(4) In places other than Accra, the northern territories of the Gold Coast, Lagos, and Northern Nigeria, the grant of hammock allowance or other allowance for personal conveyance while on duty is subject to local regulations.

(5) The inspector general draws a consolidated allowance of £3 3s. a day while in West Africa, and his staff officer a consolidated allowance of £1 1s. a day. They are supplied with transport and hammock or other conveyance.

(6) No other allowances, whether in the shape of free rations, ration allowance, or traveling allowance, are given to officers of the West-African frontier force.

TRAVELING EXPENSES.

Free passages are provided for officers from England to West Africa and back (subject to the exception specified in Section XI of these conditions), but every officer is required on first appointment to sign an agreement with the crown agents for the colonies binding him to repay the cost of his first passage out in the event of his relinquishing his appointment within one year of the date of his arrival in the colony

or protectorate for any other reason than mental or physical infirmity.

Traveling expenses in the United Kingdom are not paid by the government.

QUALIFICATIONS OF OFFICERS.

A candidate for first appointment as a lieutenant in the West-African frontier force—

(1) Must be an officer of the regular army, militia, imperial yeomanry, or reserve of officers.

(2) Must, at the date of appointment, be more than 22 and less than 35 years of age.

(3) Must be unmarried on first taking up his appointment.

(4) Must, at the time of application, have completed two years of actual regimental duty at home or abroad, or, if a militia officer, three trainings with his own battalion.

(5) Must, if a militia officer, hold the following certificates:

(a) An officer's certificate in musketry, including machine guns, from the school of musketry at Hythe, or its equivalent, and

(b) A certificate on Army Form E 516 (promotion to the rank of captain), or a P. S. certificate, Army Form E 527.

Except in special circumstances, officers serving abroad will not be accepted for service in the West-African frontier force.

APPOINTMENT OF OFFICERS.

Officers are selected for appointment by the secretary of state for war subject to the concurrence of the secretary of state for the colonies. The list of applicants for employment in the West-African frontier force is kept by the military secretary at the war office, and applications should be addressed to that department.

When the appointment of an officer has been sanctioned by the secretary of state for the colonies, he will receive instructions from the colonial office as to the date on which he should proceed to West Africa. Appointments date, as a general rule, from the day on which the officer embarks in this country; but officers appointed while serving abroad date their appointment from the day on which they leave their foreign stations to take up their duties in the West-African frontier force.

RANK AND PRECEDENCE OF OFFICERS.

(1) Officers of the West-African frontier force rank according to the date of their army commissions, or of their local rank (if any) in the army under the king's regulations, paragraphs 3 (i) and 9 (i).

(2) Second lieutenants in the army and lieutenants or second lieutenants in the militia appointed as lieutenants in the force are given the local rank of lieutenant in the army from the date of appointment to the force while serving as lieutenants in the force.

(3) Militia captains appointed as captains in the force are given the local rank of captain in the army from the date of appointment to the force while serving as captains in the force.

(4) Militia or army officers appointed to a higher grade in the force than their own militia or army rank are given the local rank of the higher grade.

(5) Militia captains appointed to the force as lieutenants take rank on their militia commissions, viz, as junior to all the captains of the force but senior to the lieutenants; such seniority does not, however, carry any claim to advancement in the force. Militia lieutenants promoted to the rank of captain in the militia while serving as lieutenants in the force take rank similarly.

PROMOTION AND TEMPORARY APPOINTMENTS.

Promotion is made by selection, and seniority alone confers no right to it.

The officer commanding each unit of the force is empowered, subject to the approval of the governor or high commissioner, to select officers for temporary commands and appointments. Such temporary commands and appointments carry with them no increase of pay other than the allowance or command pay which may be attached to the command or appointment, and will not be regarded as substantive promotion unless, and until, confirmed by the secretary of state for the colonies.

When the promotion of an officer is confirmed by the secretary of state, the appointment will date, and the officer will be entitled to the pay of the higher rank, from the day on which the officer whom he succeeds ceased to draw the full or half pay of that rank, and from no earlier day.

PERIOD OF SERVICE AND TERMINATION OF EMPLOYMENT.

The period for which officers must engage to serve in the first instance is one tour of service, which consists, subject to the exigencies of the service, of twelve months' residential service in West Africa. Officers are required to report to the under secretary of state for the colonies in writing within one month of their arrival in England at the end of their tour of service whether they wish to reengage for further service, and in the absence of any such report they will be treated in respect of leave and reabsorption in their British regiments as if they did not wish to return to West Africa. When an officer signifies his wish to return, the secretary of state for war will be asked to approve of his being seconded in his regiment for a further period of service with the force.

During the first tour of service an officer is regarded as on probation, and during the period of probation it is open to the officer commanding the unit of the force in which he is employed to represent to the governor or high commissioner that he thinks the officer, either from temperament or other cause, is unsuited for employment with the force; in which case the governor or high commissioner, if satisfied with the reasons, will cause the officer to embark for England, with instructions to report himself to the secretary of state for the colonies, who will arrange with the secretary of state for war as to his return to his regiment.

No officer will be allowed to resign his appointment in the force before the expiration of the period for which he has been seconded in his regiment, except on sufficient grounds to be approved by the governor or high commissioner, the secretary of state for the colonies, and the secretary of state for war.

An officer who is ordered to return to England on the ground that he is unsuited for employment with the force will be granted a free passage home, but will not be entitled to any pay after leaving the colony or protectorate. He may, however, at the discretion of the secretary of state for the colonies, be granted half West-African pay from the date of leaving the colony or protectorate until the date of arrival in England or such other date as may be fixed.

An officer who is permitted to resign his appointment before the completion of a tour of service entitling him to leave of

absence will not be entitled to a free passage home or to any pay after the date of leaving the colony or protectorate.

LEAVE OF ABSENCE.

Leave of absence is granted in accordance with the regulations in force for civil officers in the West-African colonies and protectorates, copies of which may be obtained from the colonial office. A brief summary of these regulations is given here for convenience.

The ordinary tour of residential service is one year, followed by leave with full pay during the voyages to and from England, and for four or two months clear in England, according as the officer is returning for further service in West Africa or not. If an officer is detained beyond the year, additional leave is given with full pay for ten or five days in respect of each completed month beyond twelve, according as he is returning or not. If he is invalided before the end of the year, the leave with full pay is for the voyages and for ten or five days in respect of each completed month, according as he is returning or not. Leave granted on the understanding that an officer will return is known as "return leave," and any pay drawn in respect of such leave is liable to be refunded if he does not return.

Leave may be extended for a limited period with half or no pay on the ground of ill health, or without pay on other grounds.

PENSIONS.

Officers of the regular army seconded for service in the West-African frontier force are not eligible for any pension from colonial funds in respect of such service. Militia officers seconded for service in the West-African frontier force are eligible for pension from colonial funds under the same regulations as civil officers in the West-African colonial service.

Copies of these regulations may be obtained from the colonial office.

UNIFORM.

Officers are required to provide themselves with the uniform laid down in "Equipment and Dress Regulations of the West-African Frontier Force," copies of which may be obtained from the colonial office.

LANGUAGE REWARDS.

Special rewards will be given to European officers for passing standard examinations in native languages.

CANADA.

ROSS RIFLE—CONTRACT CLOSED WITH GOVERNMENT FOR A SUPPLY.

Sir Charles Ross has closed a contract with the government to supply 12,000 stand of the Ross rifle. Under the contract the government adopts the Ross rifle as the arm for the Canadian army, stipulating that it shall be manufactured in Canada. The factory is to be in Quebec, and will commence with some two or three hundred hands, though it is calculated that in a very short time the number employed will average a thousand. There is also a contract between the government and Sir Charles Ross in which the government binds itself to purchase all its rifles from him, personally giving him a preliminary contract for 12,000 rifles. Sir Charles Ross binds himself to supply the government with arms, and if at any time the minister of militia and defense shall decide to change the weapon, then he is to give Sir Charles twelve months' notice to that effect, and at the expiration of that time he is to be in a position to supply the needed weapon. Should any difference arise between the minister and Sir Charles as to the price, then the matter is to be settled by arbitration, the point to be decided by the arbitrators on the basis of the price at which the government could have purchased the arm in open market in Great Britain.

The work of building and equipping the factory will be begun at once. The only thing at present uncertain being the exact location in Quebec of the factory. — *Montreal Gazette, May 1, 1902.*

ITALY.

REGULATIONS GOVERNING MILITARY TRANSPORTATION.

The newly published regulations governing military transportation are of the greatest importance. They regulate according to modern and practical principles the execution of important strategic transports and the movements in the rear of mobile armies as far as they are to be made by rail. What exists has been used and developed. The peace preparation is now in the hands of a military technical central

committee for military railway transportation, permanently attached to the general staff command. The quartermaster general is at the head of this committee and is detailed as assistant to the chief of the general staff. The members are the chief of the section of transportation, the military committee officials, the presidents of the railway sections with their railway engineers, the inspectors general of traffic, construction, and concession of railways, and the directors general of the large railways. Their work consists in the study of the most practical employment of means of transportation during war and the proposition of corresponding plans. Railway service comes with the beginning of mobilization and during the whole of the war into the custody of military command. As soon as mobilization is begun a general direction of transports and a transportation direction for each army separately are formed. The members of the general direction are the director general, a general, and several detailed officers. The two Mediterranean railway sections and the general direction of the Adriatic network are increased in personnel of the line commissions. A line commission is established in Sicily. The general direction notifies the line commissions with regard to transportation and movement of trains. To these line commissions and sub-commissions are subordinate a certain number of station commands according to principles already established during peace time, the strength varying according to the importance of the station. Mobile station commands are established on the railway lines of the etappe zone, the number, seat, and composition being determined by the general direction, and whose purpose is the same as those of station commands at the time of mobilization and strategic advance march. If necessary, the general direction has the power of creating military technical railway sections which are either independent or are combined by twos, threes, or fours into railway companies. They are destined (1) for the exploitation of such lines where it seems necessary that it should be done by soldiers, and (2) to reestablish interrupted lines, and, if necessary, to build branches and narrow-gauge lines. As has already been done in 1901 and 1902, volunteers may be trained as firemen, brakemen, etc., in the railway brigade or with private railway companies.—*Allgemeine Schweizerische Militärzeitung*, August 16, 1902.

REORGANIZATION OF THE ARTILLERY.

The adoption of the new field artillery material will entail the reorganization of that branch of the service. At present the Italian artillery consists of: Four inspecting staffs, 1 committee for experiments, 8 artillery commands, 14 territorial subdivisions, 24 field artillery regiments (consisting of 186 batteries divided into 48 brigade divisions, 36 transport companies, and 24 depots); 1 horse-artillery regiment with 6 batteries, divided into 3 brigade divisions, plus one group of 4 transport companies and a depot; one mountain-artillery regiment with 15 batteries, divided into 5 brigade divisions and a depot; 22 coast and fortress artillery brigades (11 of each), having in all 78 companies and 2 administration bureaus; 5 companies of artificers.

The present law regarding the cadre of officers fixes that of the artillery at 1,684, who are thus distributed by ranks: Forty-two colonels, 62 lieutenant colonels, 116 majors, 528 captains, 926 subaltern officers.

The characteristic of the new organization, which is about to be submitted to parliament, is the reconstitution of coast and fortress artillery regiments, which were done away with in 1895, and the conversion of the brigade divisions into field artillery. At the present time, of the 48 brigade divisions of which the field artillery regiment consists, 42 are made of 4, while 6 have only 3 batteries. According to the new organization each field artillery regiment will consist of 3 brigade divisions (2 to 3 and 1 to 2 batteries). Later on the brigade divisions will be made up to 2 batteries each, by joining to them a howitzer battery, should the experiments now being carried out demonstrate the utility of these guns, on which opinion is still divided. It is not known if the ministerial scheme provides for the reconstitution of the 6 field batteries which were transformed in 1895.

The new organization of the Italian artillery will be as follows: One general inspection staff; 3 inspection staffs; 9 artillery commands; 13 territorial subdivisions; 24 field artillery regiments, forming 72 brigade divisions, 36 transport companies, and 24 depots; 1 horse-artillery regiment with 3 brigade divisions (in all 6 batteries); 1 group of 4 transport companies and 1 depot; 1 mountain-artillery regiment with 5 brigade divisions (in all 15 batteries), and 1 depot; 6 coast and fortress artillery regiments with 24 brigade divisions (in

all 72 companies) and 6 depots; 1 coast-artillery brigade division of 3 companies for Sardinia; 6 companies of artificers.

The new artillery organization demands a cadre consisting of 1,738 officers, thus made up, viz: Forty-five colonels, 69 lieutenant colonels, 132 majors, 539 captains, and 953 subaltern officers.—*Journal Royal United Service Institution, April 15, 1902.*

AUTOMOBILE BAKING OVEN FOR THE ARMY.

The periodical *l'Ingegneria e l'Industria* of May 30, 1902, gives the description of an automobile baking oven which can follow the troops on the march and which possesses the advantage of transforming the grain immediately into flour and bread.

This carriage, invented by Schweitzer, is composed of two parts: The first contains the motor and a series of mills with sieves and mechanical kneeding troughs, put in motion by the same motor which propels the carriage; the second part consists of a small oven with constant temperature.

The grain poured into the mill hopper is rapidly transformed into flour, which is afterwards mixed with slightly salted water and, after fermentation, is worked and introduced into the oven.

The Schweitzer automobile oven gives 100 kilograms of bread per hour; the apparatus is very simple and does not exact the employment of a special personnel; the bread obtained is of the best quality and more nutritious than that baked in ordinary ovens.—*Rivista di Artiglieria e Genio, July-August, 1902.*

TROOPS IN ERITREA.

Financial considerations and peace in the colony of Eritrea allow a decrease in the numerical strength of the troops. The Italian corps of chasseurs is decreased from 600 to 300 men distributed among three companies; the native troops are reduced to four battalions, of which two are constituted of six companies each and two of four each. Only one of the two mountain batteries will remain in the colony; the coast guards will be reduced from 400 men to 4 officers and 300 natives; the squadron of cavalry will count only 60 horses, and only three independent sections of engineer troops will be left in the colony. The training, on the other hand, will be far more strictly looked into and the selection of the natives will not

be as wide. In case of disorders the mobile militia of the colony will be resorted to. It has been decided to construct a narrow-gauge railway from Massaua to Asmara, where the seat of the government will be transferred for the greater part of the year. This line, some 125 kilometers long, is estimated to cost 25 millions and to be completed within three years.—*Jahrbücher für die deutsche Armee und Marine, May, 1902.*

JAPAN.

THE ARMY AND NAVY OF JAPAN.

The reorganization of the army, according to an imperial decree, must be conducted so as to be completed by 1903; the *Armeebblatt*, however, states that this will take place sooner. Since 1896 the average annual contingent has increased to 50,000 recruits.

At the present time the Japanese forces comprise: Three armies of 13 divisions, 52 infantry regiments (156 battalions), 13 cavalry regiments (65 squadrons), 13 field artillery and mountain artillery regiments (117 batteries), 7 battalions and 8 half-battalions of engineers, 26 train companies, and 1 railway battalion. For war outside its frontiers, Japan could easily mobilize 7 divisions comprising 140,000 men and 370 guns, while leaving a similar force for home defense.—*Revue de l'Armée Belge, March-April, 1901.*

IMPORTANT MODIFICATIONS IN THE JAPANESE ARMY.

The following important changes are contemplated for the fiscal year of 1902-03 (from April 1, 1902, to March 31, 1903):

1. Clothing and shoes will no longer be manufactured in the army, but only repaired; there will consequently be a reduction in the number of the regimental tailors and shoemakers.

2. Diminution of the central supply depot, in consequence of which there will be a smaller number of the personnel.

3. Each division has heretofore had a prison. There will remain only the following: One in Tokyo for the guard and first division; Asaka, fourth division; Kokura, twelfth division; Taipei, Formosa; and Asahikawa (Hokkeido), seventh division. The other divisions, the second (Sendai), third (Nagoya), fifth (Hiroshima), sixth (Kumamoto), eighth (Hirosaki), ninth (Kanazawa), tenth (Hinseji), and eleventh

(Marugame) will have only a small place of detention for prisoners.

4. The division intendency and the intendency of Formosa will be abolished, and instead of them each division and Formosa will have a small commissary bureau.

5. Reduction of the supply depot for Formosa. Until now all necessaries for the troops were sent from Japan; but now this is not indispensable as order has been established on this island and the greater part of supplies can be obtained on the spot.

6. The strength of the companies in Formosa (three infantry brigades are stationed there) is reduced, that is, the companies numbering 200 men will now consist of only 150. A reduction will likewise be made in the mess allowance for the military personnel stationed in Formosa and Korea.

An economy of 1,043,000 yen will be realized by the changes contemplated.

On the other hand, greater expenditure will be necessitated by the following innovations:

1. Increase of the number of cavalry and artillery horses in peace time, as experience has shown that it is very difficult to obtain good mounts in time of war in a country as poor in horseflesh as Japan.

2. New organization of the siege artillery. So far there was only coast artillery. Henceforth fortress artillery will be divided into two parts—coast and siege artillery. For this purpose a course for siege artillery will be established at the fortress-artillery firing school.

3. Formation of a telegraph battalion at Tokyo.

4. New organization of a central intendency division and increase of the scope of the intendency school, as the division intendencies are abolished and only small commissary bureaus will be established in each division. All paymasters (there are 620 in all) will be dismissed and their functions will fall upon intendency officials. For this purpose the intendency school will be increased so as to supply the necessary number of intendants. It is thought that it will be possible to transact the business with 200 intendants instead of 620 paymasters.

5. Establishment of penal section at Tokyo for men who have been punished five or six times without reforming.

6. Increase of pay to majors—until the present day they received 96 yen (\$94.93 Mexican) per month—by 10 yen (\$9.95 Mexican), of the quarters allowance for officer's aspirants, and the pay of the second-class privates—until the present day 90 sen (\$0.90 Mexican) a month—by 30 sen (\$0.30 Mexican).

There are first and second class privates in the Japanese army.

7. The supply of trained horses to the mounted troops in Formosa.—*Internationale Revue*, April, 1902.

MOROCCO.

ARMED STRENGTH.

There are five Maghzens tribes which do not pay any taxes and are, consequently, at the disposition of the government. Every man not with the colors pays about 0.80 franc per month.

All the other tribes are considered as auxiliary.

The Maghzens tribes supply the personal guard of the sultan, his couriers, the garrisons of certain kasbas, especially those on the boundary between Fez and Morocco.

All the Maghzens tribes furnish tabors; the nouaïbs (auxiliary troops) do the same. The tabor is the only unit known in Morocco. If the chief is popular the tabor is large; if not, there is not a man in it. There are tabors of 4,000 men each, and others of as few as 17 each. Every time that mention is made of a tabor its name must be given. It is that of the tribe which furnishes it.

When necessity arises the tribes furnish auxiliary contingents, the men on foot increasing the tabors and those on horseback forming the cavalry, which must have degenerated since the celebrated bulletin of Isly, for it is anything but redoubtable.

There exists no systematic rule for recruiting. As soon as a tribe grows wealthy and numerous, the sultan sends there a column. One or more tabors of 1,000 men each are raised on the spot. These men must all be young and robust. The families follow these conscripts, who are taken away in chains, and the tribe is sufficiently weakened by this proceeding to calm all the fears of the sultan.

Each tabor is commanded by a caïd aga. It is divided into mia (100), each commanded by a caïd mia. Each mia counts

a certain number of mokhadems, which correspond to non-commissioned officers. All these belong to the tribe which furnishes the tabor.

These three grades represent the whole hierarchy. They do not demand any technical knowledge or give any right to command. They signify only that those who have them are sufficiently rich to pay their posts, where the economy realized upon the pay of their subordinates constitutes their only prerogative.

There exists an allef (paymaster), whom the Europeans call minister of war. He is intrusted with the pay of the army, but in reality commands the army. At the present time this post is occupied by El-Mahadi-El-Menebhi, favorite of the sultan and a creature of MacLeane.

The menebhi, who is not a Maghzen, but a Berber, has two khalifas under him for the purpose of administering and commanding the army; also a number of allefs, who have the same title as he, and who are placed each over one or several tabors.

The soldier gets his pay and must feed himself. The Maghzen furnishes tents and two complete costumes per year. The armament is distributed by mias; normally it is in the hands of the caïd mias, who distribute it only at the time of exercises. This armament is variable. It consists of Martini-Henry and Gras rifles for the men with the colors, but the nouaïbs, who form the nucleus of the army, are armed with stone moukhalas.

The pay varies from 1 grich (0.25 franc) for the private to 2 pesetas per day for the caïd aga who feeds his horses. This is paid very irregularly. Normally, the war minister keeps one day's pay per week, the caïd aga one more, but in reality the five remaining days are not generally paid. All the men have a trade. They are not obliged to be present at exercises; they may even go home. The idea of desertion is unknown.

It is thus that a reenforcement of 800 men, which started in 1886 from Mogador to Sous, arrived there reduced to 50, although pains had been taken to chain them. But if a tabor is to be raised for the purpose of weakening a tribe, certain numbers are called and taken.

From time to time the war minister or his khalifa count the men with the colors. If the caïd aga gives a suitable present, the effective strength is reported complete, otherwise his post is given to another man.

At the present time the sultan pays 40,000 men for 200,000 said to be under arms.

There exists but one mode of punishment—blows with a rope on the small of the back. Every man has the right of appeal to the war minister.

INFANTRY.—The infantry neither shoots nor marches. As a principle there are three exercises a week. An exercise consists of a march lasting from one hour to one hour and a half.

The Harraba battalion (instructors) is directed by the Englishman MacLeane, formerly of the garrison of Gibraltar. He has obtained a baronetcy and calls himself general of the sheriff's army. MacLeane has contrived to lay his hand on all the infantry tabors, with the exception of two, those of the Oudaïa and Cherarda, who are instructed by Algerian noncommissioned officers.

At the present time MacLeane commands at Rabat the Harrabas and a machine-gun section with five pieces, and a tabor of 4,000 men is being organized for him at Caouïa. Six British noncommissioned officers have arrived at Rabat for this purpose.

There is also a tabor of 500 men, recently created at Tanger, commanded in English by pupils of MacLeane.

The tabors of Rabat (75 men), Salé (25 men), and Sasablanca (abandoned a few years ago) have been instructed by the French mission (a captain of infantry, an adjutant of zouaves, two noncommissioned officers of the Algerian rifles).

The strength of the tabors being in close relation to the favor enjoyed by their chiefs, it may be easily seen what is the situation of the French mission as compared to the British.

ARTILLERY.—The artillery consists of four tabors.

The weakest is that of the renegades. It counts 17 men, including 5 Frenchmen, 1 "joyeux," and 1 spahi (deserters).

The strongest is that of the Boukharis, which counts 800 men.

There are neither horses nor mules. For the maneuvers or exercises the necessary animals are taken from the sultan's stables, and sometimes it happens that their service is needed for the harem, and then the artillery has to remain without. Moreover, this artillery is exercised only for ceremonies.

The material consists of one old French 4-pounder mountain gun, two Italian Krupp guns, and some Canet guns.

These latter are not appreciated on account of their being too complicated.

ENGINEERS.—This scientific arm is represented by 70 tolba mohendicins (engineers), who possess a few very elementary notions on geometry. Among them there are some renegades who form the élite. The tolba mohendicin are subordinate to French artillery instructors.

CAVALRY.—The cavalry is constituted solely of contingents of tribes grouped around their caïds. The caïds are, as the mediæval governors of provinces, small sovereigns, possessing all the powers of their grade.

The armament is furnished by the sultan, the horses by the tribes, who are invited to make a present of them to the cidna.—*Armée et Marine, February 23, 1902.*

PERSIA.

FORMATION OF NEW BRIGADE.

According to the *Viestnik inostrannoy voennoi literatury*, the Persian journals *Iran* and *Ittila* announce the formation of a brigade, consisting of three regiments of cavalry and a 6-gun battery of horse artillery, which are being instructed in Cossack tactics by Russian officers. This news is not surprising when the Russian tendency to spread down toward the south is taken into consideration, and in view of the fact that a Russian general is head of the Persian cavalry. The men of the new brigade are recruited, for the most part, in the province of Aderbéidjân, which borders on the Caucasus. The inhabitants of this province are of Turco-Tartar origin, and are regarded as an especially brave and strong race. Each soldier brings his horse and complete equipment with him, with the exception of his carbine, which is presented by the state. The uniform consists of a black tunic, buttoning down the side; an astrakhan cap, high black boots, etc. The training is good; the batteries, however, are not as efficient as they might be, as the horses and wagons are in frequent use by the shah's court officials.—*United Service Magazine, May, 1902.*

PERU.

NEW ORGANIZATION OF THE ARMY.

According to the law authorizing the executive to increase the army to 4,000 men, the president decreed that it should be organized as follows:

A detachment of the general staff with 20 privates.

One regiment of mountain artillery with 665 privates distributed as follows: Two battalions of 7 batteries and one section of sappers.

Seven battalions of infantry with 310 privates each.

One squadron of cavalry, escort of the president of the republic, with 135 privates.

Six squadrons of cavalry with 135 men each.

Two garrison companies of Loreto with 50 men each.

One garrison company of 50 men in the mountains of Puno.

One garrison company of 50 men in the mountains of Cuzco.—*Revista Militar (Brazil), September, 1902.*

ORGANIZATION OF THE ARMY.

According to the law promulgated in June, 1899, all citizens are liable to military service between the ages of 19 and 50.

The army is divided into five classes:

1. The regular army.
2. Supernumeraries.
3. The first reserve.
4. The second reserve.
5. The national guard.

The regular army is subdivided into three groups:

(a) The volunteers: These are men between 19 and 30 years of age who enlist without waiting to be enrolled and those between 23 and 30 years of age who have served the obligatory term and desire to continue the service.

(b) The conscripts: These are young men between 19 and 23 years of age who have drawn lots for service and are on the municipal rolls.

(c) The enlisted men: These are such as have been enrolled in the army for crimes committed.

The three above-mentioned groups are sufficient to keep the regular army on the footing required by law. When circumstances so warrant, the supernumeraries are called to

arms. These are the conscripts included on the municipal rolls and who await their turn to enter the service. When these are not sufficient the reserves are called in.

The first reserve comprises:

(a) Men between 23 and 30 years of age who have served their term.

(b) Men between 19 and 23 years of age who have married before entering the service.

(c) Students of technical schools and universities between 19 and 30 years of age.

The second reserve comprises:

(a) Men between 30 and 35 years of age.

(b) Professors of schools, universities, etc.

The national guard comprises:

(a) Men between 35 and 50 years of age.

(b) Physicians and surgeons of hospitals.

(c) Permanent judges.

(d) Only sons of poor parents who are over 60 years of age.

(e) The sons of widows.

(f) The employees of the post and telegraph services.

(g) Chiefs of bureaus, municipal functionaries (alcaldes municipales), etc.—*Mexico Militar*, October 15, 1902.

PORTUGAL.

REORGANIZATION OF THE ARMY.

The Portuguese army, reorganized by the law of July 13, 1899, which brought about remarkable changes in the recruiting system then in force, has again been the object of measures of the greatest importance, by the division of the kingdom into three great commands.

The continental territory of Portugal had been distributed among four division districts, the headquarters of which were Lisbon, Vizeu, Oporto, and Evora. Each division was subdivided into six regimental subdivisions or bureaus of recruiting and reserve, and the Portuguese army, the constitution of which was based on the principle of regional recruiting, was composed in the following manner:

ACTIVE ARMY.

1. Four divisions, each comprising 1 company of engineers (sappers-miners); 1 regiment of mounted artillery with 8

batteries; 1 regiment of cavalry of 5 squadrons, 1 in the depot; 1 regiment of chasseurs on foot with 3 battalions of 4 companies each, and 2 brigades of infantry of the line with 2 battalions of 4 companies each.

2. Nondivisional troops: Six companies of engineers (1 of drivers, 2 of pontoniers, 1 of telegraphers, one of railway workmen, and 1 of depot); 2 batteries of horse artillery; 2 batteries of mountain artillery; 2 regiments of garrison artillery of 2 battalions of 8 companies each, and 2 brigades of cavalry of 2 regiments with 5 squadrons each, 1 a depot squadron.

3. Troops of the Azores and of Madeira: Three companies of garrison artillery, and 3 regiments of infantry of the line of 2 battalions with 4 companies each.

Deducting the horse artillery and garrison artillery, the Portuguese active army comprised: One regiment (10 companies) of engineers, 4 regiments (32 batteries) of mounted artillery, 8 regiments (40 squadrons) of cavalry, 4 regiments (12 battalions) of foot chasseurs, and 27 regiments (54 battalions) of infantry of the line.*

RESERVES.

When the three classes of the active units had been placed on a war footing by the call to colors of the five classes of the first reserve, the seven remaining classes, constituting the second reserve, were to form:

1. In Portugal proper 5 companies of engineers (sappers-miners, pontoniers, telegraphers, and railway workmen), 4 groups of mounted artillery, each of 4 batteries; 2 battalions of garrison artillery; 8 groups of cavalry, each of 2 squadrons, and 24 regiments of infantry of the line of 2 battalions each.

2. In the adjacent islands, 3 companies of garrison artillery, and 3 regiments of infantry of 2 battalions each.

According to the terms of the decree of December 7, 1901, the continental territory of Portugal is to be divided into three large military districts, the northern, the central, and the southern. The territory of the adjacent islands will continue as heretofore to form two military districts of the Azores and of Madeira.

* The arms of service follow the order of precedence in the Portuguese army.

Each of the large military districts of the continent will comprise divisional circumscriptions, or territorial military divisions, each of these subdivided into two brigade circumscriptions, and each brigade circumscription into two regimental circumscriptions or recruiting and reserve districts.

The military district of the Azores will comprise two recruiting and reserve districts; that of Madeira shall form only one.

Two divisions of the active army shall be recruited and permanently garrisoned on the territory of each great command. The composition of each division shall be the following: One company of sappers-miners, 1 regiment of mounted artillery of 6 batteries, 1 regiment of cavalry of 4 squadrons, 2 brigades of infantry of the line of 2 regiments of 3 battalions each.

The headquarters of the territorial military divisions shall be: For the great northern military district, Oporto and Villa Real; for the central, Vizeu and Coimbra; for the southern, Lisbon and Evora. The command of the territorial military divisions, the seat of which will be at Lisbon, Oporto, and Vizeu, shall be intrusted to a general of division; that of the other divisions may be intrusted to a general of division or a brigadier general. The cavalry and infantry brigades shall be commanded by brigadier generals of the same arm, or colonels of recognized aptitude. The recruiting and reserve districts shall be commanded by infantry field officers.

These dispositions have been completed by a second decree of December 24, 1901, fixing the future composition of the Portuguese army as follows:

ENGINEERS.—The active troops of this arm shall form a regiment of 10 companies—6 of sappers-miners, numbered from 1 to 6; 2 of pontoniers, numbered from 1 to 2; 1 of field telegraphers, and 1 railway company. A section of drivers shall be detailed to each company of pontoniers, telegraphers, and railway troops. The effective strength on a peace footing shall be 47 officers and 1,022 men, with quite a large number of horses and mules. On a war footing the number of officers shall be increased to 65, and of the men to 2,822. There shall be also 3 independent companies—1 of fortress sappers, 1 of torpedoists, and 1 of fortress telegraphers.

ARTILLERY.—There shall be 6 regiments of mounted artillery, numbered 1 to 6, of 6 batteries each; 1 group of 2

horse-batteries; 1 group of 2 mountain batteries; 6 groups of garrison artillery, numbered 1 to 6, of 3 batteries each; 4 independent batteries of garrison artillery, numbered 1 to 4. On a peace footing the battery shall consist of 4 guns and 2 caissons for mounted artillery, and 4 caissons for horse artillery. On a war footing each battery shall have 6 guns with 9 caissons, 3 battery carts, and 1 forge for mounted artillery; 6 caissons, 3 battery carts, 1 forge, and 1 wagon of supplies and forage for horse artillery; 1 reserve limber, 2 echelons of ammunition with 60 boxes and 1 forge for mountain artillery. The batteries which, on a peace footing, have 3 officers and 78 men, 4 officers and 85 men, and 3 officers and 74 men, respectively, shall each have on a war footing 5 officers and, respectively, 159, 187, and 222 men, with the necessary horses and mules.

In time of peace the sixth battery of each regiment of mounted artillery shall be armed with howitzers, and the 6 batteries of 1 regiment shall form 2 groups of 3 batteries each, numbered from 1 to 3.

CAVALRY.—There shall be 10 active regiments of cavalry, numbered 1 to 10, and each regiment shall be composed of 4 squadrons, numbered 1 to 4. The number of sabers per regiment on a peace footing shall be 519, and on a war footing shall be increased to 759.

INFANTRY.—The active infantry troops shall form 6 battalions of chasseurs, numbered 1 to 6, of 6 companies each on a peace footing, and reduced to 4 at the moment of their passing to a war footing; 24 regiments of infantry of the line, numbered 1 to 24, with 3 battalions of 3 companies each; 3 regiments of infantry of the line, numbered 25 to 27, of 2 battalions of 3 companies each.

The battalions of chasseurs shall each have a platoon of sappers and a platoon of cyclists distributed among the companies for their administration; moreover, each company shall be provided with a machine-gun section. The effective strength of the battalion of 27 officers and 498 men on a peace footing shall have double this number of officers and men on the war footing.

The infantry of the line is the arm which will receive proportionally the greatest number of reservists. The effective strength provided in time of peace for a 3-battalion regiment is 38 officers and 567 men; that of a 2-battalion regiment, 28

officers and 438 men; in time of war there would be per regiment 62 officers and 3,012 men in the 3-battalion regiments, and 43 officers and 2,008 men in the 2-battalion regiments. All new creations will be made gradually, beginning July 1, 1902, according to the resources of the budget.

Another decree of the same date, following upon the one mentioned above, relates to the reserves. Portuguese citizens, who were to serve only during fifteen years, three years in the active army, five in the first reserve, and seven in the second, are now liable to military service for ten years more, from 35 to 45 years of age, in a third territorial reserve. The decree says as follows:

The first and second reserves of the army are designed—

(a) To complete the effective strength of army units when passing from a peace to a war footing.

(b) To supply in the same units the losses which take place in the field.

(c) To form position troops specially designated to occupy fortified strategic points.

(d) To form field units which circumstances might demand as troops of the second line.

The men of the third territorial reserve are intended for local defense; they shall be incorporated in centers of resistance which shall be formed in the close vicinity of their homes.

As yet nothing has been changed in the existing formations of the second line, but it is evident that they will soon be the object of new measures. The decree in question allows this supposition, as it indicates that special instructions will intervene to regulate the utilization of the reserves.

With regard to the active army an "Ordem do exercito" of January 8, 1902, indicates how the provisions of the new decrees are to be carried into effect, the scheme being as follows:

ENGINEERS.—Of the present companies the fourth sapper-miners shall be numbered 2, the fifth and sixth shall be the first and second pontoniers, the seventh shall be the field telegraphers, and the eighth the railway company. The company of drivers (second) and the depot company shall be dissolved. There shall be formed three new companies of sapper-miners, which shall take numbers 4, 5, and 6, and 1 company of fortress telegraphers.

ARTILLERY.—The four artillery regiments shall each be reduced from 8 to 6 batteries. The extra batteries and others newly made shall serve to form regiments Nos. 5 and 6. The fifth regiment is about to be organized; the sixth will be organized later. The batteries which shall form part of it, the Nos. 4 and 5 of the first regiment where they were numbered 7 and 8, will continue to temporarily belong to their original unit; Nos. 1, 2, and 3, at present 5 and 6 of regiment No. 3, shall form an independent group.

CAVALRY.—The two new regiments Nos. 9, and 10, will be organized partly by active squadrons from other regiments, where they will be replaced by newly formed or depot squadrons, and partly by depot squadrons of the same origin. It is unnecessary to observe that this increase of the cavalry refers only to the regiments; that of the squadrons does not change.

INFANTRY.—The chasseur companies which will enter into the new formations, where they will be numbered 5 and 6, will be furnished by the abolished battalions. Two companies of regiment No. 4 exceeding the regulation number shall be dissolved; the ten remaining companies (battalions Nos. 3 and 9 in full) will pass to the infantry of the line. In this branch battalion No. 3 shall be constituted for 19 regiments by the fourth companies of the present battalions and by one company newly created; for five other regiments the reorganization will take place by the passing of the companies or even whole battalions from regiment to regiment, namely, by the complete breaking up of regiment No. 15, which will be reorganized by the chasseur battalions Nos. 3 and 9, and by the organization of a few new companies.

Regiments Nos. 25 and 26, garrisoned in the Azores, and No. 27, stationed at Madeira, will remain, as has been said; two battalion regiments and their fourth companies will be dissolved.

Such is the outline of the new organization of the Portuguese army. It shows great progress over the past and on this account merits notice. Its principal effect will be the increase of infantry battalions from 66 to 88, making easier the incorporation of men of the first reserve, and at the same insuring a better defense of the kingdom.

It seems that budgetary resources had to be considered when three companies only were given to the battalions. The

state of the finances did not allow Portugal to increase the expenses of the army, but it is almost certain that the lacking fourth companies will be provided for, to be created at the time of mobilization. The organization of the chasseurs is entirely new. It may be noted, contrary to what will take place in the infantry of the line, that the number of companies is decreased at the moment of passing to a war footing. Two reasons have imposed this measure. The recruiting of the chasseurs being from the whole territory of the kingdom, it would be difficult, at the moment of mobilization, to assemble in the necessary time a sufficient number of reservists to complete the effective strength of the six companies. Moreover, the special instruction received by these companies did not allow giving them as many reservists as to the infantry of the line proper. It seemed, therefore, preferable to re-enforce the effective strength of four companies by the distribution of men from the other two, so as to take as few as possible from the first reserve.

When the new decrees have received their full application, that is, in a very short time, the army of the first line will number about 95,000 men. Adding to it the special formations of the second reserve (65,000 men) and the formations of the territorial reserve (70,000 men approximately), a strength of 230,000 men is reached, showing the maximum of the military strength of the kingdom. If the whole strength is not of the same value, the care taken for the instruction, which is limited to two periods of thirty days each for the men of the first reserve, and two periods of twenty days for the second reserves proves at least that Portugal, the military organization of which is at present at least somewhat similar to that adopted by the great European powers, is making serious efforts to render her army as powerful as the resources of the population allow.—*Revue du Cercle Militaire*, March 22, 1902.

NUMBER OF OFFICERS SERVING IN EAST AFRICA.

According to order No. 12 of December 31, 1901, the number of officers serving in East Africa on that date was the following:

Officers of regular army	
Colonel	1
Majors	2
Captains	18
Captain, surgeon	1
Captain, riding master	1
Lieutenants	25
Ensigns	14
Total	<u>57</u>
Officers in garrison in the province:	
Colonel	1
Lieutenant colonels	2
Major	1
Captains	17
Lieutenants	26
Ensigns	11
Total	<u>58</u>
Royal navy:	
Captain	1
Lieutenant captain	1
First lieutenant	1
Second lieutenants	3
Aspirant of naval administration	1
Machinists	4
Total	<u>11</u>
Grand total	<u>126</u>

—*Revista do Exercito e da Armada, March, 1902*

RUSSIA.

KITCHEN ON WHEELS.

The *Revue du Cercle Militaire* gives the following description of the rolling kitchen used by the Russian troops in the Chinese expedition:

A large iron kettle is placed on the axle of a light carriage attached like a gun to a kind of limber, the body of which can carry a few provisions and combustible material. The kettle is closed by a cover with double turning joint and is

provided with a safety valve. An iron fire box is located under the kettle and is supplied with a chimney about 1 meter in height. The men in charge of the rolling kitchen put water, vegetables, and meat into the kettle before the starting of the troops. Fire is made some two hours before the final halt or the cantoning. One such rolling kitchen is detached per company, squadron, or battery. There does not exist as yet any regulation model, but the one described is in general use.—*Bulletin de la Presse et de la Bibliographie Militaires*, May 31, 1902.

KITCHEN OF A RAILROAD TRAIN.

The *Revue du Cercle Militaire* contains a description of a kitchen connected with a railroad train designed for the transportation of troops by rail, and which has just been experimented with on the line between St. Petersburg and Sebastopol. This car kitchen contains two great iron pots sufficiently large to prepare in them a hot meal for 700 men in one and a half hours, a large boiling kettle, which can contain 430 liters, for the purpose of making tea, a reservoir of 1,230 liters of water, a tank in which to wash the meat, an ice chest, some tables, and some scales.—*Bulletin de Presse et de la Bibliographie Militaires*, November 30, 1902.

SWEDEN.

REORGANIZATION OF THE ARMY.

The reforms sanctioned by the new law on the military service and organization of the Swedish army began to come into operation during the autumn of last year. Although, as is known, this law will not come into full effect until 1914, it may be as well to give now a sketch of the most important innovations introduced by it. Among the latter figures the new organization of the staff service. In order to be appointed lieutenant on the staff every officer must fulfill the following conditions:

1. He must have taken part for three years in all the exercises of the branch of the service to which he belongs.
2. He must have undergone a course at the academy or at the artillery or engineers schools.
3. He must have served a term of probationary duty in each branch of the service other than his own.

4. He must have served as a probationer on the staff for 2½ years, and during that period must have gone through two summer maneuvers on topographical duty, have done duty with the chief section of the general staff and with that of state defense, and, finally, have taken part in staff rides.

5. He must be a good rider.

Should the officer have already taken part in some of the exercises and works mentioned in paragraph 4, the term of this probationary service on the staff may be reduced.

The organization of the army corps staff has also been changed. This staff consists now of the chief of the staff, a staff captain, two orderly officers (one a captain and the other a lieutenant), the principal medical officer of the army corps, engineer officers, and commissariat officials. The staff of an army corps is divided into two sections: the first, under supervision of the chief staff officer, has to elaborate questions regarding preparations for war and the mobilization of the army corps; the second, under the orderly officers, is charged with matters regarding the personnel.

This year the war budget was fixed at 61,839,835 francs. This sum is thus divided: Ordinary expenditure, 45,089,857 francs; extraordinary expenditure, 16,749,984 francs. The budget shows this year an increase of 13,350,000 francs over that of last year; this was necessitated by the new effectives of the cadres. Among the extraordinary expenditures may be mentioned:

	Francs.
Purchase of new rifles and carbines	1,900,000
Purchase of new field guns	2,700,000
Construction of fortified works	2,600,000
Construction of barracks	5,000,000
Subsidies to shooting societies	500,000
Reserve funds	800,000

It may be remarked that the total number of rifles and carbines to be bought by the state amount to 350,000 of the former and 50,000 of the latter. The credits voted this year allow for the purchase of about 150,000 rifles and 20,000 carbines. The carbines should be available the first in order to arm the units of the newly organized engineer, transport, and fortress troops. About 25,000 rifles can be manufactured a year.

As regards the field artillery, a contract was effected by which the Krupp foundries engage to supply Sweden with all the material. The Swedish government, however, reserves to itself the right to manufacture 120 caissons and 23,000 projectiles

in the national works on condition that the Krupp works receive an order of 120 guns with gun carriages and limbers. Experiments with field artillery gun carriages are still being carried out at the present time. In spite of that, in June, 1901, the king of Sweden decided to give out a portion of the order mentioned above, which would tend to show that the definite adoption of the Krupp gun is no longer a matter for doubt.

Experiments have been made in Sweden, as among other powers, as to the best color for uniform, and as a result a neutral tint, a sort of cinnamon grey, has been finally selected. The number of horses for the state has been fixed this year at 9,396, namely: Cavalry, 6,000; artillery, 2,929; engineers, 143; transport, 324.

In conclusion it may be of interest to give some details of the peace effective of the Swedish army when the new law comes into full effect. The personnel of the staff and administration will consist of 374 officers or clerks. The other effectives will be as follows:

INFANTRY.—1,293 officers, 1,041 sergeants, 3,998 corporals, 326 cadets, 4,117 volunteers, and 16,800 recruits.

CAVALRY.—270 officers, 150 sergeants, 910 corporals, 60 cadets, 2,010 volunteers, and 1,500 recruits.

ARTILLERY.—451 officers, 390 sergeants, 1,505 corporals, 144 cadets, 1,192 volunteers, and 3,396 recruits.

ENGINEERS.—128 officers, 108 sergeants, 253 corporals, 15 cadets, 317 volunteers, and 500 recruits.

TRANSPORT.—90 officers, 108 sergeants, 282 corporals, 12 cadets, 156 volunteers, and 156 recruits.

By adding these figures together it will be found that on a peace footing the Swedish army consists of 2,606 officers or clerks, 1,797 sergeants, 6,947 corporals, 557 cadets, 7,792 volunteers, and 22,352 recruits, or altogether 42,031 officers, non-commissioned officers, and men. It may be added that 60,000 men are called out for training each year.—*Journal Royal United Service Institution, November 15, 1902.*

SWITZERLAND.

WAR IDENTIFICATION TAGS—DECREE OF THE FEDERAL COUNCIL,
JANUARY 31, 1902.

In order to be able to recognize soldiers fallen upon the battlefield, the federal council has decided to adopt, in

times of peace, tags for identification, for the picked men of the regiment (élite), for the landwehr of the first ban, also for the recruits; and to insert a credit in the budget for 1903 to be applied for their acquisition. The model submitted consists of a rectangular tag made of celluloid which can be attached to a cord and worn around the neck. The inscriptions are written with a special kind of ink. On the face are inscribed the personal descriptions, such as surname and given name, place and year of birth, and on the reverse side, the military branch of service (rank and unit). The changes which may occur as the result of promotions, transfers, etc., may be easily noted.—*Feuille Militaire Fédérale, February 25, 1902.*

TURKEY.

THE BAGDAD RAILWAY.

The sultan has authorized the construction of a railway which will traverse Asia Minor from west to east and will join the Mediterranean Sea to the Persian Gulf.

This railway will be the shortest route from Europe to India and the extreme Orient.

The railway line will start at Koniah, the present terminus of the Anatolian railway. Crossing the high plateaus of Caramania and the broken mountain chain of the Taurus, it runs into the fertile valleys of northern Cilicia and will join at Adana the already constructed line coming from the port of Mersina.

Its direction from Adana will be east. It will reach the Euphrates at a distance of a few kilometers from Biredjick; crossing the river, it will pass through the northern part of Mesopotamia and reach the valley of the Tigris in the vicinity of Diarbekir; here it will turn to the southeast, stopping at Mardin and the populous and wealthy city of Mossoul; it will then follow the left bank of the Tigris, which it will cross at Bagdad; thence it will run to Moussedjik, Kerbela, and Nedjeb, and end at Bassorah, or perhaps at Koveit, on the Persian Gulf.

Another plan detaches a line from Deli-Abbas, reaching the Tigris at the city of Amarah, crossing the Persian frontier and ending at Fao, on the Persian Gulf.

The plan, including branch lines, provides for 2,500 kilometers of road from Koniah to the sea.

The railway will be a standard gauge single-track road, but appropriations have been made in view of having two tracks in the future.

Rapid trains will run between Constantinople and Bagdad, so that the journey from the capital to the headquarters of an important army unit will not exceed fifty-five hours.

The concession of this railway in Asia Minor was not looked upon with favorable eyes by Russia. The Russian minister of finance advised Russian capital against the enterprise, as immense sacrifices have been made for the construction of the Trans-Siberian and the continuation of the line Orenburg-Tashkent to the Indian frontier.

This is why Russia is keeping aloof, allowing French, German, and Belgian capital to take part in the construction of the railway between Constantinople and Bagdad.—*Armée et Marine, May 11, 1902.*

PERSIAN GULF DEFENSES.

The correspondent of the *Morning Post*, telegraphing from Berlin on the 15th, says: The commission appointed two years ago to draw up plans for the fortification of the Bagdad railway terminus in the Persian Gulf has presented a comprehensive report to the Turkish government.

The commission was assisted in its labors by two German officers.

Its recommendations are: The two Turkish forts at Fao to be reconstructed and provided with modern batteries, and their garrisons to be increased from 65 men to three companies of infantry, together with the requisite number of artillerists; the island of Bubian to be fortified by the establishment of at least two field batteries, each with two heavy pieces of ordnance, on the eastern shore; a similar battery to be established at the promontory Ras Sobnja immediately opposite the southern point of the island of Bubian; on the Arabian coast the promontories of Ras Asheiridz (west of Koweit) and Ras-el-Arif (east of Koweit) to be fortified; the last-named points to be occupied by garrisons appointed by the Sheik of Koweit; the guns to be supplied by Turkey.—*Morning Post, May 15, 1902.*

ARTILLERY.

The Turkish artillery, says *La France Militaire*, consists of 248 batteries, of which 18 are horse, 178 field, 46 mountain,

and 6 howitzer. The Porte is attempting to rearm her artillery with quick-firing guns, and has approached German firms with that object. On account, however, of her financial embarrassments, she has not, hitherto, been able to push forward the work of transformation. In March, 1902, her batteries were distributed as follows among the army corps: First army corps—3 horse, 33 field, and 6 mountain, total 42 batteries; second army corps—3 horse, 33 field, and 8 mountain, total 44 batteries; third army corps—3 horse, 50 field, 12 mountain, and 6 howitzer, total 71 batteries; fourth army corps—3 horse, 30 field, and 10 mountain, total 43 batteries; fifth army corps—3 horse, 18 field, and 3 mountain, total 24 batteries; sixth army corps—3 horse, 9 field, and 3 mountain, total 15 batteries.

The nine other batteries are divided between the Tripoli and Hedjaz divisions, as follows: At Tripoli, 4 field and 2 mountain batteries; at Hedjaz, 1 field and 2 mountain batteries. As soon as the quick-firing guns are delivered, new batteries will be formed, which will be given to those army corps which are least well provided with artillery.—*United Service Magazine, June, 1902.*



VII.—MANEUVERS.

THE AUSTRO-HUNGARIAN MANEUVERS OF 1902.

[REPORTED BY CAPT. F. W. HARRIS, FOURTH CAVALRY, UNITED STATES MILITARY ATTACHÉ AT VIENNA.]

These maneuvers took place from the 12th to the 16th of September, inclusive, in the district of Sasvar, in Western Hungary, and were the culmination of continuous exercises, beginning with brigade maneuvers in the month of August. The brigade maneuvers were succeeded in turn by division and corps maneuvers, the corps being grouped into armies, on the days above mentioned, for the grand maneuvers.

While this report will be restricted to the grand maneuvers of the Austro-Hungarian army, in which the three divisions of the second corps and the two divisions of the fifth corps, one division of the first corps and two divisions of cavalry of the regular army, besides two divisions and one brigade of landwehr infantry, participated, it is important to call attention to the fact that the entire army, except the fourteenth corps, was exercised during the months of August and September in brigade, division, and corps maneuvers. The exercises in the excepted corps did not extend beyond those of the division. The accompanying table, marked A and entitled: "Übersicht der Waffenübungen des k. und k. Heeres im Jahre 1902" (Table of the Military Exercises of the Imperial and Royal Army in the Year 1902) shows the dates, localities, and extent of these practical military exercises. When, after a study of this table, it is borne in mind that the exercises therein represented follow immediately upon constant drill in the schools of the soldier, company, battalion, and regiment during the entire preceding year, some adequate idea may be obtained of the earnest and zealous effort made in this country to maintain one of the best trained and most efficient armies in the world.

The following is a translation of the instructions in detail for the grand maneuvers of this year:

**INSTRUCTIONS IN DETAIL FOR THE GRAND MANEUVERS IN
WESTERN HUNGARY, 1902.**

I.—Directions.

By command of His Imperial and Royal Apostolic Majesty, the chief of the general staff will have charge of the direction of the grand maneuvers in Western Hungary, which will take place from the 12th to the 16th of September, inclusive, this year.

II.—Hypothesis, organization of the troops, and situation at the beginning of the maneuvers.

(Will be published by the chief of the general staff.)

III.—Composition of headquarters and staffs; umpires, assistant umpires, and reporters.

1. The composition of the headquarters of the maneuver direction, which will be established in Sasvar from the 9th to the 17th of September, inclusive, may be seen in Appendix 1; the list of umpires and assistant umpires, in Appendix 2; the list of reporters, in Appendix 3.

The official newspaper reporting will be performed by one representative of the Austrian press and by one representative of the Hungarian press. The intermediary of communication for the newspaper reporters will be Major Aurel von le Beau of the general staff, attached to the detail division of the maneuver direction, under whose orders both gentlemen will be directly placed under all circumstances.

For the mounting of certain officers of His Majesty's suite and of the military attachés attending the maneuvers, hussar regiment No. 16 will detail a cavalry detachment, consisting of 1 officer with 2 horses, 1 mounted noncommissioned officer, 20 mounted hussars, and 20 led horses. All horses must be well broken and perfectly accustomed to troops. The march of the cavalry detachment will be so directed by the commander of the fourth corps that it will reach Sasvar on the 10th of September. During the maneuvers these horses will be saddled with infantry officers' saddles, furnished by the life-guard squadron; but the regulation bridles will be retained. The men will receive, through the commander of the life-guard squadron, during the time they are attached to that squadron, an increase of pay most graciously granted by His Majesty, and the horses will receive an extra supply of forage.

2. The composition of the headquarters of the higher commands may be seen in Appendices 4, 5, and 6.

Their completion follows in Appendices IIa and IIb, which are personal and which will be distributed separately.

To each army, corps, division, and independent brigade, an officer of the general staff will be assigned as reporter (Appendix 3). Special instructions will be published concerning their duties.

For the direction of the service of the telephone detachments, which are formed conformably to Orders, Bureau 5, No. 1073, 1902 (supplement No.

17), the officers of the railway and telegraph regiment designated as commanders of the corps telegraph detachments in case of mobilization are to report to the corps commanders. The above-named regiment will be notified by the corps commanders where and when these officers are to report.

The field gendarmes will report to the corps commanders on the 8th of September.

The corps commanders will notify directly the imperial royal ministry for national defense and the royal Hungarian ministry for national defense where the field gendarmes are to report.

The corps commanders will provide beforehand for the special equipment as well as for the proper mounting of the field gendarmes, in accordance with the "Organic Regulations and Service Instructions for the Field Gendarmerie of the Imperial and Royal Army" (Dienstbuch A—I, tt, Appendix B, sec. 18).

The field gendarmes assigned to the maneuver direction will be equipped by the fourth corps. The maneuver direction will provide their mounts (Appendix 1).

The organization of the field post offices is given in Appendices 4, 5, 6, and 8. The corps commanders notify directly those post and telegraph offices that furnish the civil personnel where and when it is to report. At the same time instructions as to the routes to be followed by the civil personnel are forwarded to the post and telegraph offices concerned. For the duties of clerks and orderlies, those noncommissioned officers and privates designated for this service in case of mobilization will be employed so far as possible; those of the reserve so designated will be employed for this duty only when they have completed their military duties. The civil personnel will carry with it the necessary office requisites. The field postmen will be provided with the prescribed apparatus and equipment.

The field post offices begin operations on the day of their establishment and they will be discontinued on the 17th of September. They will forward and receive ordinary and registered letters and will cash postal money orders. No other mail matter will be handled by the field post offices, nor will they issue postal money orders. Private letters will not be forwarded free of postage.

In other matters, reference is made to the "Organic Regulations and Service Instructions for the Field Post Offices of the Army in Campaign" (Dienstbuch A—I, uu), especially to section 6 (addressing of letters), section 30 (transfer of authority), and section 31 of the service instructions.

The civil commissioners will report on the 11th of September at the places in which the corps headquarters are located. These places will be made known directly and in due time to these officials.

The distribution of the staff troops will conform to Orders, Bureau 5, No. 700, March 28, 1902, and Bureau 3, No. 647, March 22, 1902 (supplement No. II).

For the establishment of the field offices of the higher commanders, the corps commanders will be supplied with funds, in compliance with Appendices IIa and IIb.

IV.—Uniform.

1. All troops and employees will appear during the maneuvers in campaign uniform; officers and officer candidates will not carry revolvers or

holsters. Cavalry troops will carry with them their fur coats (winter "atillas" and fur "uhlanken").

Reservists, as well as the other troops, will be uniformed and equipped in a faultless manner. The required articles of uniform and equipment will be forwarded to the reservists in the theater of the maneuvers at the expense of the appropriation for military exercises.

The officers and men of the Austrian field gendarmerie will wear their helmets, and those of the Hungarian gendarmerie will wear their hats.

2. The staff troops, the personnel of the telephone detachments, servants and grooms in civilians' clothing, sutlers, and civilian teamsters will be provided with the prescribed brassard.

The official newspaper reporters attached to the maneuver direction will be distinguished by a white band, with the word "Reporter," on the left arm.

The umpires, assistant umpires, and reporters, as well as the orderlies assigned to them, will wear a white band, 10 centimeters wide, on the left arm. The same will be worn by the personnel of the branch subsistence depot in Sasvar that is assigned to the maneuver direction (Article XII, par. 4a).

V.—Equipment.

1. Each infantry and rifle battalion will equip four pioneers.

The pioneer sections of the cavalry regiments will take with them the pioneer tools only; the tools for the destruction of railways, as well as explosives and fuzes, will be left behind.

The equipment for pioneer work is not taken along by the squadrons.

Besides the equipment transported in wagons (Appendix 8), each pioneer company will also take with it the portable field equipment. Explosives and fuzes will be left behind.

2. A cavalry telegraph patrol of 8 troopers will be formed and completely equipped (Orders, Præsial, No. 6051, December 24, 1898) in each cavalry regiment. For this purpose, reservists who have not completed their military duties and "furloughed" horses may be called in, if necessary, for twenty days' service.

Instead of the batteries of the war equipment, the telegraph patrols will use the elements of exercise batteries in the battery cases. Each cavalry regiment will be allowed \$2 for the purchase of filling material, candles, etc.

The cavalry telegraph wire, M. 1896, employed by the telegraph patrols in establishing telegraphic connections will not be left in position, when the connections are no longer necessary, but will be taken up by those expressly designated for this duty, and will be taken along in the prescribed form of coils for further use.

An infantry telegraph patrol (six telegraph operators and nine orderlies) is attached to each infantry division. Special instructions will be issued for their detail, equipment, and employment.

A telephone detachment, with apparatus for four stations and 60 kilometers of line material, is attached to each corps, conformably to Orders, Bureau 5, No. 1078, 1902 (supplement No. 17). The men required for this service are detailed in accordance with "Service Regulations and Instructions for the Telephone Detachments of the Imperial and Royal Army"

(Dienstbuch E—35 e). Vacancies in the telephone detachments will be filled by suitably instructed infantry soldiers.

The complete exercise batteries of the telephone detachments will be utilized. The filling and other necessary material for the batteries will be paid for from the appropriation for the army.

The material of the telephone detachments will in no case be supplied to the cavalry telegraph patrols.

With regard to the regulations for the use of State telegraph lines, attention is invited to Orders, Bureau 5, No. 3222, October 29, 1891; Bureau 5, No. 1297, June 22, 1898, and Bureau 5, No. 427, March 19, 1900.

After the close of the maneuvers, all material is to be placed in good condition; the expenses incurred for this purpose, including those of the train divisions for filling and other material for the batteries, will be reported to the ministry of war for payment.

During the maneuvers of recent years, the cable lines of the corps telephone detachments were destroyed in different places and rendered wholly useless by the opposing cavalry, thus subjecting the funds for military purposes to considerable loss. In order to avoid similar destruction in the future, the troops are implicitly directed to spare the cables in question.

3. Field balloon detachments Nos. 1 and 2 of the military aeronautical establishment will be made ready for service. The effective of each field balloon detachment will be as follows:

Six officers, 81 men, 6 officers' servants, 6 saddle and 84 draft horses, train according to Appendix 8, a complete dragon balloon, the reserve equipment for a field station with 120 filled gas receptacles, and a complete spherical balloon with anchoring equipment.

These field balloon detachments will report on the 8th of September at the places named in Appendices IIa and IIb.

4. Each infantry and rifle battalion and each artillery regiment will have four litter-bearers; each cavalry regiment and each corps artillery regiment, two assistant surgeons; each organization will supply the dressing carriers with the old exercise equipment. The dressing carriers will be provided with the required medicines and dressings from the current supplies of the troops.

For the improvement of bad drinking water, the troops will be supplied by the military medical depots with citric acid (one gram per man per day).

5. With reference to the use of field glasses and Zeiss army telescopes, see Orders, Bureau 5, No. 3126, November 19, 1901.

The distribution of these instruments among the higher commands may be learned from Appendices IIa and IIb.

VI.—Maps.

The maneuver maps will be furnished the second and fifth corps headquarters by the Military Geographical Institute not later than August 15 and will be distributed according to Appendix 7. The landwehr troops attached to the infantry divisions of the regular army will receive the necessary maps from the corps commanders concerned; the troops and auxiliary services of the regular army attached to the landwehr infantry divisions will receive their maps from the commanders of these divisions.

The umpires, assistant umpires, and reporters will receive the necessary maps from the maneuver direction.

VII.—Ammunition.

1. The following number of blank cartridges, with smokeless powder, will be issued.

For each repeating rifle, 50; for each repeating cavalry carbine, 20; for each repeating pioneer short rifle, 30. For each gun 100 rounds of blank ammunition will be issued with smokeless powder, and the corresponding number of friction primers. The artillery ammunition will be carried in the limber chests and in the country wagons that are allotted, as is indicated in Appendix 8.

In addition, each regular and each landwehr infantry division will be supplied with six battalion ammunition wagons, each wagon carrying 25,650 8-millimeter blank cartridges. These ammunition wagons form the division ammunition park.

The supply of this extra ammunition will conform to Orders, Bureau 7, No. 4516, 1902.

2. The amount of ammunition actually fired by the different organizations will be reported to the ministry of war by the corps commanders before the end of October.

3. The unused small-arms ammunition will be added to the annual allowance of exercise ammunition of the troops; the unused artillery ammunition will be turned in to the ordnance depot in Wollersdorf.

4. Of the small-arms ammunition, 40 per cent of shells and 60 per cent of the powder charges will be issued gratuitously; requests for extra supplies of parts of the ammunition will not be submitted.

VIII.—Hospitals.

Each division and each independent brigade will be furnished with one hospital, which will consist of the wagons mentioned in Appendix 8, and of the prescribed equipment. An officer, for whom a public horse will be furnished, or an officer candidate will be assigned to each hospital, and four men of the hospital corps will be assigned to each ambulance. The required medicines and dressings will be drawn from the current supplies of the garrison hospitals concerned. The quantity of refreshing food (tea, sugar) will be fixed by the surgeon general and supplied by the garrison hospitals concerned in the maneuvers.

Each hospital will be furnished with a Berkefeld pump filter, which will be used, when necessary, for the supply of drinking water for the troops.

IX.—Train.

1. During the maneuvers, the maneuver direction will be furnished by the fifth corps with seven carriages (four of these to be four-seated) and six wagons.

The supply officer of the maneuver direction takes over these vehicles.

2. The commanders and troops will be provided with the train specified in Appendices 8 and 9, on the evening of September 11.

The wagons designated for the transportation of baggage will be attached to the fighting train.

3. The draft horses for the division ammunition parks will be furnished by the respective division artillery regiments; those for the tool wagons of the pioneer troops, by the respective pioneer battalions; finally, those for the field balloon detachments, by the military aeronautic establishment. Horses for the other government wagons mentioned in Appendix 8, including those for the landwehr, will be furnished by the train divisions designated for this purpose in the organization of the army.

Draft horses will be used in the squadron wagons of the cavalry (Appendix 8).

With regard to the calling in of "furloughed" horses, instructions have already been published in Orders, Bureau 5, No. 1273, 1902.

4. The "furloughed" horses will be sent for by the organizations to which they are assigned and will be broken in for two or three days.

The forwarding of the "furloughed" horses from the cavalry reserve cadre stations to the stations of the train, thence to the theater of maneuvers, will be effected, within distances of 100 kilometers, by marching; beyond this distance, by railway transportation.

5. The calling in of the teamsters for the division ammunition parks and for the tool wagons of the pioneer troops has already been provided for in Orders, Bureau 2, No. 1087, 1902 (supplement No. 7).

Any lack of teamsters for the train troops will be made up by the calling in of lance corporals and privates who are still subject to military duty. The date for calling in these men will be so fixed that they may be employed, if necessary, in bringing in and returning the "furloughed" horses.

6. Civilian teams will be hired for the time only that is absolutely necessary and at the cheapest possible daily wages.

7. The presence of sutlers within the number authorized by the "Instructions for the Subsistence of the Army, Second Part, Section 98," will be permitted.

After the close of the maneuvers the public wagon transportation will be carefully inspected and placed in a perfectly serviceable condition before it is turned in to the depots.

The repair of this transportation will be made on the account of the appropriation for war material. For all wagons, harness, and riding equipment taken to the maneuvers from the depots of extra supplies, there will be granted an extra money allowance to the amount of the allowance for one month for material in actual use (Table of Allowances for the Imperial and Royal Army, First Part, Sections 111 and 112); for the field postal wagons, a money allowance for two months; for each bridge equipment taking part in the maneuvers, an extra money allowance for material to the amount of about \$40, on the account of Title VII, Item 49, of the ordinary appropriation for 1902. These allowances must suffice absolutely for the purposes mentioned. For the additional equipment of wagons, horses, etc., employed during the maneuvers, no extra money allowance will be requested.

The "furloughed" horses employed as draft horses will be given a rest of one or two days by the cavalry reserve cadres before delivering them to the troops that are to use them.

Musicians' horses and sutlers with their teams may be forwarded by rail, at the expense of the appropriation for the army, with those troops that are returned to their stations by this kind of transportation.

X.—Field Damages.

1. The estimate of field damages and the compensation therefor must conform to the instructions on this subject (Dienstbuch E—23 a), and the executive regulations supplementary to section 56 of the law for quartering soldiers.

2. For the settlement of all claims that can not be satisfied in an amicable manner by the troops themselves or by military representatives appointed for this purpose, the commanders of the second and fifth corps will create, after the end of the maneuvers, as many field-damage commissions as may appear to be necessary for the completion of the field-damage estimates within a period not exceeding two weeks. These will enter into a mutual understanding and will establish accurately the limits of their operations.

3. In order to prevent the duplication of claims each reimbursement for damages will be reported to the corps commander, at the latest, on the day following the payment, with an accurate statement concerning the receiver and the days and places of the damages. The corps commander will furnish the respective field-damage commissions with a compilation of these data.

XI.—Allowances.

1. Up to September 11, inclusive, the general orders for military exercises in the year 1902 (Appendix I to Orders, Bureau 5, No. 700, 1902), will govern in the matter of allowances.

2. From the 12th to the 16th of September, inclusive, there will be paid to all officers, military employees, and officer candidates taking part in the maneuvers in western Hungary, an "exercise" increase of pay equal to twice the "march" increase of pay; to cadets, the same increase of pay as to officer candidates, and to the men an "exercise" increase of pay equal to the "march" increase of pay.

In addition, the civilian employees and the men, including the one-year volunteers paying their own expenses, and the civilian servants of officers will be entitled to the march rations, namely, three field and two reserve rations, and to a daily increase of subsistence pay of 4 cents. For those days on which the reserve rations are issued, an allowance of 200 grams of meat per ration will be granted, in addition to the increase of subsistence pay.

The beef component of the field ration will be 800 grams. Tobacco can not be supplied. The reserve ration will be composed of field conserves (400 grams of zwieback, 200 grams of compressed meat and vegetable cake, 25 grams of salt, and one coffee conserve, consisting of 28 grams of coffee and sugar). The breakfast soup and the black coffee will be supplied throughout the maneuvers in the form of conserves.

The commutation of bread and of the cooked components of the ration will not be permitted. If, in special cases, commutation must be resorted to, the following commutation prices will govern:

	Cents.
For one ration of bread at 700 grams	2
For one ration of flour soup	5
For one ration of beef at 300 grams	8
For one ration of vegetables, with seasoning.....	1.2
For one ration of coffee.....	1.6

The zwieback and the other articles of the reserve ration will not, under any circumstances, be commuted.

Three field and two reserve rations will be issued for each horse from the 12th to the 16th of September, inclusive; in addition, one field ration of oats will be allowed for each day on which the reserve ration is issued.

For the supply of firewood for cooking and for camp fires, money allowances will be granted. During the grand maneuvers in western Hungary, these allowances have been fixed as follows:

For the headquarters of the maneuver direction	\$16.00
For the headquarters of an army	8.00
For the headquarters of a corps	4.00
For the headquarters of a division	4.00
For the headquarters of an independent brigade	2.00
For the headquarters of an infantry regiment	2.00
For the headquarters of a cavalry regiment	2.00
For a subdivision (balloon detachment)	4.00

The allowance for the headquarters of a division includes that for the headquarters of its brigades and for its hospital; the allowance for the headquarters of an independent brigade includes that for its hospital.

The staffs not included in the above table participate in the allowances of their subdivisions; the ammunition parks participate in the allowances of the corresponding artillery regiments.

3. Beginning with the 17th of September and during the return march, the troops and commands will receive the normal march allowances.

In those cases in which the troops cook their own rations (that is, when the march rations are not delivered by the Supply Department, or when the railway dinner is not furnished), the troops are entitled to their subsistence money, together with an extra allowance of about 1 cent per man per day for the improvement of their rations.

In addition there will be issued gratuitously, on the 17th of September, to each man of all troops, one meat, one soup, and one coffee conserve, and to each horse one reserve ration of oats.

4. The civil commissioners and the employees, drivers, and office servants of the field post office are entitled equally with the military employees to temporary quarters; however, any extra charges for these quarters must be paid by these persons from their own funds, according to the regulation tariff of the law for quartering troops. If a civil commissioner or a postal official be accompanied by a servant, the latter will be entitled to the quarters and allowances of an officer's servant, on the account of the appropriation for the army.

The noncommissioned officers and privates attached to the field post offices receive the same allowances as do those on duty with their organizations.

5. The teamsters and horses of the civilian transportation receive no rations. However, these teamsters will be permitted to purchase bread and the other articles of the ration at the average cost price of the same. The same rule holds good with regard to forage for the horses of the civilian transportation.

XII.—Rations.

1. Rations will be issued to the commands and troops on the evening of September 11 as follows:

To each man, one field and two reserve rations, together with one ration of zwieback, and one meat, one soup, and one coffee conserve: to each horse, three reserve rations of oats.

The daily field ration per man and one field ration of oats per horse. The latter will be carried in the supply wagons or by the troops.

On each of three days, meat in the quantity of the field ration of 300 grams per man, and on each of two days in the quantity of 200 grams per man, will be issued (on the 12th of September, butchered, and on the other days on the hoof).

To the infantry, cavalry, and brigade subsistence columns, one field ration per man and three field rations of oats per horse.

These rations will be used as follows:

Three field rations of food and of oats and two reserve rations of food and of oats from the 12th of September to the 16th of September, inclusive; one field ration of oats as an extra allowance on those days on which the reserve rations of oats are used; finally, one ration of zwieback and one meat, one soup, and one coffee conserve, and one reserve ration of oats on the 17th of September (see Article XI, par. 3).

2. With regard to the supply of subsistence stores, the following regulations will govern:

(a) The corps commanders will provide independently for the feeding of their troops up to the 11th of September, inclusive.

(b) As the more restricted situation at the beginning of warlike conditions will be made known only shortly before the beginning of the maneuvers, the supplies in zwieback, conserves, and oats, and the camp equipage required for the time from the 12th to the 17th of September, inclusive, and which will be provided by the corps intendants, will be collected and held ready in the places named in Appendices IIa and IIb, so that they may be drawn without delay, on the orders of the corps commanders, after the publication of the situation at the beginning of warlike conditions.

The bread required from the 12th to the 16th of September will be baked in double-ration loaves, with 700 grams to the ration, of wheat and rye flour in the ratio of one-third of the former to two-thirds of the latter. The supply of the necessary wheat flour (class No. 5 of the Budapest steam mills) will be obtained by purchase.

The zwieback and oats will be drawn from the depots of war supplies and the meat conserves from the subsistence stores provided for the year 1902. The other conserves will be specially supplied.

All the other articles and the beef cattle will be purchased and their supply will be effected, so far as practicable, by the troops. Hay and the straw allowed for rubbing down the horses, wood for cooking, and, if necessary, for heating, will be secured by the troops as these articles are needed.

For the return march, the following orders will be observed:

(a) The corps commanders will issue independently the necessary orders for the return of those troops that rejoin their stations by marching. In

this connection, they will receive further instructions at the beginning of September.

(b) For those troops returning by railway, commutation of the breakfast and of the travel ration will be authorized on the day of the journey. If bread can not be supplied in kind its commutation will be authorized.

Bread, meat conserves, and oats will be placed in readiness for the feeding of the troops and horses transported by railway. The quantity of these supplies and the dates and places of their collection will be made known later.

The field railway transportation direction will forward these supplies to the loading stations, where they will be received by the troops in quantities depending upon the length of the journey to be made.

Furthermore, an effort will be made to furnish the railway midday meal to those troops traveling by railway that remain for a longer time on the journey. This will be provided for in the marching orders. The troops will not pay, but will receipt, for the railway midday meal. If rations be furnished in kind, commutation of the traveling rations will not be paid. Any hay that may be required during the railway journey will be purchased by the troops before entraining.

On the return march, unbroken packages of meat conserve will be paid for at the rate of 4 cents each.

3. In those cases in which their rations can not be delivered in the way prescribed for the troops, reconnoitering patrols and detachments and the men of the field telegraph detachments may purchase the authorized quantity of the articles of the ration, or may request them from the local authorities on receipt and subsequent payment.

4. The subsistence depots will be established as follows:

For the maneuver direction, the commander of the fifth corps will establish in Sasvar, on the 4th of September, a branch subsistence depot with supplies, cooked and uncooked, for ten days for the men and horses of the maneuver direction, the umpires, and the assistant umpires.

For the army corps, the corps commanders will establish, at their own discretion, the absolutely necessary branch subsistence depots.

As a rule the establishment of subsistence depots beyond the limits of the territory in which the army corps find themselves at the beginning of warlike conditions will not be permitted.

On account of the necessity of maintaining tarpaulins in good condition their use will be avoided as much as possible.

One official and 20 pupils of the school in Vienna for candidates for the subsistence department and for one-year volunteers will be attached to the headquarters of the second corps; one official and 20 pupils of the corresponding school in Budapest will be attached to the headquarters of the fifth corps. They will be ready for duty from the 1st of September. The corps intendants will apply for them directly to the subsistence depots in Vienna and Budapest, respectively. The pupils will be employed sufficiently for instruction in the duties of noncommissioned officers.

5. In order that the least possible quantity of bread and other articles of the ration may remain on hand after the close of the maneuvers, the probable requirements for the return march will be ascertained as accurately as possible. Should, however, supplies remain over, they will be charged on the money allowance for subsistence, and to this end will be

turned in by the corps commanders to the nearest garrisoned post. In this case, the following commutation will be paid: For the ration of meat and vegetable conserve, the value of the ration of fresh vegetables; for the ration of soup conserve, $\frac{1}{3}$ of a cent; for the ration of coffee conserve, $\frac{1}{3}$ of a cent.

XIII.—Return from the maneuvers.

1. The troops will be returned from the theater of the maneuvers as follows:

(a) By marching: The mounted Austrian landwehr troops; the foot troops of the garrisons of Ungarisch Hradisch, Tyrnau, Trentschin; all the cavalry and artillery troops, the squadron wagons accompanying the cavalry; all public wagons.

(b) By rail: The Austrian and Hungarian landwehr foot troops; the higher commanders; all other troops, with their sutler wagons; the public wagons left without teams after sending away the "furloughed" horses (par. 4); the field post office wagons and teams.

2. The men of the eighth, forty-ninth, seventy-sixth, eighty-third, and eighty-fourth infantry regiments, of the infantry battalions 2-54 and 4-54, and of the eleventh, seventeenth, and twenty-first rifle battalions that will be entitled to their furlough will be sent directly from the theater of the maneuvers to the stations of their respective reserve cadres.

The furloughed men of the other troops will generally be returned with their organizations.

In order that the necessary number of cars may be available in due time for sending away the furloughed men and the reservists from the garrisons, commanding officers will report to the respective railway station masters, as soon as possible after the return from the theater of the maneuvers, the probable amount of transportation required.

3. The reservists will be returned directly to the depots, those of the seventy-first regiment by marching, all the others by rail.

4. The "furloughed" horses used in the cavalry staff detachments, for the mounting of military persons, and for draft purposes, will be returned to the stations of the cavalry reserve cadres. If the distance is within 100 kilometers, the return will be made by marching; if the distance exceeds 100 kilometers, the return will be made by railway transportation. If, however, in returning these "furloughed" horses by marching, the prescribed limit of time for their military use can not be observed, the order on which they were taken from their civilian keepers must be presented, in order to obtain transportation for them by railway.

The "furloughed" horses will not be sent away until the wagons to which those used for draft purposes belong have been delivered at the stations at which these wagons are to be loaded.

5. The officers, veterinarians, and noncommissioned officers of the train troops, as well as the aids, supply and medical officers, officers of the pioneer troops, field gendarmes, etc., who will be on duty with the higher commands and foot troops, and who will be mounted on public horses, together with the men on duty under these officers, and the cavalry staff troops will, without exception, report on the 17th of September to their organizations, or to their cavalry staff detachments, respectively, and will return with the latter to their stations.

6. The return of the troops by marching will be ordered by the corps commanders, among whom there will be, when necessary for this purpose, a mutual understanding. The return of the staff cavalry of the maneuver direction and of the cavalry detachments attached thereto will be ordered by the commander of the fifth corps.

The field railway transportation direction attached to the maneuver direction will be charged with the return of troops by railway transportation.

7. All commands, troops, and detachments taking part in the maneuvers that are to be returned, wholly or in part, by railway, will immediately prepare the lists required for this transportation (supplement to section 26 of the "Instructions for Military Railway Transportation"). In these lists, the number of men remaining present in the organizations, of those entitled to furlough, and of the reservists, will be separately noted; the places of destination (for Vienna, the railway station also) of the different organizations to be transported, as well as those of the sutler wagons, will be accurately specified; however, those traveling individually will not be mentioned. The strength will be stated by battalion. The column headed "Daily Requirements" must absolutely be filled in, and the number of rations of bread of 700 grams each must be stated; if, however, no bread or forage is required, this fact will be mentioned under the heading "Remarks."

Until the 1st of August these lists will be sent directly to the ministry of war.

XIV.—Accounts and vouchers.

1. The accounts of the supply officers attached to the various headquarters will be submitted to the respective commanders; except those of the supply officer attached to the headquarters of the maneuver direction, which will be forwarded to the chief intendant of the fifth corps.

The instructions concerning the accounts of the troops (companies and supply officers) will be published as supplements to the Official Gazette, conformably to the existing regulations for mobilization.

So far as is possible, the supply depots that are to be established will be administered independently. The returns will conform to the "Instructions for the Subsistence of the Imperial and Royal Army, II Volume, Third Part." The accountability of these depots, which will include the turning-in of the utensils and material that may be used in the issue of rations to the troops, will devolve upon the permanent supply depot charged with the establishment of the depots utilized during the maneuvers.

2. In those cases in which retail purchases are made, during the maneuvers, at farms and small hamlets where stamps are not obtainable, the stamp dues will be charged to the account of the appropriation for the army in such a way that the vouchers (bills, receipts, retail purchase journals, etc.) relating to the returns may be stamped by the accounting officer subsequently and in regulation manner.

3. All the other extra expenditures that arise from the grand maneuvers in western Hungary will be accounted for under Article VII, Item 49, of the ordinary appropriation for the army for 1902, and will be reported to the ministry of war before December 15.

The increased cost of the active service of the balloon detachments for hydrogen, auxiliary, and construction material will be charged under Item 40 of Article VII. Separate vouchers for these expenditures will therefore be submitted.

4. The rations issued to the landwehr troops and all the necessary expenditures for these troops will be reported before the 15th of December, through the proper corps supply department of the expert accounting bureau of the ministry of war, with a view to taking the necessary steps for reimbursement. All the articles of the ration, with their original cost, will be included in these accounts.

Appendix 1.—Headquarters of the maneuver direction.

General Baron Von Beck, chief of the general staff.

Attached: One captain of the general staff.

OPERATIONS DIVISION.

One colonel, one lieutenant colonel, and four captains of the general staff; one first lieutenant of infantry, and two noncommissioned officers, the latter detailed from the office of the general staff.

DETAIL DIVISION.

One colonel, one major, and one captain of the general staff, the major being charged with the duties of press superintendent; one noncommissioned officer from the direction bureau of the general staff; one noncommissioned officer of infantry, assistant to the subsistence officer.

ORDERLY OFFICERS.

Two officers from the war college; two officers from the military riding institute.

BICYCLISTS.

Four officers and four noncommissioned officers from the military fencing and gymnastic school.

FIELD GENDARMES.

Four mounted and four dismounted field gendarmes of the royal Hungarian gendarmerie. They will report at Sasvar on the evening of September 8.

FIELD PRESS DIVISION.

Four presses and the personnel required therefor will be assigned to the military geographical institute. The presses and personnel will arrive at Sasvar on the 8th of September.

POST COMMANDER AND BILLETING OFFICER.

A captain of infantry.

COMMISSARY OFFICER.

A first lieutenant of infantry.

SURGEON.

A staff surgeon, for whom a mounted dressing-carrier will be detailed from the staff cavalry detachment. The carrier will be provided with

an exercise equipment. The required medical supplies will be taken from the current stores.

STAFF TROOPS.

Infantry: Half a company, to be designated by the commander of the second corps, and consisting of two officers and fifty-two men, including two musicians, four infantry pioneers, one cook for officers, and one cook for enlisted men. This detachment will reach Sasvar on the morning of September 4, and will be provided with an officers' field oven.

Cavalry: Half a squadron from a regiment of hussars of the fourth corps, consisting of one officer, five noncommissioned officers, one trumpeter, two cooks, one veterinarian, one dressing carrier, and sixty-one troopers. This detachment will reach Sasvar on September 8.

The staff troops will be forwarded by the respective corps commanders, the infantry by rail, and the cavalry by marching.

In those cases in which the time and place of reporting are not specially fixed for the above-named persons, the necessary orders will be issued directly by the chief of the general staff.

The officers of the general staff will take with them their private horses. The orderly officers will each take two horses; if they do not possess private horses they will be mounted on public horses by the war college or the military riding institute. The mounted gendarmes will be provided with public horses by the staff cavalry.

FIELD RAILWAY TRANSPORTATION DIRECTION.

One major of the general staff; one major and seven captains of the railway bureau of the general staff, to be detailed by the chief of the general staff; the railway-line commandants of the first, second, and fifth corps; one military intendant, and one noncommissioned officer of the railway bureau of the general staff; representatives of the railways concerned; two soldiers as orderlies, to be detailed by the commander of the second corps.

The field railway transportation direction will be established in Lundenburg on the 14th of September.

OFFICERS ASSIGNED TO DUTY WITH THE MANEUVER DIRECTION.

General von Kropatscheck, inspector general of artillery, with one colonel.

Lieutenant General Count Paar, inspector general of cavalry, with one major.

Mounted officers will notify the railway bureau of the general staff, before the 1st of August, of the number of horses, grooms, and servants that they intend to take with them.

Appendix 2.—Umpires and assistant umpires.

Lieutenant General Baron Von Albori, with his aid-de-camp; eight other lieutenant generals, eleven major generals, four colonels of infantry, seven colonels, one lieutenant colonel, four majors, and twenty-three captains of the general staff.

1. A number of umpires and assistant umpires will be attached permanently to the higher commanders, who will provide quarters and subsistence for such umpires and who will detail the orderlies required for

their messenger service. Some of these umpires and assistant umpires will report at Sasvar on the afternoon of September 13.

2. The other umpires and assistant umpires will be quartered and subsisted, throughout the maneuvers, at the station of the maneuver direction in Sasvar.

3. The umpires will arrive on the 10th of September at the places to be designated later by the chief of the general staff. The officers referred to in the preceding paragraph will report at 5 o'clock p. m. on September 10 to the chief of the general staff.

4. The umpires and assistant umpires will take with them their private horses. The number of horses, grooms, and servants that are to be taken along will be reported to the railway bureau of the general staff before the 1st of August.

5. Further orders for the umpires and assistant umpires will be issued directly by the chief of the general staff.

The railway bureau of the general staff will transport to the theater of the maneuvers the horses of those officers proceeding there from Vienna and from the theater of the maneuvers to their respective stations, also the horses of all the umpires and assistant umpires.

Appendix 3.—Reporters.

Two colonels, one lieutenant colonel, two majors, and ten captains of the general staff and one first lieutenant attached to the general staff.

1. The reporters are assigned directly to the various organizations by the special orders of the chief of the general staff.

2. On each day of combat there will be detailed by the higher commanders concerned, for each reporter attached to the headquarters of an army or of a corps, three troopers as permanent orderlies; for each reporter attached to the headquarters of a division or of a brigade, there will be detailed two such orderlies. In addition, the military fencing and gymnastic school will detail ten noncommissioned officers as bicyclists, who will be assigned to the reporters by the chief of the general staff.

3. The reporters will take with them their private horses. The number of horses, grooms, and servants to be taken along will be reported to the railway bureau of the general staff before August 1.

The railway bureau of the general staff will transport to the theater of the maneuvers the horses of those officers proceeding there from Vienna, and from the theater of the maneuvers to their respective stations the horses of all reporters.

Appendix 4.—Headquarters of an army.

Army commander.

Chief of staff.

OPERATIONS DIVISION.

One officer of the general staff as chief and detailed by order of the chief of the general staff; a number of superior officers of the general staff as assistants and also detailed by order of the chief of the general staff.

One official of the supply department, provided with a public horse.

One superior officer as superintendent of office work.

Two noncommissioned officers as clerks.

DETAIL DIVISION.

One field officer of the general staff as chief and detailed by order of the chief of the general staff; a number of officers of the general staff as assistants, also detailed by order of the chief of the general staff.

One superior officer as superintendent of office work.
Two noncommissioned officers as clerks.
Four printers.

ATTACHED TO THE DETAIL DIVISION.

One aid-de-camp and six orderly officers of the army commander, to be mounted, if necessary, on public horses.

One officer and four enlisted men as bicyclists.

Five field gendarmes mounted on public horses and three dismounted field gendarmes of the imperial royal or of the royal Hungarian gendarmerie.

Field post office: Two officials, one driver, and one servant from the imperial royal or the royal Hungarian post office department, one non-commissioned officer as clerk, one private as orderly.

One subaltern of the train as train commandant of army headquarters.

The commander of the staff infantry as post commandant.

One commissary officer, mounted on a public horse.

The commander of the staff cavalry as billeting officer.

One surgeon, mounted on a public horse.

TRAIN.

One veterinarian.

One mounted sergeant as staff wagon master

STAFF TROOPS.

Infantry: One officer, 25 men.

Cavalry: One officer, 30 men.

Appendix 5.—Headquarters of a corps.

Corps commander.

Chief of staff.

STAFF.

Officers of the general staff and superior officers attached thereto, to be detailed by order of the chief of the general staff.

One captain of engineers.

One officer as superintendent of office work.

Two noncommissioned officers as clerks.

Two printers.

ATTACHED TO THE STAFF.

One aid-de-camp and three orderly officers of the corps commander, the latter to be mounted, if necessary, on public horses.

One officer and four enlisted men as bicyclists.

One officer of the railway and telegraph regiment, mounted on a public horse, in charge of the telephone detachment.

Gendarme detachment: One captain and six field gendarmes, mounted on public horses, and four dismounted gendarmes of the imperial royal or of the royal Hungarian gendarmerie.

Field post office: Two officials, one driver, and one servant of the imperial royal or of the royal Hungarian post office department; one noncommissioned officer as clerk and one private as orderly.

One subaltern of the train as commandant of the train of corps headquarters.

The commander of the staff infantry as post commandant.

One commissary officer, mounted on a public horse.

The commander of the staff cavalry as billeting officer.

One chief quartermaster, mounted on a public horse.

Two officials of the quartermaster's department, mounted on public horses.

Two noncommissioned officers as clerks and one civil commissioner for the office of the chief quartermaster.

ASSISTANTS.

For artillery affairs: One artillery brigadier, with his adjutant general.

For pioneer affairs: The commandant of the pioneer detachment attached to the corps, with his adjutant.

For train affairs: The field officer or captain of the train troops as corps train commandant, with his adjutant.

For medical affairs: One corps chief surgeon, mounted on a public horse.

TRAIN.

One veterinarian.

One mounted sergeant as staff wagon master

STAFF TROOPS.

Infantry: One officer and 25 men.

Cavalry: See Article III, next to last paragraph.

Appendix 6.—Headquarters of a division, including the headquarters of its two brigades.

Division commander.

Two brigade commanders.

STAFF.

One chief of staff.

One captain of the general staff and the officers attached to the staff, to be detailed by order of the chief of the general staff.

Four noncommissioned officers as clerks, including one for each brigade.

Two printers.

ATTACHED TO THE STAFF.

Four orderly officers, including one for each brigade commander, to be mounted, if necessary, on public horses.

Five enlisted men (noncommissioned officers or privates), including one for each brigade, as bicyclists.

Gendarme detachment: Three field gendarmes, mounted on public horses, and three dismounted field gendarmes of the imperial royal or of the royal Hungarian gendarmerie.

Field post offices: Two officials, one driver, and one servant, of the imperial royal or of the royal Hungarian post office department; one non-commissioned officer as clerk and one private as orderly.

One subaltern of the train as commandant of the train of division headquarters, eventually of the combined fighting train.

One division commissary, mounted on a public horse.

One mounted sergeant as staff wagon master.

The commander of the staff infantry as post commandant.

One commissary, mounted on public horse, for headquarters.

The commandant of the staff cavalry as billeting officer.

Quartermaster's department: One chief quartermaster, mounted on a public horse; one assistant quartermaster, mounted on a public horse; one noncommissioned officer as clerk.

One captain of the train as division train commandant.

One division chief surgeon, mounted on a public horse.

STAFF TROOPS.

Infantry: One officer, 15 men.

Cavalry: See Article III, next to last paragraph.

(The composition of the headquarters of a cavalry division is the same as that of the headquarters of an infantry division, except that the former has six instead of four orderly officers; one officer in charge of the cavalry telegraph service; one officer in charge of the technical service; three noncommissioned officers as trumpeters, including one for each brigade commander; four instead of three mounted, and two instead of three dismounted field gendarmes; and one instead of two civilian officials of the post office department.)

Appendix 7.—Distribution of maps.

To each army and corps headquarters, four maps of the scale of 1:750,000; fifty of the scale of 1:200,000, and fifty-five of the scale of 1:75,000.

To each division headquarters, three maps of the scale of 1:750,000, thirty of the scale of 1:200,000, and four of the scale of 1:75,000.

To each brigade headquarters, one map of the scale of 1:750,000 and four of the scale of 1:200,000.

To each infantry, cavalry, and artillery regimental commandant, to each telephone detachment, two maps of the scale of 1:200,000.

To each cavalry squadron, five maps of the scale of 1:200,000.

To each battalion, group of three squadrons (called a division), company, battery, cavalry pioneer platoon, cavalry telegraph patrol, war bridge equipage, division ammunition park, division hospital, brigade hospital, field post office, transportable field-bakery section, each infantry and cavalry brigade subsistence column, one map of the scale of 1:200,000. The balloon detachments and the infantry telegraph patrols will be furnished with the necessary maps by the army and infantry division commanders, respectively.

Appendix 8.—Train.

The commanders, troops, and establishments will be provided with the following transportation, beginning with the evening of September 11.

Army headquarters: One four-horse office wagon and one two-horse passenger wagon for the field post office; three passenger, five baggage, and five commissary two-horse country wagons; one automobile.

Corps headquarters: One four-horse postal wagon, one automobile, and the same number and kind of country wagons as for an army headquarters.

Division headquarters: The same number and kind of postal wagons as for an army headquarters; one passenger, three baggage, and three commissary two-horse country wagons, and, for a cavalry division, one automobile.

Independent brigade headquarters: One passenger, one baggage, and one commissary two-horse country wagons; one four-horse and one two-horse postal wagons.

Infantry regiment of four (or three) battalions: One passenger, nine (or seven) baggage, and nine (or seven) commissary two-horse country wagons.

Independent battalion: One passenger two baggage, and two commissary two-horse country wagons.

Cavalry regiment: Six two-horse squadron baggage wagons; one baggage and fourteen commissary two-horse country wagons.

Artillery regiment of sixteen (or thirty-two) guns: Nine baggage and four (or eight) commissary two-horse country wagons.

Horse-battery division (two batteries): Four baggage and four commissary two-horse country wagons. The batteries of artillery may use old-model rack wagons instead of country wagons in the ratio of one of the former to two of the latter.

Pioneer company: Two four-horse wagons for material and one four-horse wagon for company baggage; one baggage and one commissary two-horse country wagons.

Pontoon train: Thirty-two four-horse and twelve six-horse bridge-equipage wagons.

Each division and brigade hospital: Two four-horse ambulances. Of the two wagons of a field hospital, one will be used for medical supplies and the other as an ambulance.

Division ammunition park: Six four-horse battalion ammunition wagons, to be taken from the extra stores of the artillery.

Corps telephone detachment: Four passenger, four material, and four station two-horse country wagons.

Field balloon detachment: Six gas, one balloon, and one cable four-horse completely equipped wagons, the horses for which will be furnished by the military aeronautical establishment; one baggage and one commissary two-horse country wagons. For the necessary transportation of the reserve material from the railway station, fourteen country wagons will be employed.

Movable field-bakery section: Six four-horse field ovens, drawn by country horses; one passenger two-horse country wagon and three freight automobiles.

Each brigade subsistence column: One passenger and one baggage two-horse country wagons.

The country passenger wagons assigned to dismounted troops, subsistence columns, and field-bakery sections are intended for such surgeons, accountants, and commissary employees as are not mounted.

One of the three passenger wagons assigned to each army and to each corps headquarters is intended for the civil personnel of the field post office.

Appendix 9.—Subsistence train.

This train will be formed on the evening of September 11, as follows:

Army headquarters: Two wagons in echelon No. 1 and three in echelon No. 2.

Corps headquarters: Two wagons in echelon No. 1 and two in echelon No. 2.

Division headquarters, including its two brigade-headquarters: One wagon in echelon No. 1 and two in echelon No. 2.

Independent brigade headquarters: One wagon in echelon No. 1.

Infantry regiment of four (or three) battalions: Six (or four) wagons in echelon No. 1, one wagon in echelon No. 2.

Independent battalion: Two wagons in echelon No. 1.

Staff of a cavalry regiment, including its two divisions, pioneer platoon and telegraph patrol: One wagon in echelon No. 1, one wagon in echelon No. 2.

Cavalry squadron: Two wagons in echelon No. 1, three wagons in echelon No. 2.

Artillery regiment of sixteen (or thirty-two) guns: Four (or six) wagons in echelon No. 1, five (or nine) in echelon No. 2.

Horse battery division (two batteries): Four wagons in echelon No. 1, six wagons in echelon No. 2.

Pioneer company: One wagon in each echelon.

Half of a light bridge equipage: One wagon in each echelon.

Bridge equipage: One wagon in echelon No. 1, two wagons in echelon No. 2.

Movable field bakery: One wagon in echelon No. 1.

Infantry and cavalry brigade subsistence columns: The wagons that belong to their respective commands and organizations.

All the wagons enumerated above are two-horse country wagons.

Echelon No. 1 carries one field ration of food and of oats per man and horse, respectively; echelon No. 2 carries two field rations of oats per horse.

The wagons of echelon No. 1, for independent brigade and battalions and for the field-bakery sections, will carry, besides one field ration of food and oats per man and horse, respectively, two field rations of oats per horse.

The country wagon transportation of the army and the corps headquarters will be attached to an infantry subsistence column.

The field rations of food and of oats of the division and brigade hospitals, division ammunition parks, telephone detachments, and field balloon detachments will be carried, respectively, by the country wagon transportation of the division and brigade headquarters, artillery regiments, corps headquarters, and army headquarters.

So far as practicable, officers or cadets of the train troops will be assigned to the echelons as train commandants.

The teams of the echelons will be discharged immediately after delivering the supplies they carry to the troops. This condition must be understood when civilian transportation is engaged.

Appendix 10.—Distribution of the instructions in detail for the grand maneuvers in western Hungary in 1902.

To the first corps, 40 copies.

To the second corps, 110 copies.

To the third corps, 10 copies.

To the fourth corps, 10 copies.

To the fifth corps, 80 copies.

To the sixth, seventh, eighth, eleventh, twelfth, thirteenth, and fifteenth corps, 8 copies each.

To the ninth, tenth, and fourteenth corps, and the military command of Zara, 5 copies each.

To the Austrian and Hungarian ministries of national defense, 40 copies each.

To each army, corps, and division commander taking part in the maneuvers, 8 copies; to each brigade commander, 1 copy; to each independent detachment, 2 copies. The remainder will be delivered to the corps commanders as a reserve.

While many of the details in the preceding instructions are of no interest to us, their full translation has been made with a view to demonstrating the painstaking care with which the preparations for the grand maneuvers are made by the general staff. They may also be of interest in the way of reference and comparison when considering the orders for maneuvers in our own country. While it may be objected that it would not be practicable or wise in time of war for a general staff to concern itself with details that should be left to the commanders of troops and to the chiefs of the auxiliary services, yet it must be remembered that the maneuvers of this year, in which about 100,000 combatants and noncombatants participated, were carried out without a hitch on account of all these apparently insignificant details having been previously provided for by the general staff. The army is accustomed to their repetition in the autumn maneuvers, year after year. The general staff is efficient and sufficiently large for the mobilization of the army. It should not, therefore, be hastily concluded that such orders would not be practicable for the army of this country in case of war.

The following is a translation of the general orders for the maneuvers of this year:

GENERAL ORDERS OF THE MANEUVER DIRECTION FOR THE GRAND MANEUVERS IN WESTERN HUNGARY, 1902.

1. Division of time.

September 10: Troops take their positions for the beginning of hostile relations.

September 11: Rest.

September 12: Reconnoissance and advance under warlike conditions.
September 13: Maneuvers.
September 14: Rest.
September 15: Maneuvers.
September 16: Maneuvers.
September 17: Discussion.

2. Execution of the maneuvers.

The hostile relations of the armies will begin at noon on September 11, and continue until the end of the maneuvers. At this hour the information detachments and patrols will set out.

Movements and changes of position of troops on days of rest will not take place.

The service of information and security will be continued unbroken throughout the maneuvers.

The announcement by the maneuver direction or by the umpires of the establishment of lines limiting the operations of the armies will be equivalent to an order for the cessation of the combat conformably to warlike conditions.

These limiting lines are those along which the outposts may be placed; however, commanders will be at liberty to select lines for their outposts farther to the rear.

With the exception of the reconnoitering detachments and patrols, no one, without the approval of the maneuver direction, will be permitted to cross the limiting lines toward the enemy before the morning following the day on which they are fixed.

Special attention is invited to the sparing of the numerous plantations of young pines south of the Miava and between the March and the large forests, and also of those near Bur Szt. Miklos and Bur Szt. Peter and extending as far as Laksar Ujfalv. On account of the furrows freshly made for the setting out of the pines and of these young plantations often having the appearance of badly cultivated sandy fields, it is sometimes difficult to recognize such plantations.

The close of the maneuvers for this year will be indicated at the termination of the exercises on the last maneuver day by a trumpet call sounded by order of the emperor.

Sasvar may be occupied by troops in so far as such occupation will not interfere with the quartering of the maneuver direction.

Special instructions will be published by the maneuver direction for the night dispositions of the troops on September 16, as well as for the marches on September 17 to the entraining stations.

3. Communication.

Unavoidable communication with an enemy will be sent under a flag of truce. No other kind of communication between the armies will be permitted. This also applies to communication with the maneuver direction, in case the latter happens to be in the territory of the opposing force.

The officers of the maneuver direction, the umpires and the assistant umpires, the reporters, and the orderlies of all these officers may move at any time and in any direction unhindered.

The state and railway telegraph lines in the theater of the maneuvers may be used at all times for reports to the maneuver direction. For other official purposes, however, the two armies may use those sections only of the lines that lie in rear of the outposts of their respective forces. With these exceptions all telegraph lines will be considered destroyed.

4. Reports, notes, etc., to the maneuver direction.

The maneuver direction will exercise superior authority over both armies. Its headquarters will be established in Sasvar.

The distribution of orders by the maneuver direction will take place daily at 6 o'clock p. m., beginning with September 12. An officer from each army headquarters will report at this time for orders ("Service Regulations, Part 2," par. 4), provided these headquarters be located at a distance not greater than 12 kilometers from Sasvar. Besides these officers, one officer from each corps, independent infantry division, and independent brigade will report for orders on the 15th of September, whatever the distance may be.

Copies of the orders in the form prescribed for the field will be made in duplicate, one copy being intended for his imperial and royal apostolic majesty, and will be sent in by the army commanders, and, on the 11th and 12th of September, by the cavalry commanders also, as follows:

For the 11th and 12th of September, by noon, September 10;

For the 13th and 16th of September, by 6 o'clock p. m. on the day preceding each of these dates;

For the 15th of September, by 10 o'clock a. m., September 14.

For the purposes of the discussion at the close of the maneuvers, the commanders of corps and of divisions, as well as the commanders of the larger independent groups, will send directly to the maneuver direction daily and at the earliest possible hour; beginning with September 11, one copy of their orders in the form prescribed for the field.

Furthermore, the army commanders will report, immediately after the cessation of the battle on the 15th of September, the objects they will endeavor to accomplish on the following day.

Any changes in the orders sent in will be reported immediately, if necessary, by telegraph.

Sketches of the night dispositions from the 10th to the 11th of September will be sent in by the army, corps, independent division, and independent brigade commanders by noon on September 10; on other days, immediately after the issue of the night orders. These sketches must clearly show the position of the outposts, the localities in which the troops are quartered and camped, the location of the corps and division headquarters, and, when possible, the situation of the detachments advanced on the service of information.

Beginning with the 10th of September, morning reports will be prepared and will be delivered to the maneuver direction at the earliest practicable hour. Those for September 10 will reach the maneuver direction by noon on that day.

Under the heading "Special remarks" will be mentioned whether or not the rations were delivered promptly, whether any individual organizations were very late with their cooking, and, if so, why, and the condition of the trains.

The morning reports will show the actual strength on the day for which they are prepared and, therefore, will not be handed in, as a rule, before the afternoon or night of the preceding day.

Should events requiring immediate attention, or events of urgent interest to the maneuver direction, be mentioned under the heading "Special remarks," they should be copied from the morning reports and reported by telegraph to the maneuver direction.

Reports and sketches of positions and brief notes of the battle will be made as required by the instructions of the "Service Regulations, Part 2," pars. 349 and 389. The brief notes of the battle will be submitted by 6 o'clock p. m.

The battle reports of the army commanders, with detailed sketches of the night dispositions, sketches of the situation of the corps from hour to hour on the march and in battle, the reports of the different organizations of each corps, the reports in detail of the troops and balloon detachments on the engagements, and all reports, etc., concerning the enemy will be arranged according to date and forwarded to the chief of the general staff by the 1st of November, this year.

In case countersigns are issued, they will be reported to the maneuver direction.

5. Notes of the umpires and of the assistant umpires.

Special instructions will be published with regard to the sending in of the notes and sketches of the umpires and of the assistant umpires.

6. Reporters.

Reporters will be assigned to the armies, corps, divisions, and independent brigades.

The "Instructions" relating to this subject contain the particulars concerning their duties.

The orders contained in the preceding Articles 4 and 5 are not hereby amended.

7. Discussion.

The army, corps, division, and brigade commanders, with their chiefs of staff and the chiefs of the operations divisions of their respective headquarters, the umpires, the assistant umpires, and the reporters will attend the discussion.

In order that all action coming into question in the discussion may be clearly explained, all important notes, orders, reports, etc., will be brought along, so far as it is practicable to do so, by those attending the discussion.

8. Conventional signs, time.

In all graphic representations, the troops of the Western army will be indicated in blue, and those of the Eastern army in red.

Watches will be regulated by Central European time.

The troops participating in the maneuvers were divided into two groups, one being designated the "Western army group," and the other the "Eastern army group," which, for

brevity, will be referred to, respectively, as the Western army and the Eastern army. The first is designated a group, because, as will be seen from the hypothesis, it was composed of the corps forming the left wing of the main army to which it was supposed to belong; the second was so designated because it was composed of a number of divisions on the march to join the main army to which they were supposed to belong.

HYPOTHESIS FOR THE WESTERN ARMY.

(See any general map of Austria-Hungary.)

The main army to which the Western army belongs is advancing from Moravia against the enemy's main force occupying the left bank of the Danube at Vienna and Tulln.

Several of the enemy's divisions of infantry, with advanced cavalry, on the march from Upper Hungary to join their main army on the Danube, are to reach the line Ungarisch Brod-Waag Neustadt on the 9th of September.

The Western army, formed from the corps of the left wing of its own army, receives orders to attack these divisions, which form the Eastern army, and to drive them back into Waag Thal.

HYPOTHESIS FOR THE EASTERN ARMY.

(See any general map of Austria-Hungary.)

The enemy is advancing from Moravia toward the Danube and the left wing of his main force is to reach the district of Mistelbach and Nikolsburg on the 9th of September. The main army, to which the Eastern army belongs, is posted on the left bank of the Danube at Vienna and Tulln and will oppose the enemy's advance.

The Eastern army, advancing from Upper Hungary, receives orders to attack the left wing of the enemy's main army and to draw upon itself the greatest possible force.

ORGANIZATION OF THE WESTERN ARMY.

Commander: His Imperial and Royal Highness General Archduke Franz Ferdinand, heir to the throne of Austria-Hungary.

Chief of staff: A major general of the general staff.

SECOND CORPS.

Commander: General Count Uxhull-Gyllenband.

Chief of staff: A colonel of the general staff.

Artillery brigade commander: A major general.

Twenty-fifth infantry division: Commander, His Imperial and Royal Highness Lieutenant General Archduke Leopold Salvator; 16 battalions of infantry, 2½ squadrons, 16 guns

Forty-ninth infantry brigade: 9 battalions of infantry.

Fiftieth infantry brigade: 7 battalions of infantry.

Forty-seventh infantry division: Commander, Lieutenant General Fischer-Colbrie: 13 battalions, 2 squadrons, 16 guns.

Nineteenth infantry brigade: 7 battalions.

Ninety-fourth infantry brigade: 6 battalions.

The second corps therefore consisted of 29 battalions of infantry, 4½ squadrons of cavalry, and 32 guns in its two divisions. Its total strength was 29 battalions, 4½ squadrons, 48 guns, 2 pioneer companies, 1 light bridge equipage, and 1 telephone detachment.

COMBINED CORPS.

Commander: Lieutenant General Schonaich.

Chief of Staff: A colonel of the general staff.

Artillery brigade commander: A major general.

Fourth infantry division (in the regular organization of the army, this division belongs to the second corps, which is stationed in Vienna, and which is the only one of the fifteen corps that has three divisions of infantry): Commander, Lieutenant General Von Vivenot; 16 battalions, 2 squadrons, 16 guns.

Seventh infantry brigade: 8 battalions.

Eighth infantry brigade: 8 battalions.

Thirteenth Austrian landwehr infantry division: Commander, Lieutenant General Von Steinitz; 12 battalions, 2 squadrons, 16 guns.

Twenty-fifth Austrian landwehr infantry brigade: 6 battalions.

Twenty-sixth Austrian landwehr infantry brigade: 6 battalions.

The total strength of the combined corps was 28 battalions, 4 squadrons, 48 guns, 2 pioneer companies, 4 bridge equipages, and 1 telephone detachment.

THIRD CAVALRY DIVISION.

Commander: His Imperial and Royal Highness Lieutenant General Archduke Otto.

Chief of staff: A lieutenant colonel of the general staff.

Eighth cavalry brigade: 12½ squadrons.

Tenth cavalry brigade: 11½ squadrons.

Total strength of the division: 24 squadrons, 12 guns (horse artillery).

Total strength of the Western army: 57 battalions of infantry, 32½ squadrons of cavalry, 108 guns, 4 pioneer companies, 5 bridge equipages, 2 telephone detachments, and 1 balloon detachment.

ORGANIZATION OF THE EASTERN ARMY.

Commander: His Imperial and Royal Highness General Archduke Friedrich.

Chief of staff: A major general.

FIFTH CORPS.

Commander: Lieutenant General Von Pitreich.

Chief of staff: A colonel of the general staff.

Artillery brigade commander: A major general.

Fourteenth infantry division: Commander, Lieutenant General Baron Von Kraus; 12 battalions, 3 squadrons, 16 guns.

Twenty-seventh infantry brigade: 4 battalions.

Twenty-eighth infantry brigade: 8 battalions.

Thirty-third infantry division: Commander, Lieutenant General Niklos; 14 battalions, 3½ squadrons, 16 guns.

Sixty-fifth infantry brigade: 8 battalions.

Sixty-sixth infantry brigade: 6 battalions.

Total strength of the fifth corps: 26 battalions, 6½ squadrons, 48 guns, 2 pioneer companies, half of a light bridge equipage, and 1 telephone detachment.

In addition to the fifth corps, the Eastern army contained two separate infantry divisions, not organized as a corps, and a cavalry division.

FIFTH INFANTRY DIVISION.

(In the regular organization of the army, this division belongs to the first corps.)

Commander: Lieutenant General Baron Von Mertens; 16 battalions, 4½ squadrons, 32 guns.

Ninth infantry brigade: 8 battalions.

Tenth infantry brigade: 8 battalions.

THIRTY-SEVENTH HUNGARIAN LANDWEHR INFANTRY DIVISION.

Commander: Lieutenant General de Felso Eor; 13 battalions, 3 squadrons, 16 guns.

Seventy-third Hungarian landwehr infantry brigade: 7 battalions.

Seventy-fourth Hungarian landwehr infantry brigade: 6 battalions.

SECOND CAVALRY DIVISION.

Commander: Lieutenant General Count Attems; 24 squadrons, 12 guns (horse artillery).

Sixteenth cavalry brigade: $11\frac{1}{2}$ squadrons.

Seventeenth cavalry brigade: $12\frac{1}{2}$ squadrons.

Total strength of the Eastern army: 55 battalions of infantry, $37\frac{1}{2}$ squadrons of cavalry, 92 guns, 2 pioneer companies, half of a bridge equipage, 1 telephone detachment, and 1 balloon detachment.

On the 14th of September, the ninety-second Austrian landwehr infantry brigade was ordered from Gaya to reenforce the Western army. This brigade consisted of 6 battalions.

There were, therefore, altogether 118 battalions of infantry, $69\frac{1}{2}$ squadrons of cavalry, 200 guns, 6 pioneer companies, $5\frac{1}{2}$ bridge equipages, 3 telephone detachments, and 2 balloon detachments, besides the regulation supply and medical services participating in the maneuvers of this year.

Each cavalry regiment has a pioneer platoon, which is equal in strength to one-fourth of a squadron. This accounts for the fractions in the above number of squadrons.

The military attachés were invited to attend the grand maneuvers, but not the preliminary exercises or the discussion at the close of the maneuvers.

The following-named countries were represented at the maneuvers by military attachés or by officers specially appointed for this purpose, the rank of the foreign officers being indicated after the names of their respective countries:

Egypt: One major.

France: One major of artillery, military attaché.

Germany: The Crown Prince of Germany, with one colonel and one first lieutenant; one major of the general staff, military attaché.

Great Britain: One lieutenant colonel of artillery, military attaché.

Italy: One lieutenant colonel of the general staff, military attaché.

Japan: One major of infantry, military attaché.

Norway: One captain.

Roumania: One lieutenant colonel of engineers; one major of artillery, military attaché.

Russia: One colonel of the general staff, military attaché; one lieutenant colonel of the general staff, assistant military attaché.

Servia: One colonel.

Switzerland: One lieutenant colonel of artillery and one lieutenant colonel of infantry.

Turkey: One general, military attaché; one lieutenant colonel of the general staff, assistant military attaché.

United States of America: One captain of cavalry, military attaché.

All these officers arrived at Sasvar on the evening of September 11. They were transported from Vienna in a special train furnished by the government. As is customary in all European States, they were quartered, mounted, and provided with orderlies at the expense of the state and had all their meals at the emperor's table.

THEATER OF OPERATIONS.

The part of the theater of operations with which this report is concerned is bounded on the north by a line drawn through Gaya and Ungarisch Brod; on the east by the Waag river; on the south by a line passing through Tyrnau, Rohrbach, and Dürnkrot; on the west by the line Mistelbach, Nikolsburg. All fighting of any great importance took place in the space bounded on the north by the Chvojnicka River; on the east by the Miava River; on the south by the Miava River as far west as Sasvar, then by the forest extending south and west and that town to the March River; on the west, by the March River.

In the eastern part of the theater of operations are found the Weisse Karpaten Mountains to the north and the Kleine Karpaten Mountains to the south, with a number of highways and numerous narrow wagon roads and trails leading through and between them. The highest point of these mountains, within the theater as limited above, is about 3,000 feet above the level of the sea, while their average height is

about 1,200 feet. The country descends from these mountains in a succession of hills and valleys to the March.

After the March was crossed by the Western army there were no obstacles of any great difficulty between the opposing forces. The means of lateral communication between the wings of each army were favorable. The location of the highways and the configuration of the country, as well as the object to be accomplished, favored the concentration of the Eastern army toward Szobotist and Szenicz, on the Malina River. The district immediately west of the line joining these two points became the scene of all the important engagements of the maneuvers.

This field was an ideal one for tactical exercises on a large scale. It is an unfenced, hilly, and generally open country, the highest point being about 900 feet above the level of the sea, and the slopes of the hills being sufficiently easy for the movement of all arms in any direction. It abounds in favorable points for extensive views and in excellent artillery positions. The soil is of such a character that artificial cover could be hastily constructed for foot troops and guns. The valleys and depressions generally enabled commanders to hold their reserves where they were screened from the view and fire of the enemy.

Of the numerous villages and hamlets in the theater of operations, the most important of the former are Bur Szt. Miklos, Sasvar, Egbell, Holics, Verbocz, Szobotist, and Szenicz. To the north are the towns of Goding, Skalitz, and Strassnitz; to the east, Miava; to the southeast, Tyrnau; to the west, Lundenburg. Sasvar, where the emperor and his staff, the maneuver direction, the military attachés, etc., were quartered, has a population of 2,500.

SITUATION OF THE TWO ARMIES AT THE BEGINNING OF WAR-LIKE CONDITIONS.

All troops were to reach, on the evening of September 10, the positions that they were to occupy at the beginning of hostile relations between the two armies.

WESTERN ARMY.

At the time above mentioned, the second corps was located at Prinzendorf; the combined corps at Nikolsburg; the third cavalry division at Hohenau, with a part of its line of outposts beyond the March.

EASTERN ARMY.

At this time, the fifth corps was located at Miava; the fifth infantry division at Strassnitz; the thirty-seventh landwehr infantry division at Pistyan; the second cavalry division at Szenicz, with its outline of outposts pushed forward to Stepano and Bur Szt. Peter.

The 11th of September was a day of rest for all troops until noon. At that hour the service of information began in both armies. The main body of each army rested the entire day.

EXTRACT FROM THE ORDERS FOR RECONNOISSANCE ON THE
11TH AND 12TH OF SEPTEMBER.

WESTERN ARMY.

For the reconnoissance of the territory between the March, on the west; the line Strassnitz, Ungarisch Brod, on the north; the Waag, on the east, and the line Dürnkrut, Tyrnau, on the south, the third cavalry division will send forward, at noon on the 11th of September, reconnoitering detachments, which will reach on that day the line Egbell, Sasvar, Laksar Ujfalú, Rohrbach; and on the 12th, the line Strassnitz, Miava, Nadras.

The following information is to be obtained:

(a) The strength and distribution of the columns advancing between the Kleinen and Weissen Karpaten.

(b) The strength and direction of march of the hostile force advancing from Ung. Brod. It is very important to learn as soon as possible whether this force is endeavoring to form a junction with the main body by way of Welka and Verbocz, or to reach Holics by way of Strassnitz.

The main body of the third cavalry division will cross the March on the morning of the 12th and will advance into the district Dojcs, Stepano, Bur Szt. Miklos.

The second corps will reconnoiter north as far as Egbell, Unin, Holy Vrch; south, as far as Hohenau, Morva Szt. Janos, Blasenstein St. Peter.

The combined corps will reconnoiter north as far as Holics and Verbocz.

The third cavalry division will send out at noon on the 11th of September the following reconnoitering patrols:

No. 1 ($\frac{1}{4}$ squadron of the fifth dragoons): From Drössing by Malaczka to Rohrbach; on the 12th, by Blasenstein St. Peter to Nadas.

No. 2 (1 squadron of the eighth uhlands): By Morva Szt. Janos, Tomek M. to Laksar Ujfalu; on the 12th, by Jablonicz to Brezova, from which point it will reconnoiter toward Verbo and Miava.

No. 3 (1 squadron of the eleventh dragoons): By Morva Szt. Janos to Sasvar; on the 12th, by Szenicz to Szobotist, from which point it will reconnoiter toward Verbocz and Miava.

No. 4 (1 squadron of the fifteenth dragoons): By Kuklo to Petersdorf; on the 12th, by Holics to Strassnitz; at daybreak on the 12th it will send a platoon from Petersdorf by Unin to Holy Vrch as a post of observation.

Independent officers' reconnoitering patrols on the 11th of September:

No. 1 (from the fifth dragoons): By Morva Szt. Janos, Laksar Ujfalu to Brezova; on the 12th, to observe the roads in the vicinity of Brezova.

No. 2 (from the eleventh dragoons): By Morva Szt. Janos, Sasvar, Szenicz, Szobotist; on the 12th, to observe the roads toward Miava and Verbocz.

No. 3 (from the fifteenth dragoons): By Morva Szt. Janos, Petersdorf, Holics, Skalitz to Strassnitz; on the 12th, to observe the road from Strassnitz to Holics.

All of these three patrols will note the night positions of the enemy and will personally report upon them on the 12th.

EASTERN ARMY.

The second cavalry division will reconnoiter the district between the Thaya River and the highway Dürnkrut, Schrick, Mistelbach. Its reconnoitering detachments will proceed on the 11th as far as the March River; on the 12th, as far as the locality of the enemy, or the road Nikolsburg, Schrick. The main body will advance on the 12th by Hohenau toward Mistelbach and will hold the crossings over the March southeast of Landshut, east of Hohenau, and east of Drösing. In opposing the crossing of the March by the enemy the passage of his main body over the river must be prevented or at least delayed. In case of irresistible pressure by the enemy, the division will retire toward Sasvar.

The fifth infantry division will reconnoiter both banks of the March and the country to the west as far as Gaya and Nikolsburg. The most advanced reconnoitering patrols will endeavor to reach, on the 11th, the railway Nikolsburg, Lundenburg, Broczko.

The thirty-seventh landwehr infantry division will complete the reconnoissance of the second cavalry division as far as Miava, toward the north; as far as Dürnkrot and Malaczka, toward the south; on the 11th, if possible, as far as Blasenstein St. Peter.

The fifth corps will reconnoiter on both sides of its line of march, will establish communication with the second cavalry division, and may, if necessary, consolidate the divisional cavalry.

The eleventh rifle battalion will proceed by Szenicz to Sasvar, which point it will reach by noon on the 12th and where it will be placed at the disposition of the commander of the second cavalry division.

The commander of the second cavalry division will send forward on the 11th the following reconnoitering detachments:

No. 1 (1 squadron of the sixth dragoons): From Dojcs by Unin and Radimo towards Kopcsan; if possible, as far as Teinitz; to continue on the 12th through Lundenburg toward Feldsberg, leaving a strong post in Kopcsan.

No. 2 ($\frac{1}{2}$ squadron of the sixth dragoons): To Broczko; on the 12th, by Bernhardsthal to the cross roads west of Mühlberg (218).

No. 3 (1 squadron of the fourth hussars): To Szekelyfalu; on the 12th, by Hohenau and Prinzenhof toward Mistelbach. Should it not succeed in crossing the March, the bridge and causeway at Hohenau will be constantly observed on the 12th and during the forenoon of the 13th.

No. 4 (1 squadron of the eleventh hussars): To Kis Levard; on the 12th, by Jedenspeigen, or, if necessary, by Dürnkrot and Zistersdorf, toward Prinzenhof.

On the 12th, all detachments will set out at 5 o'clock a. m.

For the service of intercommunication there will be established on the 11th of September:

(a) One squadron of the ninth hussars, as a strong orderly post, on the highway at the western entrance to Sasvar. None of the enemy's horsemen will be allowed to pass this point.

(b) One-fourth squadron of the fourth hussars, as a strong orderly post, toward Tomek Major, southwest of Sasvar. There was also an orderly post of ten men at Rudolfshof, north of Egbell.

EXTRACT FROM THE ORDERS FOR THE 13TH OF SEPTEMBER.

(See map.)

WESTERN ARMY.

Object: From its initial position on the other side of the March, the army is to assemble on a line approximately coincident with that joining Sasvar and Holics and is then to advance against the enemy in the general direction of Miava and Brezova.

The army will advance from its initial position as follows:

(a) The third cavalry division, on general reconnoitering service, according to special orders.

(b) The second corps by Hohenau into the district Sasvar, Szmolinszko, Csari, and Bur Szt. György, in such a way that the march may be continued on the next day with one division directed towards Petersdorf. The advance will begin in time for the point of the advance guard to reach the bridge of Hohenau at 8 o'clock a. m.

(c) The combined corps into the district Landshut, Kostitz, and Lundenburg. The corps artillery to Lundenburg.

The second corps will send one battalion, at noon on the 11th of September, to occupy Morva Szt. Janos and Szekel-falu, for the purpose of covering the crossing of the cavalry division and as a support for the reconnoitering detachments. The ferry at Drösing will be held until the evening of the 12th by half a company.

The combined corps will prepare to cross the March, on a broad front, early on the morning of the 13th, by means of bridges or by fording, at the above Broczko. The railway bridge will be utilized, so far as it is practicable to do so, in the crossing. Two battalions of this corps will be sent forward to Lundenburg at noon on the 11th of September.

Army headquarters, until 5 o'clock a. m. on the 12th, at Mistelbach; then by Zistersdorf to Morva Szt. Janos.

The third cavalry division will be assembled, on the 12th of September, on the highway at the western entrance to Morva Szt. Janos, with the fifteenth dragoons as advanced guard and with the main body 1,000 paces in rear of the latter. The advance of the division will begin at a quarter past 7 o'clock a. m.

EASTERN ARMY.

Object: To continue offensive operations toward Mistelbach.

Points to be reached on the 12th:

By the fifth infantry division: Holics and Kapcsan. This division will seize the crossings in the vicinity of Göding and Kapcsan and will send a detachment to Broczko.

By the fifth corps: Szenicz and vicinity, one division; Szobotist and the villages immediately west of that town, one division.

By the thirty-seventh landwehr infantry division: Jablonicz and Hradischt.

Army headquarters will leave Miava at 7 o'clock a. m., and will march to Szenicz.

The second cavalry division will be assembled, on the 12th, at Bozek, with the fifth dragoons as advance guard and with the head of the main body 1,000 paces west of that town. The advance of the division will begin at half past 6 o'clock a. m.

DETAILS OF THE OPERATIONS ON SEPTEMBER 12, CAVALRY BATTALION OF KUKLO.

The third cavalry division passed the night from September 11 to September 12 in the vicinity of Hohenau, and the second cavalry division in the vicinity of Szenicz.

The eleventh rifle battalion, attached to the second cavalry division, reached Szenicz on the morning of the 12th, after a night march, from which point it was hurried to the front, in wagons, and was placed between the support and the reserve of the advance guard.

The third cavalry division reached Bur Szt. György before 8 o'clock a. m. on the 12th, and the division commander, the Archduke Otto, there made the following dispositions for the attack of the enemy, now known to be advancing on the road from Sasvar toward Hohenau.

The advanced guard, consisting of the fifteenth dragoons, with two guns, to proceed north of the above-named road and toward Kuklo, with the object of deceiving the enemy as to the direction of the main attack. As an offensive right flank, the eleventh dragoons, with the rest of the artillery, was sent out on the road leading to the southeast from Bur Szt. György, with the elevation 184 as its point of direction. The

main attack was to be delivered by the eighth uhlans and the fifth dragoons, formed in one line and advancing between the highway and the wood southeast of Kuklo.

The second cavalry division reached Sasvar about half past 7 o'clock a. m. on the 12th, and, after proceeding some distance beyond that town, on the road leading toward Hohenau, the commander, Lieutenant General Count Attems, learned that the enemy was approaching north and south of the road from Bur Szt. György to Kuklo. He decided to attack, and accordingly issued the following orders:

One brigade (the fifth and eleventh hussars), in one line, to deliver the main attack, its point of direction being the church tower of Bur Szt. György; the fourth hussars in the second line, to the left; the sixth dragoons in the third line, to the right and in prolongation of the line occupied by the horse batteries, which were posted on a low ridge at the edge of the wood about 1,000 paces southeast of Kuklo.

The artillery of the third cavalry division was the first to get into position, and, from the higher ground at the northern edge of the wood directly south of Kuklo (elevation 171), opened a most destructive fire against the attacking brigade of the second cavalry division. At about the same time that this brigade met the principal shock of the enemy in front, it was attacked on its left flank by the eleventh dragoons and was defeated. The fourth hussars, forming the second line to the left rear of the attacking brigade of the second cavalry division, apparently accomplished nothing. The sixth dragoons, forming the third line to the right rear of this brigade, charged and defeated the fifteenth dragoons of the third cavalry division. The latter regiment, it will be remembered, had been sent forward on the northern side of the highway from Bur Szt. György to Kuklo.

In consequence of the defeat of the main body of the second cavalry division, the retreat was ordered for the entire division, which fell back through Sasvar to Morvaör. Its retreat was covered by one company of riflemen, which had advanced as far as Kuklo, and by its artillery. This company fell back to the edge of the wood west of Sasvar, where the other three companies of the battalion of rifles attached to the second cavalry division had been posted. This battalion, with the assistance of the artillery, checked the pursuit by the third cavalry division, and the maneuvers for that day were soon afterward terminated.

EASTERN ARMY.

The army will attack and drive back the enemy's forces that have crossed the March.

The fifth corps will move forward, in the space between the Miava on the one side and the road Csasztko, Unin, Lettnicz on the other, toward Morvaőr and Szmolinszko.

The second cavalry division will proceed to the vicinity of Petersdorf, will maintain communication between the fifth corps and the fifth infantry division, and will operate in conjunction with the latter.

The fifth infantry division will march toward Petersdorf and Egbell. In conjunction with the second cavalry division, it will delay the advance of the enemy's forces by Broczko toward the east. The principal object, however, will be to support the fifth corps in battle by attacking with the largest force practicable. The advance will begin in time to cross the line of outposts at 7 o'clock a. m.

The thirty-seventh landwehr infantry division will march by Csacso and Szenicz and will reach N. Kovallo at 9 o'clock a. m. It will send a detachment by Rothes Kreuz and Bur Szt. Miklos in time to reach Sasvar by 12 o'clock m.

The field balloon will begin observations at N. Kovallo at half past 5 o'clock a. m.

The headquarters of the army will march from Szenicz by N. Kovallo to the elevation 258, where it will arrive at 8 o'clock a. m.

DETAILS OF THE OPERATIONS ON SEPTEMBER 13.

In compliance with the above orders, the second corps, consisting of the twenty-fifth and forty-seventh infantry divisions, took up the following positions:

One brigade of the twenty-fifth division, with the corps artillery regiment, 16 guns, occupied the height of Barbaiki, facing east; one brigade of the forty-seventh division, with the division artillery regiment, 16 guns, was posted on the heights south of Petersdorf and Lettnicz, facing north; the second brigade of the forty-seventh division was placed in echelon to the left and rear of the first as corps reserve. A battalion of infantry and a regiment of cavalry were left in Sasvar to oppose any attempt of the enemy's cavalry to pass through that place toward the March. The second brigade of the twenty-fifth division covered the right flank of the

second corps on the height Vrch (272) and in the wood south of Barbaiki.

The attack of the Eastern army was opened by the fifth infantry division at Petersdorf and Lettnicz, about 8 o'clock a. m., against the brigade of the forty-seventh infantry division, in position on the heights south of those villages. The fifth corps advanced with its thirty-third division on the right, directed toward Lettnicz, and its fourteenth division on the left, directed toward Barbaiki (305) and Vrch (272). The fourteenth division was the first to come under the fire of the enemy's artillery occupying the height of Barbaiki. From this time until the deployment of the Eastern army, the action was confined almost exclusively to the artillery. The divisions of this army having reached their respective positions in the line of battle about half past 9 o'clock a. m., the army commander ordered a general attack, hoping to defeat the second corps, notwithstanding its strong position, before the arrival of the combined corps on the field of action.

The second corps was at this time wholly dependent upon itself. Being held in its position on Barbaiki by the fourteenth division attacking in front, with the thirty-seventh landwehr division threatening its right flank and with the fifth and thirty-third divisions and the second cavalry division attacking its left wing in front and on the flank, the result was inevitable. Although the brigade of the forty-seventh division, holding the heights south of Petersdorf and Lettnicz, had been reenforced by the corps reserve, the entire left wing of the second corps was forced to abandon its position and fall back to the height of Brezi (240) north of Szmolinszko. The right wing of the second corps held tenaciously to the height of Barbaiki, the commander of the Western army evidently hoping each moment to see the head of the combined corps appear in the open space about Egbell. So far as I could observe or learn, no part of this corps reached the field of battle before the close of the maneuvers for the day. About 12 o'clock m., the right wing (twenty-fifth division) of the second corps was driven out of its position on Barbaiki and in the adjacent wood to the southwest, and ordered to retire to the height of Vinohradki, north of Morvaör. The victory of the Eastern army was now complete and the lines of demarcation between the opposing forces were established by the maneuver direction.

COMMENTS.

Through some mistake in transmitting orders, the combined corps did not begin the crossing of the March before 8 o'clock on the morning of September 13. In actual warfare this would have been a fatal blunder, as the second corps was overwhelmed by the attack on converging lines of the entire Eastern army before the combined corps reached a position from which it could fire a single shot at the enemy. If such a mistake is possible in maneuvers, one may well ask if similar or even greater ones, under the vastly more difficult circumstances of actual war, might not be committed. It would seem that, under the general orders above given, a zealous and enterprising corps commander, separated by a practically unfordable river from the other half of his own army, the latter being in presence of an enemy twice its strength, would not wait from the afternoon of one day until 8 o'clock on the morning of the next to begin the crossing of that river to support the other half of the army in its perilous situation.

Besides the railway bridge immediately in front of the combined corps, the corps commander had at his disposition four complete bridge equipages. With these facilities at hand for crossing, with roads from J. H. Kadubek and Adamhof leading through the forest west of Egbell and converging toward that point, it is still unaccountable that, even if the crossing did not begin before 8 o'clock a. m., the head of the corps at least was not able to engage the enemy in the vicinity of Egbell by noon, the hour at which the maneuvers for the day terminated. Egbell is only about 6 miles from the point at which the corps crossed the March.

This was the great blunder of the maneuvers of this year. Since the two corps of the Western army were assigned to different sections of the March for crossing, the original mistake was made by the general staff in ordering the second corps forward to Morvaör, on the left bank of the river, on the 12th of September, and in leaving the combined corps at Landshut, on the right bank, with orders to cross early on the morning of the 13th. Such orders in actual war would most likely result in disaster.

During the night, from the 12th to the 13th of September, the fifth infantry division was cantoned at Holics, about 10 miles only from the points at which the combined corps crossed

the March. By making a night march this division could have reached a position on the river from which it could have prevented the crossing of the combined corps early on the morning of the 13th of September, or at least delayed this crossing until the second corps was defeated by the Eastern army. The latter would still have had three divisions of infantry, after detaching the fifth division, with which to attack the two divisions of the second corps.

**CANTONMENTS OF THE TWO ARMIES DURING THE NIGHT
FROM SEPTEMBER 13 TO SEPTEMBER 14.**

WESTERN ARMY.

Third cavalry division: At and in the vicinity of Holics.

Combined corps: At and in the vicinity of Egbell and Szmolinszko.

Second corps: At and in the vicinity of Csari, Kuklo, and Bur Szt. György.

EASTERN ARMY.

Fifth infantry division: At and in the vicinity of Radosocz.

Thirty-third infantry division (fifth corps): At Unin, Petersdorf, and Letnicz.

Fourteenth infantry division (fifth corps): At and in the vicinity of Szmrdak and Kovallo.

Thirty-seventh landwehr infantry division: At Stepano and Dojcs.

Second cavalry division: At and in the vicinity of Bur Szt. Peter and Bur Szt. Miklos.

These localities were occupied, practically without change, until the morning of September 15.

Sunday, September 14, was a day of rest. In addition to the fighting of the 12th and 13th, the troops had been occupied almost continuously for about three weeks in hard marches and severe exercises preliminary to the grand maneuvers. A day of rest on the 14th was essential, in order not to cause unnecessary and unreasonable fatigue.

EXTRACT FROM THE ORDERS FOR THE 15TH OF SEPTEMBER.

WESTERN ARMY.

The army, reenforced by the ninety-second landwehr infantry brigade, which has arrived at Holics, will resume the advance against the line of Szobotist and Szenicz.

The troops will move forward as follows:

The second corps, in the space between Sasvar and Szenicz, on the south, and Lettnicz and Holy V., on the north.

The combined corps north of this space.

The ninety-second landwehr infantry brigade, with one squadron of the third cavalry division, provisionally as far as Radimo, where it will receive orders from the army commander.

The third cavalry division, between the Chvojnica River and the Unin woods, and will cover the left flank of the army.

In case of an engagement, the direction of the interior wings of the two corps will be Holy V.

The line of the outposts will be crossed by the heads of columns at 7 o'clock a. m.

Army headquarters will be on the height Vinohrad, south of Egbell, by 7 o'clock a. m., and will then march with the combined corps.

EASTERN ARMY.

The army will continue the offensive on the 15th, and, with this object in view, will advance as follows, the right wing being placed in the first line:

The fifth corps, in the space between the road Unin, Petersdorf, and Egbell, on the north, and the line of the height 286 (south of Lettnicz) and M. H. (northeast of Szmolinszko), on the south, toward Broczko; the main body by Petersdorf. The advanced guard will cross the line of outposts at 7 o'clock a. m. One brigade of this corps will constitute the army reserve, which will pass the west end of Unin at 7 o'clock a. m., and will march by Petersdorf to Egbell.

The fifth infantry division will follow the fifth corps in echelon to the right rear, and will cross the line of outposts at Radimo at 7 o'clock a. m. The direction will be approximately that of Rudolfshof, north of Egbell.

The thirty-seventh landwehr infantry division will assemble, ready for battle, on the heights of Barbaiki and Vrch, and will move forward to Szmolinszko, in the direction of Csari, regulating its march by the progress of the fifth corps.

The second cavalry division, upon Kuklo. It will cover the left flank and will send a detachment to destroy the bridge over the March at Hohenau.

The field balloon will begin observations on the height 286, south of Lettnicz, at half past 5 o'clock a. m.

Army headquarters will be on the height 286 at 7 o'clock a. m.

**DETAILS OF THE OPERATIONS ON THE 15TH OF SEPTEMBER.
BATTLE OF EGBELL.**

The ninety-second landwehr infantry brigade arrived by rail at Gaya on September 13 and on the morning of the 14th was placed under the orders of the commander of the Western army, who ordered it to proceed at once by marching to Holics. This brigade had been held in readiness to reenforce one or the other of the two armies, according to circumstances, in the course of the maneuvers. The time of this reenforcement and the selection of the army that was to receive it were determined by the general staff.

As the lines of outposts of the two armies had been not more than about two miles distant from each other since September 13, the battle of the 15th began from these lines at about 7 o'clock in the morning. Each army commander knew, and would doubtless have known in actual war, the location and approximate composition and strength of his adversary's forces.

The fifth corps of the Eastern army and the combined corps of the Western army first came into collision. The former was formed in three columns, each of one brigade and one artillery regiment, the fourth brigade acting as army reserve. The right brigade occupied the height 248, west of Petersdorf; the center brigade, the height 262, south of Petersdorf; the left brigade, the height 266, extending the line south in the direction of the height of Barbaiki (305).

The combined corps was deployed on a line extending north and south through Egbell, the fourth division to the north, and the thirteenth landwehr division on the height of Vinohrad (261), to the south of that town. One brigade of the forty-seventh division (second corps), with the division artillery regiment, continued toward the south the line occupied by the thirteenth landwehr division. These two positions of the opposing forces were separated by an open, shallow valley inclosed between gently sloping hills.

On account of the strong position held at Egbell by the Western army, the commander of the fifth corps could gain

no ground toward the front and was forced to suspend any further attempt at a forward movement until the fifth division should come into action on his right flank. Pending the arrival of this division, the action on both sides was confined almost entirely to the artillery.

The fifth division marched from Radosocz and Vlcskovan to Radimo, where it learned that the fourth division (combined corps) was advancing in the direction of Breszti (255), north of Petersdorf. The former was now obliged to change its direction toward Breszti, thereby leaving a considerable gap between itself and the fifth corps. On reaching Breszti the fifth division was attacked in front and on its left flank by the fourth division, and on its right flank by the ninety-second landwehr brigade, which was marching from Holics to Radimo. To relieve this critical situation of the fifth division the commander of the Eastern army now threw his reserve into the gap between the fifth division and the fifth corps and ordered a general advance, the principal attack being directed against the height of Vinohrad, south of Egbell. But the fourteenth division, forming the left wing of the fifth corps, met with such strong resistance that it could make no progress toward the enemy's position, which had been strengthened by bringing the army reserve into the fighting line. The fifth division could no longer hold on to its position at Breszti.

It was now about 9 o'clock a. m. and the Eastern army, after two hours of hard fighting, had not succeeded in any of its attacks. About this time the commander of the Western army ordered a counter attack by his combined corps and the ninety-second landwehr brigade in the direction of Unin. This resulted in the defeat of the center and right of the Eastern army.

During all this time, the thirty-seventh landwehr division, forming the left wing of the Eastern army, had been able not only to hold its own on the heights of Barbaiki (305) and Vrch (272), but to gain some successes against the opposing twenty-fifth division (second corps). This was the only part of the battle of which I could see nothing from the high ground about Petersdorf and Lettnicz. It is reported that the second cavalry division, operating by way of Sasvar and Morvaör, captured the enemy's corps artillery posted on the height of Vinohradki (256), south of Szmolinszko.

With the defeat of the enemy's center and right, the commander of the Western army was able to direct the entire second corps against the thirty-seventh landwehr division. In consequence of this attack and of the uncovering of its right flank by the defeat of the center and right of the Eastern army, the thirty-seventh landwehr division was compelled to abandon its position and join in the retreat of the rest of the army. The retreat became general for the Eastern army about 10 o'clock a. m. The Western army pursued in the general direction of Szenicz until half past 12 o'clock p. m.

COMMENT.

The maneuvers on this day consisted almost entirely of exercises in grand tactics. Although the line of battle was about nine miles in extent, the commanders were able, by moving comparatively short distances, to observe most of the course of the battle from certain commanding points. With the knowledge possessed by each army commander of the disposition of his adversary's forces, the excellent maps in use and the generally open field, there could be few surprises. The retreat and pursuit were carried out in a faultless manner, the artillery playing a most important rôle in both.

CANTONMENTS OF THE TWO ARMIES DURING THE NIGHT
FROM THE 15TH TO THE 16TH OF SEPTEMBER.

WESTERN ARMY.

Ninety-second landwehr brigade: At Radimo.

Combined corps: At and in the vicinity of Egbell, Lettnicz, Petersdorf, and Rudolfshof.

Second corps: At and in the vicinity of Sasvar, Morvaör, Bozek, and Stepano.

Third cavalry division: At and in the vicinity of Csari, Kuklo, and Bur Szt. György.

EASTERN ARMY.

Fifth corps: At and in the vicinity of Szobotist.

Fifth infantry division: At Roho, Rovenszko, and Ribek.

Thirty-seventh landwehr infantry division: At and in the vicinity of Szenicz.

Second cavalry division: At and in the vicinity of Hluboka, Csacso, and Kuno.

EXTRACT FROM THE ORDERS FOR THE 16TH OF SEPTEMBER.

WESTERN ARMY.

The enemy has been driven back beyond the line Radimo, Unin, Dojes.

Object: To pursue with the full strength of the left wing and, if an opportunity presents itself, to renew the attack and to force the enemy back into the mountains.

The army will advance as follows:

The second corps, with one division and a half, in the space between the line of Sasvar and Hluboka, on the south, and the line of N. Kovallo, Ribek, and Rovenszko, on the north.

The combined corps, with the ninety-second landwehr infantry brigade attached, north of the last-named line.

The third cavalry division, in the direction of Szenicz. It will cover the right flank of the army.

One brigade of the second corps will constitute the army reserve. It will follow the combined corps in the direction of Unin and Holy Vrch.

All columns will cross the line of outposts at 7 o'clock a. m. The army reserve will set out at the same hour from the southern extremity of Unin.

Army headquarters will be on the elevation south of Unin at 7 o'clock a. m.

EASTERN ARMY.

Object: To hold the prepared position on the ridge east of Rovenszko against the enemy.

Dispositions for the defense:

The thirty-seventh landwehr infantry division will occupy that part of the ridge extending from the road from Rovenszko to Kraty M. south to a point on the highway west of Kuno.

The fifth infantry division, with corps artillery regiment No. 5, will occupy that part of the ridge from the road Rovenszko-Kraty M. to the highway Szobotist-Csasztko.

Both divisions will be ready for battle at a quarter before 7 o'clock a. m.

The fifth corps will constitute the army reserve, and will occupy the hills 430 and 424, 3 kilometers northwest from Szobotist. It will be ready for a counter attack in the direction of Csasztko, and will take the necessary measures for securing its right flank on the height 541 and for the proper screening of its position. For this purpose, three squadrons

from the fifth infantry division will be placed at its disposition.

The second cavalry division will cover the left flank of the army and will operate against the right flank of the enemy. It will cross the line of outposts at 7 o'clock a. m.

The position of the fifth and the thirty-seventh landwehr infantry division will be fortified.

Army headquarters will be on the height 324, west of Szobotist, at 7 o'clock a. m.

DETAILS OF THE OPERATIONS ON THE 16TH OF SEPTEMBER.

The thirty-seventh landwehr infantry division, forming the left wing of the Eastern army, had an advanced post of two battalions at Csasco. The divisional artillery (thirteenth regiment) was posted on the high ground 296, northwest of Kuno. The fifth infantry division continued toward the north, the line of defense occupied by the thirty-seventh landwehr infantry division. The artillery of the fifth division (second regiment) and that of the fifth corps (fifth regiment) were posted on the high ground 324, southwest of Szobotist. North of the fifth infantry division came the fifth corps, with its fourteenth division on the left and its thirty-third division on the right. It was concealed behind the ridge running northwest from Szobotist to Kavran from the view of the enemy. The height of Kavran (541), on the extreme right flank, was occupied by a battalion of infantry, and the height of Barkovec (443) was held by three battalions of infantry and one battery of artillery. With the three squadrons of the fifth division that had been attached to the fifth corps, the latter had nine squadrons available for screening its position.

The advance of the second corps of the Western army was over gently rolling country and was executed without any important incident, except the driving in of the outpost at Csasco and the occupation of Szenicz. The attack of this corps was directed mainly against the front of the thirty-seventh landwehr infantry division, but, when the signal was sounded terminating the maneuvers for the day and for this year, it had not been able to gain any ground beyond the ridge running north from Szenicz and Szottina toward Roho. The second cavalry division was forced by the second corps to withdraw to a point southeast of Szenicz.

The combined corps had much more difficult ground over which to march and fight. By 10 o'clock a. m. its right wing (the fourth division) had reached the high ground east of Roho; but the extreme left of the left wing (thirteenth landwehr infantry division) had not yet been able to capture the height of Barkovec (443), and the entire line of battle of the Western army was stopped by the heavy fire from the enemy's exceptionally strong position.

About this time the Archduke Frederick, commanding the Eastern army, ordered a counter attack by the fifth corps, to meet which the Archduke Francis Ferdinand, commanding the Western army, ordered his reserve into the fighting line. Before any decisive result could be accomplished, so far as I could observe or learn, the emperor's signal, closing the maneuvers, was sounded.

COMMENT.

The marches, deployments, and attacks, from a tactical point of view and without reference to the objects to be accomplished, were faultless; but it seemed to me that a frontal attack by the Western army against such a position as that held by the Eastern army would have resulted, in actual war, in certain defeat with heavy losses. This position was not only strong naturally, but the men and guns were well protected behind artificial cover; the field of fire was excellent, and the reserves could be moved to any part of the line without being seen by the enemy. Instead of attacking with equal strength along the entire front, the Western army might have succeeded by employing a containing force against the front of the enemy's line and by attempting to turn his left flank, which was the only weak point in the defensive position.

If it had been possible to continue the maneuvers long enough for a decision to be reached, the counter attack of the fifth corps would probably have succeeded. But in actual warfare the battle would most likely have resolved itself into a trial of endurance and, without a change in the position of one or the other of the armies, might have lasted several days. As it was, the men of the fifth corps were perfectly fresh, while the opposing troops had marched that morning more than 10 miles, had marched and fought for about three hours, and many of them had been on their feet continuously for about eight hours.

The action of the two cavalry divisions seems to have been confined to their artillery. One of the umpires, a major general, who was with the second cavalry division, remarked in my hearing that the right flank of a column of the second corps was exposed to the fire of the horse batteries of this division, at a distance of 2,000 paces, long enough to have enabled these batteries to fire 2,000 rounds.

On the whole, the maneuvers were executed in a manner that demonstrated the highest degree of training and efficiency. At best, maneuvers can be only a simulation of war, and there never has been a battle fought that was wholly free from mistakes and it is more than probable that such a battle never will be fought. Many mistakes in detail in maneuvers would soon be corrected in war. For instance, unnecessary exposure of a command, by failing to take advantage of available cover, while advancing against an enemy firing blank cartridges, would in time disappear if the ball cartridges of war were substituted for the blank cartridges of maneuvers.

MISCELLANEOUS NOTES.

ORGANIZATION, ARMAMENT, AND EQUIPMENT.—I think that the information already on file on these subjects is up to date and that there is therefore nothing new to report.

EFFICIENCY.—The Austro-Hungarian army is the best trained army that I have ever seen, and I believe that it is one of the most efficient armies in Europe. It may well be compared, like the army of a neighboring state, to a perfect machine. One reason why this army is so machine-like is that it is trained and maneuvered as a machine with all its parts assembled and properly adjusted.

To give some idea of the physical condition of the men and of their powers of endurance, I may mention that during the maneuvers they sometimes marched 25 miles a day and many of them were up by 2 o'clock in the morning and did not reach their cantonments until late at night; yet I did not see one straggler, one man fall out of ranks, one man on a litter or in an ambulance. It is reported that none went to the hospital.

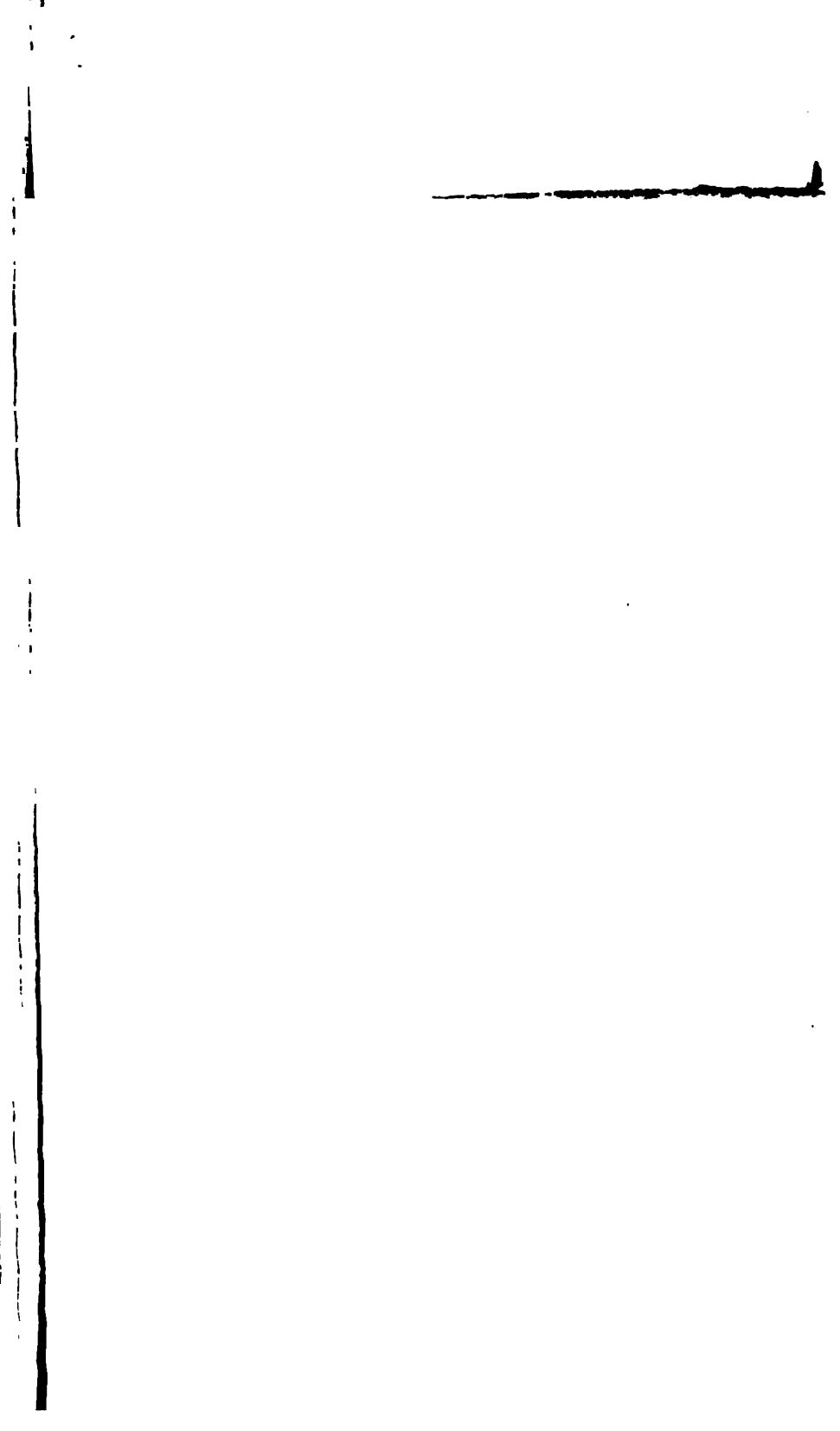
DISCIPLINE.—During the course of the maneuvers, I did not observe a disorderly act on the part of any soldier. I did not see a single soldier in the slightest degree under the influence of intoxicants. Sunday, September 14, was a day

of rest, and therefore afforded an excellent opportunity to observe the general behavior of the men when off duty. I spent the day in Sasvar, in the midst of thousands of them, and I did not see one of them slovenly in appearance, boisterous in manner, or disorderly in conduct. During my residence of a year in Vienna, which has a garrison of about 20,000, I have never seen an intoxicated soldier and I have never seen the slightest manifestation of disrespect by a soldier toward an officer or a civilian.

ARTILLERY.—All regiments of field artillery had four batteries of four guns each, except the second division artillery regiment of the fifth infantry division, which had four batteries of eight guns each. This division belongs to the first corps, stationed in Galicia, and the artillery regiments of the three corps stationed in that province are kept on a war footing. The horse batteries had six guns each. No caissons were used. The ammunition that could not be carried in the limber chests of the pieces was transported in country wagons. The horses are the best of all artillery horses that I have ever seen. They look rather light, but they are exceptionally strong in endurance, and are so much better bred than ours are that, if they were placed in competition with ours they would still be doing their work when ours were dead or abandoned by the wayside.

CAVALRY.—Except in the maneuvers of the 12th of September, I saw almost nothing of the action of the cavalry. Reference was made in the comment on the maneuvers of that day to its dismounted action. By way of illustration of the training of the cavalry, it may be mentioned that a brigade can charge in a perfect line and halt in a perfect line after the charge; a division can move at a walk, trot, or gallop with every horse in the division maintaining the prescribed gait. I have seen a regiment in column of platoons in double rank take a series of obstacles without one horse shying or refusing a single obstacle and without an accident.

INFANTRY.—I should say that the attacking formations are too dense and that the failure to take advantage of cover is too general; but it may be answered that, while a dense line of attack will suffer greater losses than will a thin one, yet an overwhelming fire and power to crush an enemy can be obtained only through density. The use of volleys has been abandoned.



AUTOMOBILES AND BICYCLES.—While the field of the maneuvers was smoother and more open than would generally be the case in war, yet it was impracticable to use automobiles or bicycles across country for the carrying of supplies or messages. The man and horse will continue to be the most reliable means of carrying orders, ammunition, and the wounded on the battlefield. The bicycles were pushed along over the hills and the valleys and across the fields, the men belonging to them following on foot as best they could the headquarters to which they were attached, while the orders and reports were carried by orderlies mounted on good horses that could go anywhere, generally at a gallop, and often at a run. These machines, automobiles and bicycles, may be of considerable utility on the roads of lines of communications, but on the battlefield the bicycles are a useless impediment. The employment of a fighting force mounted on bicycles will be impracticable in war, notwithstanding the organization and maintenance of small bodies of such troops in certain armies, and notwithstanding the volumes that have been written in support of this idea by military bicycle enthusiasts.

FRENCH MANEUVERS.

[REPORTED BY CAPT. T. BENTLEY MOTT, ARTILLERY CORPS, UNITED STATES MILITARY ATTACHÉ AT PARIS.]

The maneuvers being in a way the annual examination or stock-taking of the French army, the programme varies from year to year, so as to solve as many problems as possible and extract the most useful conclusions from the work. Therefore we find that combined operations of the army and navy and the assembling of an enormous force which characterized the maneuvers of 1901 were not repeated this year.

In 1900 the region selected for the maneuvers of an army was the great flat plain around Chartres; in 1901 the rolling plains of Champagne; this year it was the broken, hilly country about Toulouse, in the southwest of France. Each year the problems are different, as are the effectives, the terrain, the troops, and the generals. The same imposing personage, however, has directed the work of the troops for three years.

General Brugère, since his appointment in 1900 as vice president of the conseil supérieur de guerre, has directed the maneuvers and sharpened the weapon which in case of war

would be placed in his hands. This seems a wise arrangement, apart from the happy selection made in the person of General Brugère. Almost every year each general commands in the field his appropriate force, and one or two are selected in turn to command an army; but the officer designated in advance to command, in case of war, the principal army or group of armies of the republic is permitted to superintend and control all the maneuvers and to actively command an army of maneuver as long as he retains this designation. He thus learns to know the army thoroughly, sees and judges the officers at their work, and fits himself by long practice to face every problem which war is likely to present.

General Brugère spends not less than one month of every year in the field directing the maneuvers of divisions, army corps, or armies, and most serious and exacting work it is. In the saddle by 5 or 6 o'clock, he follows and directs the movements till noon; when the troops halt for their rest, he must gather the general and staff officers together for their critique; the afternoon can never be free to the commander of such a large force, even if he does not visit the cantonments; then the work for the next day must be prepared, and he is fortunate if the evening does not bring some official dinner or function where he must stay until a late hour to entertain some distinguished guest or himself accept hospitality.

The French law admits of no higher grade than major general, and thus from among the long list of these officers those who by activity, youth, and intelligence are marked as men who would be called upon for important service in war, can be selected without regard to seniority and given opportunity in time of peace to use the tools they must needs know in case of war. This is the great value to the country of peace maneuvers on a large scale. For the instruction of enlisted men and officers below the grade of general (not counting the general staff) maneuvers of brigade and divisions would probably fill every requirement.

The general performing the functions described is frequently referred to as the generalissimo, but this he is not in law or in fact. The minister of war commands the army, issuing his orders directly to the corps commanders and chiefs of supply departments; he also is ex officio president of the conseil supérieur de guerre. The general officer appointed as

vice president of this conseil is the one selected in advance to command, in case of war, the principal army or armies of France; but in time of peace he does not command them except at the maneuvers, as explained above. As vice president of the conseil supérieur, he, of course, has important duties and much influence. This officer is not at present, and often will not be, the senior major general of the army, but rather the one who gives the most promise in case of severe active service.

The greatest interest, especially on the part of the foreign press, always attaches to the grand maneuvers, because the spectacular features are more prominent, the numbers involved greater, the officers commanding are of higher rank, and foreign officers are present; but these grand maneuvers constitute in reality a small fraction of the army's annual maneuver work. For example, this year the grand maneuvers involved two army corps and a division of cavalry; but the other eighteen army corps had maneuvers during two weeks no less instructive and useful to the troops concerned; fourteen regiments of cavalry maneuvered under General Donop for ten days, and the siege maneuvers for fortress artillery at the Châlons camp kept 25,000 men busy for over two weeks.

The cost of all these maneuvers is very great, but no part of the army appropriation is, in the opinion of the most competent observers, spent to better effect. The army learns to know its chiefs and the chiefs learn to know not only the army but themselves. If defects in organization, supply, or instruction are brought out and corrected each year, there can be no doubt that many a higher officer learns something of his own limitations to his lasting benefit.

The cost in round numbers of the 1902 maneuvers was 7,000,000 francs. The various items may be interesting:

	Francs.
Algerian maneuvers	195,500
Garrison maneuvers	249,000
Staff journeys	120,800
Cantonments (revision).....	37,000
Maneuvers with cadres	169,100
Officers sent to various maneuvers	28,000
Technical exercises, infantry	720,000
Technical exercises, cavalry	11,000
Technical exercises, artillery	523,000
Technical exercises, engineers	98,000

	Francs.
Maneuvers of an army (2 corps)	348,000
Maneuvers of an army corps	388,000
Maneuvers of divisions and brigades.....	2,200,000
Maneuvers of cavalry (7 brigades)	350,000
Maneuvers in the Alps and Vosges.....	1,368,000
Fortress maneuvers	180,000

In other words, about 5,600,000 francs for maneuvers proper and 1,347,000 francs for technical exercises. The budget for the latter probably entered in the payment of the expenses of the siege or fortress maneuvers at the Châlons camp, for the cost of these is estimated at 1,000,000 francs.

This sum does not include indemnity to farmers for damage to growing crops, as this comes from another appropriation.

The following is the list of maneuvers executed in France during August and September, 1902:

MANEUVERS OF AN ARMY.—Sixteenth and seventeenth corps complete, plus a brigade of colonial infantry and two brigades of cavalry. Duration, twelve days.

MANEUVERS OF DIVISIONS.—In the third, fourth, fifth, seventh, eighth, ninth, tenth, eleventh, twelfth, thirteenth, eighteenth, and twentieth corps, and the fortieth division of the sixth corps. Duration, fourteen days.

MANEUVERS OF BRIGADES.—In the first and second corps and the twelfth and forty-second divisions of the sixth. Duration, twelve days.

MANEUVERS OF BRIGADES AND DIVISIONS.—In the fourteenth and fifteenth corps. Duration, fourteen days.

CAVALRY MANEUVERS.—The first division (3 brigades, 6 regiments), a provisional division (6 regiments), and a brigade of cuirassiers; 3 batteries of horse artillery. Duration, ten days. These cavalry brigades, which took part in neither last year's nor this year's grand maneuvers, executed cavalry evolutions.

FORTRESS OR SIEGE MANEUVERS.—About 25,000 men, mostly artillery and engineers, but some infantry; 167 guns. Duration, two weeks.

THE CAVALRY MANEUVERS.

The cavalry maneuvers were regarded as of special interest on account of the large force engaged and the personality of the director, General Donop. This officer seems to lead the progressive school of innovators in cavalry matters while at the same time keeping the confidence of those passionate

horsemen who dread any change that might tend to lessen the value attaching to the horse and to mounted action in favor of work dismounted.

The novelties brought out by General Donop this year were: The charge by successive echelons in single rank arranged checkerwise instead of the charge in mass; the use of Hotchkiss machine guns (small-arm caliber) carried on pack animals as integral parts of the squadrons; the large employment of systems of light footbridges for crossing the men over small rivers, and a considerable development of fighting on foot.

The question of a suitable method of charging for five or ten regiments of cavalry does not present the same interest to us that it does to the French cavalryman, whose belief that his arm must charge on every occasion is born and bred in him as is his form of religion, and he can't reason about it without falling into the domain of sentiment.

The use of the Hotchkiss mitrailleuse seems to have been attended with every success. It was considered to afford excellent support to the mounted troops and a shelter to fall back upon, relieving infantry or cyclist companies from corresponding duties. The tactics for this gun are, it is understood, now being prepared, and the coming year should bring definite regulations concerning its use with cavalry divisions.

The pack saddle used is made by Mr. Alexis Gendron, of Paris, and he has promised me drawings of it for the war department.

The "Donop bridges" have brought about a large amount of discussion, and their partisans find every advantage claimed met by some fault alleged.

One system consists briefly of a light footbridge supported on collapsable floats, with all parts light enough to be carried on a pack animal. (General Donop is quoted as believing that no vehicles save those necessary for the artillery, and then as light and mobile as possible, should accompany cavalry columns.) The bridge can be thrown across a stream 25 yards wide in about half an hour; the men walk over, conducting their horses, which swim alongside. The floats can then be made into a raft and the wagons and artillery ferried over.

It can be imagined how long it would take to pass a regiment by a single bridge under ordinarily unfavorable

conditions, or the serious encumbrment of having several equipages to a single regiment.

The Creusot footbridge was favorably received by the cavalry technical committee. The material for a 65-foot bridge is all carried on one two-horse wagon, and consists chiefly of four corrugated-iron boats and five balks.

The bridges were generally built by the cyclist sappers, detachments of which accompanied each division.

The fighting on foot during the cavalry maneuvers is an echo of the numerous articles, some from weighty sources, that have appeared in the press ever since the South African war. The teachings of our war of secession have not been neglected by French writers, but they have never fully overcome the contempt of cavalry officers for dismounted action.

It is to be noticed that even this year the fighting on foot was done, as it were, "by order," and not at all habitually, and as a matter of course by officers recognizing the value and application of this method of meeting an enemy. Certain days of maneuver were arranged apparently for the purpose of illustrating the use of dismounted fire action, while the other days passed almost without seeing its application.

These remarks show how far the French are from viewing this rôle of the cavalry with our eyes.

These maneuvers were carried on in a rich farming country, and their expense may be judged when the damages due to farmers after one day's operations amounted to 60,000 francs.

THE SIEGE MANEUVERS.

These were the most extensive and costly siege maneuvers that have ever been seen in France; in fact such have been undertaken only three times before. They took place at the great camp of Châlons sur Marne, where the "normal school of target practice" is situated, and is one of the best-equipped artillery ranges in the world, permitting each year practice with shell under war conditions of whole regiments of field artillery at once. The maneuvers lasted from August 4 to August 20, and occupied 25,000 men. These were to a great extent under canvas, an unusual thing in French maneuvers, but made necessary or advantageous by the work in hand. The troops consisted of engineers (railway sappers, miners, aërostats, and telegraphists), position, field, and foot artillery gathered from the center and west of France.

The general theme had in view the attack and defense of a part of the principal line of a land fortress. Five thousand men were assigned to the defense and 25,000 to the attack. The investment was supposed to be completed by the assailant, though the sorties of the defenders had harassed him in building his first line of approach, his railways, his batteries, etc.

The engineers (railway troops) built and equipped 1½ miles of permanent railway to connect the works with the main line; constructed a military railway station and manned the trains which brought up all the heavy siege material during the whole time of the operations. Besides this, they built some 12 miles of light temporary line for siegework.

A serious effort was made to conceal from each side what was being done by the other and all communication between the troops of the contending parties was absolutely prohibited during the whole period. The besieged were considered cut off and no information of the enemy was allowed them except what they could find out from their spies or balloons. Considerable extension was given on both sides to every means of deceiving the enemy; false works were built and never occupied while well-concealed batteries were dug alongside and usually at night; the exterior slopes were sodded, and in some cases the interior of the battery was likewise given the appearance of the surroundings as a protection against balloon observations. (The soil was almost white, easily betraying new works when such precautions were not taken.)

Considerable use was made of a revetment of iron sheets cut into network, as commonly used by plasterers.

Captive balloons were employed by both parties and in all weather. The defense lost their balloons twice (by shells cutting the cable which ran along the ground) during the two days of firing with real shell. A telephotograph apparatus was used both with the balloons and with kites. When the weather was too bad for an ascension or when it was desired to reach a part of the enemy's line too dangerous for a balloonist, this method of automatic photography was used, with what real success can not be said, but it was persistently tried.

The balloons were used to find the range and regulate the fire; they telegraphed the fall of the shots, and during the fire with real projectiles, they were enabled to prove exactly how efficacious is this method of fire observation. The army seems satisfied with it.

The assailants' first line was about $2\frac{1}{2}$ miles long, comprised thirty-nine works, armed with 167 guns of all calibers. The heaviest piece used was the 270-millimeter mortar, firing a 350-pound shell. There were four of these. There were 24 of the 75-millimeter guns. A new model 155-millimeter short seems to have attracted a good deal of favorable attention, but no details of its peculiarities are obtainable. The usual equipment of truck cranes, truck platforms and truck gun carriages was on hand, rails were laid for them behind the parapets and their functioning seems to have been satisfactory.

The organization of the defense comprised both permanent works already existing and works built during the siege. At each extremity of the sector attacked was a heavy fort provided with bomb-proof shelter, deep ditch, flanking arrangements and a glacis covered with barbed wire. In the interval was an almost continuous line of infantry epaulements of various profiles and dotted at intervals with field-gun batteries. Behind this line, concealed from view of the enemy, were the main artillery positions containing the heavier guns; some of these had been brought into action in the earlier stages, but for the most part they were carefully dissimulated and reserved for receiving the attack in force when it should be pronounced. In rear were various kinds of shelter improvised for the reserves.

About a mile in rear of the first line of works a second had been arranged to oppose the enemy in case he got possession of the advanced positions.

All the usual phases of a siege were simulated and the zig-zags and parallels actually dug, often at night and with a real effort at concealment. The last parallel, of no mean profile, had a length of 1,600 yards. The assailant made several attacks in force to seize works of the enemy which impeded the progress of his trenches. Some of these were considered successful; others not. The defense made numerous sorties, some at night, with similar results.

On the 13th, 14th, and 19th the attack used real shell, the observation and correction of the fire being assured from balloons. The fire ceased as soon as the range was gotten accurately, in order to save ammunition; thus the experience was chiefly valuable as practice in indirect fire at unknown ranges, practically all shooting being of this nature, which the French

employ more and more each year in field and siege artillery, while its development in coast artillery seems much less marked. Most of the batteries could not see their targets at all, being on the reverse slopes of the hills, in woods, etc. An auxiliary target was habitually used, on which the sights were directed, while the angle between this line of sight and the line of fire was read and changed from shot to shot by the goniometer sight, which I have frequently described and referred to in my reports. Thus the methods of aiming and ranging in the field and siege artillery approach each other more and more every year. During this actual practice 3,000 shots of all calibers were fired.

These siege maneuvers cost, roughly, 1,000,000 francs, and the army and the press seem satisfied that the money was usefully spent. The most evident conclusions to be drawn from them seem to be:

That a great development of indirect fire from carefully concealed batteries is advantageous. The positions of such batteries may be behind hills or woods, and even balloons will have trouble in detecting them.

A careful study of the method of observing and correcting the fire of field and siege guns from a balloon is much to be desired. Actual practice can alone produce a satisfactory system of transmitting information and of using it.

The erection of dummy batteries for drawing the opponent's fire is a useful ruse and can be depended upon even in the face of balloon observation. At Châlons a large percentage of shots was wasted on such dummy works built by the defense, which entirely deceived the attack.

GRAND MANEUVERS OF THE SIXTEENTH AND SEVENTEENTH CORPS.

The only maneuvers of "an army" in 1902 were those in the neighborhood of Toulouse, in which two army corps, a brigade of colonial infantry, and a cavalry division of two brigades constituted the maneuvering force. The *ordre de bataille* gives the strength and organization of this army.

All the other troops of the French army had maneuvers of effectives not greater than one army corps.

Most of the troops of the sixteenth and seventeenth corps left their garrisons August 27 and were moved to the places

of concentration by rail. Some that had marched started the 23d. The concentration was completed on the 29th.

The work began the next day, August 30, with maneuvers of division against division in each corps, which occupied three days; then the sixteenth corps operated against the seventeenth corps for four days; finally, the two corps, united into an army, maneuvered against a represented enemy for two days. There were nine working days and two days of rest, neither of the latter falling on a Sunday. As a rule, Sunday is a maneuver day or a day of rest, as is most convenient.

The consolidated reports for September 4 gave the following total effective of the maneuvering troops:

	Officers.	Men.
Staffs and auxiliary services.....	180	180
Infantry.....	1,111	37,718
Cavalry.....	231	2,738
Artillery.....	190	3,015
Engineers.....	22	878
Total.....	1,684	44,529

THE THEATER OF OPERATIONS.

The theater of operations lay to the southeast of Toulouse, between that town and Castelnaudary and for the most part to the north of the Canal du Midi, which, starting at Toulouse, connects the river Garonne with the Mediterranean. Numerous small streams flowing northwest are separated by hills which are generally high and frequently precipitous. Besides the usual rows of trees planted along the banks and ditches which separate the fields, there are numerous patches of woods, which, with the frequent ravines, the rolling country, and deep-sunken roads, furnish concealment and cover for troops and constitute an admirable terrain for tactical movements and the application of flank attacks and concealment in approach.

The numerous hills furnished not only a great variety of artillery positions, but by the very fact of their abundance gave a chance to the artillery commanders to exercise skill in selecting the best, and afforded every opportunity for the application of the system of indirect fire, the battery being under natural cover, and of stationing batteries in "waiting positions," concealed, but with all the initial elements for laying determined.

The terrain was not favorable to the action of cavalry in large bodies, nor to charging in any number, but it was favorable to the action of cavalry in raiding movements and for harassing and deceiving the enemy by attacks on foot followed by a rapid change of position mounted.

The only railroad in the region runs along the Canal du Midi. Three of those perfect roads seen only in France run from Toulouse southeast through the scene of operations; two nearly as good run at right angles to these from Villefranche and from Boziège. The rest of the numerous roads of the region are what in France are considered poor; they are very hilly and in bad condition, but even these in America would be called excellent roads.

This country is not a very rich agricultural district though thoroughly cultivated; corn is raised in large quantities but of poor quality. It was the only crop remaining in the ground and caused much trouble to the troops that constantly marched through it.

The weather during the maneuvers was all that could be desired; it rained frequently at night, but was fine during the day.

It was in this region that Soult and Wellington maneuvered in 1814 and fought the battle of Toulouse.

The maneuvers were divided into three periods, each separated from the others by a day of rest. First period, maneuvers of division against division; second period, maneuvers of corps against corps; third period, maneuvers of an army of two corps against a represented enemy.

MANEUVERS OF DIVISION AGAINST DIVISION.

SIXTEENTH CORPS.

SITUATION AUGUST 29.—An army is being concentrated in the vicinity of Toulouse. It has sent a division (the thirty-second) with the seventeenth dragoons, toward Castelnaudary to watch the roads leading from the east, from which direction the enemy is expected. This forms the party "B."

The party "A" is in two groups; the sixty-first brigade, the colonial brigade, four squadrons of cavalry, and three batteries are in the neighborhood of Carcassonne (southeast of Castelnaudary); the other group, sixty-second brigade, a squadron, and three batteries, is on the other side of the Montaigne Noire in the valley of the Agout. The party "A"

is expected to move on Castlensaudary and Toulouse and break up the concentration of the other forces.

The programme mapped out for the three days' work of these troops was as follows: August 30, "B" tries to prevent the concentration of "A;" August 31, "B" retires and takes up a defensive position and is attacked by "A;" September 1, "B" is reenforced and resumes the offensive against "A," who has been obliged to detach a brigade to watch the valley of the Ariège; September 2, rest.

OPERATIONS OF AUGUST 30.—General Laplace, commanding the party "A," divided his forces into three columns; the sixty-second brigade, one squadron, and three batteries, were to move along the road Brousses Montolieu and the Châu. Bouillonnac; the sixty-first brigade, a squadron, and two batteries, were directed on the same place by Pennautier, Ventenac Cabardès, Moussoulens, and the valley of the Rougeanne; the colonial brigade and one battery formed the left column and were to follow the national road No. 113 by Pennautier and Pezens, directing itself toward Alzonne.

The front of march of party "A" was about 9 kilometers, each column having about 3 kilometers to cover in order to come to the aid of its neighbor over ground that was quite easy.

General Herson had divided the party "B" also into three columns. One regiment was directed on Alzonne, two upon Raissac sur Lampy, and the fourth regiment of the division upon St. Martin le Vieil. These troops thus had a front of about 6 kilometers, but over much rougher ground. The one hundredth regiment of infantry (party "B") left the column at Villarzens to occupy Alzonne, whose northern edge it indifferently organized for defense. Proper measures, however, were not taken to barricade the eastern approach to the village, and it was from exactly this direction that an attack might have been expected and did take place. The rest of the division continued its route toward St. Martin le Vieil, but after passing the Tenten, General Herson detached the one hundred and forty-third infantry by Raissac sur Lampy toward the Château de Bouillonnac. As was stated above, this Château de Bouillonnac was the point toward which the whole thirty-first division had been directed, and so, when the one hundred and forty-third regiment came up, it found the place occupied by very superior forces; nevertheless it

attacked with some vigor, but the umpire soon made the commanding officer understand that his action was a mistake and there was nothing for him to do but to retreat. During this time, toward the south, the one hundredth infantry stationed at Alzonne received the attack of the whole colonial brigade, and, as they had failed to fortify the eastern entrance to the village and had not destroyed the bridges over the Vernassone, the place was taken with little trouble by General Perraux. The latter left one of his regiments of colonials in the village and sent the other with a battery toward the north in the direction of the Château de Bouillonnac.

The arrival of this regiment and of the sixty-second brigade, which after a hard march debouched upon the Plateau of Bouillonnac, made certain the defeat of party "B," whose artillery, almost unoccupied during the beginning of the day, had, at its close, the heavy task of arresting the progress of the victorious enemy and of covering the retreat. The maneuver ended here.

OPERATIONS OF AUGUST 31.—On the night of August 30 the party "A" cantoned to the north of the national road No. 113 on the left bank of the Vernassone; party "B" cantoned on the right bank of this stream. The latter having been beaten on the previous day by superior forces, and being separated by such a short distance from its adversary, General Herson decided to make a night march so as to withdraw from his dangerous position and take up a line to the northwest so as to menace the flank of his adversary if he continued his march toward Castelnaudary or else to check him if he attempted to make a front attack upon the heights which separated the valleys of the Fresquel and the Tenten.

The position chosen by General Herson rested its left on the Châu. de Ferrals and its right on the Châu. de la Rouquette, passing by the Bois des Potences, a front of about 3 kilometers.

The interval between the Châu. de la Rouquette and the bridge over the Papoul, near the village of Lasbordes, was intentionally deprived of troops, only a few sections of infantry being left along the positions Télégraphe, Fort, Fort du Faure, and the Châu. de St. Gemme. This weak screen, spread over about 5 kilometers, was intended to deceive the adversary and to tempt him, by easy success, along the route Villepinte, St. Martin Lalande; once engaged along this road

the party "B" was to fall upon its flank near Villagre and the hill marked 169. This ridge presented quite a strong position for the party "B," whether for defense or from which to make an attack.

The first column of the party "A" to make its appearance was the colonials who debouched from St. Martin le Vieil and St. Gemme Latour. They attacked at once, and the defenders of the position left it rather too precipitately to carry out the rôle given them, not waiting even to be cannonaded. While the colonials pushed toward the northwest the rest of the party "A" moved up the brook Lampy, following the route Raissac sur Lampy, St. Martin le Vieil, and Carlipa. Here the head of the column was stopped short by an unexpected fire of musketry. This was the cavalry of the party "B," who were fighting on foot, and, though a single squadron, forced several battalions to take the time to deploy.

During this time the colonials, pushing the advanced line of the party "B" in front of them, debouched from the Fort du Faure and continued their offensive upon Télégraphe. At this moment it looked very much as though the troops of General Laplace were going to fall into the snare prepared for them by the general commanding the party "A."

On its side, the thirty-first division (party "A"), after having driven off the dismounted cavalymen, moved up against Villespy without apparently bothering itself about the thirty-first division, which was solidly fixed in the Bois des Poténces; the artillery of this division on the hill marked No. 191 was getting ready to enfilade the thirty-first division the moment it came in front of the woods; but this attack did not come off on account of a mistake in the bugle calls which stopped the maneuver along the whole line, and after which the day's work ended; not, however, before a counter attack executed by the defense of the St. André wood had commenced by a charge of a squadron of the thirty-second division of cavalry against the left flank of the colonials.

OPERATIONS OF SEPTEMBER 1.—The party "A" cantoned the previous night east of the line Villepinte and Villespy. It had detached its colonial brigade to the southwest toward the railroad to watch the roads coming from the valley of the Ariège. This valley is to the west of and parallel to that of the Tréboul.

The party "B," on the contrary, received from Toulouse reinforcements consisting of one brigade. As may be imagined, this is simply the colonial brigade which has changed sides. The troops of the thirty-second division (party "B") cantoned at Castelnaudary, Peyrens, and Issel. Their general, confident in his recently acquired numerical superiority, decided to take the offensive and push back the enemy on Carcassonne.

The troops of party "B" were started out very early in the morning; a dense fog made it difficult to see more than a few paces in front, and General Herson decided to profit by the circumstances and throw his cavalry upon the cantonment of the party "A." This was done with considerable success at Villespy, where the cavalry created a great deal of disturbance and uncertainty and made its escape without difficulty. Order having been established, the troops on both sides took their positions for the combat of the day.

The thirty-first division (party "A") occupied the hills which crossed the road from Villepinte to Villespy. Its sixty-second brigade and most of the artillery were in the environs of Villepinte, leaving only a small detachment on the heights of Télégraphe, Cammasou, and Cammasblanc; these positions were very strong and assured to the occupant access to the valley of the Tenten. One regiment occupied the village of Villepinte; two batteries were sent to the top of the peak, 700 meters north of the village. This was rather an uncomfortable position for the batteries, as once there they could not move forward and could only fall back with the greatest difficulty. Two hundred meters farther north the other regiment of this brigade (sixty-first) was held massed under cover of a hill. The second group of artillery was on the Télégraphe hill with a good view toward Villagre and Garric. One battery of the first group was on the road to Gresse. One regiment was in reserve a little behind Télégraphe. The front occupied by party "A" between Cammasou and Villepinte was only about 1,600 meters.

At the opening of the maneuver the troops along this front had a very simple affair, since the orders given not to trample on the crops caused the front and flanks to be almost unattackable. But this situation was changed about 9 o'clock by the corps commander giving orders to march and attack across the fields—at least the corn, the vineyards being respected.

Party "B" had taken up its march on a rather extended front. The left column was moved on Villespy, the right on St. André, and it looked as though the opposing sides would not make contact since the thirty-first division, as has been explained, was between Cammasou and Cammasblanc. The colonial brigade (party "B"), however, descending the valley of the Papoul found the advance line of party "A" to the east of this stream, and the commander of the party "B," at last learning the position of his enemy, could oblique one of his columns in that direction and reenforce the colonials. These had reached the Escabasse farm and were moving upon the ravine which separates Bigou from Villagre. One regiment of party "B" had opened fire upon the eighty-first, in front of it, but its artillery could not follow the movement in this difficult country and the attack was given up. These troops of party "B" made very little progress toward their object, especially under the heavy fire of the batteries on Télégraphe. The theoretical projectiles of these guns, however, did not prevent the colonials and the sixty-fourth brigade (party "B") from taking the enemy's first line; on the other hand, the commander of party "A" moved three regiments against the heights which the enemy had taken and which he refused to abandon. The maneuver had to be stopped, and, after considerable discussion, the umpires decided that this counter attack of the party "A" had failed and that they must fall back.

Upon the renewal of the action the colonials, delighted at their first success, made a dash at the peak to the north of Villepinte, where, as has been stated, two batteries had been placed in position; aided by the sixty-third brigade, the colonials forced the one hundred and forty-second infantry to quit Villepinte, and thus the guns were left without any support. The officer commanding them waited in vain for succor or a formal order to retreat; nothing coming, he distributed the carbines to the cannoneers in a last effort to beat off the attacking infantry. This failed, however, and the guns were captured. The thirty-second division and the colonials had the honors of the day.

SEVENTEENTH CORPS.

The maneuvers of the two divisions of the seventeenth corps during this time had chiefly for their object the concentration of the units in the neighborhood of Toulouse,

where the corps commander was to take charge on the 3d of September and begin his operations against the sixteenth corps.

It does not seem necessary to describe in detail the operations of these two divisions as they do not offer as much interest as the work of the sixteenth corps, and a description of the maneuvers of corps against corps will be taken up at once.

MANEUVERS OF THE SIXTEENTH CORPS AGAINST THE SEVENTEENTH CORPS.

The following is the theme of the maneuver: An army coming from the north has, on the 2d of September, reached the Tarn, between Montauban and Albi (not on map). It has detached against Verfeil an army corps (the seventeenth) charged with the object of pushing back the enemy's forces, which have been reported as marching from Castelnaudary upon Toulouse. The sixteenth corps constitutes the advance guard of an army coming from the east and which has established itself upon the Aude as high up as Carcassonne, between the Pyrénées and the Montaignes Noires. This army is supposed to occupy a front of about 40 kilometers perpendicular to the Canal du Midi. The sixteenth corps has received orders to push rapidly from Castelnaudary upon Toulouse and occupy the latter place.

The headquarters of the seventeenth corps on the night of the 2d of September was Verfeil (nearly east of Toulouse); the headquarters of the sixteenth corps, Castelnaudary.

INITIAL POSITIONS NIGHT OF SEPTEMBER 2.

The initial positions of army "A," the seventeenth corps reinforced by the provisional cavalry division (three brigades), are marked in red on the map. The corps headquarters were at Verfeil; headquarters of the thirty-third division, Verfeil; of the thirty-fourth division, Lavalette; of the cavalry division, Lauzerville. The corps artillery and engineers were about Bertron.

The initial positions of army "B," the sixteenth corps, are marked on the map in blue. The corps headquarters were at Castelnaudary; headquarters of the thirty-first division at Souilhanel; of the thirty-second division at Castelnaudary. The corps artillery and engineers were about Castelnaudary.

The colonial brigade, with headquarters at Tréville, was held at the disposal of the director of maneuvers, General Brugère, who proposed to throw it on one or the other side as he saw fit.

ORDERS GIVEN FOR THE MOVEMENTS OF SEPTEMBER 3.

The following orders were issued by the respective commanders of the armies the evening of September 3:

ARMY "A," SEVENTEENTH CORPS.

The seventeenth corps will move upon Villefranche to intercept the enemy in his march upon Toulouse and push him back to the southeast.

The three brigades of cavalry united into a provisional division and reenforced by the two batteries of horse artillery of the seventeenth corps will have for their object to find and push back the enemy's cavalry and then to reconnoiter and retard the march of his infantry, at the same time covering the front of march and the left flank of the seventeenth corps so as to enable it to take position on the hills on the right bank of the Hers, between St. Germier and Montgaillard.

The corps will march in two columns; the left will consist of the thirty-fourth division, the corps artillery, and engineers, and will march by Lanta, Tarabel Cessales; the head of the advance guard should move out of Lanta at 4.30 a. m. The column will march as follows: Advance guard—the divisional squadron and company of engineers, sixty-seventh brigade, divisional artillery (six batteries). Main body—company of engineers, corps artillery, sixty-eighth brigade.

The right column, thirty-third division, will march as follows: Advance guard—divisional squadron and company of engineers, seventh infantry, three batteries. Main body—ninth infantry, three batteries, sixty-sixth brigade. Itinerary: Dremil, Aigrefeuille, Préserville, Fourquevaux, la Bastide de Beauvoir, Maurémont.

The head of the advance guard should debouch to the south of Dremil at 6.30 a. m.

The corps commander will march at the head of the main body of the left column.

ARMY "B," SIXTEENTH CORPS.

The sixteenth corps will move directly upon Toulouse by the main road along the canal. Its brigade of cavalry and

two horse batteries will reconnoiter in the direction of Salles sur l'Hers and Nailloux, the region south of the canal; they will have two points to fall back upon, one at the Château Majesté, 2 kilometers southwest of Avignonet and one at Gardouch. At each of these places a battalion of infantry will be stationed.

The following order of march will be observed:

Advance guard—the divisional squadron and company of engineers, sixty-fourth brigade, six batteries. Main column—sixty-third brigade, corps artillery and engineers, sixty-second brigade. The main body of the advance guard should reach the hamlet les Carmes on the road south of Ricaud at 4.45 a. m. The distance between the advance guard and the main column should be 2,000 meters.

A flank guard composed of the squadron and company of engineers of the thirty-first division, the sixty-first brigade, and the six batteries of the thirty-first division will cover the right flank of the corps, marching by Montmaur, Mourvilles Hautes, Lux, St. Vincent, and Cessaies toward Bastide de Beauvoir.

The head of this flank guard should beat Montmaur at 5 a. m.

The corps commanders will march with the main body of the advance guard of the principal column.

THE COLONIAL BRIGADE.

This brigade will be at 9.30 a. m. at the hill marked 266, on the road and halfway between Auriac and Vaux. It will receive orders there from the director of maneuvers to move against one of the combatants.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 3.

The commander of the seventeenth corps intended to install himself on the ridge Tual Lagrange, due north of Montgailard, and from there continue his movement on Villefranche. He expected his division of cavalry with its known superiority, to drive back readily the adverse cavalry and inform him of the whereabouts of the enemy's columns, at the same time protecting his left flank.

About 7.30 a. m. this division was marching on the road from la Bastide to Beauville when it was shelled by the artillery of the opposing cavalry brigade (sixteenth), which, in marching from Villeneuve on Varennes, had caught sight of the enemy.

The provisional division established its artillery to the west of the road and opened fire, while two regiments of dragoons were sent by Varennes upon Maurémont. The opposing brigade, however, leaving a support for its artillery, slipped between the dragoons and the rest of the division, fell on their flank and cut them off. It was a skillful use of the very broken ground.

But here the advance guard of the thirty-fourth division (left column, seventeenth corps) arrived; the infantry opened fire on the victorious cavalry brigade and obliged it to retire and cover the right of the flank guard of the sixteenth corps.

The provisional cavalry division then continued its march to the east, and soon opened with its batteries and one brigade upon the head of the advance guard of the right column of the sixteenth corps, which had reached Cessales. This column had thrown one battalion into Cessales and with another protected the two batteries which, in position to the north of the village, were firing upon the cavalry detachments in the neighborhood and upon a larger body of cavalry plainly visible upon the hill of Lagrange. This body was the provisional division which had taken post there and was waiting the arrival of the advance guard to establish this first position as contemplated by the commander of the seventeenth corps.

While the advance guard of the flank column of the sixteenth corps was making its dispositions to take possession of the heights to the northwest of Cessales, the first hussars (provisional division) made a prettily concealed movement against two batteries in action north of the village, got in among the guns before they could be returned to the flank and captured them. The infantry battalion which protected these batteries had moved forward to aid in the attack on the heights above mentioned.

As soon of the commander of the sixteenth corps learned from his cavalry that the main body of the enemy was toward his right, he changed his original march along the main road from Villefranche to Toulouse, and realizing the importance of the position of Montgaillard, at once sent there his corps artillery and one brigade, while the rest of the corps (one division in all) moved along the road leading from Villefranche to Cessales to take position between Montgaillard and Cessales, to aid the sixty-first brigade already engaged at Cessales.

General Brugère had given orders to the colonial brigade at 9.30 a. m. to reenforce the seventeenth corps and to this end to move by Cambriac and Beauville to support the thirty-fourth division which was attacking in the direction of St. Germier-Cessales. This order was received when the brigade was on the road halfway between Auriac and Vaux. By 11.45 the brigade had reached the outskirts of Beauville.

The flank-guard column of the sixteenth corps (sixty-first brigade) was hotly disputing the possession of the heights near Cessales with the advance guard of the thirty-fourth division (seventeenth corps) when the end of the maneuver was sounded. The colonials had not had time to attack in strength in aid of the thirty-fourth before the maneuver ended.

The positions of the various troops were noted by the umpires and orders were given for all parties to resume them the next morning at 6.45 a. m., it being the intention to resume at 7 a. m. on September 4 the movements where they had left off at noon on September 3.

A glance at the map will show that the main forces of the two sides were separated at the beginning of the movements of September 3 by some 38 miles; it was evident, therefore, that unless the troops were subjected to unnecessary fatigues, the day would be spent in marching and maneuvering for position rather than in fighting. Such, as is seen by the résumé above, was the case, the advance guards and cavalry alone making contact and the engagements being chiefly between the artillery.

If the troops of each corps had only to leave their position in the morning, march 16 miles, fight an engagement, and go into bivouac on the spot, the necessity for making the maneuver cover more than one day would not have been so pressing; but it must be remembered that in this not very thickly populated region the cantonments were rather widely separated and many detachments had to leave them by 2.30 a. m. to march to the point of assembly of their brigade or division. Then the march in the face of an enemy was necessarily slow at times and subject to digressions following the reports coming in of his movements; finally when the "end of the maneuver" was sounded the various organizations had to march to their cantonments, from 2 to 4 miles distant, prepare their supper, and make their dispositions for the night, knowing the reveille would sound between 2 and 3 o'clock the next morning.

This idea of making a single maneuver cover several days seems rather new in France and its practice this year may be said to have made an excellent impression, the occupation next morning of the lines held at the close of the previous day being much as things would happen in real war when two forces have gotten closely in touch with each other. Besides all this, the development of the maneuver was slower, more rational, and more instructive.

CANTONMENTS NIGHT OF SEPTEMBER 3-4.

SEVENTEENTH CORPS, COLONIAL BRIGADE, DIVISION OF CAVALRY.—The advanced troops of the corps cantoned along the line Varennes-Mourvilles, with the troops which had not come up distributed in the villages from Odars to Tarabel, Maureville, and Caraman; the colonial brigade at Toutens, Cambiac, and the village in rear; the cavalry division around Baziège and Montgiscard; corps headquarters at Bastide de Beauvoir.

SIXTEENTH CORPS.—Advanced troops from Montgaillard to Cessales, the others in the villages on the road from Villefranche to Lux and those to the south of this line; the cavalry brigade at Gardouch and Vielle Vigne; corps headquarters at Avignonet.

The outposts at each side were established in front of the cantonments.

INTENTIONS OF EACH COMMANDER FOR SEPTEMBER 4.

The troops on each side were to resume the positions held at noon the day before and the movements to proceed as though they had not been interrupted.

At 7 a. m., then, the line of battle of the seventeenth corps as marked by the artillery positions was along the front Bosse (near the high road), Bordeneuve, Emboudières, the sixty-seventh brigade of infantry was toward St. Germier ready to attack Cessales, the colonial brigade moving from Beauville with the same object. The cavalry division covered the left of the seventeenth corps toward Beauville with the cavalry brigade of the sixteenth corps opposing it.

The sixteenth corps held Montgaillard, l'Érmitage, Tugal (a high hill and the key to the position), Esquilles, Cessales; the main artillery position being Rigaud Château.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 4.

The first troops to attack were the sixty-seventh brigade, moving on Cessales, which the sixty-first held; at 8 a. m. the colonial brigade made itself felt in the same direction. The sixty-first yielding to this pressure, and the necessity of joining hands to its left with the troops of the thirty-second division, now moving up the stream and forming to the left, evacuated Cessales, which the colonials seized.

From Tucal the artillery could enfilade the sixty-seventh brigade as it advanced, and this determined the commander of the thirty-fourth division to make a change of front, facing more to the south. The artillery was established at Lagrange and the sixty-eighth brigade sent toward Emboudières. This was about 8 o'clock.

At 9 o'clock the thirty-third division (seventeenth corps) sent its sixty-fifth brigade from Coudère Haute by the dip in the ground west and south of Maurémont and deployed it, facing Montgaillard and l'Ermitage; its sixty-sixth brigade moved from Bastide de Beauvoir by Varennes upon Barthioles and deployed facing the hill of Tucal. This deployment was supported by three of the batteries of divisional artillery which took up a position south of Barthioles, the other three batteries being at Enfriesbise and having for their objective l'Ermitage. The corps artillery was sent to Bourdis to support the artillery of the thirty-fourth division at Lagrange.

To meet this move, the commander of the sixteenth corps sent the sixty-fourth brigade to reenforce the few troops which supported the three divisional batteries on Tucal and had the hill fortified, placed the sixty-third brigade on the west of Montgaillard and l'Ermitage with the other three divisional batteries, called up toward l'Ermitage the sixty-second brigade (which had been held in reserve near Rigaud) as well as the whole corps artillery. Remembering that the sixty-first brigade was in front of Trebons, we have the whole position of the sixteenth corps.

The seventeenth surrounded this position in a vast arc of a circle from Cessales through Lagrange to the south of Enfriesbise.

By 10 o'clock the action was intense. The sixty-sixth brigade (seventeenth corps) had gotten into a wood 700 meters west of Tucal while the sixty-seventh was descending from the heights of Lagrange to attack Tucal from the north,

supported by a heavy artillery fire from Lagrange and Bourdis (nine batteries) and by the reserve of the seventeenth corps (sixty-eighth brigade).

At 11 o'clock the sixteenth could no longer hold Tucal and fell back to a position half a mile in rear. It was at this critical moment that the reserve brigade of the sixteenth corps and the corps artillery arrived near l'Ermitage (a movement, as we saw above, ordered as soon as the intentions of the enemy became evident); these troops were assembled to make a counter-attack, but it had only commenced when General Brugère hoisted the signal for the "end of the maneuver."

CANTONMENT NIGHT OF SEPTEMBER 4-5.

The seventeenth corps occupied the villages in rear of its positions from Villenouvelle and Baziège on the railway to Caraman and Mauréville to the northeast. The colonial brigade was around Toutens and Beauville. The cavalry division west of Baziège in the same region as the night before.

The sixteenth corps occupied the villages in rear of its positions from Montgaillard and Cessaies to Lux and Villefranche; the cavalry brigade the same region as the night before.

The outposts established in the morning along the positions held at the end of the previous day's fighting.

INTENTIONS OF EACH COMMANDER FOR SEPTEMBER 5.

The maneuver was to be resumed at 7 a.m. exactly where it left off the previous day. The seventeenth corps having taken Tucal expects to continue its offensive movement, while the sixteenth corps intends to resist at every point until the reinforcements which are coming up (this information having been sent the general commanding the sixteenth corps by General Brugère) have arrived, when the offensive can be resumed with good hope of success.

HYPOTHESIS OF THE MANEUVER OF SEPTEMBER 5.

General Tisseyre, commanding the seventeenth corps, hears that an enemy's force is reported in the direction of Cuq Toulza (about 25 kilometers northeast of Villefranche), coming from the east. He sends the fourteenth brigade of cavalry to reconnoiter, and it reports that a force estimated

at a brigade of infantry passed Cuq Toulza at 4 a. m., marching in the direction of Auriac.

General Tisseyre gives orders to the colonial brigade to move by St. Germier, Beauville, and Cambriac to meet and delay this force.

NOTE.—This hypothesis was announced by General Brugère with the sole object of changing the colonial brigade and the fourteenth brigade of cavalry from the side of the seventeenth corps to the sixteenth corps, in order that a new element might be introduced into the succeeding maneuvers and to give the opposing commanders a chance to make dispositions in the face of unexpected events.

At 7.30 a. m. General Tisseyre learns that the enemy has received reinforcements during the night, and he decides that he can not maintain himself upon the position at Tusal which he captured the day before and makes his arrangements to fall back upon the strong line of La Bastide de Beauvoir-Basiège, where he expects to vigorously resist the enemy's further advance.

General Pedoya, commanding the sixteenth corps, learns at 7 a. m. that reinforcements of one brigade of infantry (the colonial) and one of cavalry (the fourteenth), which had been looked for, had arrived near Beauville at 6.30 a. m.; he immediately decides to take the offensive, and gives orders for a concerted movement against the enemy's positions to begin at 8 a. m., at which hour the reinforcements will have had time to reach and attack his left flank.

NOTE.—General Brugère's order informing General Pedoya of the arrival of reinforcements stated that the colonial brigade would be at his disposal at 7.30 a. m. and the cavalry brigade at 6.45.

In order to facilitate and make more natural this change of fortune, General Brugère directed the commander of the sixty-first brigade to take Cessales (occupied by the outposts of the colonial brigade) before daybreak. This was done at 4 a. m. and the colonials were driven back in the direction of Toutens.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 5.

When the maneuver proper was resumed at 7 a. m., the troops occupied the positions of the day before, only Cessales was in possession of the sixteenth corps, held by the sixty-first

brigade, while the colonial brigade (now part of the sixteenth corps) was assembled east of St. Germier.

The attack of the sixteenth corps was begun by the thirty-second division, which, supported by its own artillery and the corps artillery, drove the two regiments of the enemy from the hill of Tual and installed themselves there at 8.30 a. m. Meanwhile the sixty-first brigade (sixteenth corps) had advanced from l'Ermitage and attacked the farms Ledegs and Montagnol.

Toward the right, the sixty-first brigade was now brought from Cessales and Trebons and placed in line in rear of the right of the thirty-second division, which having taken Tual was ordered to attack Lagrange, its left marching on Maurémont. The colonial brigade was to move with the high road as its axis against the enemy's left; its head reached St. Germier at 9 a. m.

During this time the sixteenth corps had made its dispositions for falling back.

The thirty-fourth division occupied successively the heights of Barthioles and Lagrange by its sixty-seventh brigade and of Embulargne-Larguille and Bordeneuve by its sixty-eighth; then the hills at Varennes (sixty-seventh) and Lambri (sixty-eighth). This about 10 a. m.

The thirty-third division at the same time slowly retired to the range of hills north of Villenouvelle and running west of Maurémont.

The pursuit of the sixteenth corps became more vigorous by 10.30 a. m. The colonial brigade passed to the north of the high road and, supported on its right by a provisional cavalry division formed of the fourteenth and sixteenth brigades, tried to envelop the enemy's left. At 11 a. m. it had reached the line Lambri-Mourvilles.

On its left the thirty-second division, south of the main road, was moving against Varennes and Coudere Haute. It was supported in this attack by its divisional artillery and the corps artillery.

The thirty-first division on its side pushed back the troops that were holding the line Maurémont-Villenouvelle.

At the close of the maneuver, noon, the main part of the seventeenth corps was grouped about la Bastide de Beauvoir, which strong position was solidly occupied by the thirty-fourth division. The thirty-third was still retiring by echelons, fighting in retreat to reach and occupy the heights

which run along the stream just east of Baziège, which once reached would enable it to join hands with the thirty-fourth at la Bastide.

CANTONMENTS NIGHTS OF SEPTEMBER 5-6 AND 6-7.

The seventeenth corps occupied the villages along its front and to the rear as far as St. Foy, Odars, and Pempertuzat (south of the canal); its cavalry (two brigades) were at the last-named place and Donneville. Outposts from Château de Mourville by Varennes and down the right bank of the stream to Baziège.

The sixteenth corps was in the villages from Villenouvelle to Maurémont and Segreville and in those to the rear; its cavalry (two brigades) south of the canal as far west as Villefranche. Outposts from Falgayrac by Houliers and down the left bank of the stream to Baziège.

September 6 was a day of rest.

INSTRUCTIONS FOR THE MANEUVER OF SEPTEMBER 7.

The seventeenth corps will move in the night of September 6-7 to the positions Château de Montlaur, hill 223, hill 235, Fourquevaux, where it should be in place at 6.45 a. m. It will resist here to the last extremity, reinforcements being on the way which should arrive by noon on the 7th.

The sixteenth corps will follow up its success by vigorously attacking, at 5 a. m., the enemy which is retiring to the west.

ORDERS GIVEN BY THE COMMANDERS OF EACH SIDE FOR THE MOVEMENTS OF SEPTEMBER 7.

SEVENTEENTH CORPS.—The troops will fall back before daylight under protection of the outposts.

The thirty-third division will take up the position Montlaur, hill 223, up to Palis; the thirty-fourth will hold with one brigade Palis, Tiffaut, and la Truffe, the other brigade will form the general reserve.

The cavalry division (two brigades) will cover the right flank.

The corps artillery will be posted (in "position d'attente," that is, concealed but with all elements ready for opening fire) in the southwest angle of the roads that cross near Fourquevaux.

As soon as the attack of the enemy is pronounced, the outposts will fall back slowly upon the front of the position

indicated, each on its own division. (These outpost troops consisted of four battalions.)

SIXTEENTH CORPS AND COLONIAL BRIGADE.—The corps will resume its forward movement. The cavalry division (two brigades), reinforced by two batteries of horse artillery, will act against the enemy's right flank down the valley of the Hers (that is, along the canal).

The thirty-first division will assemble to the east of Segreville, with a detachment at Falgayrac, and take as its line of direction the road to Segreville-Caragoudes.

The thirty-second will assemble at hill 219, north of Cesales, with a detachment at Château Pausié, and will attack the enemy as soon as he is encountered.

A curtain composed of the colonial brigade, one battalion of the one hundred and forty-third, and a group of corps artillery will occupy the heights on the left bank of the stream Varennes-Bazidège to keep the attention of the enemy and hold his lines. In other words, General Pedoya, knowing his superiority, determined to make a turning movement around the enemy's left flank while holding his line by front attacks and thus preventing his meeting this movement when it should be discovered. The force for this turning movement was the thirty-first division, which was ordered to move from Segreville on Caragoudes and Tarabel.

The thirty-second was ordered to take as its axis the high road from St. Germier to la Bastide. The curtain along the stream, composed as stated, was ordered to march from Lagrange upon Coudère Haute and on to the southwest of la Bastide.

These dispositions seemed entirely sound, the only criticism possible being the separation by about 2 miles of the two right columns of attack (leaving out the curtain of troops on the left). These were divided by the Marquaisonne, a no mean obstacle, and the country was very rough. The curtain troops might also have given another group of artillery to convince more effectually the enemy of a serious attack on his right.

As it turned out, General Tisseyre did not worry himself much about his right, and the turning movement having been discovered, and indeed made itself felt before the attack of the thirty-second division, he did not hesitate to meet this move by sending up his general reserve and making a change

of front with Fourquevaux as a pivot. This he was able to do without danger of having his center pierced by the thirty-second division since it had not come up.

General Pedoya, finding the flank movement met in good time, profited by the resulting weakness of the enemy's right to make his decisive attack there with the colonials and thirty-second division. These troops were not fully assembled, but were sent in, nevertheless, as it was late. This attack was not pushed home, as it was 1 o'clock and the troops had had a fatiguing day of marching since dawn; therefore General Brugère hoisted the signal for the end of the maneuver.

The following is a more detailed résumé of the day's movements:

By 8.30 a. m. the sixteenth corps had begun to push back the four battalions left by the seventeenth corps along its old positions; by 9.30 the sixteenth had crossed the stream and reached the heights west of the road; the right column had gotten to Tarabel.

At 10 a. m. the squadron of the thirty-fourth division (seventeenth corps) reported to General Tisseyre that strong columns of the enemy were seen about Tarabel. He immediately directed the brigade of the thirty-fourth, which was his general reserve, upon Fourquet and Foucaud Châu. The thirty-third division was ordered to hold fast with two regiments along the line from Ratabou to Palis and send the other two to Bichinis to be held ready for any eventuality. It can be seen that this reserve could be thrown equally well toward Fourquet or Palis.

On the other side, the thirty-first division continued its movement toward Foucaud Châu, the thirty-second toward la Pradasse and le Loup, further south. The latter's artillery, established on the hill marked 241 (near the high road), now took in reverse the brigade of the thirty-fourth division at Foucaud; this and the advance of the thirty-second obliged this brigade to retire to the south of the Marquaisonne and occupy the heights of Fourquevaux, which it did under the protection of the batteries of the divisional and corps artillery. (11.30 a. m.)

Meantime, the colonial brigade marching south of the high road could not get further than Francou on account of the fire which came from the two regiments near Embesse and the six batteries on the hills near it.

About noon the thirty-second division took possession of Palis. The thirty-first was attacking the heights of Fourquevaux when the maneuver was stopped (1 o'clock).

The cavalry does not seem to have been used to any effect by either party during the day. The two divisions faced each other near Ayguevives, and early in the day, after maneuvering for position, they got ready to charge, but a wide and deep ditch was found to separate the two forces; the charge was halted and nothing happened. It would have seemed a fair chance for a little fighting on foot, but none was observed, the artillery alone firing.

On the evening of September 7 General Brugère united the sixteenth and seventeenth corps into an army, of which he assumed command. The intention was to maneuver this army against a represented enemy on the 8th and 9th. This force, commanded by General De Lacroix, was constituted by the sixty-seventh brigade, another provisional brigade of infantry, a group of field artillery, and the thirteenth and fourteenth brigades of cavalry united into a division and reinforced by a group of horse artillery.

The place of the sixty-seventh brigade in the seventeenth corps was taken by the colonial brigade.

CANTONMENTS NIGHT OF SEPTEMBER 7-8.

General Brugère's army was quartered as follows:

Sixteenth corps in the region from la Bastide and Baziège, on the south, to Odars and Belbéraud, on the north.

Seventeenth corps to the northwest of the sixteenth from St. Orens to Pempertuzat.

Cavalry division (sixteenth and seventeenth brigades) south of the canal between Castanet and Toulouse.

The outposts began at Fontenilles (on the river three kilometers due south of Lanta), ran west to the Marquaisonne, and along its left bank to near Toulouse.

General De Lacroix's army was quartered along the line Flourens, Quint, Lauzerville to Ste. Foy, and the villages to the northeast.

Cavalry division on the right flank in the villages east of Toulouse.

The outposts faced those of the enemy.

HYPOTHESIS OF THE MANEUVER OF SEPTEMBER 8 AND 9.

General Brugère's army coming from the south has crossed the Ariège at Auterive, Grépiac, and Venerque, and on September 7, in the afternoon, after crossing the Canal du Midi, has encountered the advance guard of the enemy and pushed it back to the heights of Ste. Foy-Lauzerville.

General Brugère intends to attack vigorously on the 8th the force at Lauzerville; the main strength of the enemy appears to be on the heights from Quint to Aigrefeuille and St. Pierre.

INTENTIONS AND ORDERS FOR THE MOVEMENT OF SEPTEMBER 8.

The commanding general intends first to hold the enemy by a vigorous attack along his whole line and then act upon one or the other of his flanks following the results obtained by the preliminary action and the facilities offered by the terrain as the fight develops it.

The seventeenth corps will take for its objective the line Quint-Aigrefeuille, the sixteenth the line Aigrefeuille-Dremil. These two corps will keep in touch with each other along the line Château d'Odars, Lafiou, Testettes, Gde. Borde, Aigrefeuille (a north-south line).

In each corps the movement will be executed with divisions side by side. One brigade of the sixteenth corps will constitute the general reserve; at the opening of the action it will be massed at Mouriès, 1,000 meters southeast of Belbéraud (near the railroad).

The cavalry division will operate in the direction of Flourens to worry the enemy about his communications with his army in rear.

General De Lacroix had placed his first line along the hill Cayras, Bordeneuve, 223, Lauzerville, Pujol, Ste. Foy; the remaining six battalions organized the defense of the line Quint-Aigrefeuille in rear; the engineers had placed bridges over the Saune between these two lines.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 8.

The Southern army moved to the attack from right to left as follows: Thirty-first division, thirty-second, thirty-fourth, thirty-third; sixty-third brigade (thirty-second division) in reserve. At 7.30 p. m. the thirty-first had reached the heights of Préserville, the thirty-second was crossing the

river north of Odars, the thirty-fourth was at Auzielle, the thirty-third at St. Orens.

An hour later, after preparation by the artillery lasting half an hour, the thirty third took hill 214 and the thirty-fourth Lauzerville and Larroque. At 9 a. m. the sixty-fourth brigade took Pujol and half an hour later the thirty-first division got possession of Ste. Foy and Enfarines.

The whole artillery of the two corps was now established a little behind the long ridge running from Préserville through Lauzerville to Cayras to prepare the attack against the main position of the enemy, upon which his advance line had fallen back. This withdrawal had taken place in good order under the protection of two batteries posted at La Tourette (east of Quint) and of three others near and west of Aigrefeuille. The position from the hill northwest of Quint to that east of Aigrefeuille was fortified and held by the whole force of General De Lacroix except one brigade in reserve south of Montauriol.

The artillery preparation lasted about half an hour, when the infantry moved forward again. They crossed the Saune between 10 and 10.30 a. m. and slowly climbed the slopes to the enemy's position, each move being prepared and followed by the artillery. The ground here afforded excellent cover to the advancing troops, and constant and skillful use was made of it by the small columns of attack which moved up along the whole front.

The thirty-third division was directed against Quint, the sixty-eighth brigade against Boisrond and la Serre, the colonials against the Château Arbanère, and the sixteenth corps had reached Brignac on the right.

The assault of these positions was about to take place when the enemy retired from them and fell back on the line Levade, Montauriol, Dremil Lafage (the most southerly village of that name).

The maneuver ended for the day, to be resumed on the 9th where it left off.

The outposts the night of September 8-9 were established by each army along the line Quint, Boisrond, Gde. Borde, Brignac Lagarde.

The troops on each side went into bivouac or such cantonments as could be found within 2 or 3 miles of the outposts. The cavalry of both sides was sent to the cantonments of the previous night.

Orders were given that all troops should find themselves at 5.45 a. m. in the positions they held at the close of the maneuvers on the 8th, these positions to be verified where necessary by the umpires. The signal for beginning the movement will be hoisted about 6 a. m.

NOTE.—No change in any of the forces was made, except that the colonial brigade was moved from the first line to become the general reserve at Gde. Borde, the sixty-third brigade taking its place in line.

RÉSUMÉ OF THE MANEUVER OF SEPTEMBER 9.

General De Lacroix placed one brigade at the most advantageous point about Dremil and Montauriol and the ground between, on one or the other side of the road, as was most suitable; the other brigade was on the hills about Levade and Serre, north of Quint; the artillery was posted on the hill 243.

General Brugère's forces moved to the attack as follows: Thirty-first division on St. Pierre and Dremil, sixty-third brigade on hill 243, sixty-fourth brigade on Piot. The artillery of this corps (sixteenth) was firing from Bordes Haute (south of St. Pierre) and Libournel.

In the seventeenth corps, the sixty-eighth brigade moved on Montauriol, the thirty-third division on Levade passing between Quint and La Tourette; six batteries were on the ridge of Boisrond, six others on hill 214 near Bordeneuve.

About 8.15 the sixty-third brigade debouched from Carbouguères; General De Lacroix ordered the one hundred and twenty-sixth infantry, till then in reserve behind the little wood near hill 243, to make a counter attack in aid of the regiment already engaged. It was a very fine sight, but seemed like a useless sacrifice. This incident was one of the most striking examples of all the maneuvers I have seen of the target made by a great mass of troops open to hot fire at close range. It is wholly impossible to say what would have happened had the guns been really loaded.

The brigade reserves and the colonials now coming up soon made the counter-attack pause. It is probable that this charge was ordered to cover the retreat of the rest of the army to the north, a sufficiently difficult thing, with a stream to cross and the enemy on their heels. It is also to be suspected that an aimable desire to close the maneuvers with a

magnificent spectacle for the benefit of the vast throng of the country people assembled, all of whom had friends and relatives among the troops, was not absent from the minds of the officers who arranged the work of the day.

Meantime the rout of the Northern army was completed by the taking of hill 243 by the colonials and by Lacase and Levade falling before the seventeenth corps. Dremil and Château Lafage had also been taken by the rest of the sixteenth corps. The attack had thus gained the enemy's positions along the whole line and General Brugère had the maneuver stopped.

There was no review of the troops by the president this year as has been customary, but at the close of the day the various organizations were assembled where they had attacked and the minister of war rode along the lines and conferred a number of decorations.

In the afternoon of the 9th all the troops were marched to the cantonments they were to occupy in view of the departure which took place on the 10th, when all were sent by rail or marching to their garrisons.

Forty trains conveying troops left the vicinity of Toulouse between 9 a. m. and 6 p. m. on the 10th: the troops that marched set out on the 11th.

OBSERVATIONS.

The impression seems to have been left upon the minds of all who witnessed this year's maneuvers that they were more businesslike, more instructive, more interesting, and less spectacular than any seen in recent years, although no new questions were definitely solved. Indeed, it would seem that those most under discussion will never be decided to the satisfaction of Frenchmen until a long campaign has shown conclusively what changes in the old system are made imperative by the smokeless powder, flat trajectory, long range, and rapid fire of present infantry and artillery weapons.

These things have been discussed in the press, both civil and military, and the "teachings of the Boer war" have been cited ad nauseam for over two years.

Writers without other responsibility than the possession of a printing press have been crying aloud for changes and demanding the adoption of new methods of combat which will enable an army of Frenchmen fighting in France to

stand off odds as great as those met by an army of Boers fighting in South Africa.

Those high in military authority have met this indiscriminate clamor with both conservatism and open-mindedness. The Frenchman is not a Boer in physique or habits of life; France is not the South African veldt, and the French army is first and foremost, if not wholly, maintained to defend the national territory or at best to make a campaign in contiguous countries. At the same time those teachings of the recent war applicable and essential to a continental army have been studied carefully by the highest military chiefs and it is not to be supposed that some of their published works dealing with the subject represent the whole result of their labors. On the contrary, the matter is being examined most carefully and the changes made clearly necessary by the progress of armament are being tried and doubtless will be slowly introduced; but where the best responsible military intellects are widely at variance as to the needfulness and the scope of these changes, it would seem that the French Government is acting wisely in not making too great haste. The French army is too large a body to be remodeled and retaught unless the necessity for it is unquestionable.

If the year's maneuvers did not settle the question of what changes in battle tactics are imperative and what needless, they did offer occasions to practice some of the new ideas and furnished to all the chance to think and compare on the ground, in the presence of actual formations of troops engaged, and to draw conclusions more or less definite as to whether battles can be fought to-day in the same fashion as they were fifteen years ago.

The terrain about Toulouse was admirably adapted to marches of approach under cover and illustrated the need and value of scouting. No points of vantage offered a post from which a general could see his army, his corps, or sometimes even a whole brigade. The necessity for initiative in the lower commanders was evident to all, and fortunately the rigid formations of the drill book, so tempting to follow on the great plains where the maneuvers often take place, were out of the question on this broken ground.

The eternal question of formations for assault was much talked of during and after the maneuvers, and plenty of criticism could be heard upon the terrible loss of life which

must ensue when masses of men are moving against a hill in final assault; this is inevitably the first thought of observers unaccustomed to seeing bodies as large as army corps in action. But the question may fairly be asked, how can 40,000 men attack a position about 4 miles long (as for example on September 8) without being seen and fired at in close formations?

Ten thousand men to a mile means 600 to every hundred yards, and at the place chosen for assault, more than this. The successive lines and the reserves can not produce their effect if not close enough together; if close together, how avoid a large target and much loss? Is, then, the assault to be given up? Even flank attacks if not complete surprises present nearly the same problem between forces about equal. If there is to be no assault, will the enemy be driven in confusion from his position and a decisive result obtained?

Each man asks himself or others these and similar questions and the replies are as various as the individuals. The French in general believe that the assault must be made as heretofore; that the troops for this work must accomplish the final act by shock, and that to this end a certain density of formation is necessary; heavy losses in these troops will be inevitable, but the position will be carried and it will be carried in no other way. So, also, in no other way will effective and disorganizing pursuit be usually possible.

If an intelligent reason can be given for the dense formations under fire sometimes seen where the ground makes cover impossible, it is hard to defend the poor use of cover made by the individual French soldier. On outpost, on the defensive and thus stationary, he will get in a ditch or behind a wall if told, but in moving to the attack he almost always stands and fires, kneeling only when ordered to, which is far from habitual; as for lying down it practically is not done except to rest. It may be that all this would correct itself when bullets come singing by, but since maneuvers are for instruction and therefore intended to inculcate correct habits, it would seem that here is the place to teach the individual that use of cover which has been dinned into Europe's ears ever since 1899.

The most precious if not the only effects of training that remain to the enlisted man or subaltern officer when once engaged under killing fire are the habits and instincts made

part of his physical system by long and intelligent instruction; these habits and instincts constitute the only effective difference in battle between disciplined regulars and undisciplined levies, and they chiefly cause the former to succeed where the latter would fail.

In these days more than ever a perfect drill book presenting a most skillful method of attack can not make soldiers succeed whose individual habits as fighting men are bad. The intelligent procedure, then, is to prescribe a general method of attack permitting much elasticity of application; educate the officers to a thinking use of this elasticity, and the men, the tools, to an instinctive obedience to the necessities of the ground.

This elasticity, producing considerable variety of method during this year's maneuvers, was the most noticeable result of the recent wide criticism of the old attack formations. The influence of the new ideas upon company and battalion commanders, as well as upon the higher grades, was evident, but the enlisted men seemed unchanged in those bad habits above referred to and commented upon in previous years.

There is another side to this question containing an important lesson to ourselves. The French soldier's pack is of such bulk (it weighs less than ours) and so carried that he has much trouble in shooting prone; this, then, is probably one reason why he has not the habit seen in our men of lying down to fire; he really prefers to stand as a matter of comfort and he can not shoot well if he does lie down.

The lesson to be drawn from this is, make the pack as light as possible; reduce it to just what a man would carry when going off with three days' rations and the anticipation of long marches and constant fighting; place it in the small of his back; reduce its bulk. Having done this, require him to carry it whenever he is under arms—drill in it, do guard in it, above all shoot in it in all positions and especially when skirmishing.

The French soldier carries his pack as easily and as naturally as he does his rifle; for him the two go inevitably together—it is one of his good habits inculcated by peace training—but the load is too heavy and too bulky and he can't shoot prone in it.

On the other hand our men have excellent habits of seeking cover and skill in shooting prone, but they have acquired

them through always drilling and shooting without any pack. A combination of these respective good habits is most necessary and can only be obtained in the way indicated.

The following remarks on the attack of positions are believed to translate the ideas obtaining among the officers who to-day direct the training of the French army: The new theories which deny the possibility of an assault and admit only fire action and enveloping movements are considered dangerous, and if allowed prevent a decisive result from being obtained. The South-African war is an example in point; no one of its battles was decisive to either side, since neither seemed capable of final offensive action. It is to protest against such theories that the attack continues to be made in the French maneuver battles, though it is wholly granted that the assaulting columns must remain under cover until a complete preparation has been accomplished.

The latter is effected by the artillery and by deployed infantry which has gotten to as close range as possible; it is considered complete when the enemy's front is wholly engaged and his reserves neutralized by the expectation of assault and the uncertainty of the point chosen; when a fierce and increasing fire has reduced his effective and shaken his nerve, and when the assaulting troops have gotten within striking distance without being seriously shaken or reduced by the enemy's fire.

The above results once accomplished and the fire of the enemy practically silenced, the troops designated to make the decisive attack move upon the demoralized enemy without pause and drive him from his position with the bayonet.

The fire at will is the habitual fire employed, volleys used only exceptionally. Fire is opened only when it can be made effective, and then with all the intensity consistent with the supply of ammunition and the further work to be done.

The grand maneuvers this year presented unusually favorable occasions for the employment of cavalry in what we consider one of its most important rôles, that is, rapid movements to favorable positions followed by fighting on foot; but it can not be said that advantage was taken of these opportunities, and this in spite of the example to a certain extent set in General Donop's maneuvers, already referred to, or the teachings of that officer.

The ground was such that cavalry could readily move under cover to favorable positions for fire action against infantry

columns or against the enemy's cavalry held fast by the numerous impassable obstacles of the terrain. But it seems a point of honor with French cavalymen to attack opposing cavalry only with the saber, however favorable the opportunity to get behind an obstacle and fight on foot.

There are no more intelligent or hard-working officers in the army than in the cavalry, but in no arm is tradition so oppressive or outside interference so much resented. It is not an exaggeration to say that the average cavalry officer would rather sacrifice himself and his men in a fine charge with the saber or lance than accomplish a useful result through what he feels is the ignominious method prescribed for "mounted infantry."

The whole matter is a question of caste which military conviction can not dissolve, and it must inevitably injure the usefulness of a brilliant and devoted body of officers.

If it must be acknowledged that maneuvers can not conclusively show this or that method of combat to be good or bad, can only illustrate theories and not prove them, the same inconclusiveness can not be alleged as regards the visibility of uniforms, the marching capacity of the men, the suitability of their equipment, or the mobility and strength of the artillery material.

In all these things the maneuvers, as conducted in France, offer conclusions hardly less valuable than could be drawn after a campaign.

Previous reports, dealing especially with the artillery, have expressed the opinion that French officers had good cause for their general satisfaction with the qualities of mobility, resistance, and freedom from derangement exhibited by the 75-mm. gun.

Nobody has ever doubted the wonderful effectiveness of this piece as shown in polygon tests, but the statement has been often made in many countries that it was too complicated, too liable to derangement, too hard to repair, and too heavy to stand the rough work of a campaign.

If the French had any doubts on this subject they gave little evidence of worry, and certainly they are not the kind of people to go on turning out each year a thousand or more guns of the same type without having had severe tests of their resisting power under campaign conditions.

These tests were never given out, but those to which the batteries were incidentally subjected this year in the maneuvers over the rough ground around Toulouse were sufficiently convincing to those who saw them. Freshly plowed fields, others of standing corn ready to cut, bad roads, steep slopes, and numerous ditches offered a sufficient variety of obstacles to test all the field qualities of the artillery, and it can not be denied that it acquitted itself brilliantly.

Indeed, the almost reckless disregard for men, horses, and material during combat can not fail to strike any observer. In action, when a movement is necessary, the movement is made exactly as it would be were the fight real. If a ditch, a stream, or a cornfield lies in the way of the artillery changing position, if a heavy plowed field divided by treacherous banks and ditches confronts the cavalry about to charge, there is no going round to find a safer way or an easier place, unless always it is evident that this exists near by and that time would be saved. The artillery horses are put at the ditch and the gun bumps over as best it can; a carriage may break a tongue or a wheel, but the others have gotten to where they are needed and the broken tongue is quickly replaced and the other gun comes up; the leading squadron has a dozen men unseated as the horses fail at the deceptive obstacle, but the others follow steadily on, undisturbed by the knowledge that more men will be spilled.

It is admirable training and spirit, and as far as the mounted services are concerned, vividly illustrates the value of the hard work done all the year round over every sort of obstacle prepared on the garrison maneuver fields or sought in any cross-country ground available.

The question of the too great visibility of French campaign uniforms seems for the first time to have been made a subject of serious study this year. The khaki uniforms, the russet-leather equipments, bronze buttons, leather sword scabbard, campaign hat, etc., characterizing the dress of the British or American officers attending the maneuvers, received marks of decided approval from the Minister of War, many general officers, and the military press. As a result, a board of officers was convened to study this question and in a preliminary report (as published in the press) they recommended changes in the French field uniform following on the lines of our own, the

suppression of bright metal and the substitution of a felt hat for the forage cap being noticeable suggestions.

If these recommendations are given effect at all it can not be for many years, since the replacing of a stock of over a million uniforms is not a matter which the French budget can lightly contemplate.

Nothing but admiration can be expressed for the endurance and cheerfulness of the troops of all arms. Generally they left their cantonments at 3 a. m., marched and maneuvered till noon, and then, after a rest of an hour or two, marched another two or three hours to the next cantonments. Sometimes the day was much longer than this.

During the "long halt" after noon the ingenuity of the Frenchmen in the matter of making a good meal with few resources was evinced in the most picturesque and yet substantial fashion.

The stacks would be formed where the battalion halted at the "cease maneuver," in line or column of companies of other formation. Then each little family (a squad of eight) would begin preparations for a comfortable meal out of the provisions kept from the supper of the previous night. Each squad had a different method and the supplies produced from the haversack were no less various. Here a man would be peeling raw potatoes to boil, there last night's cooked potatoes were being mashed to go in the gravy; here a piece of raw beef was being broiled or sausages ingeniously grilled on twigs across the fire trench, while in the next squad the cold roast beef was being heated up with fat to make the gravy. Everywhere were tiny fires, made of the twigs collected before the morning's march began and carried all day on the knapsack, and over them water boiling for the coffee.

Wherever the army halts, whether it consists of eight men or eighty thousand men, the method is the same. A portion of last night's supper, prepared most skillfully in each squad, is eaten with hot coffee; then a rest and in good weather a nap, after which the march to the night's cantonment is begun.

As this system is exactly that which would obtain in war, it is evident how useful is its constant practice during all maneuvers. Indeed, it can hardly be truthfully said, as some maintain, that the maneuvers of large bodies of troops is solely an exercise—though a most necessary one—to the general and staff officers; it is equally a practice to the enlisted

men in marching, sleeping, eating, and taking care of themselves under the precise conditions which would obtain in a campaign on European territory.

There was no "special attraction" offered by the great military show of this year. In 1900 carrier pigeons and the extensive use of automobiles were the talk of the newspaper correspondents; in 1901, such space as was left after gossip concerning the Czar and suite, the grand review of 140,000 men, and the cavalry charges, was devoted to the numerous balloons and wireless telegraphy; this year these various novelties were reduced to simply practical proportions.

Automobiles, usually small, light, and powerful, and in cases capable of going across rough fields, were used by General Brugère, his guest, the Prince of the Asturias, and the two corps commanders, but their use was restricted to serious business. Indeed, I remember seeing only five in all. No balloon was employed except a small one for hoisting signals, and there was no carrier-pigeon service and no wireless telegraphy.

GERMAN MANEUVERS.

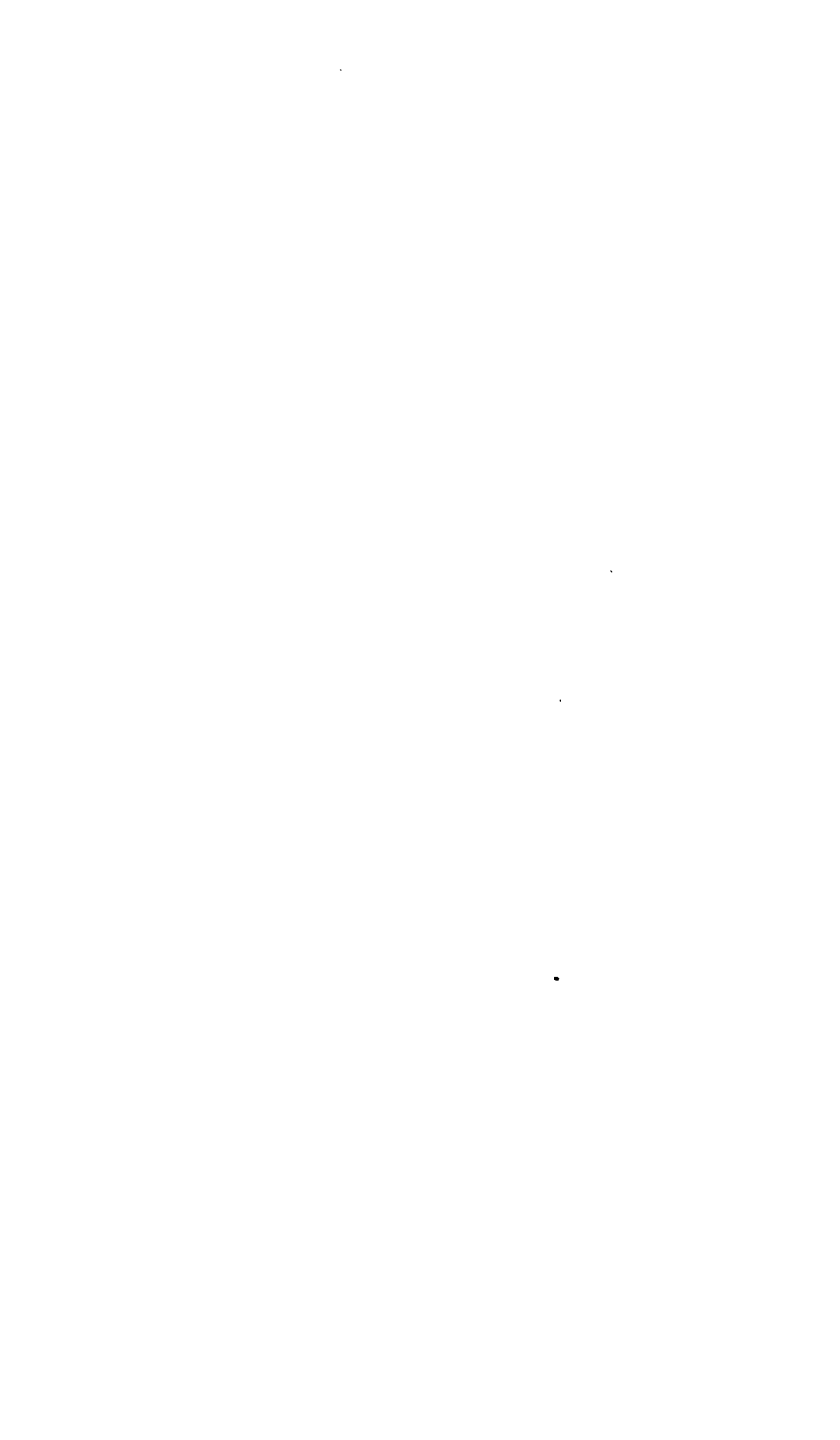
[REPORTED BY LIEUT. COL. J. B. KERR, ASSISTANT ADJUTANT GENERAL, UNITED STATES MILITARY ATTACHÉ AT BERLIN.]

While the German Kaiser maneuvers several years ago were held between two armies, each composed of several corps, the maneuvers of 1902, in accordance with the practice of recent years, were restricted to the employment of two army corps. The organizations of the two corps were established as far as practicable, excepting as to their strength, after the model adopted for war, which finds its greatest expression in the fact that each corps is composed of three divisions. The opposing forces being thus limited, their contact furnished more important tactical than strategical lessons.

The maneuver was held in eastern Prussia, within and immediately to the west of the territory acquired from Poland, near the Russian frontier.

The forces engaged were designated as the Blue and the Red, the strength of each being 35,000 men.

General of Infantry Von Lignitz, the commander of the third army corps, commanded the Blue. His forces advanced from the west and consisted of his entire army corps, the



Bluc.		III rd Army Corps.		42 Bunkers - 405 Squads - 40 Batteries of Machine Guns.	
General of Infantry von Ligniev.		6 th Infantry Division. B-3-13		5 th Infantry Division. B-3-12	
1 st Guard Infantry Brigade. 7-5-14	1 st Guard Infantry Brigade. 7-5-14	12 th Infantry Brigade. 1 st Infantry Brigade. 17 th Infantry Brigade.	10 th Infantry Brigade. 18 th Infantry Brigade.	9 th Infantry Brigade. 10 th Infantry Brigade.	8 th Infantry Brigade. 9 th Infantry Brigade.
2 nd Guard Regiment. 1 st Guard Regiment.	1 st Guard Regiment. 1 st Guard Regiment.	Regt. No. 24. 1 st Guard Regiment.	Regt. No. 20. 1 st Guard Regiment.	Regt. No. 12. 1 st Guard Regiment.	Regt. No. 8. 1 st Guard Regiment.
Guard Fusiliers Regiment. 3 rd Guard Regiment.	3 rd Guard Regiment. 3 rd Guard Regiment.	Regt. No. 4. 3 rd Guard Regiment.	Regt. No. 35. 3 rd Guard Regiment.	Regt. No. 32. 3 rd Guard Regiment.	Regt. No. 42. 3 rd Guard Regiment.
4 th Guard Regiment. 4 th Guard Regiment.	4 th Guard Regiment. 4 th Guard Regiment.	4 th Guard Regiment. 4 th Guard Regiment.	4 th Guard Regiment. 4 th Guard Regiment.	4 th Guard Regiment. 4 th Guard Regiment.	4 th Guard Regiment. 4 th Guard Regiment.
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3 rd Guard Field Artillery Regiment. 3 rd Guard Field Artillery Regiment.	3 rd Guard Field Artillery Regiment. 3 rd Guard Field Artillery Regiment.	F. A. R. No. 39. 3 rd Guard Field Artillery Regiment.	F. A. R. No. 3. 3 rd Guard Field Artillery Regiment.	F. A. R. No. 54. 3 rd Guard Field Artillery Regiment.	F. A. R. No. 18. 3 rd Guard Field Artillery Regiment.
3 rd Co. of Guard P. B. 3 rd Co. of Guard P. B.	3 rd Co. of Guard P. B. 3 rd Co. of Guard P. B.	20 Co. of P. B. No. 3. 20 Co. of P. B. No. 3.	20 Co. of P. B. No. 3. 20 Co. of P. B. No. 3.	20 Co. of P. B. No. 3. 20 Co. of P. B. No. 3.	20 Co. of P. B. No. 3. 20 Co. of P. B. No. 3.
Cavalry Division A. 0-30-2		Cavalry Division A. 0-30-2		Cavalry Division A. 0-30-2	
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Commissar Regiment No. 6. 6 th Cavalry Brigade.	Commissar Regiment No. 6. 6 th Cavalry Brigade.	3 rd Guard Uhlans Regiment. 3 rd Guard Uhlans Regiment.	3 rd Guard Uhlans Regiment. 3 rd Guard Uhlans Regiment.	3 rd Guard Uhlans Regiment. 3 rd Guard Uhlans Regiment.	3 rd Guard Uhlans Regiment. 3 rd Guard Uhlans Regiment.
Muser Regiment No. 3. 6 th Cavalry Brigade.	Muser Regiment No. 3. 6 th Cavalry Brigade.	3 rd Guard Uhlans Regiment. 3 rd Guard Uhlans Regiment.	3 rd Guard Uhlans Regiment. 3 rd Guard Uhlans Regiment.	3 rd Guard Uhlans Regiment. 3 rd Guard Uhlans Regiment.	3 rd Guard Uhlans Regiment. 3 rd Guard Uhlans Regiment.
Horse Artillery Battalion of 1 st Guard Field Art. Regiment.		Horse Artillery Battalion of 1 st Guard Field Art. Regiment.		Horse Artillery Battalion of 1 st Guard Field Art. Regiment.	
Batteries for Battery of Guard Artillery Division.		Batteries for Battery of Guard Artillery Division.		Batteries for Battery of Guard Artillery Division.	
Regt. G. 1 st Battalion Guard P. B.		Regt. G. 1 st Battalion Guard P. B.		Regt. G. 1 st Battalion Guard P. B.	

third augmented by the first guard infantry division, which in turn had been reinforced by the Leib guard hussar regiment as divisional cavalry, by one company of pioneers of the guard corps, and by the first and second guard cavalry brigades. There were also attached to the corps, balloon and telegraph detachments. The Blue cavalry up to include September 10 consisted of one regiment with each division as divisional cavalry, and one cavalry division designated as cavalry division A. The latter was composed of three cavalry brigades, two batteries of horse artillery of the first guard field artillery, one machine-gun "abtheilung" (battery), one bicycle company, and a detachment of guard pioneers. During September 11 and 12, cavalry divisions A and B were united into a corps, under the immediate command of the Emperor, and constituted a part of the Blue force.

The Red army was under the command of General of Infantry Von Stulpnagel, the commander of the fifth army corps. His forces advanced from the east and consisted of the fifth army corps, reinforced by the provisional forty-first infantry division formed by two brigades taken from the second army corps, with dragoon regiment No. 3 as divisional cavalry, and one provisional field artillery brigade. A regiment of mounted orderlies acted as divisional cavalry to the tenth infantry division of this corps, this being the first time orderlies have been employed in the Kaiser maneuver in regimental organization. The remaining infantry division, the ninth, was reinforced by the uhlan regiment No. 1 as divisional cavalry. Cavalry division B was also under the Red commander until the evening of September 10. This division was composed of three brigades, two batteries of horse artillery, one machine-gun battery, and a pioneer detachment.

There were altogether engaged in the Kaiser maneuver 79 battalions, 90 squadrons, 78 batteries of field and horse artillery, 4 machine-gun batteries, 9 pioneer companies, 2 corps telegraph and 2 balloon detachments. The organizations of the Blue and the Red forces are shown in detail in the accompanying diagrams.

The Emperor acted as chief umpire, excepting during the last two days, when he commanded the Blue cavalry corps, the function of chief umpire being performed for this time

by Field Marshal Prince Albrecht of Prussia, assisted by Major General v. Gossler, chief quartermaster in the general staff. There were also fourteen other general officers and two colonels on duty as umpires. To each of these umpires were assigned five officers, principally from the general staff, as adjutants, and a number of noncommissioned officers and privates for duty.

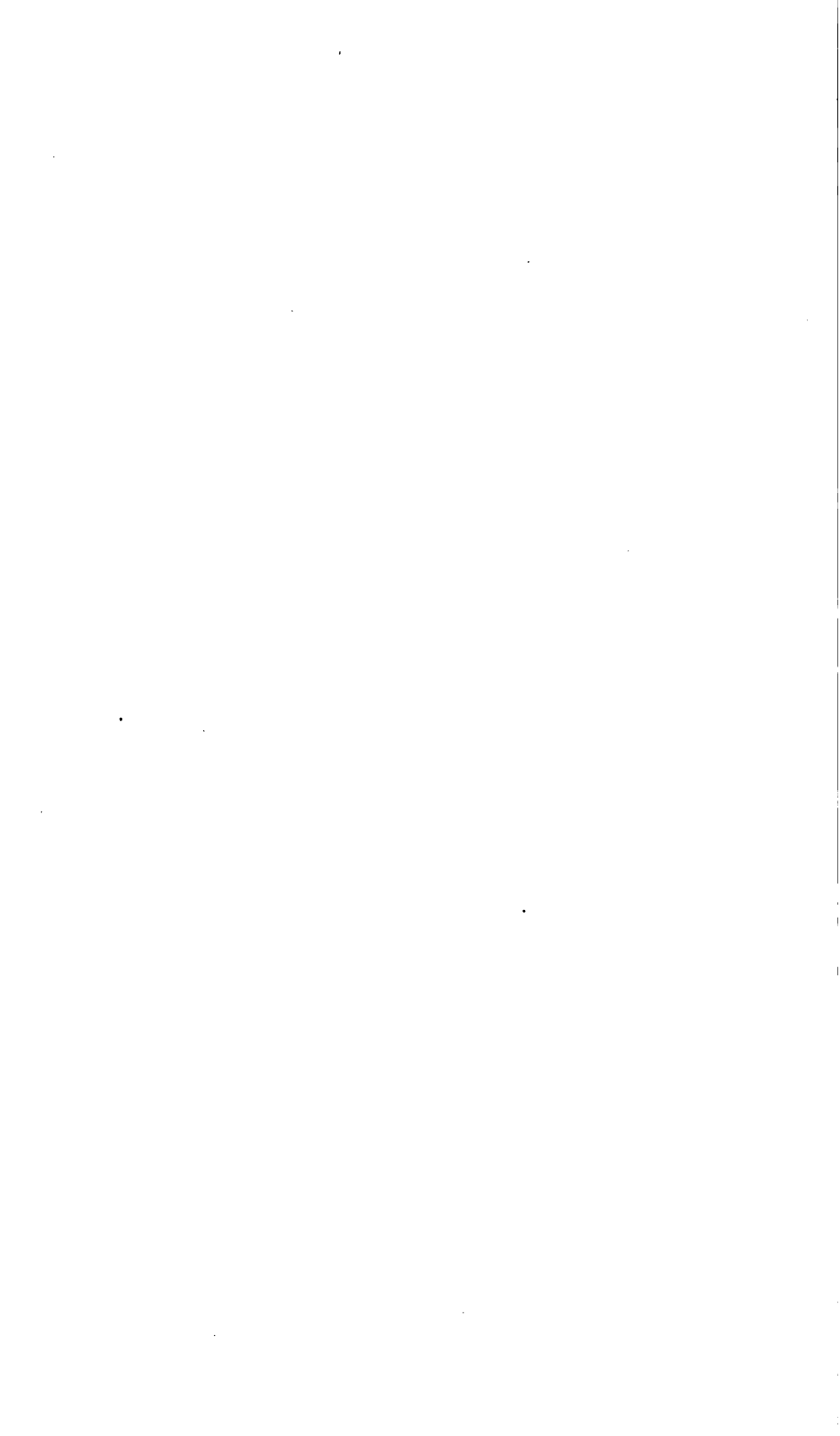
The maneuver direction was under the charge of General of Cavalry Count v. Schlieffen, chief of the general staff, who acted under the supervision of the Emperor, and in his absence under that of Field Marshal Prince Albrecht.

Besides the regular army with the colors, 199,795 men additional from the reserve, landwehr, and the ersatz reserve were called into active service with the Prussian army corps alone, for periods of time varying from fourteen to twenty-eight days during the year 1902. Of this number 12,440 men engaged in the Kaiser maneuvers with the third army corps and 9,595 with the fifth. They were called August 1 for twenty-eight days' service, and were required to report in time to have twenty days' drill, discipline, and practice in marching before the maneuvers commenced.

In accordance with the requirements of the field-service regulations, the organizations taking part in the Kaiser maneuvers left in their garrisons about one-fifth of their strength. These consisted of the sick, the physically weak, and detachments for guard. As many men as were necessary were recalled to the colors to make up the prescribed peace establishments. The cavalry regiments recalled only as many men as they could mount on horses in condition for hard service. The commanders of squadrons decided whether young remounts should be taken or not. After the permanent organizations were thus reinforced, new organizations of peace strength were formed. The battalion was the highest organization formed for the Kaiser maneuvers. There were, however, entire new infantry regiments of war strength organized for the corps maneuvers of the seventh, tenth, and seventeenth army corps. In the formation of new organizations for all the maneuvers, nearly one-half the officers and noncommissioned officers were taken from the active army, these being detached for this duty. The places thus made vacant were filled temporarily by officers and noncommissioned officers from the reserve and landwehr. The remaining

7th Army Corps. General of Infantry von Strilpenogel.				
Red				
18-3-12 41st Infantry Division.	18-3-18 10th Infantry Division.	18-3-18 19th Infantry Division.	18-3-18 9th Infantry Division.	18-3-18 17th Infantry Division.
8th Infantry Brigade Regt. No. 49 Regt. No. 140	20th Infantry Brigade Regt. No. 37 Regt. No. 155	18th Infantry Brigade Regt. No. 47 Regt. No. 50	19th Infantry Brigade Regt. No. 6 Regt. No. 46	17th Infantry Brigade Regt. No. 19 Regt. No. 52 Sharpshooter Bat. No. 5
Dragoon Regiment No. 3.				
Regiment of Mounted Orderlies.				
41st Field Artillery Brigade.				
F. A. R. No. 78 Combined (Haupt) I (Haupt) II (Haupt) III (Haupt) IV (Haupt) V (Haupt) VI (Haupt) VII (Haupt) VIII (Haupt) IX (Haupt) X (Haupt) XI (Haupt) XII (Haupt) XIII (Haupt) XIV (Haupt) XV (Haupt) XVI (Haupt) XVII (Haupt) XVIII (Haupt) XIX (Haupt) XX (Haupt) XXI (Haupt) XXII (Haupt) XXIII (Haupt) XXIV (Haupt) XXV (Haupt) XXVI (Haupt) XXVII (Haupt) XXVIII (Haupt) XXIX (Haupt) XXX	F. A. R. No. 58 (Haupt) I (Haupt) II (Haupt) III (Haupt) IV (Haupt) V (Haupt) VI (Haupt) VII (Haupt) VIII (Haupt) IX (Haupt) X (Haupt) XI (Haupt) XII (Haupt) XIII (Haupt) XIV (Haupt) XV (Haupt) XVI (Haupt) XVII (Haupt) XVIII (Haupt) XIX (Haupt) XX (Haupt) XXI (Haupt) XXII (Haupt) XXIII (Haupt) XXIV (Haupt) XXV (Haupt) XXVI (Haupt) XXVII (Haupt) XXVIII (Haupt) XXIX (Haupt) XXX	10th Field Artillery Brigade. F. A. R. No. 20 (Haupt) I (Haupt) II (Haupt) III (Haupt) IV (Haupt) V (Haupt) VI (Haupt) VII (Haupt) VIII (Haupt) IX (Haupt) X (Haupt) XI (Haupt) XII (Haupt) XIII (Haupt) XIV (Haupt) XV (Haupt) XVI (Haupt) XVII (Haupt) XVIII (Haupt) XIX (Haupt) XX (Haupt) XXI (Haupt) XXII (Haupt) XXIII (Haupt) XXIV (Haupt) XXV (Haupt) XXVI (Haupt) XXVII (Haupt) XXVIII (Haupt) XXIX (Haupt) XXX	9th Field Artillery Brigade. F. A. R. No. 41 (Haupt) I (Haupt) II (Haupt) III (Haupt) IV (Haupt) V (Haupt) VI (Haupt) VII (Haupt) VIII (Haupt) IX (Haupt) X (Haupt) XI (Haupt) XII (Haupt) XIII (Haupt) XIV (Haupt) XV (Haupt) XVI (Haupt) XVII (Haupt) XVIII (Haupt) XIX (Haupt) XX (Haupt) XXI (Haupt) XXII (Haupt) XXIII (Haupt) XXIV (Haupt) XXV (Haupt) XXVI (Haupt) XXVII (Haupt) XXVIII (Haupt) XXIX (Haupt) XXX	F. A. R. No. 5 (Haupt) I (Haupt) II (Haupt) III (Haupt) IV (Haupt) V (Haupt) VI (Haupt) VII (Haupt) VIII (Haupt) IX (Haupt) X (Haupt) XI (Haupt) XII (Haupt) XIII (Haupt) XIV (Haupt) XV (Haupt) XVI (Haupt) XVII (Haupt) XVIII (Haupt) XIX (Haupt) XX (Haupt) XXI (Haupt) XXII (Haupt) XXIII (Haupt) XXIV (Haupt) XXV (Haupt) XXVI (Haupt) XXVII (Haupt) XXVIII (Haupt) XXIX (Haupt) XXX
Cavalry Division B.				
0-30-2				
12th Cavalry Brigade Hussar Regiment No. 6 Ulan Regiment No. 2	9th Cavalry Brigade Dragoon Regiment No. 4 Ulan Regiment No. 12	2nd Hussar Brigade Hussar Regiment No. 1 Hussar Regiment No. 2		
Heavy Artillery Battalion Regt. No. 35.				
Machine Gun Battery of Sharpshooter Battalion No. 5.				
Detachment R. B. No. 6.				

37 Batteries, 45 Squadrons, 20 Battalions,
1 Battery of Machine Guns.







officers and noncommissioned officers of the new organizations came from the various reserves. In selecting the classes for the exercises regard was had that the men, if possible, be able to exercise at least once as reservists and once as landwehrmen. In the landwehr the selection began with the youngest class, in the reserve with the second youngest class. The calling in of the chief, assistant, and under surgeons, and veterinary surgeons was under regulations prescribed in special orders. Enlisted men called in for the maneuvers from the reserve and landwehr, whose annual incomes were less than \$714 each, were exempted from the payment of all taxes during the exercise months; an entire month being tax free if one day's service was had in the month. Before the granting of this tax freedom, however, applications were required to be made for the same. These were handed in after the maneuvers to the proper civil authorities.

The territory used for the maneuvers extended from Frankfort on the Oder west to Posen. It is bordered on the west and south by the Oder. The Odra runs nearly parallel with the border between the provinces of Posen and Brandenburg, and flows into the Warthe at Schwerin. It passes through a section strengthened by numerous lakes and divides the region into two parts of about equal size, the eastern of which served mainly as the exercise ground of the fifth army corps and the western that of the third army corps. In the environs of Schermeisel the Baltic hills rise to respectable heights. Eastward to the Odra these hills decline gradually, forming terraces, until in front of Meseritz a wide valley begins, in the center of which the town is situated at the crossing of the Odra. The latter is a stream of considerable width and of dark color due to the swampy subsoil. The swampy character of the ground makes the Odra a formidable hindrance to troops of any kind. As the lakes generally had marshy, reedy borders, the water supply of the troops was somewhat complicated. The maneuver ground was rich in forests, especially on the lower Warthe and on the Oder between Frankfort and Zullichau. Smaller water courses with marshy borders also cut the generally hilly ground. There are two main roads from Posen to the Oder. The northern is along the left bank of the Warthe to Custrin, and the southern extends through Gratz Zullichau to Grossen Frankfort, with branches through Meseritz and Schwiebus.

Ground on the maneuver field exempted from occupancy by the troops, such as nurseries, hop, tobacco, and garden grounds, etc., which could not be readily distinguished at a great distance, were marked before the beginning of the maneuver, by means of conspicuous notices placed on sign-boards at the height of nine feet. Ditches, steep inclines, and pits were marked by black flags. All field damages by the troops, which were caused by the owners neglecting to timely harvest the crops, gave no valid claim for indemnification. Citizens were required to submit claims for damages within two days after the end of the maneuver. The expenses for damages during the Kaiser maneuvers last year having been unusually large, on account of the unfavorable weather and the backward crops, the Emperor directed that for the present year and in the future, while actual damages would be fully compensated, excessive and unjust claims must be strongly rejected.

The fifth army corps having been assembled, its Kaiser parade was held for the first time in the province of Posen, on the drill ground near the village of Lawica, four miles from the city of Posen. The troops during and after concentration were generally billeted. The great parade of this corps took place September 3, when it was inspected and reviewed by the Emperor just previous to its start for the maneuvers. From the 4th to the 8th of September, inclusive, the corps marched, practicing reconnoitering exercises.

The third army corps was assembled in like manner for its Kaiser parade at Frankfort on the Oder, where the corps was paraded, inspected, and reviewed by the Emperor on September 6. The distinguished foreign guests, to whom His Majesty the Emperor and King had forwarded invitations to attend the maneuvers as his special guests, assembled here and formed a brilliant attending suite. Among, these from the United States, were Maj. Gen. Henry C. Corbin, Adjutant General, United States Army, Maj. Gen. Samuel B. M. Young, and Brig. Gen. Leonard Wood, with their aids de camp; Lieut. Col. John A. Johnston, assistant adjutant general; First Lieuts. Frank R. McCoy, Tenth Cavalry, and James F. McKinley, Fourteenth Cavalry. From Great Britain, Field Marshal Earl Roberts, Lieutenant Generals French and Kelly-Kenny, Major General Hamilton, Secretary of State for War Brodrick, and the Earl of Lonsdale. From Italy, General Saletta, chief of the general staff. From Bavaria, Crown

Prince Ludwig, and Princes Leopold and Arnulf. From other countries, General Granadez of the Republic of Guatemala, the Crown Prince of Roumania, Prince Henry of Prussia, Field Marshal Count Waldersee, and the military attachés of the United States, Great Britain, France, Russia, Austria, Italy, Spain, Sweden, and the Argentine Republic. The numerous attendants of the high personages and foreign officers is an eloquent evidence of the generous hospitality of the Emperor. The difficulties arising from the transporting, mounting, quartering, boarding, and guiding of all the invited guests and of the officers attached to and accompanying them were overcome in a faultless manner, and the model-like machinery put in operation for this purpose proved a valuable and pleasant lesson of the maneuvers. The parade and subsequent maneuver took a splendid turn. The reinforcements of this corps for the maneuver from the guard corps did not attend the parade, as they were paraded and inspected by the Emperor with the guard corps on the Tempelhofer field, Berlin, August 30, previous to marching for the maneuvers.

OFFICIAL ANNOUNCEMENTS.

The following official announcements were given out by the maneuver direction concerning war dispositions, situations, intentions, events, etc., from day to day during the maneuvers:

GENERAL DISPOSITION.

A Red army corps has crossed the Weichsel and advanced in the direction of Rogasen; another from the south has advanced through Silesia in the direction of Sagan.

A Blue army corps is being concentrated near Frankfort on the Oder.

SPECIAL DISPOSITION FOR BLUE.

The Blue (third) army corps is to repulse the enemy, who has invaded the territory.

On the evening of September 7, there are in position near Frankfort on the Oder the fifth and sixth infantry divisions on the left bank, and the sixth cavalry brigade on the right bank of the Oder, while the remainder of cavalry division A is at Drossen. The first guard infantry division, which has been placed at the disposition of the commanding general, is to be transferred to Landsberg on the Warthe, by rail, by noon September 8. Additional troops are being concentrated on the left of the Oder.

The northern army corps of the enemy crossed the Warthe with the left wing of its infantry on September 5 at Obornik, and with its right wing on the sixth at Wronke. The main body of its cavalry was on this day at Neustadt. The advance guard of the southern army corps of the enemy is expected at Sagan on the 8th.

SPECIAL DISPOSITION FOR RED.

Both army corps shall endeavor to effect a junction in the direction of the enemy. On the evening of September 7, the northern army corps (fifth) reached Zirke with the main body of the forty-first infantry division; Kwiltsch with that of the tenth, Neustadt with that of the ninth, and Bentschen with cavalry division B. The southern army corps is to reach Sagan on the following day with its advance guard.

EVENTS OF SEPTEMBER 8 AND INTENTIONS FOR SEPTEMBER 9.

Blue.

The third army corps began its advance September 8 from Frankfort on the Oder, in two columns, against the enemy approaching by Obornik and Wronke.

The following points were reached:

By the fifth infantry division, Reppen, with advance guard at Bottschow.

By the sixth infantry division, Drossen, with part of its advance guard at Heinersdorf.

Cavalry division A on the morning of September 8 moved the sixth cavalry brigade, which, on September 7, was still near Frankfort on the Oder with the machine-gun battery of the third army corps, by Schönwalde, Lindow, to near Grochow. It also advanced the two guard cavalry brigades, the battalion of horse artillery, and the two machine-gun batteries of the guard corps from Drossen by Zielenzig, Schermeisel, as far as Grochow.

Cavalry division A, now united, marched northeast from Grochow with the intention of observing the flank of the advancing enemy, and to veil the approach of the first guard infantry division. Its reconnoitering squadrons had along its whole front come in touch with the reconnoitering detachments of the enemy. Late in the afternoon the cavalry division went into bivouac between Falkenwalde and Neudorf.

The first guard infantry division by noon of September 8 had arrived at Landsberg by rail and went into close quarters south of Landsberg, occupying the Obra line from Blesen down stream; one company securing the crossing near Zantoch.

By noon September 9 the commanding general intends to reach, with the advance guards of the fifth and sixth infantry divisions, the line Grunow-Lagow, forest outlets west of Langenpfehl. The first guard infantry division the line Neudorf-Grunzig.

Cavalry division A stands ready near Neudorf.

Red.

The fifth army corps, on September 8, continued its advance march undisturbed by the enemy. Only reconnoitering detachments repeatedly met the enemy.

The following points were reached by the advance guards:

Of the forty-first infantry division, Politzig.

Of the tenth infantry division, Schierzig.

Of the ninth infantry division, Lagowitz.

Near and to the east of these points the divisions went into bivouacs.

Cavalry division B advanced from Bentschen by Stentsch, Schwiebus, to Wutschdorf. It also came into touch with the enemy only with its reconnoitering detachments. In the afternoon the division went into bivouac in the locality of Lagow, Grunow, Wutschdorf, and Selchow.

On September 9 the commanding general intends to advance as follows:

Forty-first infantry division, by Meseritz, Pieske, to Tempel.

Tenth infantry division, by Bauchwitz, Hammermuhle, Kalau, Hochwalde, Seeren, to Langenpfuhl.

Ninth infantry division, by Schindelmuhl, Paradies, Starpel, to Schonow.

Cavalry division B stands ready to advance in a northerly direction and to place itself at the head of the vanguards of its infantry divisions.

SEPTEMBER 9.

Blue.

The third army corps continued its advance march as intended. Weak mixed detachments early occupied the forest edge west of Grunow, the narrows near Lagow, the forest edge west of Langenpfuhl and east of Grochow, also Neudorf and Grunzig. The reconnoitering detachments of the enemy experienced much opposition in observing the advance march.

The following points were reached by the advance guards:

Of the fifth infantry division, Lagow.

Of the sixth infantry division, Grochow.

Of the right column of the first guard infantry division, Neudorf.

Of the left column of this division, Grunzig.

The main bodies went into bivouac in rear of the advance guards. During the day no important engagements occurred with the army corps of the enemy.

Cavalry division A, in further carrying out its intention of operating against the right flank of the enemy, advanced from Neudorf at 5.30 a. m. through Blesen, east of the Obra, to Meseritz. It succeeded in surprising in attack the head of the forty-first infantry division. In leaving by Weissensee it suffered considerable losses by artillery fire from the environs of Kurzig. It then remained for observation between Neudorf and Grunzig. The division went into bivouac for the night near Gleissen.

The reconnoitering squadron sent against Krossen reported that cuirassier patrols of the enemy were recognized in the afternoon of September 8 near Sommerfeld and Christianstadt.

The commanding general intends to attack on September 10. The fifth infantry division is to march north of the line of lakes against Tempel.

The sixth infantry division and the first guard infantry division are to turn the right wing of the enemy.

Cavalry division A is to advance by Blesen.

Red.

Cavalry division B advanced at 7.30 a. m. from the line Langow-Selchow through Schonow to Pieske and joined with the advance guard of the forty-first infantry division north of the latter place. It next took position east of Lake Pieske, where it held itself in readiness and observed to

the north, also the east outlets of the beech forest. When shortly after 10 o'clock the infantry of the enemy with some guns debouched from the forest west of Tempel, the horse artillery of the cavalry division deployed against them and compelled them to retreat into the forest.

The forty-first infantry division, marching by Meseritz, had deviated from its course in the direction of Kurzig, when its head, near Lange's Vw., was surprised and attacked by a hostile cavalry division with machine guns, which had advanced along the right bank of the Obra through Blesen, the infantry division suffering heavy losses. The division later, from the height due southwest of Kurzig, fired with its artillery at this hostile cavalry division, which then withdrew through Weissensee to height 79, southwest of Weissensee.

In accordance with orders received from the general headquarters at 12 o'clock noon, the tenth infantry division turned off through Hochwalde to Pieske, and the ninth infantry division through Burschen to Seeren. The latter in the afternoon compelled weak hostile infantry and artillery west of Langenpfehl to retreat into the beech forest.

In the evening, cavalry division B was in bivouac near Ober Gorzig, the forty-first infantry division near Kurzig, the tenth infantry division near Pieske, with advanced posts against Tempel, and the ninth infantry division near Seeren, with its advanced posts at Langenpfehl and Schonow.

The commanding general intends to attack, on September 10, the forty-first infantry division in the direction of Grunzig, the tenth infantry division by Tempel, in the direction of Neudorf, and cavalry division B, the flank and rear of the hostile division.

The ninth infantry division is to advance by Langenpfehl against Grochow, and is to block the narrows east of Gross Kirschbaum with a detachment.

SEPTEMBER 10.

Blue.

The commanding general of the third army corps intended not to advance or to attack until after the arrival of the fifth infantry division north of the line of lakes. The fifth infantry division, however, was attacked in the beech forest by a hostile division (ninth) from the direction of Langenpfehl, and after a fluctuating fight was compelled to retreat upon Schermeisel.

The sixth infantry division while deploying was attacked from Tempel by a hostile division (the tenth), its left flank was turned and the division was thrown against Grochow.

The first guard infantry division was standing in a position of readiness between Neudorf and Grunzig, when it was attacked by a hostile division (forty-first) from Kurzig and Weissensee. It maintained itself and in its turn attacked with its right wing in the direction of Tempel, without, however, gaining a decision in its favor.

Cavalry division A participated with its artillery in the fight of the first guard infantry division. Its left flank was temporarily threatened near Blesen by a hostile cavalry division, which, however, soon withdrew. It did not follow. The division remained on the left wing of the army corps, where a cavalry division newly arrived by Landsberg on the Warthe united and formed with it a cavalry corps.

The fifth infantry division bivouacked for the night near Lake Vorwerk; the sixth infantry division near Gleissen; the first guard infantry division near Falkenwalde and Oscht, occupying Grunzig; the cavalry corps north of Weissensee.

The commanding general intends to attack on September 11.

Red.

The fifth army corps attacked as follows:

The forty-first infantry division, in two columns, in the direction of Grunzig and "Die Zauche;" the fighting here remained undecided.

The tenth infantry division deployed from Tempel on both sides of the main road to Grochow against the hostile sixth infantry division, which was not then deployed, turned its left wing and drove it toward Grochow.

The ninth infantry division met the hostile fifth infantry division in the beech forest and compelled it to retreat toward Schermeisel.

Cavalry division B advanced against the hostile left flank from Ober Gorzig by Blesen, but before being able to participate in the fight it had to be sent away in a southern direction to form connection with the sixth army corps advancing against Krossen.

The commanding general then withdrew the forty-first infantry division to Tempel; the tenth infantry division followed the enemy up to Grochow; the ninth infantry division pursued the enemy to Schermeisel. Near these places they went into bivouac.

The commanding general intends on September 11 to stand on the defensive—the forty-first infantry division northwest of Tempel; the tenth infantry division behind height 152 northeast of Schmach; the ninth infantry division is to cover the left flank of the corps in the direction of Gleissen-Lake Vorwerk on the hills west of and near Grochow.

The right flank is to be secured by a strengthened regiment of cavalry.

SEPTEMBER 11.

Blue.

The third army corps attacked all along the line in the following order:

The fifth infantry division toward Grochow, turning the hostile left wing.

The sixth infantry division by Posersfelde Vorwerk toward the heights near Schmach.

The first guard infantry division by Neudorf in the direction of the heights near Tempel.

The cavalry corps from near Kurzig assisted in the attack of the first guard infantry division and crossed the railroad east of Tempel, and its horse artillery from the hills east of Tempel so enfiladed the hostile right wing that it was shaken and obliged to retreat.

The hostile left wing near Grochow was also forced to retire.

The tenth infantry division could not maintain itself longer and joined in the general retreat.

The cavalry corps availing itself of its opportunity threw itself with full force against the shaken forty-first infantry division. The latter was

overridden, and the attack was then continued against the tenth infantry division, which also suffered heavy losses.

The army corps pursued the retreating enemy.

It bivouacked for the night as follows:

The fifth infantry division near Schonow.

The sixth infantry division near Langenpfehl.

The first guard infantry division near Pieske and Kurzig.

The cavalry corps behind the left wing near Weissensee.

On September 12 the commanding general intends to continue the offensive.

Red.

The divisions of the fifth army corps early in the morning stood in their positions ready for battle.

The hostile attack first fell upon the ninth infantry division near Grochow. Its left flank being turned, the division was compelled to fall back upon Langenpfehl.

The following infantry divisions were also attacked at the same time: The tenth near Schmach and the forty-first west of Tempel. The artillery of the latter was already heavily engaged and hard pressed, when it received an enfilading fire from several battalions of artillery deployed on the heights east of Tempel. The retreat of the right wing was thus rendered unavoidable. The tenth infantry division, favored by the ground, had maintained its position until now, but could only avoid the threatened turning of its flank by retreat. The entire army corps was thus forced in retreat, when from the environs east of Tempel a hostile cavalry corps charged the disordered and shaken parts of the forty-first infantry division, dispersed them, and then overrode the tenth infantry division. Hard pressed by the enemy, the army corps retreated beyond the line of Lake Strauch-Hochwalde-Liebenau.

For the night the divisions bivouacked as follows:

The forty-first infantry division near Kalau.

The tenth infantry division near Paradies and Jordan.

The ninth infantry division near Leimnitz and Rinnersdorf.

News having been received that on September 12 the sixth army corps, which had crossed the Oder during the night, might be expected by Wutschdorf, the commanding general intends to fight on the heights near and to the west of Kalau.

The following additional events of the maneuvers are of interest:

SEPTEMBER 8.

The bicycle company attached to the Blue cavalry division was employed September 8 from 7 a. m. in guarding the narrows of Lagow and Gross Kirschbaum and the eastern outlets of Schermeisel.

The Blue corps telegraph detachment with the advance guard of the sixth infantry division established connection between Zielenzig and its corps headquarters at Drossen. It

also forwarded reports from the Blue cavalry division, which had established optical (flash) signal stations at Zielenzig and in the environs of Königswalde and near Schermeisel.

The two following suppositions were authorized: First, a Blue reconnoitering squadron was supposed to have proceeded to Krossen; second, the Oder bridges from Krossen to Tschicherzig were supposed to be occupied the morning of September 9 by Blue pioneer detachments of the fifth infantry division prepared to destroy the bridges.

The headquarters of the Red army at Bauchwitz was connected by its telegraph patrols with Schwiebus, Pieske, Liebenau, and Niedewitz.

During the day the cavalry of both sides successfully reconnoitered the situations of their opposing forces.

SEPTEMBER 9.

The Blue cavalry division early on the morning of the 9th proceeded from its bivouac between Neudorf and Falkenwalde through Blesen toward Meseritz. It reached Georgsdorf at 8 a. m. during a heavy fog. It discovered the advance of the Red forty-first infantry division on the main road from Meseritz to Pieske. At about 9 o'clock a. m. the second guard cavalry brigade of the Blue cavalry division crossed the Odra, and having established the two batteries of horse artillery and the two machine-gun abtheilungen of the division in very favorable positions, surprised and suddenly attacked the head of the forty-first infantry division. As a result of the attack the battalion of Red infantry marching at the head of the division and three batteries of field artillery following it were put out of the fight by the umpires. A great part of the Red artillery of the division then went into action and forced the Blue cavalry to retreat with considerable loss in a north-western direction. Halting at Weissensee, its horse artillery entered into a short duel with the Red batteries near Kurzig. The division then proceeded to the eastern environs of Neudorf.

SEPTEMBER 10.

In accordance with the supposition, the advance guard of the Red sixth army corps, advancing through Silesia, would be ready to cross the Oder on September 10. The commander of the Blue forces, therefore, decided to attack early on the

morning of the 10th, in order to defeat the Red fifth corps before the arrival of the sixth, and in order to be free, if possible, to turn afterwards against the latter.

Although the approach of the Red corps through Silesia suggested a defensive action on the part of the Red fifth corps, its commander decided to take advantage of the favorable opportunity presented by the very extended Blue line and ordered an attack. With this view he directed the forty-first infantry division to advance from Kurzig against Grunzig; the tenth infantry division from Pieske through Tempel against Neudorf; and the ninth infantry division by Langenpfehl against Grochow; the latter division blocking the narrows east of Gross Kirschbaum with a detachment which should prevent any part of the hostile fifth infantry division from proceeding north. The Red cavalry division was ordered to attack the flank and rear of the left wing of the Blue line held by the first guard infantry division.

The Blue commander, having also determined upon an attack, ordered the first guard and the sixth infantry divisions to attack and turn the right flank of Red, and the fifth infantry division to advance north of the lakes against Tempel. The latter division was to approach near to the sixth and was to occupy the lake narrows of Gross Kirschbaum with a detachment. The Blue cavalry division was ordered against Blesen. The first guard and the sixth infantry divisions had assembled for the march at 6 a. m., and the fifth infantry division was already marching in two columns on the roads to Grochow and to Schermeisel. When cavalry division A had reached Falkenwalde, the Blue commander discovering the advance of Red, he countermanded his order shortly after 6 a. m. for the turning of the hostile right wing, and instead directed the first guard infantry division to await attack while scouting toward the south; the sixth infantry division to advance on the main road Grochow-Tempel to the edge of the forest; the fifth infantry division to advance north of Gross Bechen See against Langenpfehl; and dragoon regiment No. 2 to scout as far as Tempel.

The Red army advanced with the tenth infantry division in the center, the forty-first infantry division directly to its right, and the ninth infantry division to its left. The two latter divisions each advanced in two columns. When the left column of the center division debouched from the forest

at 7 a. m. on the main road to Tempel, it and the ninth infantry division were ordered to attack in the direction of Grochow, and the forty-first infantry division to hold the enemy near Grunzig-Neudorf.

The left column of the center division, in accordance with its instructions, turned off from the main road and deployed against the heights west of Tempel, its artillery going into action west of the Piesker See. The right column of the center division was ordered to turn the left wing of the Blue, reported near Grochow. The fight commenced by the meeting of dragoon regiment No. 2 with the Red regiment of mounted orderlies north of the main road Tempel-Grochow, the mounted orderlies being compelled to retreat. When the Blue commander perceived the advance of hostile infantry from Tempel, he ordered the sixth infantry division to attack it. This division being in march column its deployment was necessarily slow, Red inflicting heavy losses upon the division before it could come into action. At 8 o'clock a. m. it had succeeded in bringing into line two regiments north and one south of the high road, supported by artillery. Against this force was opposed the left column of the Red tenth infantry division strengthened by two battalions. The remainder of the tenth infantry division attacked the first guard infantry division deployed between the roads leading from Tempel to Grunzig and Neudorf.

The Blue sixth infantry division now suffered severely from the effective fire of Red artillery on the heights west and south of Tempel, and having given way before the well-directed attack of Red infantry in its front was driven with heavy losses into the forest, its artillery being compelled to retreat across the Panikel brook to the heights north of Grochow. The retreat of the sixth Blue infantry division was continued to Grochow.

While this fight was taking place in the center, the left wing of Red, the ninth infantry division, had advanced from Langenpfuhl on the main road, sending an infantry regiment between the Gross Bechen and Klein Bechen lakes toward Schermeisel, and a detachment of all arms against the narrows of Gross Kirschbaum. When the main column of the Red ninth infantry division, which had left its artillery east of the beech forest, met the advancing Blue tenth infantry brigade of the fifth division in the forest on a line with the

north point of Gross Bechen See, the division deployed north of the main road, sending one battalion south of the road, but on account of a flank attack of the tenth Blue infantry brigade it was compelled to retreat and to withdraw from the beech forest. The Blue did not pursue beyond the eastern edge of the forest. The ninth infantry division was then re-formed immediately to the left of the center Red tenth infantry division, leaving one regiment of infantry behind to observe the Blue. In the meantime the Red infantry regiment sent between the two Bechen lakes had met at the western edge of the beech forest the ninth Blue infantry brigade of the fifth division; a fight here developed which prevented the ninth infantry brigade from assisting the sixth Blue infantry division. This success of the Red infantry regiment (Grenadier regiment, King William I, No. 7) proved to be remarkable and out of all proportion to the number of troops engaged.

The Red detachment of all arms of the ninth infantry division which had advanced against Gross Kirschbaum also succeeded in pressing back the Blue detachment which occupied the narrows; it then established connection with Red infantry regiment No. 7 in the beech forest.

On the right wing of the Red army the forty-first infantry division reached the line Weissensee-Klischt at 7.30 a. m. and engaged parts of the first guard infantry division, which stood with its infantry east and south of the Zauche and its artillery southwest of Grunzig, the second guard infantry brigade holding Weissensee. The Red artillery was in action with the Blue guard artillery when Red received a report at 8.30 a. m. that Blue was advancing against Tempel. In order to meet this the commander of the forty-first Red infantry division ordered the eighth brigade to advance against Grunzig. As the first guard infantry division had drawn off the Red nineteenth infantry brigade from the attack against the Blue sixth infantry division north of Tempel, and as it was also opposed by the Red forty-first infantry division, it became impossible for it to advance in a southern direction to the assistance of the sixth infantry division. It, however, held its position until the forty-first infantry division withdrew to Tempel. The Blue fifth and sixth infantry divisions retreated, pursued by the ninth and tenth infantry divisions.

As a result of the operations of the day the umpires awarded a victory to Red.

The two cavalry divisions were not engaged in the battle. The Red cavalry division was preparing to attack the Blue cavalry division near Grunzig, when it was supposed to have received an order to establish connection with the supposed sixth army corps advancing toward Krossen. In reality it was transferred to the Blue side, where it was united with cavalry division "A" into a Blue cavalry corps commanded for the remaining two maneuver days by the Emperor in person. To meet the requirements of the situation a second Blue cavalry division was supposed to have arrived by Landsberg on the Warthe.

The Emperor bivouacked with the Blue cavalry corps for the night north of Weissensee. The Blue commander advanced a regiment of infantry of the first guard infantry division to Grunzig to maintain connection with the cavalry corps.

SEPTEMBER 11.

Early the morning of September 11 the Red commander formed his corps for battle, the forty-first infantry division northwest of Tempel, the tenth northeast of Grochow, and the ninth immediately to the west of and near Grochow. His right flank was covered by a regiment of dragoons reinforced by two squadrons of mounted orderlies.

The balloon of the Blue commander rose at 6 a. m. near Posersfelde, and at 7 a. m. the Blue army stood ready behind its outposts. The fifth infantry division, with one infantry brigade and one battalion of artillery on the high road east of See Vorwerk, and with one infantry brigade and the remainder of its artillery immediately west of Gehauenstein. The sixth infantry division northwest of Posersfelde, and the first guard infantry division near Neudorf, with one regiment of infantry near Grunzig.

The Emperor, who had spent the night with the cavalry corps in a tent with a small attendance, stood with his corps at 7 a. m. south of Grunzig.

Blue advanced for attack, the fifth infantry division against Schermeisel-Grochow, the sixth against Grochow, the first guard infantry division through Neudorf against Tempel. In connection with the attack of the latter division, the

Emperor moved the cavalry corps from the environs of Kurzig against the right flank and back of Red.

The Blue commander having discovered that a Red division was deploying west of Tempel and two others north of Grochow-Schermeisel, ordered the sixth infantry division to make a delaying fight against the two latter divisions until an attack of the fifth infantry division against the left wing of Red should become effective.

The ninth infantry division on the left wing of Red first deployed one regiment of infantry as far as Siebenruthen and one battalion of sharpshooters to near Schermeisel, with its artillery immediately behind these. As Blue only advanced faintly from the forest of Zielenzig, the commander of the ninth Red infantry division decided to order the remainder of his division to attack north of Schermeisel. With this view he deployed the eighteenth infantry brigade at 7.25 a. m. north of Siebenruthen and beyond the road of Grochow-Gleissen, connecting with the tenth infantry division. The entire artillery of the ninth infantry division, with the exception of two batteries which remained near Grochow, was now deployed on the height between Schmact and Siebenruthen.

The sixth Blue infantry division engaged the ninth infantry division in the line of Hemm-Berg-Poserfelde, the fronts extending as far as the road Gleissen-Neudorf, where a dragoon regiment covered the Blue flank. The Blue battalions at Hemm hill were at first compelled to retreat. The Blue tenth infantry brigade of the fifth division coming to their assistance, Red was pressed back from Hemm hill, and Blue advanced to the eastern edge of the forest. Blue now assembled artillery on the heights southeast of Gleissen and at 7.40 a. m. eighteen batteries were firing from this position. At 8.10 a. m. one battalion of this artillery was advanced to north of Posersfelde. From there it entered into a duel with a battalion of Red artillery located on the heights north of Schmact, the Blue battalion suffering heavy losses from the superior fire of the Red battalion. The Red forces near Schmact began to fall back at 8.30 a. m., in which retreat the entire ninth infantry division gradually participated. The advance of the Blue fifth infantry division on the main road east of Schermeisel made itself felt, the Blue sixth infantry division cooperating in this advance along its entire front.

A general retreat of the left wing of Red, the ninth and tenth infantry divisions, was now begun, although up to this time only weak forces of the tenth infantry division had been engaged.

The forty-first infantry division had gone into position east of the Panikel brook on the edge of a hill extending to Tempel, with its infantry in front and its artillery in rear. While taking up this position it was under the fire of all of the artillery of the first guard infantry division, which was in position between Grunzig and Neudorf. This deployment took place about 7.30 a. m., and as the Red artillery moving into position offered a fine target, it must have suffered severely, although it was somewhat over 4,000 yards distant.

The infantry of the guard division from the environs north of Neudorf was in readiness on both sides of Panikel brook, and attacked at 7.40 a. m., one regiment on the left wing advancing toward the northern outlet of Tempel, while the right flank was secured by a regiment of cavalry. The advance of the guard infantry was made along part of its line by creeping and along part by rushes; its artillery advanced by echelons upon the heights west of Klischt in order to prepare the assault for its infantry. All disposable troops of the forty-first infantry division had entered the fight, and its commander had sent in his last reserve. The Red commander now received information of the advance of a Blue cavalry corps against his right flank, the horse artillery and machine guns of which had opened up an energetic enfilading fire from the heights east of Tempel. The Red commander now (shortly after 8 o'clock a. m.) put in march reinforcements from his center to strengthen his right wing. These at first consisted of one regiment of infantry and a battalion of field howitzers; later a second regiment of infantry was ordered. When these reinforcements had crossed Panikel brook, the forty-first infantry division was already in rapid retreat before an assault of the first guard infantry division, covered by rapid artillery fire from all of its batteries. While in a disordered retreat it was attacked in flank and rear by the Blue cavalry corps led by the Emperor, the corps charging mounted with the lance. The guests of the occasion, whom the Emperor had invited from the United States, Major Generals Corbin and Young, and Brigadier General Wood, with their aids, rode with the Emperor

during this charge, and notwithstanding the flat seats of their German army saddles, were evidently at home and thoroughly enjoyed this very exciting and brilliant charge.

The reenforcements mentioned above from the tenth infantry division were now also attacked and defeated.

The Emperor had at 7 a. m. assembled from their bivouacs 60 squadrons of cavalry, 4 batteries of horse artillery, 4 machine-gun batteries, and 1 bicycle company south of Grunzig, his command being covered by the heights of Die Zauche and the neighboring southern forests. The bicycle company first advanced to the forest edge and secured the assembling position. When the Emperor learned of the advance of the first guard infantry division near Neudorf he advanced his corps in a southerly direction, covered by the heights east of Tempel, and crossed the railroad $1\frac{1}{4}$ miles east of Tempel. The horse and machine-gun batteries went into position on the heights east of the station of Tempel and opened fire at about 8 a. m. against the flank of the forty-first infantry division. A pioneer company which had occupied Tempel was forced to retire. Red cavalry now appeared in front across the railroad; the life hussar brigade marching at the head of the cavalry corps deployed against it, when it retreated south of Tempel toward the forest. At about 8.30 a. m. the cavalry corps stood facing west, east of Tempel between the railroad and highroad, division A on the right and division B on the left, both divisions in brigade columns. When soon afterwards the first guard infantry division advanced for assault, and the retreat of the forty-first infantry division was observed, the Emperor deployed the corps for attack, advancing it in several lines in a north-westerly direction. Division A met principally the retreating infantry of the forty-first infantry division; division B met the reenforcements from the tenth infantry division, and put the battalion of field howitzers accompanying it out of fight at the edge of the forest north of the railroad. The third line of division B carried the attack as far as the Panikel brook. Against the left flank of division B a counter shock had been made from a southerly direction by dragoons, which attack was met and defeated by the ninth cavalry brigade. The main charge of the cavalry corps extended over two miles; it passed from the right flank entirely through the length of the disordered forty-first infantry division to

beyond its left flank and well into the tenth infantry division, both divisions being rolled up, as it were. The infantry, as it was charged, fixed bayonets and assembled hastily, as best they could, in detachments to ward off the lances of the passing cavalymen. The forty-first infantry division was adjudged to be practically hors de combat and the tenth infantry division to have suffered heavy losses.

The Red commander intended to assemble his corps behind the line Pieske-Hochwalde. With this view he ordered the forty-first infantry division to retreat from Tempel to Pieske, the tenth infantry division by Tempels M. in the same direction, and the ninth to Langenpfehl. The retreating north wing of Red was fired upon by the artillery of the first guard infantry division and the cavalry corps, also by the machine-gun batteries from the heights west of Tempel. The cavalry corps withdrew behind the left wing of the first guard infantry division.

On the right wing of Blue the ninth infantry brigade of the fifth division took up the pursuit on the highroad Schermeisel-Langenpfehl, its artillery firing into the retreating ninth infantry division until it found cover in the beech forest. The tenth brigade of the fifth infantry division advanced by Grochow and connected with the ninth. The sixth infantry division followed by Grochow and connected with the first guard infantry division; it then followed in the direction of Seeren-Pieske. The pursuit was not continued beyond the line Schönau-Langenpfehl-Pieske.

The Empress, mounted on horseback, and accompanied by a maid of honor, the Crown Prince, and an escort, arrived at 7 a. m. on the "commander's hill," where the Emperor had the preceding day viewed the maneuver. Here she was received by Field Marshal Prince Albrecht, who was acting chief umpire. Later she was greeted by the Emperor after the cavalry charge.

SEPTEMBER 12.

It may be remarked that at all German maneuvers it is customary to restore to action within a short time all parts of troops that have been put out of action by the umpires, in order that all of the organizations engaged may have, as far as possible, uninterrupted practice during the time allotted for the maneuvers. The morning of the 12th of September,

therefore, found all the divisions of the two armies restored to full strength.

The following supposition was authorized:

“The Blue cavalry corps was reinforced during the night of September 11 by two batteries of horse artillery which arrived by Landsberg on the Warthe.”

To better carry into effect this supposition the horse artillery of the cavalry corps was reorganized into six batteries of four guns each, and each battery was supposed to have six guns.

The Red commander decided to hold the heights near Kalau and to the west of it until reinforced by the sixth Red corps, which was supposed to have crossed the Oder during the night of the 11th.

The forty-first infantry division was held in readiness near Kalau, the tenth infantry division north of Neuhofchen, the ninth infantry division near Paradies. Early the morning of the 12th the Red commander discovered that the Blue sixth infantry division was entering the forest of Kainschter from Seeren, and that the fifth infantry division had assembled near Schönau. He thereupon ordered the forty-first infantry division, reinforced by most of the artillery of the ninth infantry division, to take a position between the high-road north of Kalau and the road of Kalau-Hochwalde; this position extended from height 105 to height 121; the tenth infantry division to hold the section between the left of the forty-first infantry division to the south as far as the Packlitz See. Shelter trenches and gun pits were dug throughout the entire length of these two positions.

The ninth infantry division was ordered to march by Schindelmuhl into the Kalauer forest, to be held in readiness for offensive action in the direction of Kainscht. This division left back as reserves, at the disposition of the Red commander, one infantry regiment near Kalau, and one regiment and one battalion of field artillery between Elisenthal and Neuhofchen.

The divisional cavalry of the forty-first infantry division (one regiment) made a reconnoissance against Kainscht, while the divisional cavalry of the ninth infantry division (one regiment), reinforced by two squadrons of mounted orderlies, advanced through Liebenau and scouted in the direction of Seeren-Schönau.

The Blue commander resolved to take the offensive and advanced the fifth infantry division against Starpel-Neu M., while he attacked with the sixth and first guard infantry divisions from the line Hochwalde-Kainscht-Nipter. This attack was prepared by the artillery in position on the heights south of Seeren and on the Rüssen Bergen, the sixth infantry division sending for this purpose one regiment of artillery to reinforce the first guard artillery; it also sent directly afterwards one regiment to reinforce the artillery of the fifth infantry division.

Blue covered its right flank with the divisional cavalry of the fifth and sixth infantry divisions and one battery of field artillery. This brigade, which was designated as the fifth cavalry brigade, advanced to Liebenau and from there operated against the rear of the Red army, reenforcing the Blue cavalry corps under the Emperor during its charge.

Flying reconnoitering detachments of Blue were also sent as far as the road Starpel-Liebenau and the road Liebenau-Selchow.

The cavalry corps advanced to the environs southeast of Meseritz in order to cooperate on the left Blue wing if desired.

During the night Blue constructed a bridge across the Obra above Meseritz.

The Blue army advanced at 7 a. m. At 9 a. m. one brigade of the fifth division had reached Neu M. and one Starpel. At this time a Red brigade of the tenth infantry division reinforced by two battalions had advanced to the line Burschen-Kessel See and had forced the extreme right of Blue, which had advanced against Neu M. to retreat. At 8.30 a. m. 18 Blue batteries had been assembled on the heights south of Seeren and engaged in an artillery duel with 21 Red batteries on the heights east of Burschen-Hochwalde; the batteries on the extreme right of the Red artillery position also directed their fire against the sixth infantry division advancing from the forest north of Hochwalde. This division (the sixth), which advanced by Seeren, had reached, as early as 7.45 a. m., the section northeast of Hochwalde, where under cover of the forest it deployed in two lines for attack. It advanced in the direction of the Drei Herrscher Berg (the three sovereigns' hills), and as it did so constantly increased the density of its firing line. At about 9.45 a. m. it reached the heights situated between the two roads from

Kalau to Hochwalde, on which heights Blue later placed in position one regiment and one battalion of field artillery. Opposing this attack of the sixth infantry division, Red had drawn up at first one and a half regiments of infantry of the tenth infantry division on the heights, which sloped rather steeply to the front toward Hochwalde and Burschen; behind these Red posted nine batteries of artillery. The remainder of the tenth infantry division was principally engaged with the fifth infantry division near Starpel. To the right of the tenth infantry division, Red had in position a brigade of the forty-first infantry division on the heights between the two roads from Kalau to Hochwalde, with a reserve of two battalions at Kalau. The thirteen battalions of the sixth infantry division were directly opposed to nine and one-half battalions of Red. The remaining brigade of the forty-first infantry division (the eighth) was drawn up on both sides of the highroad from Kalau to Meseritz; in rear of it, west of the road, the field artillery of the forty-first infantry division was in position. The fight here opened by an artillery duel between the divisional artillery of the forty-first infantry division and twenty Blue batteries of the first guard and sixth infantry divisions in position on the Russen Berg. The extreme right wing of Red was formed by the ninth infantry division in the Kalauer forest. This division had marched with ten battalions and three batteries from Paradies (Paradise) through Schindelmuhl-Hammer M.; it had left at each of the two Packlitz (Jordan) River crossings one company of infantry, and arrived at 7 a. m. in the neighborhood of the western forest edge halfway between Kalau and Nipter, where the division closed up. At about 8.30 a. m. hostile Blue skirmishers of the first guard infantry division appeared south of Nipter east of the highroad.

The first guard infantry division marched at 6 o'clock a. m. one brigade (the second guard infantry brigade) from Pieske through the Kainscht forest to Kainscht, and one brigade (the first) from Kurzig by Muhlen Vw. Kainscht to Nipter. Its divisional cavalry was at 7. a. m. south of Kainscht; it then reconnoitered in the direction Hochwalde-Paradies.

The commander of the first guard infantry division having discovered the Red infantry of the ninth infantry division in the Kalauer forest, and desiring to secure the narrows near Hammer M. and Schindelmuhl for the use of the Blue cavalry

corps, ordered the first guard infantry brigade to advance from Nipter to Hammer M. and the second guard infantry brigade to follow, this with the view of attacking later on east of Kalau. The right flank of the division was covered during the advance by a battalion of infantry which marched east of the highroad to Kalau. The first guard brigade surprised part of the ninth infantry division in the Kalauer forest, compelling it to retreat. The second guard brigade also entered into the fight east of the highroad to Kalau, and pressed back the Red troops in its front. Red had drawn over to the east side of the road all available infantry, but was unable to withstand the advance of the first guard infantry division until near the edge of Kalau, where it succeeded in temporarily checking it.

The ninth infantry division was only able to keep with much difficulty slight touch with the forty-first infantry division, as the former was driven farther back into the forest.

The first guard infantry division made itself felt on the right wing of Red, and as it advanced to the western edge of the Kalauer forest it more and more threatened the east flank of the forty-first infantry division near Kalau; the latter division was compelled to send back to Kalau its last reserve, although it was hard pressed at the time by the sixth infantry division.

Blue gradually advanced in the center. The Red tenth infantry division was unable in the absence of reinforcements to withstand the attack of the sixth infantry division, which attack was supported by heavy artillery fire.

The Red commander decided to retire from his position at 10.10 a. m. He ordered the forty-first infantry division to retreat in the direction of Schindelmuhl, its artillery to take a covering position near Neuhofchen. The tenth infantry division to maintain itself as long as possible, but if pressed back to retreat to Neuhofchen.

On the left wing of Red the tenth infantry division had gained at the beginning an advantage over the fifth infantry division. But Blue advanced artillery beyond Starpel at 10.15 and the Red artillery being in the forest and on unfavorable ground could not reply with effect; the left wing of Red was thus compelled to retreat in the direction of Elisenthal, where part of it made a stand to further cover its retreat.

The situation had become very unfavorable to Red, the general retreat now under way was being pressed by the Blue

infantry and artillery with great vigor in front when strong forces of Blue cavalry appeared near Jordan-Paradies and threatened the rear. The Red commander had already at 9 o'clock received a report to the effect that large masses of Blue cavalry were advancing from the direction of Bauchwitz. This was the cavalry corps under the command of the Emperor.

This corps left its bivouacs near Weissensee at 4.45 a. m. and advanced through Meseritz. It was checked for a short time near Heide M. by Red bicyclists; these being driven off, the corps proceeded through Wischen. When east of the Packlitz river section one regiment and the Blue bicycle company were detached to make feints against the crossings of the Packlitz near Hammer M. and Schindelmuhl, while the Emperor proceeded with his corps through Altenhof. The forests and hills favored his advance from Altenhof, and taking advantage of the cover afforded by these, he skillfully placed his command at 10 a. m., unobserved by Red, in a concealed position immediately behind the top of the ridge Annas Hoche, north of Paradies. Division A was drawn up to the east and division B to the west of the highroad Kalau-Paradies. The 6 batteries of horse artillery and the machine guns found favorable positions and opened fire from Annas Hoche at 10.15 against the parts of the ninth and forty-first infantry divisions retreating east of the highroad. These were at 10.30 a. m. attacked by the brigade of cavalry which stood on the right of the cavalry corps, this attack being quickly followed by that of the entire corps, which rolled up the Red wing from its right flank and rear. The cavalry charge was also covered by the Blue infantry and artillery of the main line, which fired into the Red to the front and rear of the passing cavalry. A noticeable feature of the charge was that the cavalry did not halt upon reaching the infantry, but continued along the full length of that part of the hostile infantry and artillery lines east of the highroad; crossing the road, the charge turned to the left, passing along the left wing of the forty-first infantry division; the cavalry corps was here joined by the Blue divisional cavalry, the fifth cavalry brigade, which had early in the morning been sent to reconnoiter in the direction of Schönau-Liebenau and to the rear of Red, and which at this time had reached Jordan. The cavalry then continued along the lines of the tenth

infantry division adjoining the forty-first. The charge was made over a distance of three miles, the ground in places being soft on account of recent cultivation. Generals Corbin, Young, and Wood, with their aids, rode with the Emperor during this charge. The intermingling of the Blue cavalry with the Red infantry and artillery retreating in deep disordered lines, and the hasty assembling of Red in bunches or squares for protection, gave much life and zest to this ride, remarkable for its endurance after the long detouring to the east and south. The charge ended at the environs of Eisen then without a serious accident to man or horse of either side. The demands upon the capacity of the cavalry were extraordinarily high, and the leading of this great mass of riders from start to finish was superb.

This attack of the cavalry corps under the emperor has given rise to a discussion in the press as to whether it would have been advisable in war. As to this it may be well to consider that the prevailing tactical conditions assumed such a form as to extraordinarily favor a mass attack of mounted men. The ground permitted the cavalry to approach and to form under cover, its horse artillery and machine guns to go into action, and the charge to be well under way before even being fired at. The objective troops were undergoing a crushing defeat from infantry and artillery in their front. It was also desired not to allow the opportunity to be lost to practice the cavalry as a corps in all that pertains to the raid, the approach, and the charge.

The victory for the day was awarded to the Blue; the Red forty-first infantry division and the greater part of the tenth having been decided hors de combat.

When the distinguished personages present and the high officers of both armies had assembled on the commander's hill to bid adieu to their host and to hear the critique, the emperor on this occasion bade good-bye to his heartily welcomed guests from the United States, all being mounted on horseback at the time.

REMARKS.

As the government owns the railroads of Germany it is generally cheaper to transfer troops by rail than to march them through the country.

All the infantry, excepting one battalion, which had but a short distance to march, was transported from the maneuver

ground by rail to the garrisons. The cavalry and artillery marched, and it is reported that their horses arrived in better condition than when they left their posts.

The various staffs, including the regimental staffs, the technical troops, and the guards attached to the emperor's headquarters were also transported by rail.

Altogether there were 2,049 officers, 50,458 enlisted men, 2,614 horses, and 147 vehicles returned by rail. Sixty-three battalions were started by train the afternoon and night of the last maneuver day, September 12, they being provided with a good meal just before leaving. Seventeen battalions, the technical troops, etc., started the 13th. For transportation 48 special trains were used; 9 were loaded at Wutschdorf, 8 at Stentsch, 16 at Schwiebus, 11 at Meseritz, and 4 at Durlettel. In order to expedite the entrainment, temporary platforms, electric lights, ramps, etc., were provided at all these stations.

The transfer was made in accordance with a prearranged plan. Officers of the railroad division of the great general staff were detailed to arrange with the regular railroad officials the details; they were also ordered, together with detachments of railroad troops, to the support and assistance of the traffic officials until after the troops arrived at their garrisons.

The transfer of the troops was effected without interference with the regular passenger trains, and with but slight interruptions of the regular freight trains.

The cavalry and artillery that marched from the maneuvers to their garrisons sent the men who had but a few days to serve on by rail in order that they might be back in their garrisons at the expiration of their term of service. Nearly one-half of the enlisted force of the army was discharged in September, the term of service of the infantry being two years, the one-year volunteers one year, and the remainder of the army three years. All recruits report about the first of October. There is great economy in this, as the young men who enter the army are thus enabled to receive the greatest amount of training and experience in the time allotted for their service.

Some of the cavalry troops were exercised in connection with the maneuvers for about two months. The "Skull" brigade, composed of the first and second hussars, less the fourth squadron of the first hussars, which remained in

garrison on account of sickness among its horses, marched for the maneuvers from Danzig August 2 and returned to its station October 2. Some of the other regiments were also engaged in the exercises for equally long periods.

The ground was equally favorable for the operations of all arms, and being hilly and frequently interspersed with large and small forests, permitted the attackers from the very outset to easily deploy heavy firing lines, and favored the going into action of large artillery organizations.

Forest fights were numerous on the 10th and 12th of September, the most extensive and important occurring on the 12th. For these both sides employed "jäger kommandoes" (hunting detachments). These reconnoitered far in advance, often taking the place of reserves for infantry and cavalry patrols, occupying outlets of forests and defending lake narrows and bridges.

Bicyclists were also employed for reconnoitering and patrol duty, the weather being particularly favorable to their use. In fact the ground was in such good condition that the pioneers attached to the cavalry division could no doubt have used bicycles with advantage.

The highest bicycle record for twenty-four hours was made by an officer on patrol traveling 165 miles.

SANITARY MEASURES.

In order to reduce the number of men likely to be disabled on account of sickness to the lowest possible number, the surgeons of the troops were required to recommend the sick, the naturally weak, and those belonging to the various organizations who had recently passed through diseases to be left back in the garrisons as guards. In the same manner the men called out from the reserves were accepted for the maneuvers only after a careful surgical examination.

Steps were taken to guard against any infection from contagious diseases. The war ministry issued, August 1, a decree calling attention to the fact that generally every year during or shortly after the maneuvers there have appeared contagious diseases in the army, notably abdominal troubles, dysentery, etc., which in most cases was decided to have been introduced from the civil population. This danger of contagion was ordered to be met by all possible means of precaution, as when the troops were attacked in maneuvers they often

brought the disease back into the regular garrisons. All men were ordered to stay away from places and houses where such diseases had existed. The local civil authorities and the police caused every case of disease of a contagious character in the entire manœuvre region to be reported. Notices of the same were then posted on signboards.

CAVALRY.

In all formations the horses of the rear rank followed in the intervals to the right or left of the horses of the front rank, instead of the croups of the horses in front; in columns of fours, twos, etc., the horses likewise followed in the intervals.

The carbine is carried in a boot attached to the offside of the saddle cantle; it hangs nearly vertical. The saber is attached to the near side of the cantle. The kit is carried in the pommel pouches; the grain sack and overcoat are strapped in rear of the saddle. Part of the ammunition is carried in a cartridge box slung on the shoulder belt so as to rest on the back, and part in the saddle pouches.

As cavalry in line loses much of its manœuvring power, the column formations were generally retained as long as possible, they being quickly changed into the attack formation at the right moment. The changes were effected only when the direction of the attack had been decided upon and the ground upon which it was to be made reached, or when hostile artillery fire necessitated the formation. In fighting on foot when it was desired to have the led horses mobile, only the odd numbers dismounted, the even numbers holding the horses and the lances of the dismounted men. When the horses were to be stationary, they were linked, the horse holders in this case being the right and left flank file of each rank of the platoons, with a noncommissioned officer with each platoon. The officers' horses were held by trumpeters. When fighting on foot with horses stationary, the dismounted men stuck their lances in the ground or laid them down clear of the horses. There was no extensive use made of cavalry fighting on foot this year, as at the manœuvres last year at Czechlau, where a Red dismounted cavalry division successfully engaged the entire hostile tenth infantry division and immediately afterwards defeated a mounted cavalry division of superior numbers. The successful use of

masses of mounted cavalry in shock action, illustrated by the charges made by the cavalry corps under the command of the emperor the 11th and 12th of September of this year, are of the greatest importance.

The favorable decisions rendered by the distinguished generals acting as umpires prove as clearly as can be proven without actual hostile contact, that when cavalry under the cover of its horse artillery and machine guns is thrown against defeated and hard-pressed infantry the advantages of victory may be secured to the fullest extent.

The Germans decidedly accept the principle that cavalry attacks against shaken infantry can be of great, even decisive, effect when made with nerve and ably led. It is regarded that the attacks of the Boers at Brakenlaagte and Tweebosch recently confirmed the principle under modern conditions. That these attacks prove that, although when riders have no tactical training, and when the force of their attack may be disadvantageously influenced by the absence of lance and saber, much can be gained by initiative and timely resolution, even when the outside circumstances tend more to hinder than to aid success.

ARTILLERY.

The field batteries of the guard corps and those batteries having regular station near the Russian frontier all had six guns each; the remaining batteries four guns.

In their field artillery the Germans still adhere to the precept that in war only the simple things promise success. Their guns were all without barrel-recoil checks and without protective shields. They possess great mobility; their ballistic power is also excellent. The guns, carriages, and harness, with its rope traces, are all light, the horses of a battery appearing at a short distance as if stripped for a race.

A battery of six guns is able to deliver 50 directed shots per minute.

The artillery as a rule opened the various fights and endeavored to gain advantage by bringing as many guns as possible into action. Two or more batteries were generally combined, their isolated action being exceptional. The guns were used generally at ranges beyond the effective fire of infantry, and the latter seemed never to be without the support of artillery. The artillery seldom had a special escort;

if they were endangered the nearest troops assisted them. Batteries once in action were not relieved, but were supported by the advance of fresh batteries. Under fire, the personnel of the batteries took, when practicable, the kneeling position. The interval between guns was generally about 10 paces. The pace employed in going into action depended upon the object, the situation, and the ground. The guns were sometimes unlimbered under cover and run up to the firing position by hand. The firing was generally directed upon that part of the enemy playing the decisive rôle. As every change of position interrupted the fire effect, as few changes as possible were made.

MACHINE GUNS.

Germany has made long and thorough trials with machine guns for field service. Among the numerous systems tested, the Maxim, Hotchkiss, and Skoda proved to be the best. Of the three the Maxim, a recoil loader, was found to be the fittest and was adopted. It has since been gradually improved and developed. The Maxim system was also adopted by Russia, England, and Switzerland. Austria uses it excepting in the fortresses and the navy, which have the Skoda, a similar gun, the cartridge feed being different.

The machine gun first participated in the kaiser maneuvers in 1899, the batteries then being in their experimental stage. Five permanent batteries were provided for in the budget of 1901, and seven additional ones in the budget of 1902. There is, besides, one battery with the first Bavarian army corps, provided for in the Bavarian budget. It is expected that this number will be gradually increased. There is no service handbook published giving a technical description of the German machine gun similar to the handbook for the German infantry rifle and cavalry carbine, models of 1898. It is doubtful if such a handbook will appear, as up to the present there has been no service description published of the German field guns, models 1896 and 1898. The greatest difficulty to overcome, in order to render the batteries serviceable, was found to be the carriage. It was necessary that the gun should have the mobility of mounted troops; should offer in battle no greater target than does the infantryman in his different firing positions; that it should be able to be taken everywhere a footman equipped

for war was able to go. To secure good firing results a rigid frame had to be found. To further improve the firing, the batteries have been usually attached to sharpshooter battalions or infantry troops where skilled marksmen were to be found. The batteries, however, at the maneuvers were habitually placed under the direct orders of the higher leaders, who used them to assist or oppose any one or all of the three arms.

In order to accompany mounted troops, the rifle, ammunition, and men are all conveyed on carriages or on horseback. In Switzerland, Maxims are transported on horses, and the mitrailleur companies are mounted and attached to cavalry brigades. For German terrain wheeling is more practicable, as it offers a much greater readiness for fire. No unpacking and packing up is necessary, and the guns are thus relieved of the awkwardness of mountain artillery. Firing from the carriages, however, was only exceptional, occurring notably in cases of sudden cavalry fights and in surprises. In the majority of cases for action the gun with its firing frame was taken off the carriage and placed on the ground. The firing frame, which is also called the gun sled, permits the piece to be fired at different heights above the ground, so that the gun may be operated by the gunners in the lying, sitting, or kneeling position. The target offered to the adversary corresponded to the different firing positions of infantry. The rifle as such and its operators could not be distinguished from infantry, at a few hundred yards, by the naked eye, as would likely be the case in those armies using the rifle on a tripod. The sled with rifle was generally pulled over the ground by two men, but was sometimes carried and sometimes drawn by a noncommissioned officer's horse or by a draft horse. When firing without removing the sled from the carriage, the gun was made ready to fire within ten to fifteen seconds' time. The position of the gunners in this case corresponded to infantry firing erect. The guns may also be placed on the caissons and fired. The ammunition consisted of the ordinary rifle cartridge, placed in belts, each containing 250 cartridges, which were carried in narrow cartridge boxes, each holding one rolled-up belt. Six of these boxes were stored in one ammunition sled, and the sleds were stored in the limber chests. The ammunition sleds are simply open boxes, arranged with runners in such a

manner as to be used as sleds; they are similar to the gun sleds. Cartridge boxes were also carried in the axle chests for use when firing from the carriage.

The battery of six machine guns as now established consists of 1 captain, 3 lieutenants, 1 first sergeant, 1 vice first sergeant, 2 sergeants, 8 noncommissioned officers, 1 trumpeter, 1 noncommissioned officer aspirant, 7 lance corporals, 1 armorer, 1 sanitary noncommissioned officer, 54 privates, 36 draft horses, 18 riding horses, 6 machine guns, 3 ammunition caissons, 1 supply wagon, 1 baggage wagon, and 1 forage wagon. The guns are organized into three sections of two guns each. The caissons and the supply wagon form the ammunition train. The guns and the ammunition train together constitute the fighting battery. The other three wagons form the baggage train. The guns, caissons, and the supply wagon have four horses each, the other wagons two horses. For each gun there is a chief gunner, who is a noncommissioned officer, and four privates, designated as Nos. 1 to 4. Nos. 2 and 3 operated and aimed the gun, Nos. 1 and 4 unlimbered and attended to the ammunition. Nos. 1 and 4 also drew the ammunition sled when necessary, while 2 and 3 drew the gun sled. The chief gunner was mounted on horseback, Nos. 2 and 3 rode on the axle boxes, and 1 and 4 on the limber boxes. The ammunition train was accompanied by the armorer, a noncommissioned officer, the sanitary noncommissioned officer, the reserve gunners, and the range finders. The range finders and the armorers, however, when there was any probability of an action, placed themselves on the gun limbers between Nos. 1 and 4. The section leaders were lieutenants or sergeants. The leaders of the ammunition train, lieutenants or sergeants. The gunners were equipped with carbines; mounted men, including the drivers, with automatic pistols.

A battery of six guns carries in war 87,000 cartridges, which surpasses the cartridge equipment of two companies of infantry, which have 42,500 cartridges each. The fire effect of a machine gun is equal to that of a platoon of infantry of war strength, 80 men. Machine guns afford leaders an opportunity of developing from the smallest space the strongest fire. The range of the machine gun is the same as that of the infantry rifle. The rapid succession of shots, the small dispersion of the cone of projectiles, and the placing of

several guns on a limited space, often enables the machine-gun battery to obtain success quickly, and even at great distances to be destructive against large and dense targets. As many shots fall on one point, the observation of the firing is facilitated, and on account of the firm firing frame the hitting capacity is greater than that of the rifle.

The gun may be said to have two distinct parts, the recoiling and the nonrecoiling parts. To the former belong the barrel and its rear elongations containing the lock and connecting parts. To the latter, the rifle frame and the mantle, which are connected with each other. The mantle is of bronze and surrounds the barrel, giving to the whole the appearance of a short cannon. It contains water to prevent the barrel from becoming too much heated, and which is renewed from time to time. The barrel and lock in a general manner correspond to those of an ordinary rifle. The recoil gives the barrel a backward motion and is used for bending a spiral spring; the power thus stored brings the lock into the position necessary for loading, and later it brings the barrel forward again after it has received a new cartridge. After the delivery of the first shot the gun works automatically, producing an uninterrupted fire. The gunner during this fire has only to maintain the rifle in proper direction, and to press against two small plates on the rear surface of the case. The belt with the cartridges is pushed on by the mechanism from one cartridge to another. One man can so operate the piece as to deliver 600 shots per minute; a slower rate of fire and also individual fire may be held. It is not absolutely necessary to fill the mantle with water, as the device is not easily affected. The mantle has in tests been penetrated by three bullets and still proved to be serviceable.

The German machine-gun regulations provide for two kinds of fire, interrupted and uninterrupted fire. In the former after a successive delivery of about 25 shots an interruption takes place in order to observe the shot results. The object of this fire is to find the correct sight. Inasmuch as shot grazes may generally be more readily observed in front of the target, the first sight is ordinarily taken with this object. The uninterrupted fire only takes place when the conditions require it. The target is fired at in its entire extent, or a certain part or even point of the same may be selected. In the former case spreading fire is used, the piece

as mounted providing for this in a horizontal, vertical, or inclined direction; the rapidity of spread depending upon the kind and distance of the target. The shot grazes are continually observed through telescopes. In certain cases the observers are placed some distance on the flanks and are, as far as practicable, covered. They communicate their observations to the firing troops by signs, calls, or intermediate posts. At long ranges, when the target can be recognized only by means of telescopes, points on the ground are selected and given to the gunners as aiming points. For night firing the guns are arranged and fired during the day and the proper elevations and directions determined for the night. Specially instructed men in range finding, supplied with the small range finder, model-1899, belong to the machine-gun batteries. They measure the distances to appearing targets or to suitable points in the foreground, prove distances during the fight and determine new points for aiming.

The machine rifle can be used on any kind of ground that is practicable for infantry. When detached from the carriage, the gunners can take both the rifle and the ammunition sleds on their backs and ascend with them steep slopes or ladders. The rifles may be placed on the flat roofs of houses or the houses may be occupied by them. In battle the rifles and gunners do not offer larger targets than infantry fighting under equal conditions. They are safer against losses than infantry, as cover scarcely sufficient for a platoon of infantry affords protection to a full battery. The attack of cavalry can be strongly met by the battery going into action either with their guns on or off their carriages, the fire being delivered undisturbed and distributed over the whole of the advancing riders.

In action against artillery the latter arm has the superiority at long ranges, but at distances under 1,500 yards the machine gun has the advantage. When artillery is to be fought the sleds are taken as near to it as practicable and fire opened against a flank if possible, the rifles concentrating their fire upon a few guns; spreading it over the whole opposing battery at the same time is generally regarded as not so effective. Artillery in action against machine guns derives great advantage from the use of protective shields.

The machine-gun battery is habitually used undivided, only for special purposes are the sections authorized to be used independently. The use of individual machine rifles is

forbidden. The uniting of batteries is practiced only in exceptional cases. The batteries are at their greatest advantage when full use can be made of their mobility and when they can go into action under cover separated from their carriages.

The batteries are placed directly under the orders of the higher leaders of troops, as a full knowledge of the general situation, the intentions of the leader, and the phase of the fight is of special advantage to their proper use. They are, therefore, not attached to special troops or to troop parts, as their greatest fighting value could then be profited by only in exceptional cases. The battery commanders are in the closest practicable connection with their higher troop leaders.

Before selecting a position a reconnoissance is made, especially toward exposed flanks, hence the large number of mounted men in the battery. Care, however, is taken that the attention of the adversary is not prematurely called to the position selected. Effort is invariably made to take position under cover and to open fire as a surprise. In action the troop leader indicates the purpose and the general object of the fight. The battery commander selects the position, determines the distance, indicates the targets in detail, the kind of fire, and orders the commencement of the same. The section leader indicates the target to his section, the elevation, superintends the operating, and is responsible for the correct perception of the target. The gun leader selects the most favorable position for the gun, sees that it is at the proper height, superintends the execution of all orders, and sees that the center of the fire cone comes into the target. He also sees that the fire action of his piece is undisturbed. The men are not allowed to show themselves more than is required for a proper observation of the field of action, the operating of the rifle, the transportation of cartridges, and the measuring of distances.

In the fight, as a rule, all vehicles are left back under cover. Advances are made by the men carrying or dragging the detached rifle and ammunition sleds, individual horses, when necessary, being used to assist. Cover is left only when the conditions of the fight absolutely require it. The timely supply of ammunition is of the highest importance. In action, when the leaders of the caissons have brought full ammunition sleds to the firing line, the empty sleds, boxes, and belts are taken back and filled anew. The supply of

fresh men and material is also connected with the ammunition supply. The cooperation of infantry ammunition columns is regulated by the superior headquarters.

It is often of an advantage to attach machine guns to advance guards, and sometimes to the advanced cavalry, especially when the quick occupation and maintaining of favorable positions are in question, thus affording the bulk of the troops time and space for deployment. The machine guns are especially adapted for this work on account of their mobility and great fire effect. After the arrival of the infantry they are, if possible, taken from the firing line and kept ready for other use.

When attack is to be made against a fully developed defensive position, they are held back to form in the hand of the higher leader a mobile reserve, which can be used for a rapid support of threatened points, for action against the wings and flanks of the enemy, or for breaking into the defense at objective points. These batteries are able to follow advancing infantry in an attack. A closer approach, however, to the objective point than 800 yards, the range of their greatest fire effect, is, as a rule, faulty. In case of victory they participate in the pursuit by fire; they advance into the captured position to support the infantry and deprive the enemy of final resistance. When the attack fails they quickly go to the rallying position.

In defense it must be considered that these batteries are not suited to a delayed fire fight. They are not given from the commencement of the defense a certain section to defend, but are kept with the reserve to strengthen the line of defense at threatened points, to prevent flanking operations, to repel assaults, and to be used for offensive movements.

In going into position at points previously selected, cover is obtained, if necessary, by intrenching. In pursuit and retreat the batteries are at their best. When attached to independent cavalry they are used in the attack or defense of cavalry fighting on foot or on horseback. On reconnoitering duty with cavalry they are of special use in taking and maintaining positions. When cavalry is advancing against cavalry they go into position as early as possible in order to support the deployment and the attack. If the action is successful they pursue by fire and prevent renewed resistance. If unsuccessful they continue in the fire position or retreat to a receiving position. In most cavalry engagements the

vehicles are held near or else the guns are fired from the carriages. The batteries assigned to the cavalry divisions remain with the cavalry during a general engagement.

Machine guns are also used with advantage for covering artillery in position, if other forces can not be found for this purpose.

The great importance of the machine-gun battery in war is thus apparent. The machine gun is merely an auxiliary arm which, with its great fire power and mobility, assists the other arms in all fighting situations, including the rendering of quick and effectual assistance to shaken and distant points of the fighting field. It is of use to all three arms.

Germany has favorably solved the carrying question, which easily places it in advance of all other continental nations in the benefits derived from the uses of this arm.

INFANTRY.

While exact and rapid maneuvering is held in high honor and is assiduously practiced, the infantry drill regulations, as well as those for the cavalry and artillery, provide for but a few simple evolutions. The time and labor of the troops are regarded as too valuable to be wasted in acquiring proficiency in intricate drill movements, which experience has taught are of no importance or use on the battlefield. A most striking feature of the maneuver was the few movements in the drill formations and in the manual of arms. The infantry, upon going into action, invariably sent into the fighting line only the men that were absolutely necessary, effort being always made to retain a reserve. The distance between the various lines was generally regulated by the object of the action and by the ground; as the action increased the distances were gradually shortened, in flat country without cover they were greater. In reenforcing the fighting line troops were brought up and mingled with those already engaged. The regiments assumed deep formations in order to keep the various portions together and to prevent intermixture with other regiments. No normal front was observed by the regiments in action, it varied with the object of the fight and with the ground. The brigades, as a rule, fought with their two regiments side by side, the fighting formation being that of the extended order. Independent fire, in which the men waited for the most favorable moment for firing, seemed everywhere to be practiced.

Small volleys were occasionally used at the beginning of an action to get the range. Rapid fire was used in the last stages of the action, and on occasions where the enemy was met with suddenly at close range. The infantry almost invariably fired in the prone position.

The umpires in making their decisions attached unusual importance to the superiority of fire. The idea generally prevails in Germany that the Boer war has taught that the fire effect alone decides the fight, and that the proper handling of the supports and reserves behind the firing line must more than ever become a studied art. The immense penetrating power of modern rifles and the extreme flat trajectory of projectiles is regarded to have formed a zone within which it is very difficult to bring to the front reserves, ammunition, water, etc., if uncovered.

TELEGRAPH TROOPS.

While these troops are formed into special organizations of their own, they are, nevertheless, grouped with the railway and balloon units as communication troops under an inspector independent of the inspector general of engineers and pioneers.

Although the telegraph troops did not fight with arms in hand, they materially assisted in the strategical measures of the commander in the preparation for battle, and in the forwarding of orders and reports, by their rapid and exact messenger service. These troops with the least expense of labor and material and in the shortest time established connections, which, by their situation, were protected from their marching troops and vehicles, and which in turn in nowise served to obstruct them. After long marches new lines were built, permanent lines repaired, stations established, a multitude of dispatches sent and received, often during the night, and after the main fighting a line built to follow the pursuing troops, or stations broken up and material gathered in for retreat. These troops are of more and more importance as the size of armies increases. It is regarded as absolutely necessary that these special organizations be frequently practiced in maneuvers in order that they may be kept up to date. A net of field telegraph wire with twenty stations was erected in the triangle Sonnenburg-Meseritz-Schwiebus, the total length of the wire being 145 miles. The stations were each marked by a white flag with a black T. Most of the line

consisted of cables; a small part of it, however, was erected on poles.

A telegraph patrol was assigned to each cavalry regiment.

THE OPTICAL TELEGRAPH.

The optical telegraph or light apparatus was worked hand in hand with the electric telegraph and by the same troops. It not only served as a reserve means to be used where the electric telegraph was hindered by destruction or interruptions, but to establish connections over ground impracticable for wire. It was principally used by the first guard infantry division.

The composition and means of transporting the chemicals used in making the light signals, as well as the great power of the same, were described in my report of the kaiser maneuver of 1901.

WIRELESS TELEGRAPHY.

There were two stationary and three transportable stations used for wireless telegraphy during the maneuver. The first of the stationary stations was established in Sonnenburg, the headquarters of the emperor, and was in charge of Lieutenant Alsleben, the second in Schermeisel; the three transportable stations were assigned to the headquarters of the maneuver direction, the fifth army corps, and cavalry division B.

At Sonnenburg the steeple of a church was used for the sending and receiving wire. For this purpose a pole was placed on the steeple which increased its height to 54 yards. At Schermeisel the height of the pole was only 33 yards. Each of the transportable stations was carried on a wagon constructed especially for the purpose, and which consisted of a front limber and a rear chest. The limber transported the receiver, the rear chest the sender, the current of which is produced by a benzine motor with a dynamo. A balloon was used for raising the sending wire. The wagons were drawn by six horses each, and followed the troops to which they were assigned. These wagons have very much the appearance of an artillery ammunition caisson. When an order or report was to be sent the wagon was unlimbered, the men deployed, the balloon raised, and the message sent. In less than ten minutes the stations would be loaded and the wagon again follow its troops.

The distance between the two fixed stations established for the maneuver at Sonnenburg and Schermeisel was 22 miles. The station at Sonnenburg was also in direct communication with the wireless telegraph station of the balloon detachment at Berlin, the distance between these two stations being 62½ miles. The distance between the transportable stations and Sonnenburg varied, as they were established from 31 to 75 miles. Each station was in charge of an officer, the apparatus being operated by soldiers.

The apparatus is not at all affected by aerial electrical discharges. It was furnished by the "Gesellschaft für drahtlose Telegraphy system, Prof. Braun, Siemens, und Halske" (company for wireless telegraphy system, Professors Braun, Siemens, and Halske). The firm and the balloon troops are in close connection. They have much improved their apparatus for the army. The Germans were the first to equip their army with such apparatus, while most of the other countries are even now occupying themselves with the connection of places over water, where the difficulties presented by the ground do not exist.

TRANSPORTATION AND SUBSISTENCE.

The regulations that have been in force for several years requiring the train battalions to participate in the maneuvers of their respective army corps were for the kaiser maneuver of 1902 greatly extended. In both the third and fifth army corps provision columns were established from the train battalions exactly as would be done in case of mobilization. This enabled the different arms to be handled as in actual war and gave the maneuver a more warlike air.

The present train organization was adopted by Prussia in 1859. It requires every army corps to have one train battalion, which serves to educate the staff officers, officials, and men of the train in time of peace in all that pertains to train administration. It furnishes the means for train drill, in which drivers are required to attain proficiency in the many train details which can be acquired only by practice. It forms the nucleus of the transportation necessary for the more extended requirements of war.

The troops of the German army are subsisted in several different ways, which are employed according to circumstances and the prevailing conditions of the country in which

the troops find themselves. Thus may be mentioned the provisioning by hosts (billeting), the most comfortable; the provisioning by requisition, which includes both the bringing together of the necessary provisions by citizens and by the troops themselves. These ways soon fail when troops remain for some time or when other troops have already been in the country. In these cases recourse is had to the magazines, which are established by the commissariat along railroads or at other suitable points. The wagon-train columns, which establish connection between the troops and magazines, become of the highest importance when the army is advancing against a retreating enemy that has left the country exhausted.

Heretofore in the great maneuvers and in cases of mobilization only one field-bakery column was established with each army corps. During the present maneuver this number was increased to three. In addition, the entire apparatus of the field bakeries was made transportable in order that they might be able to produce bread during the march. By this arrangement the troops were better supplied with bread in unexpected and difficult situations than in case of the old stationary bakeries. The bakery columns were able to bake 35,000 rations within twenty-four hours, the requirements of each of their army corps for one day. These columns were attached to the bivouac columns, the two together receiving the official designation "bivouac column."

Each division was furnished two provision columns to be used for carrying rations and forage from the magazines, and two bivouac columns for the immediate supply of the bivouac requirements. These were designated as provision columns Nos. 1 and 2, and bivouac columns Nos. 1 and 2. One provision column and one bivouac column together contained nearly two days' requirements for a division. The bivouac column carried the supplies for the day the troops went into bivouac, including the necessary wood for cooking. The provision column carried one day's supplies of rations, forage, and wood for the following day, which was not used until after the exhaustion of the supplies of the bivouac column.

With the infantry divisions provision column No. 1 consisted of 48 two-horse wagons. With this column were 5 officers, including a paymaster and a veterinary surgeon, 99 noncommissioned officers and privates, 29 riding and 108 draft horses.

All of the other provision columns consisted of hired wagons and horses. The horses and wagons of the bivouac columns were also hired.

There was in addition one baggage column assigned to each division; the wagons and horses for this column were hired. Both the bivouac and baggage columns were also provided with officers, noncommissioned officers, and privates, who superintended the train and attended to the loading and unloading.

One transportation-battalion commander was attached to each division and superintended the entire transportation of the division.

The wagon columns were organized into platoons and sections, under officers.

The wagons were distinctly marked with a number; the kind of column to which it belonged was also plainly designated by large letters, as well as the division to which it was assigned.

The disposal of the columns and the manner in which they brought provisions from the magazines were left to the division commander.

Each man carried one day's ration, excepting potatoes, and some wood for cooking.

One day's ration of oats was carried on each horse.

Potatoes were purchased in the open market from time to time, and were carried on the officers' provision wagons.

Provisional magazines were established at Konigswalde, Schermeisel, Grochow, Sternberg, Topper, Mittel Stentsch, Meseritz, Bauchwitz, Durlattel, Bratz, and Ober Stentsch.

The baggage columns arrived first in camp, and after them the bivouac columns. A great number of water wagons accompanied the troops. These were principally one-horse wagons, each carrying a barrel with a capacity of about 65 gallons. There were also a few large sprinkling wagons used to carry drinking water. Trial was made of one large transportable drinking-water apparatus for distilling water to render it germproof. After the steam was condensed it was charged with a fresh supply of air. In this way about 250 gallons of pure water was prepared in one hour.

The length of the train for one army corps in war is about $6\frac{1}{2}$ miles. As such a long column is not desirable it is divided into two echelons, according to their use. The first echelon,

with which are two provision columns, marches from $4\frac{1}{2}$ to $6\frac{1}{2}$ miles behind the fighting troops. The second echelon follows at one day's march distance. When a column has been emptied, it returns from the first to the second echelon and from this to the magazines to be reloaded. The column leaders always endeavor to see that their wagons are able to make these marches unhindered. The innovation of the mobilized train battalion for the maneuvers of 1902 was everywhere hailed as a new and useful step in the practice of warlike conditions.

The indemnification for the feeding of the troops in billet was decided by the imperial chancellor of the empire, and the allowance for a private for the maneuvers as announced in orders, dated January 2, 1902, was as follows:

	With bread.	Without bread.
For a full day's feeding.....	\$0.19	\$0.15
For a midday feeding.....	.09 $\frac{1}{2}$.08 $\frac{1}{8}$
For an evening feeding.....	.06	.05
For a morning feeding.....	.03 $\frac{1}{2}$.02 $\frac{1}{8}$

The compensation for the keeping of an officer included that of his soldier servant; the following rates were paid per day:

For quarters and board for a general officer.....	\$0.49
For quarters and board for a field officer.....	.89
For quarters and board for a captain or lieutenant.....	.25

When a full day's board was not furnished, a smaller amount was paid for the quarters and meals actually furnished.

For the various noncommissioned officers the allowances were graded between those of the lieutenant and the private.

During the maneuvers no officer of the army, official, clergyman, teacher, or citizen enjoyed any immunity or privilege which excluded him from the full obligation to serve as host for the officers or soldiers billeted upon him.

Special preserved meat, ordinarily known as "Lauwer-Rüpins preserved meat," was extensively furnished as a part ration and for field trial. This patent is especially designed for the tropics, and consists of the inclosing of the meat in an envelope of tasteless and nonodororous mineral grease, the melting point of which is above 70° C. This in turn is inclosed in a second envelope of gelatinous membrane of a

chocolate-brown color. The double cover effectually served to protect the meat against all exterior agents, and the food was regarded as well adapted for use in campaign.

Schoolhouses being required for the use of the troops, the schools in and near the city of Posen were suspended from August 27 to September 8; those in other localities being similarly affected a few days later.

In order to provide for the great increase necessary in the field-bakery columns, bakers, in accordance with orders, were called in from the reserve (landwehr and ersatz reserve) in time enough to be thoroughly instructed in the manipulations of the field baking stoves in garrisons before they were employed in service in the maneuver.

In order that prompt payments might be made by the troops for forage and supplies, the prices to be paid were fixed for each community and published previous to the maneuver in the local newspapers.

RECONNOISSANCE.

The principal means of gathering information was by the use of exploring cavalry-patrols.

Cavalry and infantry patrols sufficed for the information service until the moments of contact with the main forces of the enemy and until the adversary made his dispositions to accept combat. The difficulties confided to the exploring cavalry increased in proportion as the veil covering the enemy thickened.

In previous maneuvers it was found that the reports of the patrols often reached the commander too late, or else they depicted situations existing several hours before and which were changed as the time arrived for prompt action. To overcome these difficulties extensive use was made of captive balloons, which are now no longer regarded as innovations in the German army.

The balloons were raised and lowered by hand winches and were rapidly taken to different positions. They were inflated with compressed hydrogen gas and made ready for ascension in about thirty minutes. Kite balloons were used, which permitted ascensions to be made in all winds. To enable them to withstand the wind the balloons were provided with air and rubber pouches. Small additional auxiliary balloons or bags were also attached to the main balloons by lines in such

a manner as to fly some distance away from them, and which looked when in the air very much like the tail of an ordinary kite.

The observers rose to an altitude of from 400 to 600 yards. At this height they could observe the changes of position of companies within a radius of $4\frac{1}{2}$ miles and the movements of battalions and batteries at $7\frac{1}{2}$ miles. The movements of large bodies of troops could be perceived at 15 miles. These observations permitted the reporting of such troops as could take part in the day's battle. The observers discovered the front of the opposing troops, and, during the artillery duel, designated objects upon which fire could be directed. In general they were not used for the observation of the shots, this having been found to be impracticable unless particular targets are assigned and the observations limited simply to this object. During the battle at short distances the observers were able to give exact information concerning the grouping of the opposing forces and the details of the ground. The balloons were not used during the night, although it is claimed that when in close contact they may even then be able to gain important information. In defensive positions they were particularly useful in the discovery of the direction of the attack and in the location of the ordinary and the masked or covered batteries. After trials, the Germans have found that the best results are obtained by raising the balloons within 200 or 300 yards of the main headquarters; also, that each minute of delay in the transmission of an observation made from a balloon frequently caused a loss of part its value. Effort is made to have the tactical situation depicted to the commander as it appears at the very moment, and not such as it was a few hours before. In battle, no patrol can depict a situation so rapidly and so completely. Were the balloons raised at some distance from headquarters the observations would have to be transmitted, and any delay would cause it to lose its principal value. Instantaneous description of the situation is of the utmost importance. From trials during previous maneuvers it has been found that when messages from the balloon had to be transmitted some distance they often could not be prevented from wandering around the field, and even when they were ready to be forwarded by telegraph or telephone lines these latter were sometimes occupied by the transmission of communications

and urgent orders and the observations failed to reach headquarters in time to be of value. The greatest objection to the location adopted for the captive balloon in the field army is that it betrays the seat of the headquarters. It has, however, the advantage of indicating to the friendly troops the proper direction to send their communications, and it also serves somewhat as a guide for the march of the troops. The knowledge by the enemy of the location of headquarters is not now, perhaps, of so much importance, as the wings are well connected with the center by the new flash-signaling apparatus and the telegraph and telephone lines.

Much attention is paid to the question as to who should ascend in the balloon to take the observations. If possible, the observations are made by a trustworthy officer of experience attached to the staff of the commander. Particular cases and the kind of observations to be made decide whether this officer shall be an officer of the balloon section or of the staff corps, the engineers, artillery, or infantry. The success of the communications made from the balloon is greater when the relations between the observer and the chief of staff of the headquarters are intimate.

The long range of modern arms now holds the patrols at great distances, rendering their reconnoitering more difficult; the balloon at the present day is therefore a greater necessity.

The clear weather which prevailed throughout all of the maneuver days favored the use of balloons, equally also the services of information, reconnoitering, transmission of orders and news, and the transportation service.

The hard ground permitted the balloons to be mobile both before and after they were raised. Thus the Red commander's balloon, which was raised near Grochow September 11, followed at a high elevation its wagon (to which it was attached by cable) when that vehicle was driven along with the retreating troops through Tempels M., Seeren, Hochwalde, Kalau to Paradies, a distance of 16 miles. During this time numerous valuable reports in regard to the strength and the directions taken by the pursuing troops, the roads that were free of the enemy, etc., were received from the observer by the Red commander.

Cuttings from maps were frequently used by the observer, who would sketch in the extent of the enemy's position, the general line of the hostile outposts, etc. Ordinary descriptions of the situations or conditions of the fight on the different

parts of the battlefield were generally transmitted by telephone, but sometimes by means of written reports, observers being able to make use of both methods.

The greatest number of messages received from one balloon in one day was eighteen.

The "signal balloon" was of great value in marking the headquarters of the maneuver leading, and for ordering the halt, the recommencement, and the end of the maneuver.

AUTOMOBILES.

During the maneuvers full advantage of the great velocity of the automobiles for persons could be taken advantage of only when the road was free from troops. This often occurred between the heads of the advance guard and the advance cavalry, between the ends of marching columns, between the army parts and the ends of certain telegraph lines, and on the crossroads connecting the lines of march. As the drivers were sometimes unfamiliar with the roads, frequently only from 15 to 25 miles per hour was practicable, the average speed being somewhat less. The automobiles in general, however, were regarded as of satisfactory speed. The desire for vehicles of greater velocity results from the wish to maintain quick time on ascents and in mountainous country. The objection to the automobiles using benzine was that the dangers arising from the use of benzine were greater than would have been from those using steam. Reliance had to be placed upon benzine depots, as the quantity necessary for their use could not be found near the line of march. Besides the benzine had to be clean and to fulfill certain other required conditions. Reliable and fearless men were required for drivers, who had to be relieved in order that they might rest. The propelling force was not so well regulated as that generally produced by the steam motor.

It is regarded as undecided in Germany whether it is more to the purpose to use automobiles only for the transportation of persons, or for bearing freight, or for drawing other loaded vehicles, or whether the same importance should be attached to all three kinds.

The freight automobile and the draft automobile, or traction engine, are yet far from the standard desired. An automobile to carry freight is particularly desired, as it can go backward or forward, and in close places can be better

directed than a wagon and team. Effort is being made by the army to secure a motor that will be able to draw on good roads an attached burden of 30,000 pounds at an average speed of about 3 miles an hour.

Twenty automobiles for the transportation of persons were used in the maneuver. These carriages were generally of a light character, some of them having only two wheels. A 16-horsepower Mercedes was placed at the disposal of the emperor, which he used once in going from Sonnenburg to Trossen and return early the morning of September 10.

The firms of Adler, Benz, Daimler, Durkopp, Eisenach Vehicle Factory, Marienfelde, Opel, and Stoewer were also represented in carriages. The two-wheeled automobiles were all of the kinds known as the Neckarsulm, Cyclone, and Progress. Of the two-wheel variety those having the motor in front stood the test better on soft ground.

There were also in addition ten Daimler freight automobiles used. These were in charge of Captain Mayer and were brought from Berlin to Frankfort-on-the-Oder, and taken from there to the maneuver ground. They were used in transporting provisions in connection with the steam traction automobiles under the command of Captain Weisse; the latter consisted of several Thornycroft and Fowler steam traction automobiles.

The ten Daimler freight automobiles were assigned the task of filling two maneuver provision magazines, which task they were reported to have accomplished in a satisfactory manner. It necessitated the transportation of 275,000 pounds about 44 miles. Trailers were attached to some of these automobiles with favorable results, the automobile and trailer carrying a load of 8,800 pounds, with an average speed of 6 miles an hour over roads generally good but sometimes soft in places.

For the motive (motor) power of the ten freight automobiles alcohol was used, preference being given it on account of its being a home product. The cost of this power in Germany is less than that of benzine.

There is much material on hand in Germany for the construction of narrow-gauge field railroads. For this purpose sections are made consisting of the rails united and held in place by the ties. These sections are transported on wagons and are quickly laid over the ground in any direction.

REPORTS.

In accordance with field-service regulations the corps commanders of those army corps which have engaged in the kaiser maneuvers must forward by the 1st of November to the chief of the general staff of the army reports on the maneuvers held before his majesty the emperor. These reports, to which must be attached the reports of all the infantry and cavalry division commanders, contain only such descriptions of the tactical exercises as would be given in war service.

Officers are not employed in sketching the movements in maneuvers; it is preferable for this purpose to append portions of maps.

The umpires also report by the 1st of November to the chief of the general staff of the army the decisions given by them, stating concisely their reasons for the decisions.

CARRIER PIGEONS.

There are 784 carrier-pigeon societies in Germany, which own about 240,000 birds. The number of birds found in the empire decreases gradually from the western frontier to the eastern, as the pigeons were introduced from the west, Belgium, and the farther from the starting point the less they are understood and the more difficult it becomes to find the proper personnel for keeping and training them. The societies are consolidated under the name of the "Association of German Carrier-Pigeon Amateur Societies." This association has accepted an obligation to train a certain number of their carrier pigeons under the regulations prescribed by the war ministry, and to place them at the disposition of the military authorities in case of war. The war ministry presents 9 gold, 140 silver, and 240 bronze medals annually to the societies for good flying results. It also pays \$1,000 yearly to the association. One-half of this is generally given as a contribution to the fund for payment of the managers, and one-half to the fund used for premiums for the destruction of birds of prey.

In addition to the amateur societies there is a military carrier-pigeon service with headquarters at Spandau, where a fine special building for a central station has been erected. This service is subordinated to the "inspection of telegraph troops," the individual stations are subordinated to the local

military commanders. In the budget, for the administration of the imperial army, \$10,000 annually is appropriated for the military carrier-pigeon service. The system now spreads its net over the whole German empire; every fortress has its carrier-pigeon post, in addition a large number of breeding stations have been established at various places, with a capacity of 200 pigeons each. Pigeons are sometimes bewildered by the noise of guns; it is therefore considered necessary to send at least four out with a single dispatch, in cases of news of special importance two or three times as many. It is considered as possible that in time wireless telegraphy may do away with the necessity of keeping up these stations.

During the maneuver the pigeons were carried exclusively by the cavalry, there being one carrier-pigeon patrol of the strength of one noncommissioned officer and three privates established in each cavalry regiment. These patrols practiced with their pigeons only during two days, the 8th and 9th of September.

The pigeon ration, the preparation of the dispatch, the adjustment of the same, and the regulations observed in starting the birds upon their flights, were the same as described in the report on the German kaiser maneuver of 1901.

THE JAPANESE ARMY MANEUVERS OF 1902.

[REPORTED BY MAJ. O. E. WOOD, ARTILLERY CORPS, UNITED STATES MILITARY ATTACHÉ AT TOKYO.]

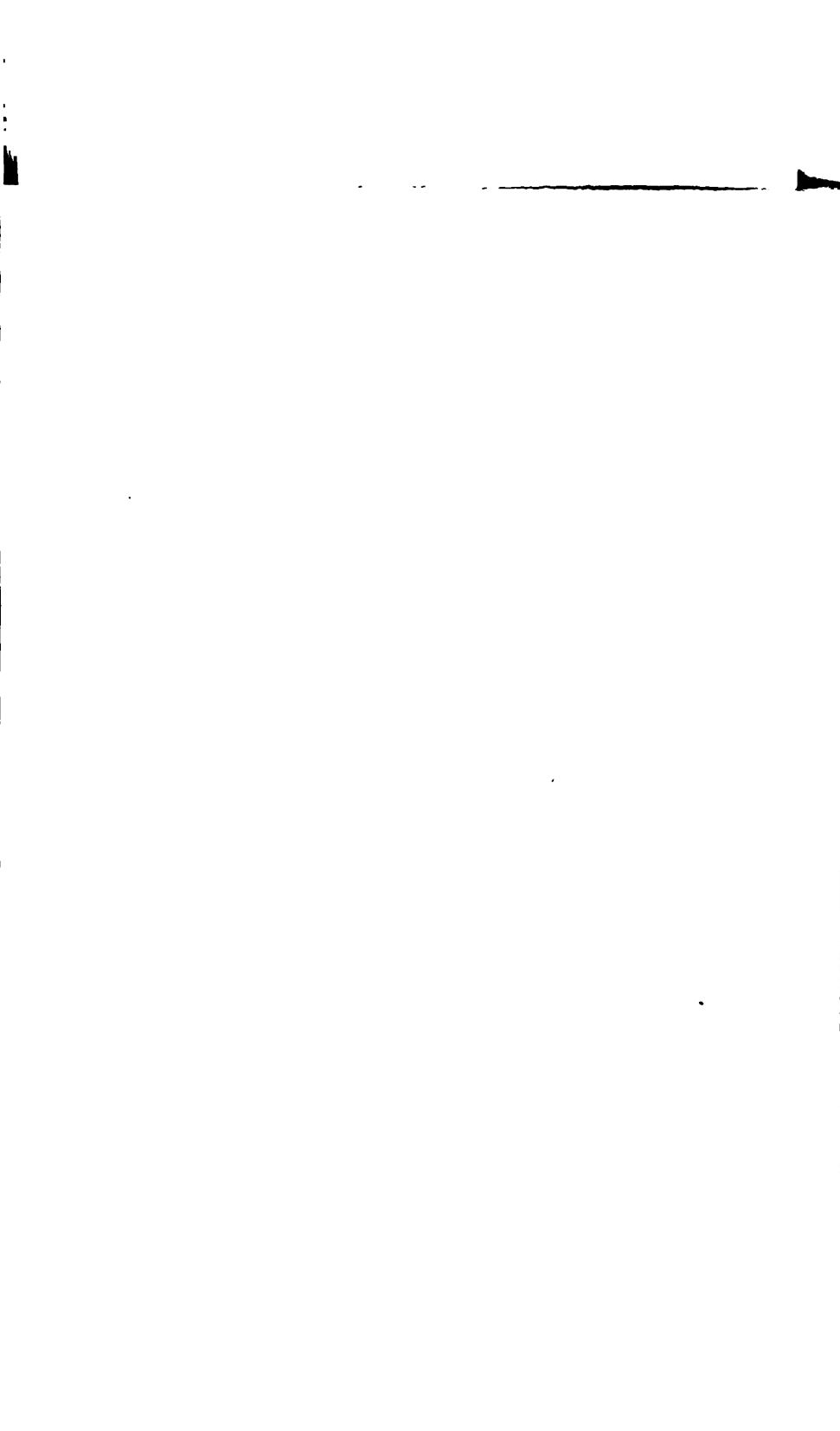
The maneuvers took place between November 9 and 15, 1902, near Kumamoto, in Higo Province, Island of Kyushu, about 830 miles south of Tokyo and within 60 miles of Nagasaki.

The foreign military attachés and other officers who were invited to attend the maneuvers left Tokyo on November 6 and 7, arriving at Kumamoto two days later, and were met by officers of the Japanese staff, who conducted them to their quarters in a large school building, which had been specially prepared for their reception.

The foreign spectators were as follows: The military attachés of Great Britain, France, Germany, Russia, and the United States of America; and in addition there were three English, two French, three German, two Italian, one American (Lieut. H. L. Wigmore, U. S. Engineers, A. D. C.), three







Korean, and ten Chinese officers, among whom was Major General Creagh of the British army.

On November 10 the emperor arrived at Kumamoto and was received at the railroad station by the princes, high officers of the Japanese army, and the foreign officers.

On the 11th, 12th, and 13th the emperor witnessed the maneuvers, and on the 14th a grand review was held by his majesty on the Champ des Manceuvres in Kumamoto.

On the afternoon of the 14th a grand reception and banquet took place in the emperor's presence, attended by over 1,000 officers and officials of high rank.

GENERAL PLAN OF MANEUVERS.

1. The Southern (invading) army, composed of the sixth division and a battalion of infantry from Tsushima Island, commanded by Lieutenant General Okobo, has disembarked its main force in Imari Bay, a part of it effecting a landing in the bay of Yatsushiro.

2. The Northern (defending) army, composed of the twelfth division, commanded by Lieutenant General Inouye, having concentrated its main force near Kurume, will advance a division in the direction of Kumamoto.

GENERAL INSTRUCTIONS FOR THE SOUTHERN ARMY.

The advance guard of the sixth division of the Southern army, charged with occupying Kumamoto as soon as possible and proceeding northward toward Kurume, will arrive at Yatsushiro in the afternoon of November 9. The main force of the division will be assembled in the environs of Yatsushiro ready to move forward by 11 a. m. November 10.

The outposts for the night of November 9-10 are assumed.

GENERAL INSTRUCTIONS FOR THE NORTHERN ARMY.

The twelfth division of the Northern army, charged with repulsing the enemy, will arrive in the neighborhood of Takase during the night of November 9-10. It will then be learned that the enemy disembarked in Yatsushiro Bay on November 9 and has concentrated its force in the neighborhood of Yatsushiro.

The outposts for the night of November 9-10 are assumed.

CAVALRY OPERATIONS OF NOVEMBER 10.

The cavalry of the Northern army advanced southward, crossed the Midorigawa River, and occupied Kokan Mura and vicinity at 12.30 p. m.

The cavalry of the Southern army, in cooperation with the company of infantry acting as its support, drove back the hostile cavalry and took possession of the bridge near Kawashiri at 2 p. m. The northern cavalry retired to Chikami.

COMMENTS.

The action of November 10 was not witnessed by the foreign spectators and was a small affair of the advance cavalry of both armies. The first brush took place at a bridge in the neighborhood of Kawashiri. There was only a small force of Northern cavalry on the north bank, and their fire was overpowered by that of the Southern army, which was supported by a company of infantry, who poured in a hot fire from the front and the left flank. The Northern force was consequently forced to retreat and the invaders remained in possession of the Kawashiri bridge.

POSITION OF THE TWO ARMIES ON THE NIGHT OF NOVEMBER 10.

THE SOUTHERN ARMY.—Main body near Ogawa, with the advance guard near Kitashinden, and left detachment near Sumiyoshi.

THE NORTHERN ARMY.—Main body near Kumamoto, with the advance guard near Motoyama Mura, and line of outposts extending from Shin Tokawara to Nishimuta.

GENERAL ORDERS FOR NOVEMBER 11.

SOUTHERN ARMY.

The division will advance. The independent cavalry will advance from Kumanjo. The advance guard (one regiment of infantry and one of artillery) will leave the south end of Matsubase at 7 a. m. and move on the Kyushu road. The left detachment (two battalions of infantry) will leave Kitashinden at 5.30 a. m.

NORTHERN ARMY.

The division will advance from Ogawa. The advance guard (one regiment of infantry, two squadrons of cavalry,

Ordre de bataille, VI^e Division, Armée du Sud.

Général Okubo, commandant la Division.

Colonel Yamamoto, chef d'Etat-Major.

23^e Brigade d'infanterie.

C^e Kigoeki.

23^e Rég^t d'infanterie.

L^e-C^e Tomita.



46^e Rég^t d'infanterie.

L^e C^e Hirai.



Bat^{on} d'inf.^{te} de Tsushima.

C^e Sadowara.



11^e Brigade d'infanterie.

G^e Ida.

13^e Rég^t d'infanterie.

C^e Matsui.



45^e Rég^t d'infanterie.

C^e Nojima.



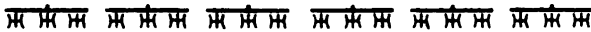
6^e Rég^t de cavalerie.

C^e Iwaya.



6^e Rég^t d'artillerie de campagne.

C^e Hara.



6^e Bataillon de génie.

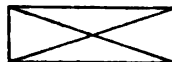
C^e Trutsumi.



Train de division.

Colonne d'équipage de pont.

(supposé)





one battery of artillery and two companies of engineers) will leave Chikami at 5.30 a. m. for Ogawa. The left detachment (one regiment of infantry, one squadron of cavalry, two batteries of artillery and one company of engineers) will leave Hattanda at 5.30 a. m. for Matsubase. The remainder of the division will follow the advance guard.

OPERATIONS OF NOVEMBER 11.

On the receipt of information that some of the hostile infantry had crossed the Midorigawa, the commander of the Southern army ordered the advance guard and the twenty-third brigade of infantry to deploy for action; the former between Iwatake and Uchikoshi and the latter at the northern end of Hanazono Mura; the artillery taking its position astride the main road near Iwatake. At 8 a. m., being informed of the approach of the hostile infantry near Kiyoto, the divisional commander of the Southern army came to the determination that he would meet the enemy.

The Northern army division occupied Utomachi with the advance guard, deployed the main body near the north end of the town, and placed the artillery near Udo Station. As a consequence of the artillery action, he decided to attack Hanazono Mura, which he effected about 10 a. m. The left detachment of the Northern army drove back the right detachment of the Southern army near Kumanjo, and made for Matsubase; in this pursuit an obstinate resistance was offered. Judging from the report of guns heard in the direction of Kumanjo that the enemy in front was not of superior strength, the Southern commander made an attack on the hostile forces in the direction of Udo. In this fight the Southern army division was compelled to make a general retreat by the situation existing in the direction of Kumanjo; the troops regaining order near Toyofuku. The Northern army division pursued the enemy up to the line connecting Matsubase with Magarino.

The Southern division placed its outposts fully prepared for battle on the line of Kawatoko, Urakawachi, and Kugu.

Having a line established along the Onogawa to guard against surprises, the Northern army division bivouacked in the rear, with its main forces present at Magarino.

COMMENTS.

The position of the Southern artillery was well chosen; they had been under cover behind some bushes and farm-houses, but rushed out and unlimbered just behind the crest of a hill which commanded a large extent of ground. Gun pits were dug, the guns placed well back on the reverse slope, and the horses and limbers were sent to the rear in short order, but were badly bunched, for a single shell judiciously placed would have killed or wounded the greater part of them.

On the crest of a lower hill, nearly in front of these guns, was a company of Southern infantry strongly intrenched, but they were packed in the trenches like sardines in a box.

The Southern forces held a stronger position than the Northern troops, occupying as they did a range of heights while their opponents were in low-lying ground and would have to advance over open country if they determined to attack.

During the progress of the engagement the general commanding the Northern army received reinforcements, and, making a feint with his right, massed them on his left and hurled them against the Southern right in the neighborhood Kumanjo, and then advanced toward Matsubase, encountering strong resistance.

The infantry came into action rapidly on both sides, the men seeming to rise out of the ground in all directions; but their line was too dense and the supports in company column too close.

The Northern force was adjudged victorious and the Southern army had to fall back.

GENERAL ORDERS FOR NOVEMBER 12.

NORTHERN ARMY.

1. The division will effect reconnoissance with view to attack.

2. The twelfth brigade of infantry will occupy the line extending from the west end of Matsubase to the extremity of the heights to the east of Magarino.

3. The twenty-fourth brigade of infantry will occupy the line extending from the nameless village to the east of Magarino to the end of the height to the northwest of Haginowo.

4. The cavalry will search for the enemy from Toyosaki to the northwest of Haginowo.

Ordre de bataille, XII^e Division, Armée du Nord.

Général Inoué, commandant la Division.

Lieut-Colonel Okara, chef d'Etat-Major.

2^e Brigade d'infanterie.

C^t Otani.

2^e Rég^t d'infanterie.

C^t Semba.



4^e Rég^t d'infanterie.

C^t Kagawo.



1^{re} Brigade d'infanterie.

C^t Takénouchi.

1^{er} Rég^t d'infanterie.

C^t Imumura.



4^{er} Rég^t d'infanterie.

C^t Yoda.



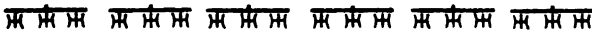
1^{er} Rég^t de cavalerie.

L^e-C^t Yamamoto.



1^{er} Rég^t d'artillerie de campagne.

L^e-C^t Matsumoto.



1^{er} Bataillon de génie.

L^e-C^t Okada.



Train de division. (supposé)



1

5. The regiment of artillery will take its position on the height to the southeast of Magarino.

6. The reserve (one regiment of infantry) will be assembled on the dry rice field to the northeast of Uenohara.

SOUTHERN ARMY.

1. The division will take up the defensive on its position extending from Kawatoko to the height north of Toyofuku.

2. The cavalry will keep its main force at Yamasaki and a part at Toyosaki.

3. The dispositions are, roughly, as follows:

The right wing (having the twenty-third brigade less one regiment as a kernel) on the line extending from the height west of Kawatoko to Urakawachi. The left wing (having the eleventh brigade as the kernel) on the line extending from the left of the right wing to Kugu and Shima. The artillery regiment and a company of engineers on the height at Toyofuku. The reserve (four battalions of infantry) near the south fork of the Urakawachi.

OPERATIONS OF NOVEMBER 12.

In pursuance of the orders issued last night, the Southern army division occupied the line extending from Kawatoko to Kugu, the artillery being posted astride the crossroads about 600 meters to the southeast of Kugu, the reserve being on the dry rice field about 600 meters to the northeast of Toyofuku, and the cavalry keeping its greater force at Yamasaki and a part at Toyosaki. As ordered, also, the Northern army division occupied the line connecting Atariomura, Nanden, and Matsubase, the artillery being on the heights at Nanden, and the reserve of the division near the three-forked road to the northwest of Magarino, and the independent cavalry keeping its greater force engaged in the search on the right side of the division and a part present near Hagiwo.

With such dispositions, the operations began at 8 a. m. The commander of the Northern army division decided to keep on the ground, as he judged that the hostile forces were superior to his own. The commander of the Southern army division, on the discovery that the fire of the enemy's artillery grew weaker gradually, decided to lead an attack near the nameless pond at Atariomura with his right wing and on Nanden with the left wing. He thrust forward the reserve

to the nameless pond out of the valley in the southern part of Urakawachi. The Northern army commander gave a counter attack when the left wing of the Southern army reached Kugu.

However, the heavy loss suffered by the artillery compelled the Northern army to make a general retreat, and the commander decided to retire to the north of the Kasegawa.

At this moment the division commander received instructions from the corps commander, and learning that a reinforcement (having one regiment of infantry as the kernel) would arrive in the forenoon to-morrow, directed the retreat to Oita.

The Southern army decided to pursue the enemy and to secure the various points of passage across the Midorigawa.

COMMENTS.

Each force was strongly entrenched along two parallel ridges about 3,000 meters distant from each other. A valley consisting of dry rice fields lay between these ridges, which, being undulating and covered here and there by clumps of trees, afforded fine artillery positions. After an hour's cannonading, the infantry of both armies advanced and brisk fighting ensued; the Southern reserves attacking the Northern left wing, while the reserve force of the Northern army engaged the Southern left wing. The two opposing lines had nearly met when the bugle was sounded suspending operations for the day. The Southern army was adjudged to have the advantage.

POSITION OF THE TWO ARMIES ON THE NIGHT OF NOVEMBER 12.

The Northern army occupies the line connecting Chikami with Fuyeda, with cantonment in rear of the line.

The Southern army has a force consisting of one regiment of infantry, a large body of cavalry, and one battalion of artillery in the vicinity of Medomachi, with the main body of the division to the south of Kawashiri.

GENERAL ORDERS FOR NOVEMBER 18.

SOUTHERN ARMY.

1. With the object of advancing on Kumamoto, the division will be formed in three columns, and first of all sweep away the hostile forces in front.

2. The right detachment (one regiment of infantry, one squadron of cavalry, one battalion of artillery, and one company of engineers) will cross the Nakanose-bashi bridge at 7.45 a. m. The right column (twenty-third regiment of infantry, one squadron of cavalry, and one company of engineers) will march by way of Gensan and Hetamura; the left column (the rest of the division, less the independent cavalry) will leave the northern extremity of Kawashirimachi, all moving at the same hour, 7.45 a. m.

NORTHERN ARMY.

1. The division will meet the enemy, occupying the line connecting Chikami with Yayamachi.

2. The various troops will be in position by 6.30 a. m. The forty-seventh regiment of infantry from Kamigo to south end of Chikami. The twenty-fourth regiment of infantry, one battalion of artillery, and one company of engineers, from the south end of Fuyeda to southeast end of Yayamachi. The second battalion of forty-eighth regiment infantry at south end of Nishimuda. A regiment of artillery (less one battalion) on the dry rice field to the northwest of Nishimuda.

3. The regiment of cavalry will cover the front of the left flank.

4. The fourteenth regiment of infantry and the forty-eighth regiment (less one battalion) will act as the reserve, being posted on the dry rice fields to the southeast of Kamichikami.

OPERATIONS OF NOVEMBER 18.

At 7.30 a. m. the Southern commander decided to place his artillery in the dry rice fields to the north of Gensan and destroy the advance guard of the right and left columns in order to make a reconnoissance of the enemy's force.

At 7.50 a. m. the artillery of the Southern division opened fire against the enemy's artillery posted opposite it.

At 8 a. m. the twenty-third regiment of infantry, the right column of the Southern division, started from Nishimura for Nishimuda, and at 8.15 arrived at a point about 600 meters southeast of Nishimuda and exchanged a hot fire with one battalion of the forty-eighth regiment of infantry which occupied this point.

At 8.15 a. m. the Northern commander reinforced the troops on the Nishimuda side by the forty-eighth regiment of infantry (less one battalion) and ordered one battery of artillery to proceed to a position near Nishimuda to attack the side of Kibe.

At 8.20 the Northern commander, informed of the forward movement of a large body of the enemy on the side of Nakanose-bashi, strengthened the troops in the direction of Fuyeda by two battalions of infantry, forming part of the reserve.

At 8.40 a. m. the Northern commander, with the object of carrying out a great counter attack on Nishimura, an attack directed from the tract of country lying between Chikami and Nishimuda, added to the artillery already posted there a battalion of reinforcements, and made the fourteenth regiment of infantry (less one battalion) deploy on the side of the left wing of the forty-seventh regiment of infantry.

At 9 a. m. the five battalions of the Northern division on the side of Fuyeda went forward, driving back, little by little, the right detachment of the enemy.

At 9.05 a. m. the chief of the Northern division went from the east side of Chikami-mura toward Nishimura with all his reserves. One battalion of the fourteenth regiment of infantry lost its way during this maneuver and was consequently unable to take part in the principal attack.

At 9.10 a. m. the chief of the Southern division decided to attack Chikami from the side of Takaye with all the troops of his reserve, and the two opposing armies opened a preparatory fire on each other, when, about 9.20, the order arrived to close the maneuvers.

COMMENTS.

The Northern army, which had retreated on the previous day, took up a position in the neighborhood of Chikami and Nagamachi, south of the city of Kumamoto, and encamped there, while the Southern army encamped on the field between Kawajiri and Tabe. During the night the Northern army threw up intrenchments near the houses at the southern end of Chikami, and behind these the forty-seventh infantry was posted. Other defensive works were also constructed at Nishimuda, Fuyeda, and Nagamachi, where five battalions of infantry and a regiment of artillery were posted. The

artillery of the attacking force opened fire shortly before 8 a. m. and sharp fighting ensued. About an hour later the reserve force of the Northern army forded the Shin River and advanced, extending west of Nishimuda, and made a furious attack on the enemy.

In the meantime the main body of the attacking force attempted to compel the evacuation of the troops intrenched at Chikami—the right wing. To save this position five battalions of the Northern army were dispatched to the southern end of Chikami, to the assistance of the defenders, who, after exchanging a hot fire for a few minutes, advanced from their position and made a charge. The charge proved unsuccessful, as they were not supported in time by the battalions which had been sent to their assistance. They were consequently compelled to retreat to the breastworks, and an apparently desperate encounter took place.

At length the Southern force charged and approached to within a few yards of the defenders, when the order for the suspension of operations was received.

This concluded the maneuvers. His majesty, who was present, then summoned the officers of both sides before him, and the marshal, Marquis Oyama, chief of staff, commented upon the operations of the preceding four days.

The emperor congratulated the officers on their skill and spoke of the diligence of both officers and men engaged.

THE GRAND REVIEW.

On the morning of November 14 a grand review was held by his majesty on the Champ des Manœuvres, a large open square in the city of Kumamoto.

After the emperor had ridden down the long lines, followed by a large number of high ranking Japanese officers and all of the foreign officers, the troops of the two divisions were merged into one body for parade purposes, the various lines passing the reviewing point successively as follows: Eight regiments of one battalion of infantry in company front, two battalions of engineers in company front, twelve batteries of field artillery in battery front, two regiments of cavalry in squadron front. Alignments and distances in column generally good.

After the passage the troops left the field in various directions and the foreign officers were dismissed.

EXTRACTS TAKEN FROM REPORTS BY SPECIAL CORRESPONDENTS OF VARIOUS JAPANESE AND ENGLISH NEWSPAPERS.

The area chosen for the maneuvers was a portion of the great plain of Higo, south of the city of Kumamoto, in Kyushu, the most southerly of the four main islands which constitute the Japanese archipelago. From an historical point of view Kyushu is intensely interesting to the European owing to the large numbers of its chiefs and people who were won over to Christianity by the Jesuits some three hundred years ago, and also to the fact that it helped more than any other part of Japan to bring about the restoration of 1868.

The great plain of Higo is well suited as a maneuvering ground for Japanese troops, being composed largely of rice fields in which the Japanese soldiers ought to feel most at home.

The number of soldiers who have not passed some years of their life among the paddy fields is very small, and that this fact is no inconsiderable advantage to the Japanese army was shown in a conclusive manner at the last attack on the Taku forts, on which occasion the little Japanese marines were able to negotiate the swampy rice fields with surprising rapidity, while their less sophisticated brothers in arms from Europe often found themselves floundering knee-deep in the soft mud.

The Higo plain is broken in some places by hillocks and woods and a good deal of undulating ground, which gave the artillery a supply of good positions. The cavalry had, however, little opportunity for close reconnoissance, a fact which is not to be lamented, as the cavalry is not the Japanese army's strong point.

The general idea of the maneuvers is very simple. A foreign fleet commands the sea along the west coast of Kyushu and lands an army, which is imaginary, but whose advance division is represented by the sixth army division and commanded by Lieutenant General Okubo, at Yatsushiro, to the south of Kumamoto, and at another point in the vicinity.

To meet this invasion and to save Kumamoto, the most important military center in Kyushu, from capture; another imaginary army, of which the advance division is the twelfth army division under Lieutenant General Inouye, had been concentrated at Kurume to the north of Kumamoto.

The men of the Southern force, which was composed of the Kumamoto division, which distinguished itself so much at

Weihaiwei, Port Arthur, and elsewhere during the China-Japan war, wore white caps as a distinguishing badge; and the men of the other side, the Kokura division, wore black caps.

A few words as to the Japanese cavalry. Owing to the fact that Japan is a mountainous country and that her plains are generally used as paddy fields, the people are not a nation of horsemen; even the old samurai do not seem to have been good horsemen, they simply used horses to convey them rapidly from place to place. The army authorities are now going to great trouble to improve their breed of horses, and have already established studs in various parts of the country and sent officers to England, France, Germany, Austria, and to America to buy good stallions and to investigate the horse-breeding industry in general as it is carried on abroad. They find, however, that the foals out of the half-breed mares generally revert to the native type. The military horses are now castrated, so that they do not seem to be the same beasts which were known in North China the year before last as "the wild animals of Japan." Though small, they seem to suit the country and to be able to stand a lot of work.

As to the infantry, it struck me, as I watched these gallant little soldiers advance to the attack on the second day, that the Tommy Atkinses of Japan have a peculiarly neat, compact, and uniform appearance which would throw a British, French, or German drill sergeant into ecstasies of delight. In fact, being all beardless and of much the same height, they look so much alike that a foreigner who sees them for the first time is inclined to wonder how their officers can distinguish between them. As for their low stature, they are not ashamed of it, for the advantage it gives them in the important matter of finding cover need not be enlarged upon.

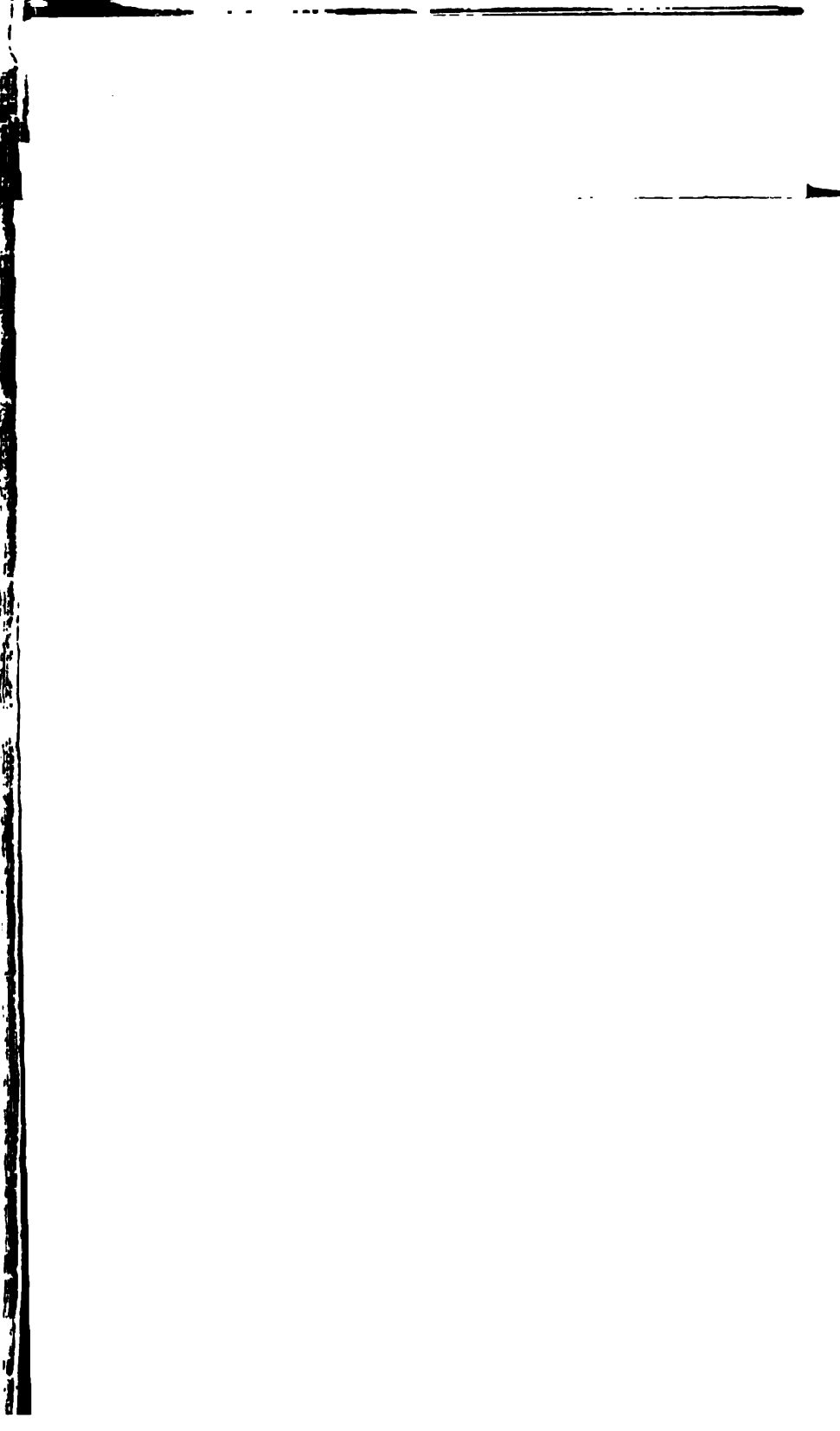
A small corps of cyclists under Captain Umezu was also on the scene, but was attached to the general staff and did not take any part in the hostilities. Behind a farmhouse was a field hospital with all the up-to-date appliances, and surgeons and orderlies were standing around as seriously as if the brisk cannonading was real and the wounded might be brought in at any moment.

The Japanese soldiers did not bivouac during the maneuvers, they were all billeted in the villages and farmhouses. No attempt was made by the army authorities to test their

transport system, only a few kitchen utensils being brought for the officers, on pack horses. I think that this was a mistake as the main object of grand maneuvers is to judge of the efficiency of all the various departments of an army, whose functions can be truly tested only when they are called upon to operate on a large scale over an extensive area. When the time for eating the midday meal arrived there was very little of the bustle of preparation which would be seen at such a time in an English or German camp. The Germans would be dividing their rations of potatoes, bacon, and black bread. The British battalion that had been in South Africa or India would soon have its tea brewed and its meat frizzling over the fire. The Frenchman would be getting ready his coffee with that extraordinary rapidity at which his allies in the Crimea were so surprised. Fatigue parties would be going for water and a look of expectation would appear on every visage. In Japan it is somewhat different, although, of course, the conditions on the present occasion do not admit of a just comparison being made. Each soldier would simply sit down, take out of his knapsack two balls of cold rice, two pieces of fish, and some "konomono," a kind of pickled radish of which the Japanese are very fond. After he had done justice to this humble fare he would take a pull from the water bottle at his belt and his meal was finished. On the last day of the maneuvers I noticed two soldiers take their food leaning against a bank directly the signal to do so had been given, and then fall asleep, both of them in almost a standing position, and with their guns at their side and all their warlike equipment on them.

The question of what rations are best suited for the Japanese soldier is one that has often been discussed by the military authorities. Some think the rice should be abandoned in favor of bread, and indeed the navy has long since, under advice of its medical officers, adopted a system of diet in which rice takes only a secondary place, biscuits and barley coming first. The result of this innovation has been very encouraging, first, on account of the evident superiority of the blue jacket over the soldier in powers of endurance, and, secondly, the remarkable decrease of "kakke," a disease very common among Japanese. Notwithstanding this, the great majority of the medical authorities in the army think that rice should be retained because it is always to be obtained in abundance





during peace or war. In the war of 1894-95 the Japanese found, wherever they moved, sufficient quantities of rice to meet any deficiency in the supply sent from home; and in every village they found, ready for use, all the appliances required for the preparation of rice. Had any other diet than rice been adopted, the commissariat would, of course, have been seriously taxed at times. During the Boxer troubles of two years ago the Japanese were, however, placed at a great disadvantage compared with the foreign soldiers, whose food could, in case of emergency, be prepared in a few moments, while they had to spend a long time looking for pots in which to boil their rice. Then, again, the foreigners could take prepared food with them, but the Japanese could not carry prepared rice for long, as it quickly becomes sour.

The daily army ration is 6 go (0.95 quart) of rice for each man, besides 6 sen (3 cents U. S.) worth of vegetables, meat, and fish. He can not therefore be said to be well fed. The bluejackets are much better treated; they get 20.1 sen a day, or rather their daily rations cost this much, and when at sea they fare still more sumptuously.

The equipment of the Japanese soldier weighs 25½ kilograms, but the authorities are thinking of reducing it to 21 kilograms.

As to their health, they seem to be, next to the German soldiers, the healthiest troops in the world. The death rate in the Japanese army is now next lowest to the death rate in the German army. Conscription seems to be improving in a marvelous manner the physique of the Japanese, but it is attended by one disadvantage, namely, that when young men return to their homes after three years' experience of the better food and the better accommodation of the barracks they become discontented with the old style of life and are often a source of trouble to those about them.

THE SWISS MANEUVERS.

[REPORTED BY MAJ. G. R. CECIL, THIRD INFANTRY, UNITED STATES MILITARY ATTACHÉ AT BERN.]

The maneuvers took place northwest of Luzerne, between the Limmat and the Aare.

The terrain is cut by numerous small streams, between which the ridges are much broken and heavily wooded, and rise from one to six thousand feet above the valleys. Across these ridges there are but few roads passable for wagons and

artillery, and in the valleys there are many marshy places, especially so between Munster and Suhr.

The following troops engaged in the maneuvers:

Fourth army corps, Colonel Kunzli commanding.

Corps troops—

Two regiments of cavalry, three squadrons each.

One regiment of field artillery, two battalions of three batteries each.

One Maxim company.

One bridge train.

One telegraph company.

Two engineer companies.

Two intendance companies.

One provision train.

The corps had two divisions, the fourth and the eighth, each composed of:

Two brigades of infantry, of two regiments of three battalions each.

One regiment of field artillery, of two battalions of two batteries each.

One engineer half battalion.

One field hospital.

One company of guides.

One section of bicyclists.

The foreign countries were represented as follows:

Germany—one lieutenant general, one lieutenant colonel, and one captain.

England—one lieutenant colonel and one major.

France—one major general and two majors.

Italy—one captain.

Netherlands—one lieutenant general and one captain.

Austria-Hungary—one major.

Russia—one major general.

United States—one major.

All were well mounted and handsomely cared for as guests of the confederation.

SEPTEMBER 11.

To-day begins the maneuvers of division against division. The supposition is that a Northern or White army located in the district Entfelden, Granichen, Aarau, is ordered to move against Luzerne; the main body in the valley of the

Suhr, with the fourth division on its left. This division is ordered to march through the valley of the Wynen via Kulm and Munster, its infantry not to cross the line Rutihof-Heidsberg-Bleien-Schwartwyl-Reffenthal before 7 a. m.

To resist this movement a Red army (supposed) located in the vicinity of Sursee and Munster is ordered to move by the valley of the Suhr, with the eighth division on its right. This division is ordered to march through the valley of the Wynen, its infantry not to cross the line of Schwarzenbach-Niederwyl-Wetzswyl before 7 a. m.

The following orders were issued by the division commanders to cover these movements:

RED.

HEADQUARTERS EIGHTH DIVISION. MUNSTER, *September 10, 6 p. m.*

March order for September 11.

1. The hostile army is situated in the district Entfelden, Granichen, Aarau.

To-morrow the main body of our army (supposed) will advance through the valley of the Suhr toward Aarau.

2. The main body of this division will march through the valley of the Wynen on the road Munster, Menzikom, Pfeffikon, Gontenschwyl, Kulm toward Aarau. The flank column on its left will march from Gunzwyl via Rickenbach, Mullwyl toward Gontenschwyl, where it will await further orders.

3. The eighth cavalry will march at 6 a. m. from Maihausen to Unter Kulm, where it will block the issue from the defile. It will also reconnoiter via Schmidrued through the Wynen and See toward Aarau. It will maintain communication with the main body (supposed) in the valley of the Suhr.

4. The infantry of the advance guard will assemble near Maihausen, head of the infantry to pass the frontier of the Canton at 7 a. m., where the eighth rifle battalion will join its regiment.

5. The main body will be in marching order at 6.50 a. m. on the Neudorf, Munster road, head near the chapel, and will follow the advance guard at a kilometer distance.

6. The left flank column and the ninetieth battalion (outpost) will pass Richenbach at 7 a. m. and maintain connection with the chief column over the Sterenberg.

7. The combat trains will follow their regiments.

The troops will march in the following order:

Advance guard—

 Eighth cavalry.

Left column—

 Thirtieth infantry, one officer and two groups of guides.

Chief column—

Advance guard, twenty-eighth infantry, one section of guides, one company of engineers.

Main body (1 kilometer distance), one battalion of the sixteenth infantry brigade, one company of engineers, eighth artillery regiment, rest of the sixteenth infantry brigade.

Eighth division field hospital (1 kilometer distance).

 WHITE.

HEADQUARTERS FOURTH DIVISION.

AARAU, *September 10.*

1. The main body of the enemy is near Sursee, with small bodies near Munster. Our army will begin the march to-morrow with its chief forces along the Suhr toward Sursee, Luzerne. This division is ordered to march by Kulm, Munster toward Luzerne.

2. The division will pass the night in the cantonments occupied yesterday.

3. (a) The eighth infantry brigade and two groups of dragoons will secure the line Ruti-hof-Galmhof-Bampf; fourth rifle battalion and one group of dragoons the valleys of the Suhr and Uerke, and maintain connection with the outposts of our army (supposed) at Ruti-hof. Outposts must be placed at 7 p. m.

(b) Two officers of the fourth dragoons to be at Aarau at 5.30 p. m. to receive patrol instructions from the division commander. Six noncommissioned officers and four groups of the fourth dragoons to be at the Suhr station in marching order at 6.45 p. m.

4. Until further orders the division commander will be at Aarau.

 HEADQUARTERS FOURTH DIVISION.
AARAU, *September 10, 6 p. m.**March order for September 11.*

1. The fourth division will march to-morrow via Kulm, Menzikon, Munster toward Luzerne.

2. The independent cavalry and one battery of artillery of the fourth artillery regiment will march from near Teufenthal at 6 a. m. to the hills of Seeberg north of Leimbach to secure the debouch of the division from the valley of the Kulm. They will reconnoiter the valley of the Wynen and keep contact with the army (supposed) in the valley of the Suhr.

3. The advance guard will march at 7.15 a. m. from near Reffenthal to Kulm, Reinach, Munster. One company will be detached over Bampf and Durrenasch in the direction of Homberg and Schwarzenbach.

4. The main body will be ready to march at 7 a. m. on the highway Aarau, Suhr, Granichen. It will follow the advance guard at one kilometer distance.

5. The right column will leave at 6.30 a. m. from southeast of Ober Entfelden and march via Engstel, Ruti-hof, Wannehof, Gschneit, Dornegg, Waltersholtz, Rehag toward Munster.

6. The division commander will be at Aarau until 6 a. m., after that at the head of the main body on the road Granichen, Kulm, Munster.

The troops will march in the following order:

Independent cavalry—

Fourth dragoons, one battery of the fourth artillery regiment.

Advance guard—

Sixteenth infantry, one section of guides, one battery of the fourth artillery regiment, one section of engineers, one balloon company, one telegraph company.

Main body—

A company of guides, less one section; one company of engineers, less one section; sixteenth infantry; one section of artillery; eighth infantry brigade; division hospital.

Right column—

Fourth rifle battalion, one section of dragoons.

FOURTH DIVISION COMMANDER.

The fourth (White) division commander sent his cavalry and one battery of artillery to occupy height 681 at Seeberg, and to secure the exit from the defile at Kulm. From that point the cavalry was ordered to patrol the front of the division.

The advance-guard regiment marched by the road Rutikof, Wannenhof, Gschneit, Dornegg, and Walterholz. The main body moved by the road and passed the defile early. The eighth (Red) division was reported to be moving by the hills to the west of the valley.

The eighth (Red) division detached the thirtieth infantry and a few mounted men to move via Rickenbach, Mullwyl to Gontenschwyl to maintain communication with the Red army (supposed) marching by the valley of the Suhr. The main body of the division marched through the valley of the Wynen via Munster, Pfeffiton, Gontenschwyl, Schoren toward Aarau.

The main body (Red) was inclined to the left, and about 8.20 a. m. the fifteenth infantry brigade (Red) was united near Geisshof. The cavalry of the two divisions passed each other without detection, that of the Red division west of the Wynen and that of the White division near Seeberg, east of the Wynen. About 8.30 a. m. the White battery at Seeberg was detected, assaulted by two companies of the advance guard and captured. The three remaining batteries of White artillery came into action near Zetzswyl in a good position for long-range fire on the enemy advancing near Gontenschwyl. At 9.30 a. m. the fifteenth brigade (Red) was in action, but

the White division threatened the Red left flank with three regiments of infantry and the fifteenth brigade was forced to retire. The sixteenth brigade (Red), near Geisshof, did not come into action.

At 9.15 a. m. the four batteries of the Red division came into action near Reinacherberg, but were too far away to have much effect upon the White artillery near Zetzwyll, and the country was so broken that they were unable to reach the White infantry. At 10.30 a. m. six batteries of corps artillery were placed at the disposal of the White division by the director of maneuvers. At 11.30 a. m. the troops were so much mixed that the recall was sounded. At 12.45 p. m., on the supposition that the Red army had been defeated, the Red division retired on Munster and the White division pursued. Contact was soon lost and the operations for the day ended.

The White division established its outposts for the night on the line Schlierbach-Emmet-Schwarzenbach.

The Red division established its outposts for the night on the line Adischwyl-Gunzwyl.

SEPTEMBER 12.

After the defeat of the 11th the commander of the Red army (supposed) announced that he would take up a defensive position on the Leidenberg to the west of the northern end of Lake Sempach, and ordered the eighth (Red) division to protect his right flank.

The Red division took position near Wili, about 3 kilometers southwest of Munster. This position is on a dominating height with a spur extending in the direction of Munster. The northern end of this ridge is fairly well covered with trees and extends to the highroad between Munster and Sursee. The east slope is abrupt and covered with trees. To the west of point 801 the ground is quite open. Farther to the west, point 852, across the valley is the southern extremity of the wooded ridge extending from Rickenbach. To the south of the Blosenbergl (name of hill) is a spur, wooded at its southern extremity. This hill and the Rickenbach range constitute the divide between the Wynen and the Suhr.

The Red division was ordered as follows:

The eighth cavalry at Kommeln to reconnoiter Wetzwyll and Rickenbach in the direction of Gontenschwyl and Reinach, the company of guides to report at headquarters at

5.30 a. m. for further orders; the sixteenth infantry and half battalion of engineers at 6 a. m. to occupy and fortify the position in front of point 801 (right wing at Wili, left wing resting on the Sochten, Waldè road); the eighth artillery regiment (four batteries) to take position at point 801 and prepare gun pits to fire in the direction of Rickenbach and Liden; the fifteenth infantry brigade (division reserve) at 6 a. m. to take position in the forest east of Wili, and to detach one company to protect the balloon near Romerhof; the outpost battalions to withdraw to the main line at 6.30 a. m.; the balloon to observe from near Romerhof and to report to point 801.

The commander (White army, supposed) determined to follow up the victory of the day before, and ordered the White division to force back the enemy in its front in the direction of Hildisrieden, Rothenburg.

The commander (White division) gave the following orders:

The division will assemble in two columns, the seventh infantry brigade at Rickenbach and the eighth at Niederwyl.

The fourth cavalry and the Maxim company will relieve the outpost line at 5.30 a. m. and advance via Witwyl and Helisberg.

The guides company will reconnoiter in the direction of Munster and Blosenberg at 6 a. m.

From Niederwyl one infantry regiment and two batteries of artillery will make a demonstration on the front of the position of the enemy at Munster and Wili.

Three regiments and two batteries will pass via Rickenbach into the woods to the west and debouch; one (fourteenth infantry) regiment on Hasenhausen in the direction of hill 804, and two (eighth infantry brigade) regiments to the north of Holdern, via Kommeln, Walde to reach the woods on hill 804. Infantry will not pass the outpost line before 7 a. m.

At 8.45 a. m. the feint attack was made, but its weakness showed its real character. It was stopped by the troops in position. Soon after large bodies of troops were seen coming from the wood to the west. These troops approached to within 200 meters of the defense under cover of the woods.

At 9 a. m. the eighth (Red) division was reenforced by six batteries of corps artillery, a brigade of guides, and Maxim company.

Seven batteries were placed on the left center and the cavalry on the left, all facing west. At 10 a. m. the White infantry, advancing from the valley, were attacked by the Red cavalry and Maxim company in the flank. These,

however, were repulsed. The main attack by the White followed. The fifteenth infantry brigade (Red) and the reformed cavalry advanced to meet them, but at 11 a. m., before the two sides met, the recall was sounded.

At 1 p. m. the maneuvers were resumed. The fourth (White) division retreated in the direction of Kulm in pursuance of the following order from the commander of the White army (supposed):

A strong Red army corps is situated in the vicinity of Dagnessellen, Reiden, with a portion of the force at Nerketal. My communications being threatened, I am forced to retire to Schoftland. You will retreat to Kulm.

At 1.30 p. m. the Red division started in pursuit. At 2.30 p. m., however, a heavy rainstorm separated the combatants.

The White division held an outpost line in the vicinity of Kulm.

The Red division held an outpost line in the vicinity of Gontenschwyl, Zetzswyl.

SEPTEMBER 13.

The commander of the Red army (supposed) issued the following order, dated Tringen, September 12, 5 p. m., to the eighth division:

1. The hostile army has retired to-day in the direction of Aarau.
2. I intend to continue the advance to-morrow via Schoftland, Entfelden toward Aarau.
3. You will advance to-morrow via Kulm, Suhr toward Aarau.
4. The outpost line will not be passed before 7 a. m.

The fourth (White) division is ordered to take up a rear-guard position near the town of Suhr, connecting with a supposed division occupying Distelberg.

The fourth division, therefore, took up a position extending along the steep ridge on the south side of the Gonhard forest, from the town of Suhr through letter "h" of the word Gonhard on the map as far as the highroad Unter Entfelden, Aarau. The fourth division commander had his troops in position at 7 a. m., four batteries well masked at the east end of the ridge covering the valley of the Suhr for about 1,300 meters and the valley of the Wynen for about 4 kilometers; the seventh infantry brigade from the town of Suhr to "h" in the word Gonhard; the eighth infantry brigade from this point to the highroad Unter Entfelden, Aarau. A flank detachment, consisting of the fourth rifle battalion, occupied the little

wood to the east of Buchs. The cavalry was ordered to delay the march of the enemy as long as possible. The streams were swollen and the bridges were supposed to be destroyed or prepared for destruction. Roads were constructed by the engineers through the Gonhard forest toward Aarau.

The fourth Red division commander formed his division at Gontenschwyl and Leimbach in two columns of equal strength, and advanced along the Wynen valley by the parallel roads on either side of the river. At Kulm, about 8.30 a. m., where these roads converge, he learned of the disposition of the enemy and sent three regiments of infantry and six batteries of corps artillery from Teuffenthal via Reffenthal, Hochspuhl toward Eien. The other regiment of infantry and four batteries of artillery continued along the main road toward Suhr. Soon after 11 a. m. the corps artillery came into action from the crests of Strick and Hochspuhl. About noon a battalion of infantry appeared at the edge of the wood directly south of Suhr, and a little later the divisional artillery came into action near the wood to the southwest of the town of Granichen, directly under the artillery of the defense. At 1.45 p. m. the Red infantry (three regiments), having made its way through the wood to the east of Suhr, waded the Wynen to attack the left flank of the White position, and at the same time the regiment of infantry on the main road made a strong demonstration. Both these attacks were repulsed. At 2.15 p. m. the signal was sounded ending the maneuvers of division against division.

SEPTEMBER 14.

Sunday, no military operations.

SEPTEMBER 15.

MANEUVERS OF THE FOURTH ARMY CORPS AGAINST A COMBINED DIVISION.

On the evening of September 14 the initial situation was announced as follows:

The principal forces of a Red army have arrived at the Bozberg and the lower Aare. One army corps (fourth corps) coming from Olten has reached the district Aarau, Hunzenschwyl. The heads of the columns of a White army have reached the line Stadel-Dielsdorf-Weiningen-Dietikon.

The troops of the fourth corps and the combined division on the evening of September 14 were in the following positions:

FOURTH CORPS.

Corps headquarters and one company of guides at Aarau.

Fourth division in the district Aarau, Buchs, Rohr, Ruperswyl, with division headquarters at Aarau.

Seventh division in the district Suhr, Granichen, Schafisheim, Hunzenschwyl, with division headquarters at Suhr.

Fourth cavalry brigade and Maxim company in the district Teuffenthal, Durrenasch.

Twelfth artillery regiment at Ober and Unter Entfelden.

Ponton train at Schonenwerd.

Telegraph company at Aarau.

Administration corps at Lenzberg.

COMBINED DIVISION.

Division headquarters at Dietikon.

Twelfth infantry brigade in the district Oetwyl, Geroldschwyl, Weiningen, Unter and Ober Engstringen, Aegensdorf, with brigade headquarters at Weiningen.

Fourteenth infantry brigade in the district Schlieren, Altstetten, Hongg.

Sixth rifle battalion at Ob Urdorf.

Seventh rifle battalion at Dietikon.

Sixth guides company at Dietikon.

Guides brigade at Nied Urdorf and Uitikon.

Divisional artillery in the district Unter and Ober Engstringen, Hongg, Schlieren, Altstetten.

Engineer battalion at Dietikon.

Balloon company at Weiningen.

RED.

ARMY HEADQUARTERS.

FRICK, *September 14, 5 p. m.*

Order for the fourth corps.

Our army (supposed) will cross the Aare early to-morrow morning near Brugg, Stilli, and Dottingen.

The fourth corps will march to Wettingen; the head of the column to reach there at 10.30 a. m., where it will await further orders, and reconnoiter along the Limmat.

The Aare may be crossed after 4.30 a. m. by cavalry patrols; after 6 a. m. by strong cavalry detachments; after 6.30 a. m. by all other troops.

RED ARMY COMMANDER.

FOURTH CORPS HEADQUARTERS.

AARAU, *September 14, 6 p. m.**Corps order for September 15.*

1. The hostile army has reached the line Stadel-Dieldorf-Weiningen-Dietikon to-day.

The main forces of our army are situated on the Bozberg and Aare. They will cross the Aare near Brugg, Stilli, and Dottingen to-morrow.

The fourth corps has received orders to march on Weiningen to-morrow; its head to reach there at 10.30 a. m. September 15, to clear up the country along the Limmat, and to await further orders at Weiningen.

2. The cavalry brigade will cross the Aare at 6 a. m. to-morrow, quickly take possession of the crossings of the Reuss near Mellingen, Gnadenthal, and Brengarten, and from there to clear up the country toward Wettlingen, Dietikon, and Zurich. They will await there until the infantry arrives on the Reuss.

3. The heads of the infantry of the fourth corps will cross the Aare at 6.30 a. m. in two columns.

RIGHT COLUMN.—Eighth division; twelfth artillery regiment; fourth telegraph company, under command of the commander of the eighth division, to march along the road Hunzenschwyl, Lentzburg, Othmarsingen; Mellingen; to use the bridge over the Reuss and to march to Nieder Rohrdorf, where it will await further orders.

LEFT COLUMN.—Fourth division; fourth bridge train, under the command of the commander of the fourth division, to march on the road Rapperswyl, Wildeg, Morikon, Braunegg to the road Brugg, Mellingen, and to pass over the Reuss by the railroad bridge and at Mellingen.

Each column will protect itself. The left column to maintain communication with the troops of the Red army (supposed) marching toward Brugg. The right column to cover the right flank of the fourth corps.

4. The trains will follow both columns to the Aare, where they will remain until the advance guards have crossed the river.

5. The fourth corps commander will be behind the advance guard of the right column.

FOURTH CORPS COMMANDER.

 WHITE.

ARMY HEADQUARTERS.

NIEDERGLATT, *September 14, 5 p. m.**Order for the combined division.*

To-morrow, September 15, the White army will march against the enemy located between the Rhein and the Limmat.

The combined division will proceed to the Reuss and cover the left flank of the White army, and prevent the hostile forces situated on the right bank of the Aare from crossing the Reuss.

The line Oetwyl-Baltenswyl-Ober Urdorf may be crossed after 4 a. m. by cavalry patrols; after 4.45 a. m. by strong cavalry detachments; after 6 a. m. by all other troops.

WHITE ARMY COMMANDER.

HEADQUARTERS COMBINED DIVISION. DIETIKON, *September 14, 7 p. m.*

Division order for September 15.

1. Nothing new concerning the enemy.

The combined division will advance to-morrow to prevent the enemy from crossing the Reuss.

2. The guides brigade will send patrols via Bremgarten, Mellingen, toward the line Wildegg-Seegeen (in conformity with special orders).

Bicyclist patrols will occupy the bridges of Ottenbach and Obfelden.

3. The guides brigade will leave the road south of Dietikon, east of Baltenswyl, at 4.45 a. m., and march on the Reuss via Birnenstorf to Werd and Rottenschwyl. There it will await the arrival of the infantry and reconnoiter toward the line Wildegg-Lenzburg-Hallwylersee.

4. (a) The main body of the combined division will assemble at 5.45 a. m. as follows: The twenty-fourth infantry and one engineer company (without wagons), northwest of Dietikon, on the Baden road; Fourteenth infantry brigade, on the Schlieren, Bremgarten road, head of the column at the street crossing east of Baltenswyl, in the following order: Two battalions of the twenty-eighth infantry, two batteries of the seventh divisional artillery, one battalion of the twenty-eighth infantry, and one of the twenty-seventh infantry.

(b) Twenty-third infantry and staff of the twelfth infantry brigade, on the road Dietikon, Baltenswyl, head at the north issue of Baltenswyl.

(c) The seventh rifle battalion will cover the assembling of the division near Baltenswyl at 5.30 a. m.

(d) The sixth rifle battalion will leave Ob Urdorf at 6 a. m. and march via Unter Reppischthal to Hohlenstrass, where it will await further orders.

(e) Sixth artillery regiment on the Dietikon, Bremgarten road, head 200 meters north of the street crossing east of Baltenswyl.

(f) Sixth guides company and one company of engineers near Baltenswyl. A staff officer will assign them their places.

(g) One company of engineers on the Dietikon, Bremgarten road, head near the street crossing east of Baltenswyl.

(h) The balloon company near Werd, east of Dietikon.

(i) The regimental trains will follow their regiments, except that of the twenty-fourth infantry, which will follow the twenty third.

(j) The provision train will go to Dietikon after distribution.

(k) The division commander will be at the Hotel Krone until 5.30 a. m., afterwards at Baltenswyl.

COMBINED DIVISION COMMANDER.

The first fighting of the day was a cavalry engagement near Mellingen. The White cavalry arrived at the Mellingen bridge at 6.45 a. m., took possession of the bridge, covering it with their Maxims and two squadrons. At 7 a. m. seven squadrons of the Red cavalry came up and a spirited engagement took place. The old stone houses of the town extend on the west side to the bridgehead. The Red cavalry succeeded in bringing a strong Maxim fire to bear on the White cavalry, from

a masked position. They then dismounted and made their way over the roofs to within a short distance of the White cavalry, bringing a strong fire to bear. The umpires decided that they had taken the bridge. The fourth corps commander transported an infantry battalion in 35 wagons of various descriptions and reinforced his cavalry at the bridgehead.

The main body of the fourth corps advanced to the Reuss in two columns. About 8.30 a. m. the ponton train arrived and constructed a bridge 900 meters below the civil bridge, which was ready for the crossing of the infantry of the fourth division at 10.10 a. m. In the meantime the eighth division crossed over the civil bridge. During the crossing of the bridge a regiment of White infantry and a battery succeeded in taking possession of a hill to the east of the bridge held by a battalion of Red infantry and the Red cavalry. The infantry of the eighth division (Red) were pushed forward and ten batteries of Red artillery played on the hill. The White forces were dislodged from the hill.

After resisting the advance of the fourth corps (Red) at every available point, the White forces retired in the direction of Zurich. It was announced that the Red forces had occupied Baden and Wettingen, and that the White forces had retired to the line Dielsdorf-Regenstorf-Weiningen, and that the combined division was ordered to cover Zurich by taking a position between the Limmat and Uetlisberg. Upon this information the combined division commander withdrew his division in the direction of Ob Urdorf. At the same time the fourth corps commander was informed that he need no longer cooperate with the supposed Red army along the Limmat, but that he would take his corps direct to Zurich. He reached the line Bremgarten-Wyden-Rudolfstetten-Dietikon that evening and placed his outposts on that line.

SEPTEMBER 16.

WHITE.

HEADQUARTERS COMBINED DIVISION.

NEAR OB URDORF, *September 15, 4.45 p. m.*

Order for September 15.

1. The enemy has halted at Hasenberg Mutscheller.
2. The combined division will take position between Ob Urdorf and Utikon, and blockade the roads to Zurich between Uetliberg and the Limmat.

3. (a) The Fourteenth infantry brigade (less twenty-eighth infantry) and the sixth rifle battalion will take position from the Limmat to Heidenkeller, including part of the forest of Scheuracker.

(b) The twenty-eighth infantry will take position near Uitikon and hold the remainder of the forest of Scheuracker, including the road Bir-menstorf, Zurich.

(c) The seventh rifle battalion will take position near Neuhaus, Brand and hold the roads between Landhaus and Ringlikon.

(d) One company of engineers will be assigned to each of the three detachments. The troops will prepare field intrenchments, and specially strong intrenchments will be erected near Heidenkeller, Scheuracker, Uitikon, and on the roads near Waldegg and Brand. In front of the position of the seventh rifle battalion strong obstacles will be placed.

(e) The artillery will take position above Uitikon, and make gun pits; front Reppischthal, Ob Urdorf, Birmenstorf.

4. The troops named above will bivouac in their positions. The artillery will bring the horses of one detachment to Albisrieden and of the other two to Altstetten.

5. The following troops will go into camp: Twenty-third infantry in Albisrieden; twelfth infantry brigade staff, twenty-fourth infantry, sixth guides company, and the balloon company in Altstetten; guides brigade in Schlieren.

6. The provision and baggage columns will receive further orders.

7. The division commander will be at Altstetten.

COMMANDER COMBINED DIVISION.

HEADQUARTERS COMBINED DIVISION.

ALTSTETTEN, *September 15, 8.30 p. m.*

Order of assembly for September 16.

1. No news about the enemy.

2. The combined division will hold the front fortified to-day.

3. (a) The twenty-seventh infantry, sixth rifle battalion, twenty-eighth infantry, seventh rifle battalion, and the divisional artillery will be ready for battle in their positions at 5 a. m.

(b) The twelfth infantry brigade, formed in platoon columns, will be in the forest north of the Albisrieden, Waldegg road at 5 a. m., head 100 meters east of Waldegg.

(c) The guides brigade will be ready near Schlieren at 5 a. m. and will reconnoiter toward Berg, Dietikon, Spreitenback, and Oetwyl, Wurenlos.

(d) The Maxim company and the sixth guides company will be at the disposal of the division commander near Waldegg, east of Uitikon, at 5 a. m.

(e) The engineer companies will remain with their detachments.

(f) The balloon company will be ready at 5 a. m. at the west issue of Albisrieden.

(g) The regimental trains will remain with their regiments.

(h) The provision and baggage columns will assemble at 5 a. m. at the north issue of Altstetten and march to Hongg, where they will await further orders on the Regensdorf road.

(i) The division commander will be at the Hotel Lowen at Altstetten until 4.30 a. m., and after that time at the artillery position at Uitikon.

COMBINED DIVISION COMMANDER.

RED.

HEADQUARTERS FOURTH CORPS. MELLINGEN, *September 15, 6 p. m.*

Corps order for September 16.

1. The enemy opposing our advance to-day has retired to the hills east of the Bremgarten, Dietikon road.

2. Our army (supposed) has advanced to the Baden, Wettingen road, and will press forward toward the Glatt to-morrow.

The fourth corps will continue its advance on Zurich to-morrow.

3. (a) The cavalry division will send patrols early to-morrow morning in the direction of Ob Urdorf, Birmenstorf, and Bonstetten toward Zurich. It will also protect the right flank of the corps and observe the Reuss bridges at Ottenbach and Obfelden.

(b) The fourth division will advance in the direction of Hasenberg, Ob Urdorf. It will withdraw the forty-fifth infantry battalion.

(c) The eighth division will advance in the direction Friedlisberg, Uitikon.

(d) The twelfth artillery regiment will follow the fourth division to Hasenberg.

(e) The bridge train will remain near the bridge at Mellingen.

(f) The telegraph company will follow the eighth division and extend the line from Stetten to the hill northwest of the Hasenberg farm.

4. The heads of the divisions will pass the Bremgarten, Dietikon road at 7.30 a. m. Each division will protect itself. The fourth division will keep communication with the army (supposed) on the right bank of the Limmat.

The left column (eighth division) will leave its baggage at Rohrdorf; the right column (fourth division) at Stetten. The baggage columns will not advance until the main bodies of the divisions have reached the hills east of the Bremgarten, Dietikon road.

5. The troops will remain in the following places to-night:

Fourth division and twelfth artillery regiment at Fislibach.

Eighth division, bridge train, telegraph company, and twelfth guides company at Mellingen on the left bank of the Reuss.

Cavalry brigade at Hendschikon.

6. At 5.30 a. m. to-morrow the corps commander will ride from Mellingen via Rohrdorf, Rennetswyl, Bellikon, to Hasleberg.

FOURTH CORPS COMMANDER.

The march of the fourth corps was delayed by the thick woods, but it eventually came forward in good shape.

The artillery occupied the borders of the woods to the west of the valley, while the infantry made its way through the woods to the north and east of Risi, where the principal attack was made. This right wing was strengthened by one regiment of infantry taken from the fourth division.

The fighting commenced in front of the fourth division (White) about 9 a. m., but it was 11:30 a. m. before the six batteries of corps artillery and the four batteries of divisional artillery came into action at the edge of the woods in front of the eighth division (White).

For the defense there were two batteries on the right, two on the left, and two down in the little village near the road on the west front. As the attack developed, these two batteries were withdrawn and placed on the extreme left of the line near the edge of the woods.

The infantry for the attack were massed in the woods near Risi, where they were sheltered until sufficient numbers had assembled for the assault, which was met by a counter attack from the reserve brigade (White). This was about 12.30 p. m., and as the moving masses came near to each other the call was sounded putting an end to hostilities. The troops, after a short rest, were marched to their encampments to prepare for the inspection on the 17th. This was the end of the maneuvers.

SEPTEMBER 17.

The Fourth corps was inspected by Colonel Mueller, chief of the military department. The corps was formed in two lines. The corps then formed in column and passed in review in fifty-eight minutes without a hitch, the infantry in half-company front, the artillery in battery front, and the cavalry in platoon front. All carried their entire equipments. The infantry carried their rifles slung on the right shoulder, barrel vertical. The troops marched well and preserved good alignments and distances.

After the review the troops were marched to their places of assembly and sent to their homes. This was done without confusion; 47 trains, carrying 22,000 men, 2,000 horses, and 380 wagons, were sent in the afternoon from eight railway stations in the neighborhood. On the 18th, 11 more trains carried the remainder of the troops.

REMARKS.

On the whole, the Swiss troops will compare very favorably with other irregular troops. They appear to be well disciplined, although at times their movements were somewhat disordered. The staff did their duty in a most creditable

manner. The formations in attack are too dense, and the men do not take enough advantage of cover. They habitually fire kneeling.

Colonel Mueller, chief of the military department, complimented the general appearance of the troops and the workings of the staff, but criticised the transport of the food to the troops not being prompt enough; that the time given for the training of the troops was not long enough, and in consequence the troops were not proficient in close-order drill; that the infantry and artillery officers did not use every advantage to obtain a superiority of fire in the maneuvers, and that the artillery was kept too far away to support the infantry at the proper time.



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