

GERMAN ANTI-AIRCRAFT ORGANIZATION.

A.—ANTI-AIRCRAFT UNITS.

German anti-aircraft guns are known as *Flaks*, an abbreviation for *Flug-Abwehr-Kanonen*. They are organized in batteries, or sections, or as single guns mounted on motor lorries.

I.—Organization in the Field.

(a) **Anti-aircraft sections** (*Flakzüge*) are armed with guns of 7.7-cm., 9-cm. or 10-cm. calibre. There are two series, one numbered from 1 to 188, and the other from 401 to 440, giving a total of about 230 sections. These units were formerly attached to divisions but are now sector troops.

(b) **Sections of automatic anti-aircraft guns** are armed with automatic or Q.F. guns of 2-cm. and 3.7-cm. calibre. They are distinguished by the letter "M" (*Maschinen-Flakzüge*), and form a separate series numbered between 1 and 131.

(c) **Anti-aircraft guns on motor lorries** are usually 7.7-cm. guns employed singly, and are designated *Kraftwagen-Geschütze* or *Kraftwagen-Flugabwehr-Kanonen* (*K-Flaks*). They form a special series numbered between 1 and 155, the number being followed by the letter "K."

(d) **Anti-aircraft batteries** (*Flak-Batterien*) in the field consist of two series, one numbered from 301 to 340, the other from 501 to 570. A new series numbered above 700 is being formed. These batteries, like the *Flakzüge*, are armed with 7.7-cm., 9-cm. or 10-cm. guns. At least 11 of them are mounted on motor lorries (*K-Flak-Batterien*).

(e) **Command.**—In each Army, the anti-aircraft units (including anti-aircraft search-lights) are placed under the control of an officer at Army Headquarters, known as the Commander of the Anti-Aircraft Guns (*Kommandeur der Flugabwehrkanonen*, abbreviated to *Koflak*, or *Stabsoffizier der Flugabwehrkanonen*, abbreviated to *Stoflak*). This officer is subordinate to the Commander of the Air Forces at Army Headquarters.

In each Corps, the anti-aircraft defences are organized in a group (*Flakgruppe*), under an officer known as the Commander of the Anti-Aircraft Group (*Flakgruko*).

(f) **Aeroplane reporting service.**—The anti-aircraft defences in an Army are organized in several lines of observation, connected to the corresponding lines of the Armies on the flanks. These lines consist of aeroplane observation posts (*Fliegerwachen* or *Fliegerwarten*) and aeroplane report centres (*Flugmeldestationen*), which are in telephonic communication.

An officer acting under the orders of the Staff Officer for the Anti-Aircraft Guns (*Stoflak*) is responsible for the supervision of the entire system.

II.—Organization in Germany.

(a) **Fixed anti-aircraft sections** (*Ortsfeste Flakzüge*) form a separate series, numbered from 1 to 122, with the letter "O" affixed to each number. They are all located in the interior of Germany or in rear of the Zone of the Armies. To each section is attached an anti-aircraft searchlight section (*Flakscheinwerferzug*), consisting of 3 N.C.O.s, 10 men and one 90-cm. naval projector.

(b) **Anti-aircraft batteries.**—In addition to the anti-aircraft batteries (*Flak-Batterien*) allotted to Armies in the field, there is a series numbered between 1 and 70, employed in defending towns, railway junctions and munition factories.

(c) **Schools and depots.**—In Germany there are a number of anti-aircraft depots (*Flak-Ersatz-Abteilungen*) under the Commander of the Anti-Aircraft Depots (*K. d. Flakan*) at Frankfurt a/M. There is a school of instruction at Ostend, and one for searchlights (*Flak-Scheinwerfer-Schule*) at Hannover.

(d) **Command.**—Anti-aircraft defence in Germany is controlled by the Commander of the Home Aerial Defences (*Kommandeur des Heimat-Luftschutzes*, abbreviated to *Kmdr. Heim. Luft.*), whose headquarters are at Frankfurt a/M. This officer is in turn subordinate to the General Officer Commanding the Air Forces (*Kommandierender General der Luftstreitkräfte*). The local command of groups of anti-aircraft units at important places, such as Duisburg, Essen, Friedrichshafen, Mannheim and Rottweil, is centred in *Flak-Gruppen* or *Flak-Kommandos*.

(e) **Aeroplane reporting service.**—The Commander of the Home Aerial Defences has under his orders an Aeroplane Reporting Service (*Flugmeldedienst*) controlled by three *Stabsoffiziere des Flugmeldedienstes* (*Stabsoffz. Melde Heim.*), the principal one being the *Stabsoffizier des Flugmeldedienstes Süd* at Karlsruhe. These officers control a number of Aeroplane Observation Posts (*Fliegerwachen* or *Fliegerwarten*).

III.—Summary.

German anti-aircraft units may be summarized as follows:—

(a) **In the field:—**

230 sections (2 guns)	...	...	...	460 guns.
155 guns on motor lorries	...	...	...	155 „
110 batteries (4 guns)	...	...	...	440 „
Total	...	...	...	1,055 „

to which must be added 262 automatic guns of smaller calibre (2-cm. and 3·7-cm.).

(b) **In Germany:—**

122 sections (2 guns)	...	...	...	244 guns.
70 batteries (4 guns)	...	...	...	280 „
Total	...	...	...	524 „

A total of about 1,580 guns of 7·7-cm. calibre and over, and 262 guns of smaller calibre.

B.—ANTI-AIRCRAFT GUNS.

1. **2-cm. gun.**—The German designation is *2 cm. Flak-Grabenkanone* or *2 cm. Flugzeugkanone*. This gun fires tracer shot; maximum range, 3,500 yards, or a maximum height of 2,734 yards; rate of fire, 120 rounds per minute.

2. **3·7-cm. guns.**—The German designations are *3·7 cm. Flak.* and *3·7 cm. Masch.-Flak.* (or *M.-Flak.*). The latter is of the 1-pr. pom-pom type, and probably fires both H.E. shell and tracer shot; maximum range, at least 3,280 yards.

3. **7·7-cm. guns.**—Various types of these are known:—

(a) The *96 n/A* pattern field gun on an improvised mounting.

(b) A 7·7-cm. gun on a pedestal mounting (*7·7 cm. Sockel-Flak*).

(c) 7·7-cm. *L/35* gun. This is probably the new field gun on howitzer mounting (*K.i.H.*=*Kanone in Haubitze-Lafette*).*

(d) 7·7-cm. guns mounted on motor lorries (*Kraftwagengeschütze*).

(b) and (c) are described in an official German publication as *pferdebespannte*=horse drawn.

7·7-cm. anti-aircraft guns fire a 15-lb. shell, the 1915 pattern H.E. shell with the *K.Z.11 Gr.* fuze, and the 1896 pattern shrapnel with the *Dopp.Z.96 n/A* fuze. When used with anti-aircraft ammunition, these fuzes contain no percussion system. The maximum range is 7,874 yards, and the rate of fire is about 20 rounds per minute.

4. **9-cm. gun.**—Some of the old-fashioned '73/'88 pattern 9-cm. field guns have been adapted for anti-aircraft work. They are known as *9 cm. Ballon-Abwehr-Kanonen* (*9 cm. B.A.K.*). They fire a 17½-lb. shell, the 1914 pattern H.E. shell and the 1915 pattern shrapnel, both fitted with a time fuze, marked *Dopp.Z.92 lg. Brlg.o.Az.* (*o.Az.*=*ohne Aufschlagzündung*=without percussion fuze). The maximum range is 7,109 yards.

5. **10-cm. guns.**—The 10-cm. gun, 10-cm. gun '04, 10-cm. gun '97, and 10-cm. gun '14 are all used for anti-aircraft work on a pivot mounting (*Sockel*).

The following details are known:—

Gun.	Shell.	Fuze.	Maximum Range.	
			Time.	Perc'n.
{ 10-cm. gun ... 10-cm. gun '04 ... 10-cm. gun '97 ... 10-cm. gun '14 ... }	10 cm. Gr. ...	Dopp. Z. 92 f. 10 cm. K. ...	yards. 8,968	yards. —
{ 10-cm. gun ... 10-cm. gun '04 ... 10-cm. gun '97 ... 10-cm. gun '14 ... }	10 cm. Schr. 96 ...	Dopp. Z. 92 lg. Brlg. ...	{ 11,264 12,085	{ 11,264 12,085

* A German official document, dated 18/9/16, states as follows:—

“The *K.i.H.* field gun can be used for anti-aircraft fire, but is not designed for it. Anti-aircraft fire entails elevations up to 70° and to obtain these with a *K.i.H.* gun necessitates mounting it on a fixed mounting. This is not so easily done with a *K.i.H.* field gun as with a *96 n/A* field gun. The *96 n/A* field gun on a fixed mounting is a more handy weapon for anti-aircraft fire than the *K.i.H.* field gun; besides, the latter should be diverted as seldom as possible from its legitimate employment, which is long-range fire.”

6. Heavy guns employed against captive balloons.

Gun.	Shell.	Fuze.	Maximum Range.	
			Time.	Perc'n.
12-cm. heavy gun (s. 12 cm. K.)... ..	12 cm. Schr. 15 ...	Dopp. Z. 92	yards. 7,218	yards. 7,983
13-cm. gun (13 cm. K.)...	13 cm. Schr.	Dopp. Z. 92 lg. Brlg.	15,311	15,311
15-cm. experimental gun on wheeled carriage (15 cm. Vers. K.i.R.L.)	15 cm. Schr. 03 (gr.) ...	Dopp. Z. 16 (clockwork fuze) {	about 18,600	about 18,600
	15 cm. Schr. 03 (gr.) (Haube)		over 18,600	over 18,600
15-cm. gun with overhead shield (15 cm. K.i.S.L.)	15 cm. Schr. 03 15 cm. Schr. 03 (gr.) ...	Dopp. Z. 92 lg. Brlg.	16,186	17,060
	15 cm. Schr. 03 (gr.) (Haube)	Dopp. Z. 16 (clockwork fuze) ...	over 17,500	over 17,500
15-cm. long gun (lg. 15 cm. K.)	15 cm. Schr. 15 ...	Dopp. Z. 92	8,968	10,936
15-cm. gun with chase rings (15 cm. R.K.) ...	15 cm. Schr. 15 m.v.F. (m.v.F. = with forward driving band)..	Dopp. Z. 92	7,546	7,546
15-cm. long gun with chase rings (lg. 15 cm. R.K.)	15 cm. Schr. 15 m.v.F.	Dopp. Z. 92	7,929	7,929
24-cm. Q.F. gun L/40 ...	Shrapnel with false cap	Dopp. Z. 16 (clockwork fuze) ...	at least 22,000	at least 22,000

7. **Miscellaneous.**—Anti-aircraft guns on fixed mountings, used for the defence of towns, works, etc., are known as *Ortsfeste Flug-Abwehr-Kanonen* or *O.-Flaks*.

Captured French (75-mm.) and Russian (7.62-cm.) field guns have also been adapted for anti-aircraft work. The Russian guns are referred to in a document as *pferdebespannte 7.62 cm. russ. 00 u.02*, i.e., 1900 and 1902 patterns 7.62-cm. Russian field guns, horse drawn.

In addition to the army guns enumerated above, there are various patterns of naval anti-aircraft guns, including an 8.8-cm. gun which is in general use on the Belgian coast.

C.—ANTI-AIRCRAFT METHODS.

The following extracts from German documents refer to the tactical employment of anti-aircraft guns in the forward area.

1. Extract from notes taken in July, 1916, at the Anti-Aircraft Artillery School at Ostend :—

“The first line of defence is located from 2,200—3,300 yards behind the front, and behind the field artillery. This line should be out of range of barrage fire, should be well camouflaged, and screened from balloon observation.

“The guns should be mounted so as to be able to open fire on an aeroplane at a range of 11,000 yards at an elevation of 10°. Cross fire should be arranged for; guns should therefore be spaced at less than 6,000 yards interval.”

2. Extract from “*The Principles of Command in the Defensive Battle in Position Warfare*,” Berlin, 1917 (Ia/32622).

“*The engagement of aeroplanes and balloons from the ground.*—Low-flying hostile aeroplanes (below 1,600 feet) should be engaged mainly by machine guns, those at a greater height by anti-aircraft guns. Infantry must detail machine guns for this, and artillery should have special machine guns allotted to it for the purpose.

“Anti-aircraft guns should be distributed so as to form one or more continuous lines of defence, which can only be passed by hostile aircraft at a great height.

"The chances of obtaining hits are increased if the anti-aircraft guns are employed in groups of two or four guns.

"In order to engage successfully captive balloons or hostile aeroplanes beyond our front line, anti-aircraft guns should be placed as near the front line as possible. It may be necessary at times to move up single anti-aircraft guns or batteries. They must be mobile, so that they can extricate themselves from a heavy bombardment by a change of position.

"Important points in rear, such as railway stations, ammunition dumps, engineer dumps, flying grounds and bridges, must be defended by fixed anti-aircraft guns.

"The effectiveness of anti-aircraft guns is increased at night by the use of powerful searchlights. Pilots who are suddenly picked up by the light, very quickly lose their sense of direction and equilibrium."

3. Extract from "*The Experiences of the IV. German Corps in the Battle of the Somme during July, 1916*," by General Sixt von Armin (Ia/20245).

"The best defensive weapons among the anti-aircraft guns were the batteries of four 10-cm. guns of the foot artillery. The anti-aircraft guns mounted on motor cars are considered less useful for the present conditions of fighting than the stationary guns, as they continually require new telephone connections with the anti-aircraft telephone exchange system as they alter their positions.

"It has already been found necessary, even in quiet sectors, to fit up some field gun sections as auxiliary anti-aircraft defences, to supplement the regular anti-aircraft gun sections. This was still more necessary in the battle of the Somme. It is desirable that at least one battery of each field artillery brigade should be equipped with guns mounted on light field howitzer carriages, so as to have guns at hand which can be quickly employed either for anti-aircraft purposes or for forming a barrage. To make these guns still more useful for defence against aircraft, it is also desirable that each field artillery brigade be equipped with portable anti-aircraft mountings (pivots) for two anti-aircraft gun sections. It would be possible to arrange for the transport of these mountings by the light ammunition column, or two-wheeled trailers."

4. Extract from "*The Experience of the German First Army in the Somme Battle*," by General von Below (Ia/32188).

"The employment of anti-aircraft units is best organized by arranging a forward line of anti-aircraft guns, the individual positions being on an average not more than 2,200 yards apart. Any gaps in the front line should be closed by a second back line. The defence of important railway junctions, ammunition depots, etc., will also be undertaken by anti-aircraft guns, in order to set free the battle-planes for operations on the front.

"In order to engage the enemy's artillery machines, which work at a low height close behind the enemy's lines and are therefore out of reach of our own battle-planes, single guns must be pushed forward as close to the front as possible (say 2,200 yards). These guns must be placed in concealed positions in order not to expose them to premature neutralization. Suitable positions are afforded by large villages, which are easy to get out of, and where cellars provide cover for the detachments in case of emergency.

"The machine gun anti-aircraft sections may be used with advantage for the protection of kite balloons. One section should be permanently allotted to each balloon.

"So long as the anti-aircraft guns are stationed within effective range of the enemy's artillery, three alternative positions must be prepared for each gun. In the case of motor anti-aircraft guns, it is advisable to allot to each gun a small area within which it can change its position as required. It is necessary to maintain an adequate supply of ammunition (800 rounds per day) at the positions of the front line of anti-aircraft guns.

"Co-operation with aeroplanes, especially with pursuit flights, must be ensured by setting up a special air defence telephone system, with which all aircraft and anti-aircraft units are connected. All reports are sent to a central station in each Group, with which the wing commanders and Group anti-aircraft officers are directly connected. Reports are collected here and forwarded as required to the units concerned.

"The establishment of joint observing posts for aeroplanes and anti-aircraft guns is recommended. The firing of a few direction rounds by anti-aircraft guns, in order to call the attention of their own aeroplanes to hostile machines, has proved very successful."

GENERAL STAFF (INTELLIGENCE),
GENERAL HEADQUARTERS,

28th August, 1917.