

Tactical Structure in World War II

France

Leland Ness

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Non-Divisional Artillery

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ARTILLERY

The French Army raised about 300 artillery regiments for service in France. They were numbered in blocks, not all of which were completely filled, that corresponded with their roles and equipment. The assignment of designations for the artillery regiments used the following sequence:

Regiments 1-99	Divisional light artillery
Regiments 101-125	Corps heavy field artillery
Regiments 141-149	Heavy artillery (155mm L)
Regiments 150-170	Static artillery
Regiments 171-179	Heavy artillery
Regiments 180-189	Heavy artillery (155mm GPF)
Regiments 190-199	Heavy artillery (220mm C)
Regiments 201-299	Divisional heavy artillery
Regiments 300-329	Light artillery (GHQ reserve)
Regiments 351-364	Heavy artillery (105/155mm)
Regiments 370-374	Railroad artillery
Regiment 391	Trench artillery
Regiments 401-409	Anti-Aircraft

Excepted from the above pattern were the colonial artillery regiments, which were numbered in a parallel series. The divisional artillery has been discussed in the Infantry and Cavalry sections and this section will deal exclusively with the non-divisional units.

Anti-Aircraft

Of the many branches of artillery, the one that events subsequently made the most potentially important was the anti-aircraft (*défense contre avions*, or DCA). The DCA was divided into two functional groups: the relatively static units of the DAT (*Défense Aérienne du Territoire*) responsible for guarding strategic targets in the interior, and the more mobile DCA units that accompanied the army in the field (*DCA aux armées*).

Such small successes as the DCA had between the wars in acquiring new weapons were mainly in the field of light and medium anti-aircraft guns, primarily for use with the field forces. Unlike the case of the heavier anti-air artillery, which was burdened with large numbers of obsolescing World War I equipment, there was no light AA artillery left over so the opportunity for a fresh start existed. During the First World War light AA defense had been undertaken by 8mm machine guns, primarily the Mle.1907 and Mle.1914, and these weapons in single and twin mounts remained in service for many years.

It was recognized that these weapons were only marginally effective, so in 1921 a program was undertaken by the infantry to develop a new and more powerful AA machine gun. In response to this requirement, the firm of Hotchkiss developed a 13.2mm on single and twin mounts. The DAT liked the weapon and in 1930 began procurement of the twin-mount version for close-in protection of its heavy batteries. The Cavalry branch also liked the weapon and mounted it in some of its armored vehicles as a ground weapon. The infantry, however, which had commissioned the study in the first place, decided that the weapon weighed too much for their purposes and sent the designers back to the drawing board with orders to come up with a 9mm weapon.

Based on their experiences in designing the 13.2mm MG Hotchkiss in 1932 proposed a 25mm weapon. The DAT, however, had already adopted the 13.2mm and the infantry was still pushing the 9mm MG, so no action was taken until 1938 when the lessons of the Spanish Civil War had driven home the need for an effective light AA gun in the field. In that year the field branch of the DCA ordered 5,000 weapons which was to equip divisional AA batteries. Unfortunately, Hotchkiss already had a full order book, producing the 13.2mm MG and 25mm AT gun, so deliveries were slow.

The same experiences finally prompted the infantry to abandon the 9mm anti-aircraft machine gun program, but being such late-comers (despite having

started the program in 1921) production capacity was already taken up with orders for the 13.2mm and 25mm weapons. Thus the infantry turned to foreign suppliers and quickly chose the 20mm Oerlikon Model JL, which they redesignated the Mle.39. Contracts were placed for a large number of these weapons to be delivered at a rate of 30 per month. This rate was not achieved until late 1939 and by 10 May 1940, the infantry had only 357 of these weapons. Theoretically, one machine gun platoon in the machine gun company of each infantry battalion was to be re-equipped with these weapons to give a total of 12 per regiment. Only 21 divisions, however, were so equipped: seven motorized infantry divisions (1, 3, 5, 9, 12, 15, and 25) and fourteen infantry divisions (10, 11, 13, 14, 19, 21, 23, 42, 43, 2 DINA, 3 DINA, 4 DINA, 1 Colonial, 1 DM). In addition, somewhat anomalously, some of the cavalry units in North Africa had 20mm Oerlikons: the horsed 4th RST and the mechanized 3rd and 4th RCAs each had a 2-gun section of these weapons as organic troops. In a related procurement, the Air Force also had to go to a foreign supplier to get light AA guns for airfield defense. They chose the Hispano Suiza 20mm HS.404, and had received about 150 before the German attack.

Thus, the French Army entered the fray with five different light AA weapons. The most numerous was the 8mm machine gun in single and twin mounts used by all the branches except the DCA itself for forward and convoy air defense. There was a 13.2mm heavy machine gun used by the DCA for the protection of its heavy batteries (and by the cavalry in the ground role). There were two 20mm weapons: the Oerlikon used by the infantry at the battalion level and the Hispano Suiza used by the Air Force. Finally, there was the 25mm weapon used by the field branch of the DCA to provide AA batteries at divisional (13) and corps (26) levels.

The situation with regard to medium anti-aircraft weapons was much simpler, but only because of the tardiness of the army in placing orders. The decision to procure such weapons was finally made in 1939 and to speed the process up parallel orders were placed with Schnieder for its 37mm and Bofors for its 40mm guns, with the latter eventually to enter production in France. By the start of the German invasion, only 20 of the former and 42 of the latter had been delivered. Both weapons were formed into four-gun batteries and used for the defense of Paris.

The one area in which France did have large quantities of weapons was heavy anti-aircraft. France had been among the leaders in the development of AA weapons during the First World War and large stocks of these weapons still

existed in 1940. Three weapons had been developed during WW I, all using the barrel of the 75mm Mle.1897 field gun. The Mle.13 AA weapon mounted it on the back of a truck to create the world's first self-propelled AA gun, the Mle.15 set it in a static platform mounting, and the Mle.17 provided it with a mobile trailer mounting for towing behind trucks.

There were two major deficiencies with all of these weapons: first, the muzzle velocity of the 75mm field gun was just not powerful enough to reach the higher altitudes being routinely used by planes in the 1920s (this also impacted the accuracy of the weapon), and second, the fire control system was so primitive only barrage fire was possible, a problem exacerbated by the long time in flight of the shell. To remedy these problems a new longer 75mm barrel was developed in the mid-1920s and a variety of new lead-computing sights were ordered into production in the early 1930s.

The new Mle.1928 barrel was too powerful for the chassis of the Mle.13 SP mounting, but a new sight was added to create the 75mm Mle.13/34 weapon, 236 of which were on hand at the start of the war. They were assigned to the field branch of the DCA to accompany troops in the field.

The Mle.1928 barrel also proved too powerful for the Mle.15 static mounting, but a new sight could be added here too, with the resulting product being called the Mle.15/34. A total of 603 had been so converted by the start of the German attack in the West, with only 21 remaining unconverted. All of these were assigned to the DAT.

It did prove possible to retrofit the new barrel into the Mle.17 mobile mount and this was done to most, but not all, of these weapons. A new sight was also added to yield the Mle.17/34, 127 of these being in service in May 1940. These weapons were assigned to the field branch of the DCA.

A new design for a trailer-mounted gun was approved in 1929, using the Mle.1928 barrel and a new sight, and this was ordered into production as the Mle.1930. A total of 132 guns were ordered, enough for 33 batteries, 27 for the DAT, and 6 for the field service.

An improvement in stability over the trailer mount was possible using a "semi-mobile" mounting and two designs using the new barrel and sights were ordered into production: the Mle.1932 from the Bourges Arsenal and the Mle.1933 from Schneider. Although both were heavier than the Mle.1930 mobile mount, due to

good work by the design teams the Mle.1933 was just as quick into action as the mobile mount (30 minutes) and the Mle.1932 was actually ten minutes faster. The Mle.1933 was no better in terms of its abysmally poor maximum towing speed (6 mph), but the Mle.1932 showed a marked improvement at 25 mph. Enough Mle.1933 guns were ordered to form 50 batteries (200 guns), but in September 1939 production was halted after 192 had been built to permit concentration of effort on the superior Mle.1932. A total of 356 Mle.1932s had been ordered in 1936 and a further 216 in 1938, and this was the only 75mm AA gun to be produced in France after September 1939, with production running at about 30 per month. By 10 May 1940 332 had been delivered. Ten batteries were in service with the field branch of the DCA, with the remaining units (about 70 batteries) in service with the DAT.

The final type of 75mm AA gun represented an effort to replace the Mle.17/34 static weapons with a new system using the Mle.1928 barrel. These were to have been designated the Mle.1939, but production capacity of the new barrel was already spoken for. Thirty-six of the barrels were delivered and mounted to create the Mle.28/39 and as an expedient 16 old Mle.1897 field tubes were rechambered to take the new family of ammunition and when these were used the system was designated the Mle.97/39. All these weapons were used by the DAT, and a few were mounted on railroad cars to form the only French railroad AA artillery.

For the extra-heavy role, the French started out with the 105mm Mle.17 gun of World War I vintage, a weapon of mediocre performance on a static mounting. It was modernized somewhat with a central fire direction apparatus and redesignated the Mle.17/34. A total of 149 were available in May 1940. All the weapons were assigned to the DAT.

To replace the elderly 105mm weapons the DAT, after many stops and starts, finally ordered a new 90mm weapon from Schnieder in 1938. A hundred and twenty batteries worth (480 guns) of these Mle.1939 guns were ordered, and the weapon showed great promise, being mobile and of high performance. In fact, in most respects, it was fully the equal of its German 88mm counterpart. Unfortunately, by May of 1940, only 20 had been delivered.

The one other AA weapon used by the French Army was the British 3.7" anti-air gun, twenty of which were delivered in 1939/40 under the terms of the Franco-British cooperation agreement. Five batteries of these modern weapons were formed by the DAT for the defense of Paris.

Of the DCA-manned weapons the 25mm autocannon was deployed the farthest forward. Thirteen batteries were deployed as division troops and a further 39 as corps and army troops. The gun squad for the autocannon consisted of a sergeant squad leader, a six-man gun crew (including a corporal gunner), and a driver, with a 25mm Mle.38 or Mle.39 and a Latil or Laffly W.15T tractor to carry the personnel and eighteen clips of 25mm ammunition and tow the gun. A gun section consisted of a sergeant with a driver on a sidecar motorcycle and three gun squads.

The firing battery had a lieutenant, a sergeant assistant, an eight-man maintenance squad with a heavy tractor, five crewmen for two medium machine guns for local defense, a five-man resupply squad with two 5-ton trucks (each carrying 3200 rounds of ammunition), and a driver with a sidecar motorcycle, all to support two gun sections. It had been planned to include three sections in each firing battery, but the shortage of weapons and the need to protect as many formations as possible as quickly as possible led to a

	Officers	Sergeants	Corporals	Privates	Medium MGs	AA Guns	Searchlights	Motorcycles	Field Cars	Light Trucks	Trucks	Tractors	Bicycles
Mobile AA Units													
Anti-Air Battery (25mm)													
Battery Headquarters	2	5	6	24	0	0	0	2	1	4	0	0	1
Firing Battery	1	12	8	52	2	6	0	3	0	0	2	7	0
Trains Group	0	2	1	6	0	0	0	0	0	2	1	0	1
Battalion HQ (75mm mle.30)													
Headquarters	6	4	8	62	0	0	0	4	4	6	1	0	3
Trains Group	0	2	1	9	0	0	0	0	0	2	1	0	0
Anti-Air Battery (75mm mle.30)													
Battery Headquarters	2	7	11	59	0	0	0	2	1	4	4	0	1
Firing Battery	1	9	11	48	2	4	0	0	1	4	0	5	0
Trains Group	0	2	1	9	0	0	0	0	0	1	1	0	1
Service Battery (75mm mle.30)													
Battery HQ & Trains	1	4	5	32	0	0	0	1	1	2	1	0	5
Medical Section	1	0	2	13	0	0	0	0	0	2	0	0	0
Maintenance Section	1	1	2	15	0	0	0	0	1	1	2	0	0
Combat Trains	1	5	4	40	1	0	0	0	1	1	9	0	0
Field Trains	1	6	1	17	0	0	0	0	1	4	4	0	2
Battalion HQ (90mm mle.39)													
Headquarters	6	3	7	79	0	0	0	4	4	6	1	0	3
Trains Group	0	2	1	9	0	0	0	0	0	2	1	0	0
Anti-Air Battery (90mm mle.39)													
Battery Headquarters	2	7	11	66	0	0	0	2	1	3	5	0	1
Firing Battery	1	9	11	52	2	4	0	0	1	1	3	5	0
Trains Group	0	2	1	5	0	0	0	0	0	1	1	0	1
Service Battery (90mm mle.39)													
Battery HQ & Trains	1	4	5	14	0	0	0	1	1	2	1	0	5
Medical Section	1	0	2	11	0	0	0	0	0	2	0	0	0
Maintenance Section	1	1	2	15	0	0	0	0	1	1	2	0	0
Combat Trains	1	4	4	27	1	0	0	0	2	0	10	0	0
Field Trains	1	6	1	18	0	0	0	0	1	4	4	0	2
Non-Mobile AA Units													
Battalion Headquarters													
Anti-Air Battery (75mm mle. 15/34)													
Battery Headquarters	2	6	13	48	2	0	0	1	0	0	0	0	1
Firing Battery	1	7	4	31	0	4	0	0	0	0	0	0	0
Trains Group	0	2	2	10	0	0	0	0	0	1	1	0	1
Anti-Air Battery (75mm mle. 17/34)													
Battery Headquarters	2	6	13	48	2	0	0	1	0	0	0	0	1
Firing Battery	1	7	4	39	0	4	0	0	0	0	0	0	0
Trains Group	0	2	2	10	0	0	0	0	0	1	1	0	1
Anti-Air Battery (75mm Mle.32 & mle.33)(Interior)													
Battery Headquarters	2	6	7	43	2	0	0	1	1	1	2	0	1
Firing Battery	1	8	7	37	0	4	0	0	0	0	1	1	0
Trains Group	0	2	2	9	0	0	0	0	0	0	0	0	0
Anti-Air Battery (75mm mle.32 & mle.33)(Frontier)													
Battery Headquarters	2	6	9	46	2	0	0	1	1	2	4	0	1
Firing Battery	1	8	10	42	0	4	0	0	0	0	2	4	0
Trains Group	0	2	2	9	0	0	0	0	0	0	1	0	0
Anti-Air Battery (75mm mle.39)													
Battery Headquarters	2	6	13	49	2	0	0	1	1	0	0	0	1
Firing Battery	1	7	4	31	0	4	0	0	0	0	0	0	0
Trains Group	0	2	2	6	0	0	0	0	0	1	1	0	1
Searchlight Battery													
Battery Headquarters	2	2	3	11	0	0	0	1	3	1	0	0	1
Three Platoons, each	1	5	3	42	4	0	4	0	1	1	1	0	1
Trains Group	0	6	3	20	0	0	0	1	0	1	3	1	1
Anti-Aircraft Artillery Units, 1940													

decision to temporarily reduce the number of sections per battery to two until enough guns could be made available. Needless to say, enough guns never became available, and the batteries went into the campaign with only two sections.

The battery headquarters included a signal section and two fire direction squads. The signal section was equipped only with telephones and optical signal devices, it had no radios. Each of the 6-man fire direction squads had a 1.25-meter stereoscopic rangefinder and an Mle.34 predictor.

The 25mm autocannon battery was not an effective unit for its role. Although the weapon itself was not a bad one, albeit perhaps a bit light, the organization was flawed. The lack of radios limited the ability of the unit to protect its parent division in mobile situations or to receive warnings of approaching aircraft. Further, the provision of only two platoons per battery, each with a marginal strength of three weapons, was insufficient to support any ground unit larger than a regiment.

Numerically the most important air defense weapon with the field troops was the 75mm mle.13/34 SP gun, 19 battalions of which served with the field armies in 1940. Surprisingly, the 1937 TO&E set for the artillery did not include the tables of organization for this weapon. It is certain, however, that it was organized along the same lines as the other 75mm AA guns, that is, three 4-gun batteries per battalion.

Although present in large numbers at the start of the campaign the number available rapidly dropped because although the sighting system had been modernized, the truck on which it was mounted had not. It still used the same 1913-vintage 4x2 trucks on which it was originally built and as the years went by parts became increasingly difficult to come by. Hard service during the campaign quickly brought this problem to a head and guns fell by the wayside in great quantities. This was not a great loss, as the gun was quite ineffective to begin with, being too weak to hit high-flying aircraft and too cumbersome to deal with fast, low-flying attackers.

The second most common AA weapon with the field troops (except for the 25mm) was the trailer-mounted 75mm Mle.17/34. Each gun had a crew of a sergeant, a corporal, and nine privates. A battery consisted of four guns, a headquarters platoon, and a trains platoon. The HQ platoon was built around a height-finding section, two fire control sections, two listening posts, and a signal

section. The 16-man height-finder section operated a wide-base optical rangefinder. A 7-man fire direction center operated a Mle.34 director, while a 13-man center ran a Mle.35 director. There were also two 6-man teams with large BBT listening devices and a 9-man telephone team. The trains platoon included a medic, four cooks, and drivers for two requisitioned civilian trucks: a light truck for rations and telephone equipment and a medium truck for ammunition resupply. In addition to the four 75mm guns two machine guns were allocated for local defense and light AA to be manned by HQ and trains personnel as required.

The small battalion headquarters included a 6-man fire direction center and a 9-man telephone team. There were thus no radios at the battery or battalion level.

The most notable feature of the Mle.17/34 battalion was its complete immobility. Motor vehicle assets for the entire battalion totaled only two trucks per battery and one more in battalion HQ, all requisitioned civilian models. Nor did the battalion have any signal gear that could control a rapidly-moving unit. To move the battalion it relied on the attachment of a truck transport company from the GHQ pool.

The more modern trailer-mounted 75mm guns, the models 30, 32, and 33, used the same TO&Es with only minor alterations. The main difference was a reduction in crew size to nine men along with a slight increase in the number of motor vehicles. For these weapons, a 3½-ton truck and a tractor were added to the firing battery to enable the battery to displace short distances two guns at a time, while the listening gear and Mle.32 predictor (which replaced the Mle.34 and Mle.35) in the battery HQ were mounted on trailers.

A modification to the TO&Es for the 75mm Mle.32 and 33 batteries was published for use with the four battalions (ten batteries) serving with the field troops. This added three more tractors (thus providing one for each gun) as well as one light truck (for the machine guns) and three more 3½-ton trucks. This essentially made the battery a mobile formation. No additional vehicles, however, were provided for the battalion HQ under this modification.

The most modern of the heavy guns was the 90mm mle.39 and to take advantage of its effectiveness a set of completely new TO&Es was issued in December 1939 (for the gun battery) and April 1940 (for the battalion HQ and service battery). In the firing battery, each gun was provided with a very capable Laffly 6x6 tractor, supported by three 5-ton trucks each carrying 200 rounds. The

battery HQ included a 14-man sound locator team, a 12-man sound corrector team, ten men for the optical rangefinder, and 14 men for the mle.35 fire control computer. Also included were a 19-man wire team with two light trucks and, unusually, a 5-man team with a radio truck. Unfortunately, it would seem that the 90mm guns were too late to see service with the field army.

These units were supported by machine gun companies and searchlight battalions. A machine gun company of the DAT consisted of a company HQ and a variable number of platoons. The company HQ was made up of the commander (a captain), two sergeants (the first sergeant and a clerk), a corporal, and five privates. Transport for the HQ consisted of a bicycle and a motorcycle for dispatch rider duties. The HQ had no signal assets.

The 8mm MG platoon consisted of two sections, each of a sergeant and four 4-man gun crews. The platoon HQ added a platoon leader, platoon sergeant, two telephonists, a motorcycle dispatch rider, an orderly, a medic, and a cook.

The 13.2mm MG platoon had a similar HQ, two fire direction squads, and two gun squads. One fire direction squad had four men, a 1.25-meter stereoscopic rangefinder, and a mle.34 predictor for direct fire while the second squad had seven men with a listening device and a predictor for night fire. Each of the gun squads was made up of a sergeant, a corporal, and seven privates with a twin-mount 13.2mm machine gun.

The machine gun company was not a particularly effective formation. The company HQ provided no support at all for the platoons, which tended to be deployed separately. The 8mm platoon was armed with ineffective weapons. The 13.2mm platoon gave every evidence that the French had seriously overestimated the effectiveness of that weapon. The provision of 38 men with two predictors and a sound-locating unit for the benefit of two twin 13.2mm machine guns has to rank as one of the most wasteful applications of assets of the time.

The searchlight company was built around three operating platoons. Each of these platoons included a six-man sound-locating team and four eight-man squads each with a 150cm searchlight. Each platoon had a nine-man signal squad with a light truck, while the company HQ had a fourth squad.

	13.2mm Twin MG		25mm		75mm mle.13/34		75mm mle.15/34		75mm mle.17/34		75mm mle.30		75mm mle.32		75mm mle.33		75mm mle.39		90mm Naval		105mm mle.17/34	
	Platoons		Batteries	Battalion HQs	Batteries	Battalion HQs	Batteries	Battalion HQs	Batteries	Battalion HQs	Batteries	Battalion HQs	Batteries	Battalion HQs	Batteries	Battalion HQs	Batteries	Battalion HQs	Batteries	Battalion HQs	Batteries	Battalion HQs
Field Anti-Aircraft Units																						
in First Army	0		6	0	6	2	0	0	3	1	3	1	4	2	0	0	0	0	0	0	0	0
in Second Army	0		2	0	3	1	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
in Third Army	0		6	0	12	4	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0
in Fourth Army	0		2	0	9	3	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
in Fifth Army	0		3	0	9	3	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0
in Seventh Army	0		7	0	6	2	0	0	0	0	3	1	6	2	0	0	0	0	0	0	0	0
in Eighth Army	0		3	0	3	1	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
in Ninth Army	0		3	0	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rear Echelon	0		7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0		39	0	57	19	0	0	24	8	6	2	10	4	0	0	0	0	0	0	0	0
D.A.T. Units in Field Zones																						
in First Army	21		0	0	0	0	9	3	0	0	0	0	2	?	3	1	3	1	0	0	2	7
in Second Army	2		0	0	0	0	2	1	0	0	6	2	0	0	0	0	0	0	0	0	0	0
in Third Army	32		0	0	0	0	6	2	0	0	3	1	7	?	3	1	0	0	0	0	3	1
in Fourth Army	17		0	0	0	0	6	2	0	0	3	1	11	?	4	?	0	0	1	0	2	?
in Fifth Army	17		0	0	0	0	4	?	0	0	3	1	1	0	4	?	0	0	0	0	0	0
in Seventh Army	7		0	0	0	0	4	?	0	0	0	0	0	0	2	?	0	0	1	0	0	0
in Eighth Army	12		0	0	0	0	8	?	0	0	6	2	4	?	1	0	0	0	0	0	0	0
in Ninth Army	3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rear Echelon	21		0	0	0	0	8	?	0	0	0	0	16	?	3	1	0	0	0	0	1	0
Total	132		0	0	0	0	47	?	0	0	24	?	41	?	20	?	3	1	2	0	8	?

Anti-Aircraft Units in Zones of Operations, May 1940

The searchlight battalion headquarters had 57 men including an eleven-man telephone section and a twenty-one-man maintenance section. It provided no significant transport assets, having only three light and three medium trucks.

The performance of the anti-aircraft artillery was to prove one of the major disappointments of the campaign to the French general staff. Organized and equipped to deal with low-performance medium bombers the branch was almost completely ineffective against the tactical air support techniques used by the Luftwaffe. The bulk of the anti-aircraft force was equipped with obsolete slow-firing, low-velocity medium caliber guns that were incapable of dealing with fast, low-flying aircraft. In addition, these guns were for the most part immobile. Communications were another weak point. Of all the anti-aircraft units in the French Army, only the 90mm battalion had any radios, the rest relying entirely on telephones and runners.

The 20-25mm and 40mm weapons were a step in the right direction but too late and too few to be of much importance. Had these programs been started a few years earlier and the infantry divisions fully equipped (36 20mm and 9 25mm per division) and the troops properly trained the Luftwaffe's efforts might have lost some of their effectiveness. Although this must remain speculative, it is interesting to note that the French did not protect the divisional component that wound up suffering the most from the Stuka attacks, the artillery regiments.

The field forces were protected by 33 battalions of 75mm and 39 batteries of 25mm guns. In addition, 143 batteries of 75mm and 105mm guns from the DAT were assigned to the areas of operations of the field forces. The rest of the DTAT was organized into two brigades, with the 31st Anti-Air Brigade having the 404th, 406th, and 407th AA Regiments, and the 32nd Brigade having the 402nd, 403rd, and 405th AA Regiments. The 31st Brigade was based in and around Paris, while the 32nd Brigade was headquartered in Dijon with regiments in Metz, Toul, and Dijon.

Corps Artillery

Numerically the most important portion of the non-divisional artillery was found in the heavy and heavy field artillery. Each field corps included a heavy field artillery regiment. In the case of the normal (non-motorized) corps the regiment was made up of a headquarters battery, two battalions of 105mm L13 field guns, and two more battalions of 155mm L17 guns.

Each of the 105mm battalions was divided into a headquarters, three artillery batteries, and a service battery. Each battery manned four 105mm Long (L13) guns and a medium MG on an anti-air mount. The unit of fire for the 105mm L was defined as 100 rounds per gun, with the battalion's total unit of fire weighing 30 tons. The batteries carried a total of 19 tons, while the service battery carried 18 tons so 123 rounds per gun were carried. If the battalion adopted static positions the gun transport could be used for ammunition resupply, allowing the number of rounds per gun carried to be increased to 163.

The 155mm battalions had a similar organization. The unit of fire for the 155mm L was defined as 125 rounds, with ammunition carriage provided for 60 rounds per gun at the battery level and 45 rounds per gun in the service battery. If the battalion adopted a static posture ammunition carriage could be increased to 94 rpg in the battery and 93 rpg in the service battery.

	Officers	Enlisted	Machine Guns	Artillery Pieces	Motorcycles	Cars	Light Trucks	Trucks	Tractors	Horses	Wagons
Non-Motorized Type											
Regiment Headquarters	8	190	1	0	2	4	15	0	0	55	6
Two 105mm mle.1913 Battalions, each	20	675	4	12	1	7	8	1	0	600	87
Two 155mm mle.1917 Battalions, each	20	800	4	12	9	7	8	1	0	750	99
Motorized Type											
Regiment Headquarters	9	175	1	0	4	1	12	2	4	0	0
Two 105mm mle.1913 Battalions, each	20	525	4	12	8	10	17	37	39	0	0
155mm GPF Battalion	20	550	4	12	8	13	17	39	18	0	0

Corps Artillery Regiments, 1939

Like the divisional artillery, the corps artillery had no radios at the battery level. Instead, each battery had a telephone section with three phones, an 8-way switchboard, and 8 km of wire. These were supplemented by a Type 10BA optical signaling device and semaphore flags. Each battalion HQ included an ER.12 transceiver and an R.11 receiver to operate in the regimental net, or whichever other command net was required by attachment. The battalion HQ also included two telephone teams and an optical signal squad. The real concentration of radios was at the regimental level where the signal platoon provided seven ER.12 transceivers and an R.11 receiver. Thus, the corps artillery regiment was no better equipped to provide flexible, responsive firepower than the divisional artillery. In both cases reliance was placed almost exclusively

on liaison teams, the role of which was not the rapid call for and adjustment of fire, but rather the planning of complicated fire missions for set-piece attacks. Since a maximum of one radio per battalion could be spared for FO duties from the combined regimental assets, even the best intentions in the world could not have changed the situation appreciably.

The 155mm Long Mle.17 was by far the more powerful weapon of the two employed in the corps artillery regiment. Its range of 17 km was longer than that of either of the two models of 105mm guns used and the shell was considerably more powerful. Unfortunately, it also represented, at 9.7 tonnes, the upper limit of what could be towed by teams of horses. As a result for moves of any but the shortest of distances the weapon had to be broken down into two loads, each on its own wagon, and then reassembled again at the new firing position. Even when moved this way, however, French artillery doctrine specified that the 155mm L17 battalion was to be restricted to movement on good roads and this tended to further restrict its usefulness.

The other weapon used at the corps level was the 105mm Long. Initially, this was the mle.13, 857 of which were still in use in May 1940. During the early 1930s, however, Schneider developed a longer-ranged weapon to counter the German 105mm leFH.18 and this was adopted as the mle.36. An order for 300 of these weapons was placed in 1936 and 149 of these had been produced by early 1940 when production was halted to speed up deliveries of anti-tank and anti-aircraft guns. The mle.36s were distributed to the corps artillery regiments as well as to the divisional artillery of the DLMs and DLCs. Although, at 4.57 tonnes in traveling position the mle.36 was almost two tonnes heavier than the mle.13, the increase in range from 12 km to 16.4 km was considered an acceptable trade-off. Although not as capable as the 155mm weapons, the 105mm guns were included in the corps artillery regiment to provide a complementary capability, that of more rapid cross-country displacement. They were expected to displace in bounds to keep the supported troops (usually a division) within coverage.

A few corps, those denominated as "motorized type" received motorized artillery regiments, these consisting of two battalions of 105mm guns and one of GPF. These used the organization of the GHQ regiments with those weapons, discussed later.

Trench Artillery

Trench mortars had proven useful and popular during the First World War, ranging in size from 75mm to 240mm. However, with the start of the infantry mortar program in 1921, which ultimately resulted in the development of the 60mm and 81mm infantry mortars, the artillery lost all its interest in trench mortars. By 1939 294 75mm, 1,159 150mm and 410 240mm artillery mortars were still available, but all were in storage.

During the "phony war" period the decision was made to reinstate the trench mortar as a part of the active artillery force and 76 new 150mm mle.17 trench mortars were ordered and delivered and used to raise the 391st Trench Artillery Regiment (*Regiment d'Artillerie Tranchee*), the only such unit formed. The older mortars remained in storage.

Each mortar battery was composed of an 18-man HQ, a 90-man firing battery, and a 23-man trains element. The headquarters section included a signal squad of 8 telephonists and optical signallers with two 1-horse wagons with drivers. The firing battery provided a 4-man crew for a machine gun on an AA mount in a 1-horse wagon as well as the mortar detachments. Each of the battery's six mortar detachments consisted of a sergeant, two corporals, six privates as gun crew, and four privates as carters. Each detachment had three 1-horse carts: one for the baseplate, one for the barrel, and one for accouterments. Once the battery was in action the latter two carts were used for ammunition resupply. There was no ammunition carriage for the battery on the move.

Each trench mortar battalion was made up of a headquarters, three mortar batteries, and a service battery. The main component of the battalion HQ was the 37-man signal platoon which included a 19-man telephone section and a 16-man radio section. The 146-man service battery provided medical and baggage trains services, as well as eighteen 3-horse wagons each of which carried 60 rounds of 150mm ammunition.

The regiment had three of these 607-man mortar battalions as well as a regiment HQ. This latter unit was built around a 52-man signal platoon that included a 20-man telephone/optical section, a 25-man radio section, and a 4-man AAMG squad.

The command and control assets of the regiment included a 13-man liaison/observer section in each battalion HQ and a 7-man section at the regiment level. These were supported by a total of twenty-two ER.22

transceivers and two R.11 receivers. This was a considerably higher allocation of radios than any other French artillery regiment. It should have made the mortar regiment much more flexible, but the short range (2,000 m) of the weapon, its relatively heavy weight (615 kg), and the need to disassemble it into three pieces for movement severely limited its potential. It must also be noted that the use of 607 men to man only eighteen mortars was somewhat extravagant.

Separate Field Artillery

The heavy reliance placed on artillery by the French Army following the First World War dictated the establishment of a large number of a wide variety of artillery units held at GHQ level. The weapons used ranged in size from the famous old 75mm mle.1897 to the 400mm railroad gun.

Under the mobilization plan, nineteen regiments were raised for the GHQ reserve using the large stocks of 75mm mle.1897 field guns still held from the First World War. Fourteen of these were of the portee variety, while the remaining five were pulled by trucks. The former were designated *Regiment d'Artillerie Portee* (confusingly abbreviated RAP as the static artillery regiments of the fortified

regions were also designated RAPs), while the latter were known as *Regiment d'Artillerie Tractee* (or RAT, not to be confused with the trench artillery regiment, also abbreviated as RAT).

In either case the old mle.1897 guns could not be towed behind a truck without their wooden-spoke wheel disassembling. A cheap remedy was the provision of light bogey assemblies with pneumatic tires on which the gun could be set for towing.

	Officers	Sergeants	Corporals	Privates	Machine Guns	75mm Field Guns	Motorcycles	Cars	Light Trucks	Trucks	Agricultural Tractors	Gun Trailers
Regiment Headquarters	7	0	0	0	0	0	0	0	0	0	0	0
Headquarters Battery												
Command Section	1	6	5	24	0	0	1	4	3	0	0	0
Signal Section	0	3	6	31	0	0	0	0	5	0	0	0
Trains	0	3	4	27	1	0	1	0	2	3	0	0
Each Battalion												
Battalion Headquarters												
Headquarters	2	0	0	0	0	0	0	0	0	0	0	0
Liaison/Observer Section	3	5	2	11	0	0	4	0	0	0	0	0
Signal Section	1	4	5	38	0	0	0	0	5	0	0	0
Trains	0	1	1	12	0	0	0	0	2	1	0	0
Each Portee Battery												
Battery Headquarters	1	2	2	13	0	0	1	1	1	0	0	0
Firing Battery	2	8	10	56	1	4	0	1	1	12	4	4
Trains	0	2	2	8	0	0	0	0	1	0	0	0
Each Towed Battery												
Battery Headquarters	1	2	2	13	0	0	1	1	1	0	0	0
Firing Battery	2	8	7	48	1	4	0	1	3	6	0	4
Trains	0	2	2	8	0	0	0	0	1	0	0	0
Service Battery												
Battery Headquarters	1	1	3	3	0	0	1	1	0	0	0	0
Medical Section	1	0	2	13	0	0	0	0	2	0	0	0
Ammunition Platoon	1	4	4	42	1	0	0	1	1	11	0	0
Maintenance Section	1	1	2	12	0	0	0	1	0	2	0	0
Regimental Trains	1	6	1	17	0	0	0	1	3	4	0	0
Battery Trains	0	1	2	16	0	0	0	0	0	2	0	0

GHQ Reserve 75mm Field Gun Regiment

A 75mm portee battery (also referred to as an agricultural tractor battery) had 106 men and was provided with twelve heavy trucks. Four of these each towed a 75mm gun on its bogey, while four more each carried a light full-tracked agricultural tractor, two carried personnel, one accessories, and one baggage. This provided a total of 306 rounds of 75mm for the battery. Since the trucks

were of the 4x2 pattern and had no cross-country mobility, movement into battery position had to be accomplished by offloading both the guns and tractors and using the latter to tow the 75s the final distance to the firing position. This was recognized as an inefficient system, further complicated by a shortage of tractors that reduced the establishment of many batteries to only two tractors. However, the continuing problems in procuring sufficient numbers of cross-country trucks throughout the Army meant that few of the regiments could be converted to the truck-drawn pattern. The battery headquarters included a small forward observer team of the commander, an observer sergeant, and a corporal data plotter with a field car, supported by the battery's telephone section of eight men and a light truck.

The towed 75mm units were similar except for the gun battery itself. Each battery had four guns on their bogies, two towed by cross-country trucks (serving as wheeled 6x6 tractors) and two by regular trucks, while two more trucks were used for ammunition (a total of 432 rounds), one for accessories and one for baggage. If the terrain was fairly clear the guns could be pulled into position immediately. If not the tractors would have to pull the four guns the final distance in turns and then return for ammunition. It would appear that in some units the two towing trucks were replaced by a third and fourth tractors and this certainly would have made displacement easier, but this is not certain.

Each 75mm battalion, of either type, consisted of a HQ, three artillery batteries, and a service battery. The latter consisted of 138 men and provided normal service support, including nine 5-ton trucks carrying a total of 3,564 rounds of 75mm ammunition, complementing the 306 rounds carried in each gun battery. The battalion HQ included a 14-man liaison/observer section, a 17-man telephone section, and 25-man radio section with five transceivers (4 ER.22 and 1 ER.17) and two receivers (R.11s). These were the only radios in the battalion.

A 75mm portée regiment nominally consisted of three battalions, but it would appear that there was some realignment during the winter of 1939/40 with some regiments being reduced to only two battalions and others increased to five or six.

Part of the realignment mentioned earlier was caused by the raising of new units. Three of the original RATs (305, 309, 319) were converted to 2-battalions towed 105mm C battalions and assigned to the 1st, 2nd, and 3rd DCRs, with the third battalion of each regiment apparently being reassigned to other 75mm GHQ regiments. During the campaign itself four more regiments were created; one

(the 322nd) from scratch for the 4th DCR, and three (323, 324, 325) by drawing off personnel and equipment from existing units for the newly-formed light infantry divisions. Although numbered in the GHQ reserve 300-series, these were in fact divisional artillery regiments.

Heavy Artillery

The peacetime order of battle provided for five active motorized heavy artillery regiments, which were expanded to twenty regiments at the outbreak of war. Eight of these were armed with 155mm GPF guns, while eight more used 220mm C howitzers. Each of these regiments consisted of a headquarters and HQ battery and three or four battalions, with the regiments controlling a total of 30 battalions each of 155mm GPF and 220mm C.

As with the rest of the French artillery, there were no radios at the battery level in the motorized heavy artillery. Each battery had a telephone and optical signaling section, while the battalion HQ included a 17-man telephone/optical section and an 8-man radio section. The radio section manned an ER.12 transceiver and an R.11 receiver. Each battery had three telephones, a switchboard, and 8 km of wire, while the battalion telephone/optical section had eight telephones, six switchboards, and 16 km of wire. The regimental HQ signal platoon added seven ER.12 transceivers and an R.11 receiver as well as two telephone squads. As with other types of artillery regiments of the French Army, the observer/liaison and signal assets were designed to undertake planning for the set-piece battles of trench warfare, and when confronted with the demands of fluid warfare were crippled by the lack of communications and shortage of observers.

A further limitation on the employment of heavy artillery was a singular lack of mobility. No heavy artillery had been developed during the inter-war years so by May 1940 the army was still using weapons entirely of First World War origin. The rated maximum towing speed for these ancient weapons was 8 km/hr (5 mph) for the 155mm and 5 km/hr (3 mph) for the heavier artillery even when being pulled by trucks. Needless to say, under the pressure of events in 1940 these speeds were exceeded in the field, but only at the cost of drastically increased wear and tear since the unsprung carriages were not designed for higher speeds. A new mounting for the 155mm GPF was developed in the late 1930s that permitted an increase in rated maximum towing speed to 25 km/hr (15 mph), but by April 1940 only 24 weapons known as the GPFT had been so modified, with a further 24 delivered before the armistice.

The venerable age of the heavy artillery was also reflected in the relatively short range of these weapons. The 155mm GPF and GPFT had a range of only 18,600 m (compared with 24,500 m for the German 150mm K.18), while the 220mm C howitzer's range was only 11,000 meters (while the German 210mm Mrs.18 had a range of 16,725 m). The situation was even worse with regard to the older 155mm guns that used horse traction: the 155mm L17 (used in the Corps artillery regiments) had a range of 17,000 m while the older L77 and L18 had ranges of only 13,600 m. This impacted not only the obvious counter-battery function but also the ability of the heavy artillery to shift fires on a mobile battlefield. Of course, the poor mobility of the artillery exacerbated this problem considerably.

The older 155mm guns were found mainly in the eight GHQ heavy artillery regiments numbered in the 140 series. These were horse-drawn units of three battalions, each organized similarly to the 155mm battalions of the corps artillery regiments.

	Officers	Sergeants	Corporals	Privates	Machine Guns	Artillery Pieces	Motorcycles	Field Cars	Light Trucks	Trucks	Tractors	Bicycles
Battalion (105mm Long)												
Battalion Headquarters	6	8	6	46	0	0	4	3	5	1	0	5
Three Artillery Batteries, each												
Battery Headquarters	1	2	2	13	0	0	1	1	1	0	0	1
Firing Battery	2	8	7	59	1	4	0	1	1	5	1	0
Trains Section	0	2	2	8	0	0	0	0	0	1	0	1
Service Battery												
Battery HQ & Trains	1	4	5	19	0	0	1	1	0	2	0	1
Medical Section	1	0	2	9	0	0	0	0	2	0	0	0
Maintenance Section	1	1	2	12	0	0	0	1	0	2	0	0
Combat Trains	1	5	4	53	1	0	0	1	1	10	0	0
Field Trains	1	6	1	17	0	0	0	1	3	4	0	3
Battalion (155mm GPF)												
Battalion Headquarters	7	9	8	54	0	0	4	3	7	1	0	5
Three Artillery Batteries, each												
Battery Headquarters	1	2	2	13	0	0	1	1	1	0	0	1
Firing Battery	2	9	10	74	1	4	0	1	1	6	6	0
Trains Section	0	2	2	8	0	0	0	0	0	1	0	1
Service Battery												
<i>as in 105 Long, except:</i>												
Combat Trains		5	4	53	1	0	0	1	1	9	0	0
Battalion (220mm C)												
Battalion Headquarters	7	9	8	54	0	0	4	3	7	1	0	3
Three Artillery Batteries, each												
Battery Headquarters	1	2	2	13	0	0	1	1	1	0	0	1
Firing Battery	2	9	10	81	1	4	0	1	1	8	6	0
Trains Section	0	2	2	8	0	0	0	0	0	1	0	1
Service Battery												
<i>as in 155 GPF, except:</i>												
Combat Trains	1	5	4	69	1	0	0	1	1	14	0	0
add: Reserve Personnel	0	1	0	24	0	0	0	0	0	0	0	0
Battalion (220mm Long)												
Battalion Headquarters	7	9	8	54	0	0	4	3	7	1	0	5
Two Artillery Batteries, each												
Battery Headquarters	1	3	2	13	0	0	1	1	1	0	0	1
Firing Battery	2	9	14	88	1	4	0	1	1	8	10	0
Trains Section	0	2	2	8	0	0	0	0	0	1	0	1
Service Battery												
Battery HQ & Trains	1	4	4	19	0	0	1	1	0	2	0	4
Medical Section	1	0	2	8	0	0	0	0	2	0	0	0
Maintenance Section	1	1	2	11	0	0	0	1	0	2	0	0
Combat Trains	1	5	4	56	1	0	0	0	3	9	0	0
Field Trains	1	5	1	18	0	0	0	1	3	4	0	2

After the 155mm guns and 220mm howitzers, the most common piece of heavy artillery was the 280mm howitzer. A hundred of these weapons were pulled out of storage in 1939-40, enough to equip 25 batteries which were organized into 2-battery, 450-man battalions, although some of these weapons were used by static artillery regiments instead. The range of these howitzers was rather short at 10,950 m and, as might be expected, they were not very mobile, having a rated maximum towing speed of 5 km/hr and requiring 16 hours to emplace in firing positions.

The longest-ranged weapons available to the heavy artillery were the fifty-six 220mm L guns. This was sufficient to raise seven 2-battery battalions. With their range of 22,800 m they were the only French weapon suited to counterbattery fire and could cover quite a bit of front, as well as throwing a potent shell. The rated towing speed, however, remained at 5 km/hr and the time to set up in battery was six hours since the weapon had to be broken down into two pieces for movement. In fact the 220mm Long appears in a favorable light largely because of the deficiencies of the rest of the antiquated park of heavy artillery held by the Army in 1940. The weapon can best be described as one of those bad compromises so beloved of the French Army during the interwar period that attempted to straddle conflicting imperatives. Generally, weapons weighing more than 20,000 kg had to be disassembled for movement, so the Germans, by way of contrast, used a long-barrelled 210mm howitzer with a range of 18,290 m, a weight of 16 tonnes and developed the 210mm K.38 with a range of 33,900 m with a weight in action of 25.3 tonnes. The French, on the other hand, wound up with a bulky weapon that had to be disassembled and reassembled for every move while gaining only a small advantage in range.

Probably the most interesting weapon of the heavy artillery pieces was the 194mm GPF. Each weapon was mounted on a fully-tracked vehicle that was powered by electric motors. Each gun carrier was paired with another tracked vehicle which carried the crew, 60 rounds of ammunition, and the gasoline engine and generator that provided the electric power to both vehicles. Thus, for movement the two vehicles were tied together, the engine vehicle in the lead, by an umbilical cord. With a maximum speed of 8 km/hr the system was not fast, but it was capable of crossing almost any terrain and could be brought into action very quickly. The major weakness was that the strategic mobility of the system was very low, since it could not undertake any long journeys and there were no trucks capable of carrying the bulky 29-ton vehicles. Instead, for movements of more than 40-to 50 miles the vehicles had to be transported by railroad. The

range of the 194mm weapon, at 20,800 m, was fair but certainly not exceptional.

The crew for a 194mm gun consisted of a sergeant gun commander, a corporal assistant, a chief gunner, a driver for each vehicle, an electrician/assistant driver, an assistant driver, and eight gun crewmen. Each 156-man battery had four of these guns, plus an extra engine vehicle as a reserve. Two such batteries plus a HQ and a service battery made up the battalion.

In addition to the 194mm gun, the tracked twin-vehicle SP arrangement was also used to carry the 280mm howitzer, 26 of these units being available in May 1940 although it is not certain how many were actually used.

Small numbers of other types of heavy artillery were also available, many of which spent the campaign in storage depots futilely awaiting circumstances that would permit their profitable use. Unfortunately, the heavy artillery was destined never to play a significant role in the defense of France. The antiquated designs, possessed of poor mobility and mediocre ballistic range, and organized into units with totally inadequate signal and command and control means were powerless to change the fate of France.

Anti-Tank Batteries

In addition to the divisional anti-tank batteries, a number of such units were formed for use as GHQ reserve. Twenty-three horse-drawn batteries were raised for this purpose, all numbered in the 600-series. In addition, nine motorized batteries were raised, these being numbered as batteries of the 11th Artillery Regiment. Both types of units were equipped with 47mm anti-tank guns and probably used the TO&Es of the motorized and non-motorized AT batteries of the infantry divisions.