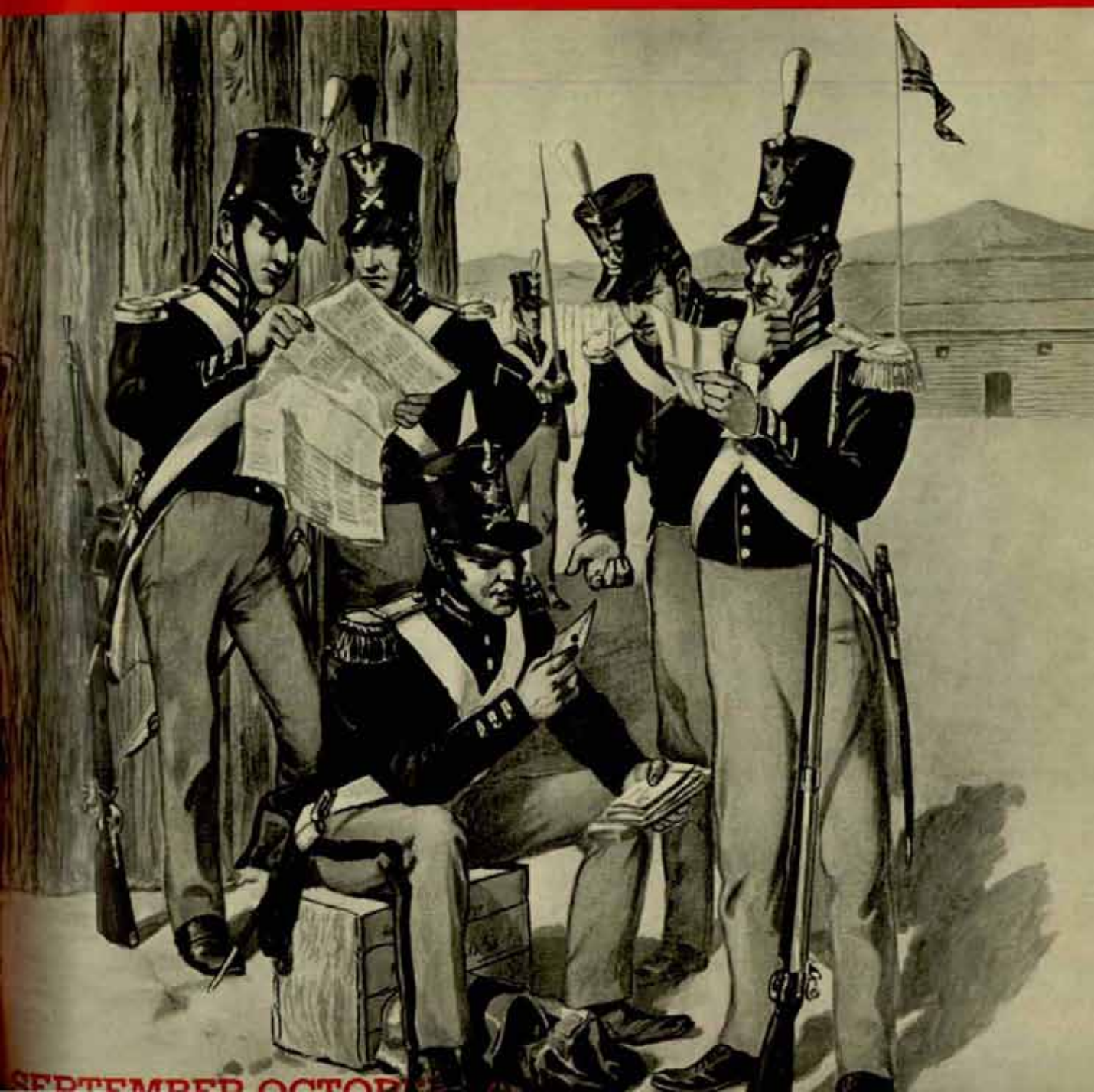
THE COAST ARTILLERY JOURNAL



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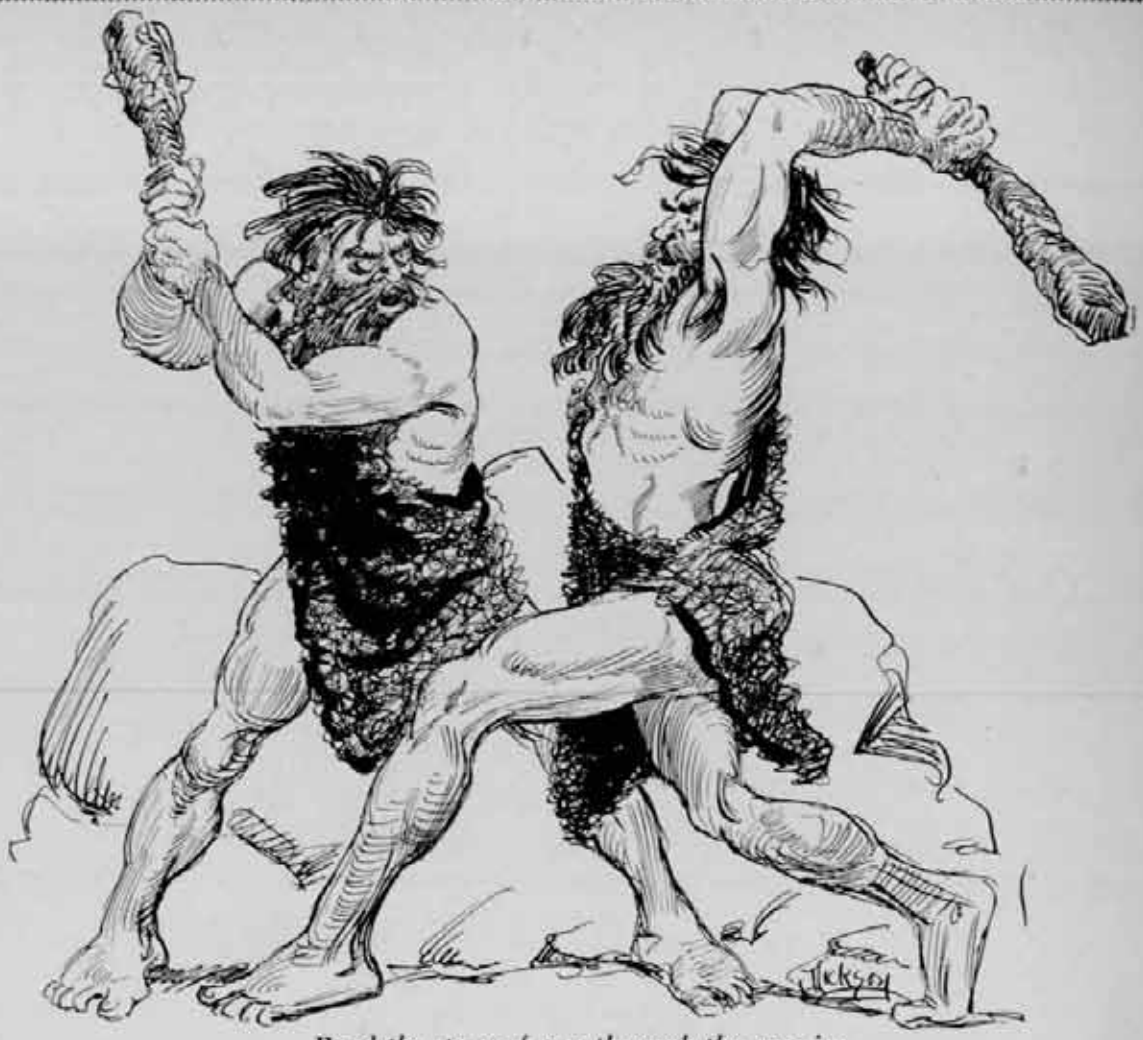

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LAUNCHING A MINE PLANTER

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THE FALL OF A FORTRESS

By SEWELL T. TYNG

"THE fortress of Maubeuge will not be expected to withstand a regular siege. Although it must be prepared to defend itself against a numerous field army supported by heavy artillery, its resistance will be intended merely to check any advance of enemy armies until the arrival of our own forces."

Such, briefly paraphrased, was the function of the only major fortress along the Franco-Belgian border as the French General Staff envisaged it in the summer of 1914.

But circumstances alter cases and barely three weeks after the outbreak of hostilities, Maubeuge was left to its own resources, abandoned by the Allied armies, to face alone the onrushing tide of German invasion. Surrounded, invested beyond any possibility of relief, the fortress and its garrison surrendered after a twelve-day siege at the very moment when the great Allied counter-offensive had begun and the Battle of the Marne was raging far to the south.

In the early days of the Third Republic, when the French Army was striving to regain some measure of the prestige it had lost as a result of the calamitous defeats of 1870 and 1871, a great military engineer, General Séré de Rivière, constructed the fortress of Maubeuge around the city that lies astride of the River Sambre, some seven kilometres south of the Belgian frontier. Around the bastioned works that Vauban built in the reign of Louis XIV, he erected a ring of six forts, completed in the main between 1878 and 1884.[1] They represented the last word in modern fortification in that era before the development of high explosive, and the fortress formed an important link in the great defensive chain that stretched from Dunkerque on the seacoast to Belfort on the Swiss border.

As time went by, the eyes of the French High Command turned more and more towards the east and towards the conception of an offensive to be launched in the general direction of Metz with the recovery of the lost provinces of Alsace and Lorraine as its objective. Because of their blind confidence that there was nothing to fear from a German invasion from the north, for the French the Belgian frontier held no more than an academic interest, and the fortifications so elaborately constructed became obsolete and fell into disrepair, while the Government lavished funds upon the fortresses—Verdun, Toul, Nancy, Epinal and Belfort—further to the east. As a result, upon the outbreak of hostilities in 1914, the French Commander in Chief found himself compelled to renounce all thought of seriously defending the great industrial center of Lille and to evacuate without combat the lesser cities of Hirson, La Fère and Rheims. Only Maubeuge and the little fort of Charlemont, at Givet on the Meuse, had been kept in a state to offer resistance that held any possibility of military value. It was an error of the first magnitude for which the responsibility rests upon no one individual, but must be shared among a long succession of Ministers of War and Chiefs of Staff.

Confident in their knowledge of the German plan of campaign—which proved in fact to be pitifully incomplete—the French High Command felt little concern over the rôle of the fortress of Maubeuge in the campaign against their traditional enemy that all agreed was imminent.

"Don't worry. I'll take you to the siege of Metz," Joffre remarked reassuringly only a few weeks before the war when General Fournier, Governor of Maubeuge, urged the necessity of modernizing the demoded fortress and of strengthening its defenses. The Commander in Chief's words were typical of the view of those high in French military counsels, and in consequence, the ancient masonry forts, built after the fashion of their time on eminences that made them the more vulnerable by reason of extreme visibility remained untouched. Of the six forts, Bourdiau alone was of concrete construction, and it was designed to withstand the impact only of 210 mm. shells.

Though lacking the strength with which it would certainly have been endowed, had the French General Staff foreseen the strategy of the Schlieffen Plan, Maubeuge in 1914 was still far from negligible as a military obstacle. Its armament consisted of 457 guns of assorted calibres, ranging from four batteries of 75 mm. field artillery (16 guns), that served as the garrison's mobile artillery reserve, to a group of twelve 220 mm. mortars. Although generally outranged by the more modern German heavy artillery of corresponding calibres, the French guns were nevertheless more formidable than has often been supposed, and indeed more effective than many French artillery officers of the time realized. The 260,000 rounds which constituted the fortress' stock of munitions was not, it seemed, a super-abundant supply, but it was enough as events proved, for nearly a third of it fell unused into the enemy's hands upon the capitulation. The complement of machine guns amounted to some 100 sections of two guns each, a liberal endowment at this period of the war.

Maubeuge's garrison, which at peace strength amounted to hardly more than 7,000 officers and men, received

Von Zwehl's decision was the valor of ignorance.

[1] Clockwise from the north, these were the Forts of Sarts, Boussois, Cerfontaine, Bourdiau, Hautmont, and Leveau. The forts were situated at a distance of from 3 to 6 kilometres from the ancient citadel in the center of the city.

successive reinforcements after the declarations of war, until at the opening of the campaign it had reached a total of approximately 50,000, including 27½ battalions of infantry,[2] two squadrons of reserve cavalry, seven companies of engineers, with appropriate auxiliary troops. While it is true that out of approximately 33,000 infantry nearly two-thirds, recruited from the Territorial Army, were troops of little mobility and doubtful combat value, there was also a regiment from the Active Army and three regiments of Reserve Infantry.

General Fournier, an engineer officer of high character and outstanding professional attainments, commanded the fortress and its garrison as Governor. Previously he had served a tour of duty as Chief of the 1st Bureau of the French General Staff (Assistant Chief of Staff G-1) and had occupied with distinction numerous staff and technical posts; but at the age of sixty-one he had seen relatively little service with troops, and Maubeuge was his first important independent command. Though admirably fitted for the technical aspects of his duty, Fournier was hardly suited either by training or experience to assume the tactical direction of a large force under battle conditions.

The Governor's peacetime staff consisted of only three officers. Hastily expanded by the addition of a miscellaneous aggregation of reserve and retired officers, recalled to active service, largely unfamiliar with their duties, it never acquired the unity or cohesion that the necessities demanded. Although there were three general officers among Fournier's subordinates, unfortunate questions of rank and precedence arose even in the face of the enemy, so that only one of them, General Ville, participated actively and effectively in the defense. Though animated by the best of intentions, the High Command of the fortress, with few exceptions, fell far short of being able to meet and overcome the trials and difficulties that lay before them.

On July 31, 1914, with the shadow of war hanging darkly over the continent of Europe,[3] the Governor of Maubeuge started serious work on his defenses. With the aid of six thousand civilian laborers, recruited from the population of the city, he constructed and organized centers of resistance around the permanent fortifications, built six new works in the intervals between the forts—including one that covered a dangerous breach of four kilometres in the northeast corner—prepared a support position facing towards the east, and established emplacements for fifty batteries. The centers of resistance consisted of groups of trenches, mainly roofed over with planks covered by a metre or so of earth and completely surrounded by barbed wire entanglements from fifteen to thirty metres in width. It was a monumental task, involving the digging of thirty-five kilometres of trenches and the placing of a million square metres of barbed wire, with 1,500,000 posts. German engineer officers of the besieging forces later paid high tribute to the efficiency of Fournier's accomplishment.

"What should have been done over twenty years, was done in twenty days," the French writer Engerand has said, and in truth the manner in which Maubeuge was prepared against attack bears high testimony to Fournier's energy and technical skill.

Though he had set about his task with commendable energy, the Governor remained only too keenly aware of the weakness and deficiencies of his position. On August 5th came the news that Liege was besieged and that German cavalry units had appeared at Huy on the Meuse, midway between Liege and Namur. The preparations at Maubeuge were still far from complete, and Fournier felt it his duty to report the fact by telegram to Messimy, the Minister of War.

"Maubeuge not mobilized. Work on defenses barely started. Need a minimum of ten days to offer even slight resistance."

It was an unfortunately worded message that did not truly reflect the driving spirit with which Fournier was carrying on his work. To Messimy, nervous, overwrought, absorbed in the overwhelming task of preparing his country's armies to take the field, it indicated a state of pessimism far from satisfactory. At five o'clock the

The theatre of war.

[2]The infantry of the garrison consisted of: 145th Inf. (Active Army), 3 battalions; 345th Res. Inf. and 31st and 32nd Col. Res. Inf. (Reserve Army), 6 battalions; and 1st, 2nd, 4th, 5th and 85th Terr. Inf. (Territorial Army), 18½ battalions.

[3]France and Germany mobilized on August 1st; war was declared August 3rd.

following morning he summoned General Pau, an illustrious veteran of the War of 1870 who had retired a few months before but had been recalled to active duty. With him Messimy called in General Désaleux, who had been Fournier's predecessor at Maubeuge.

"Go to Maubeuge immediately and report to me what you find," Messimy told Pau, "Take Désaleux with you and install him as Governor. Relieve Fournier and have him shot."

With these instructions, reminiscent of the practice in the French Revolutionary armies, Pau set out with Désaleux for Maubeuge. An officer of sane judgment and wide experience, one of the most distinguished of France's prewar generals, Pau did not permit himself to be carried away by Messimy's hysteria. Once arrived at the fortress, it did not take him long to recognize that Fournier was methodically and efficiently doing all that could be expected of him. Désaleux concurred in Pau's judgment, and the two generals, after congratulating the Governor, returned to Paris to render Messimy a wholly favorable report on Fournier's activity. In the meantime, however, Messimy had already published in the *Journal Officiel* a decree replacing Fournier by Désaleux.

Quick to realize the error of his impulsive judgment after receiving Pau's report, Messimy forthwith telegraphed Fournier:

"General Pau has told me of your vigorous efforts to place Maubeuge in a state of defense. Under a misapprehension, I had issued the decree which appears in the *Officiel*. My congratulations and encouragements."

But the message came too late to repair the damage already done. The official publication, circulated throughout the officers and men of the garrison, as well as among the civilian population, had undermined the Governor's authority and prestige, and the later message, which came as a confidential despatch and to which Fournier gave no publicity, did not serve to dissipate the impression that he was under a cloud of official displeasure and would shortly be displaced. The incident, in itself unimportant, added materially to Fournier's difficulties.

For some time past the relations of the population of Maubeuge[4] with the military forces of the garrison had left much to be desired. Fournier, anxious perhaps not to incur political antagonisms, had favored the civilian authorities to the disadvantage of his own subordinates. With the approach of the enemy, the most elementary precaution required that as many civilians as possible should be removed to a place of safety and that the garrison should be relieved of the duty of caring for them. But it is not an easy thing to uproot the inhabitants of a city from their homes, and it required a greater degree of firmness than Fournier possessed. Though in the early days of August he succeeded in evacuating some 20,000, a considerable proportion secretly returned, and in addition a large number of refugees from the Belgian villages to the north, fleeing before the advancing Germans, sought safety in the fortress. Fournier took no effective steps to deny them admittance, and as a result the preparations for defense, and even the operations of the garrison during the siege, were constantly hampered by the presence of an unmanageable mass of civilians, for whom it was necessary to provide food and protection, but who were wholly unamenable to military discipline. In the latter days of August, when the 145th Infantry came into actual contact with the enemy near Assevant, groups of civilians appeared in and about the zone of combat. To officers who protested and asked for instructions, the regimental commander, Colonel Strasser, could only reply that the Governor's orders forbade any interference with the civilian population.

It was no more than natural that the German Intelligence Service should have taken full advantage of such a situation. The city swarmed with spies and secret agents who furnished the besieging forces with timely bulletins as to the condition and intentions of the garrison.

On the 20th of August the forts of Liege had fallen, the Belgian Army had retreated on Antwerp and the vanguard of Von Kluck's Army was marching into Brussels. On the same day the French Fifth Army, 200,000 strong, advanced towards Charleroi on the Sambre, and Sir John French's Expeditionary Force left its area of concentration around Le Cateau to begin its northward march to Mons. On August 17th, Joffre had placed Maubeuge under the orders of General Lanrezac, commander of the Fifth Army. For the moment it seemed as though the fortress was destined to play the supporting rôle in the operations of the Allied field armies that the French General Staff had envisaged for it; but the events of the next three days wholly altered the situation.

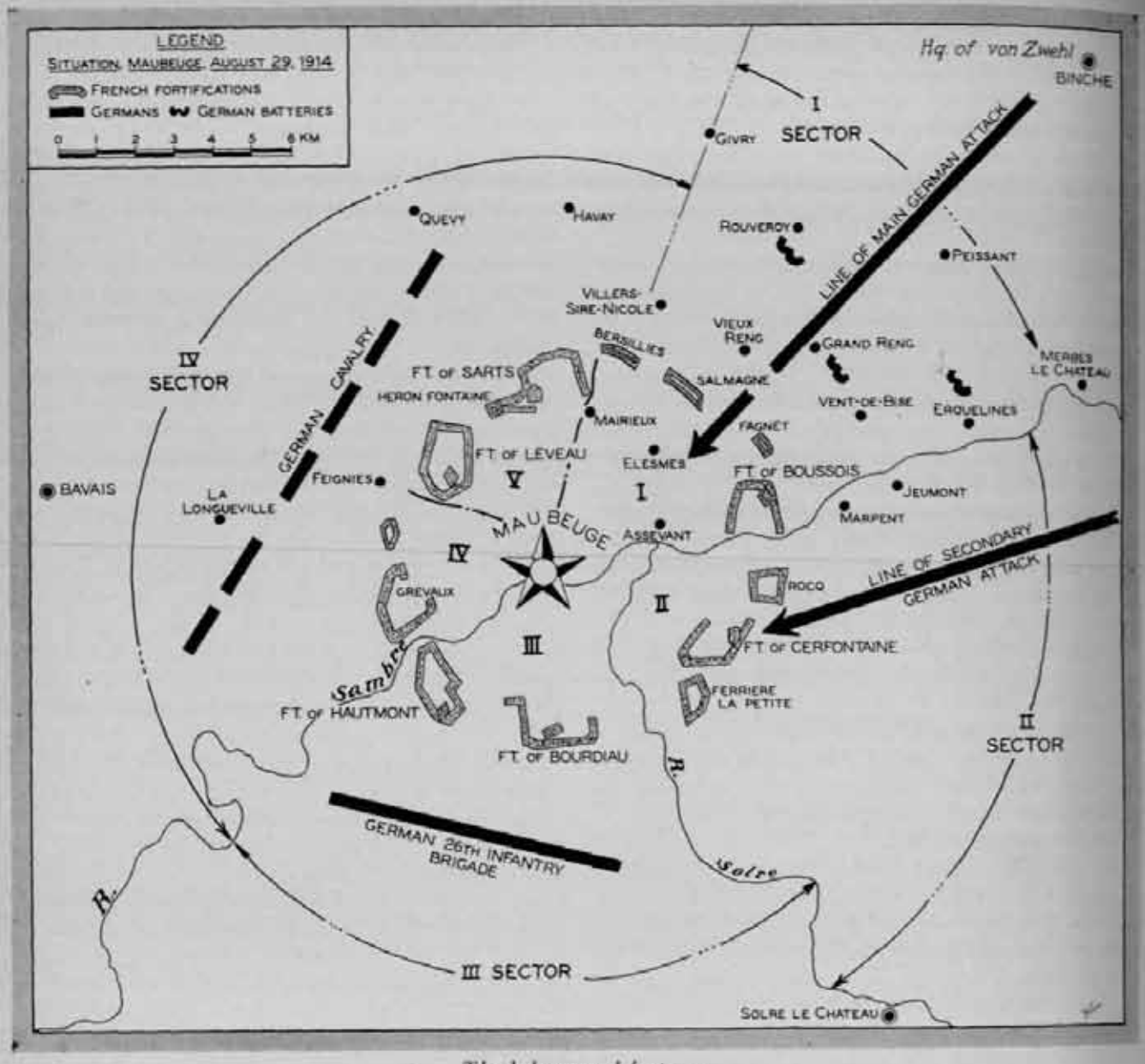
Driven back from the Sambre, after a bloody three-day battle, Lanrezac's Fifth Army, defeated though not destroyed, was in full retreat on the morning of August 24th, marching southward to the east of the fortress. On the same day, after a fierce drawn battle against Von Kluck, the British likewise began their retreat west of Maubeuge. Tempted to reorganize his army in the shelter of the fortress, Sir John French decided against it, remembering Sir Edward Hanley's comment that when in 1870 Bazaine took refuge in Metz he "acted like one who when the ship is foundering should lay hold of the anchor."

So the British passed Maubeuge by, drawing off to the south, and though elements of Haig's Corps skirmished less than two miles from the outer works of Maubeuge and less than twenty kilometres separated the fortress from the battlefields of Charleroi and Mons, it took no active part in the all but decisive Battle of the Frontiers that laid so much of nothern France open to invasion.[5]

From the British Fournier's garrison received a hundred and fifty footsore stragglers who were organized into two weak infantry companies, and about the same number wandered in from Lanrezac's Army, but these were all

[4] Approximately 60,000.

[5] Why Lanrezac did not see fit to make use of the mobile reserve of the Maubeuge garrison during his battle against Von Bülow on August 23rd, became a lively issue at the Court of Inquiry held after the war.



The beleaguered fortress.

the help that Maubeuge received from the Allied armies which the High Command had expected to cover it. Realizing that the retirement of the British to the west and of the French Fifth Army to the east would leave Maubeuge to fend for itself, Fournier on August 24th addressed an appeal for aid to Lanrezac:

"Under present conditions which give the fortress of Maubeuge a front-line position, I have the honor to confirm the information I had the honor to give you on the occasion of your visit to the fortress with regard to the weakness of its defensive organization. I therefore have the honor to ask whether it would not be fitting, in the event that your army withdraws from the region of Maubeuge, to leave in the fortress a reserve brigade of infantry and a group of 75 mm. field artillery."

Fournier's timid, almost obsequious, request received scant consideration at the headquarters of the French Fifth Army, and Lanrezac wasted no words in the reply he despatched at 2:20 P.M. the next day:

"Cannot send you infantry and artillery requested. H. Q. Fifth Army Vervins."

His appeal thus summarily dismissed by the Army Commander who had been his immediate superior, and wholly lacking in specific instructions from G.H.Q. at Vitry-le-François, Fournier prepared to make the best of his situation and took his dispositions in the expectation that the enemy would shortly appear. He had already divided the fortress into five defensive sectors and had apportioned the garrison among them with a preponderance of strength to the northeast and east, the most likely quarters of attack.

"The troops of the five sectors of the fortress will immediately take their combat position," Fournier ordered on August 24th, "The general reserve will hold itself in readiness to march at a moment's notice."

Ready, within the scope of its limited means, for any

eventuality, the fortress of Maubeuge stood alone facing the advancing enemy.

The German High Command had neither forgotten nor ignored Maubeuge. As early as 1902, while the great Von Schlieffen still presided over the General Staff, extensive plans had been prepared for its reduction. Five reserve divisions, accompanied by 64 batteries, had been assigned to the task upon the assumption that the fortress would constitute a major obstacle and that nothing must be left to chance which might retard the rapid advance of the powerful German right wing. Not the least of the modifications which Von Moltke, the new Chief of Staff, had introduced in the Schlieffen Plan had been the abolition of the second echelon behind the German right wing from which Schlieffen had expected to draw the forces required. Lacking reserves with which to constitute a besieging force, it now became incumbent upon the German Army commanders to improvise one, and the task fell to Von Bülow, commander of the II Army, who was also temporarily directing the operations of Von Kluck's I Army.

When the last of the forts of Namur succumbed on August 25th, Von Bülow immediately directed the siege artillery which had pounded the Belgian forts into submission to push on to Maubeuge, and also assigned as a besieging force three divisions, two of them from the Active Army, to be drawn respectively from the 7th and 9th Army Corps and the 7th Reserve Corps. But a decision of the High Command—the most unlucky, as it turned out, of the whole campaign—to divert two Army Corps to the eastern front forced Von Bülow to change his plans. With the 11th Corps gone from the III Army and the Reserve Corps of the Guard gone from the II Army to the aid of Von Hindenburg, two divisions of the Active Army could no longer be spared from the right wing. Instead, Von Bülow entrusted the capture of Maubeuge to the 7th Reserve Corps, composed of the 13th and 14th Reserve Divisions, supported by the heavy siege artillery that had been used before Liege and Namur. The commanding general of the 7th Reserve Corps, General Von Zwehl, received the command of the besieging Army Detachment.

On the night of August 25th, the advance-guard of the 14th Reserve Division, marching from Namur, arrived at Binche less than twenty kilometres from the northeastern front of Maubeuge. The other division of Von Zwehl's Corps, the 13th Reserve Division, was not immediately available, for some of its battalions had been left behind to garrison Liege and to guard communications, while others were still needed around Namur. Fearful that two brigades of reservists might prove unequal to the task that Von Schlieffen had thought would require five divisions, Von Zwehl appealed to Von Bülow for reinforcements. Reluctantly the Army Commander gave his assent to the temporary assignment of the 26th Brigade[6] which included two Westphalian infantry regiments of the Active Army. This constituted a powerful addition to Von Zwehl's command.

[6] Of the 13th Division of the 7th Army Corps.

While the besieging forces were drawing into position, an inquiry from the French High Command led Fournier to order a series of "offensive reconnaissances" in quest of information, one on the 26th in the direction of Quevy and Havay to the north, another on the 27th in the direction of La Longueville and Feignies to the west, and finally on the 28th toward a few villages to the south. The movements thus undertaken accomplished little, however, for no serious effort was made to push them to a contact that might have tested the enemy's strength or revealed his dispositions, and the French troops were instructed to avoid rather than to seek an engagement. Indeed, the only noteworthy incident was the capture of a lieutenant of dragoons, mortally wounded, who proved to be the Prince of Saxe-Meiningen. It seems significant, as illustrative of Fournier's lack of strategic sense, that no reconnaissance was attempted towards the northeast or along the north bank of the Sambre in the direction from which the main body of Von Zwehl's force was actually approaching.

Information obtained from other sources enabled the Governor to inform Joffre that the German 9th Corps (Von Quast) was covering the western and southwestern front of Maubeuge, protecting the flank and communications of Von Kluck's I Army as it marched past in pursuit of the retreating British, while to the east and southeast the 7th Corps (Von Einem) was performing a corresponding mission for Von Bülow's II Army. These forces gradually withdrew during the days of August 27th and 28th, however, as elements of Von Zwehl's Army Detachment arrived to replace them.

Dividing the perimeter of the defenses of Maubeuge into four sectors,[7] Von Zwehl determined to launch his main attack from the northeast and to follow it shortly with a supporting action launched along the south bank of the Sambre against Rocq and Cerfontaine. For the moment he decided that the southern and western fronts of Maubeuge should be kept under surveillance, but not, initially at least, subjected to direct attack. Along the western front of the fortress (Sector 4), Von Zwehl posted 1½ squadrons of cavalry, hardly more than a picket line to keep the garrison under observation. The southern front (Sector 3) he guarded with the 26th Infantry Brigade (Col. von Brauchitsch) of the Active Army, to forestall any attempt of the garrison to escape and rejoin the main body of the Allied armies. To the east and southeast (Sector 2) he placed the 27th Reserve Infantry Brigade with an artillery detachment consisting of two 100 mm. batteries and four batteries of mortars, and a battalion of engineers. In the northeastern sector (Sector 1) the main body of the besieging force, with the bulk of its heavy artillery, was concentrated under the command of General von Unger. The infantry consisted initially of the 28th Infantry Brigade, supported by two batteries of 100 mm. and two batteries of 130 mm. guns, two batteries of heavy howitzers and four batteries of

[7] First Sector: from Givry to the Sambre; second sector: from the Sambre to the Solre; third sector: the south front of the fortress between the Solre and Sambre southwest of Maubeuge; fourth sector: the west front of the fortress.

mortars, as well as by 2½ battalions of engineers.

Despite pessimistic reports from his engineers as to the strength of the works of Bersillies, Salmagne and the Fort de Boussois, Von Zwehl determined to begin the siege at once without waiting for the arrival of the 13th Reserve Division or of the 420 mm. siege guns that had contributed so greatly to the reduction of the forts of Liege and Namur. One cannot help admiring the boldness and resolution of the German commander, for his total force amounted to less than 30,000 men. They were younger and more active, to be sure, better trained and better led than their adversaries, but in numerical strength they were greatly inferior to Fournier's garrison of 50,000. In part, however, Von Zwehl's decision was the valor of ignorance, for the German High Command had no accurate knowledge of the reinforcements that the French had poured into the fortress since the outbreak of hostilities, and even upon its capitulation were greatly surprised at the number of their prisoners.

From emplacements in the vicinity of Rouveroy, Grand Reng, and Erquelines, the German batteries opened fire at one o'clock in the afternoon of August 29th, taking as their direct objectives the forts of Sarts and Boussois and the works of Salemagne and Bersillies, at the same time directing a harassing fire upon the city of Maubeuge itself and against the defenders' support positions.

The four-day period from August 29th to September 2nd constituted the first, or preparatory, phase of the siege of Maubeuge, during which Von Zwehl contented himself with a steady, systematic artillery bombardment. Though hardly comparable to the heavy, concentrated fire that became familiar in later stages of the war, the steadiness and accuracy of the German bombardment, which continued night and day almost without interruption, had a profoundly depressing effect on the morale of the defenders; and in the city itself, where numerous fires were started by incendiary shells, the civilian population came to the verge of panic. The French artillery, with guns of lighter calibre and shorter range than the German, found itself powerless to make any effective reply. The French High Command had not seen fit to provide the fortress of Maubeuge with any aviation, and a single antiquated and dilapidated aeroplane was all that Fournier had. Hastily repaired by such means as came to hand, it promptly crashed to destruction on its first attempt to leave the ground, and the garrison's lone captive balloon was likewise demolished on the afternoon of August 29th. As a result the French had no direct means of determining the dispositions of the enemy or of locating his batteries and were forced to rely upon such fragments of inaccurate information as they could extract from terrified peasants who crossed the lines into the city. The Germans, on the contrary, had numerous excellent observatories on the hills which dominated the city, particularly to the east and south.

The failure of the French guns to respond more vigorously led many officers of the besieging force to the conviction that the defenders had already been crushed and that the moment had come to launch a general assault. Among them General von Steinmetz, commanding the besieging artillery, urged Von Zwehl, as early as the morning of August 31st to order the infantry forward, but the German commander refused.

"The fruit is not yet ripe for the picking," he told Von Steinmetz, and directed the bombardment to continue with unabated vigor. It is impossible to say what influence, if any, the presence at Von Zwehl's headquarters of Prince Frederick Leopold of Prussia may have had upon this decision, but it was freely reported that the German Emperor had sent his kinsman to Maubeuge to see to it that the premature infantry assaults which had caused the German army such heavy losses at Liege were not repeated.

Events proved the soundness of Von Zewhl's judgment, for the besieged garrison, though seriously shaken by the effects of the German bombardment, had by no means reached the end of its resources. As the defenses slowly crumbled beneath the hail of German shell fire to which the French guns could offer no effective reply, Fournier realized that only the capture or destruction of the enemy artillery could relieve the pressure on the beleagured fortress and that this could be accomplished only by offensive action. Apart from occasional outpost encounters, the garrison had not yet come to grips with the besiegers and the Governor now resolved to test the mettle of his infantry.

Three regiments of the mobile reserve, the 145th Infantry, the 345th Reserve Infantry and the 31st Colonial Reserve Infantry, were assigned the duty of executing the sortie with the objective of reaching the enemy's heavy artillery battery emplacements and capturing or destroying the guns that were causing havoc to the fortress. The attack was to be protected on each flank by a battalion of Territorials.[8]

Contrary to the procedure that became commonplace in later years the attack did not begin at dawn, but instead the French spent the morning of September 1st in preparation and it was not until noon that the seven attacking battalions debouched from their starting positions and advanced in the direction of Vieux Reng, to the northeast of the fortress. In the vigorous combat that ensued, which consumed the better part of the afternoon, the German infantry and the engineer battalions employed as infantry gallantly sustained the honor of their arms, repelling every assault and bringing their machine guns into use with deadly effect. The French, attacking with little or no artillery support—though an abundance of artillery was available—found the task beyond their strength. Although all the regiments engaged behaved well, and the Colonials actually arrived within 250 yards of their objective, their losses were devastating—900 officers and men in two regiments alone—and as the coming of eve-

[8] These battalions proved of very little help and Fournier has been criticized, it would seem with some justice, for not using instead the two battalions of the 32nd Colonial Reserve Infantry which remained unemployed in the southern and western sectors of the fortress.

ning made it apparent that success had become impossible, the French fell back to the shelter of their lines. The sortie of September 1st marked the only real effort made by the garrison of Maubeuge to extricate itself from its plight. Thenceforth it fought a strictly defensive battle, the result of which was only a question of time.

During the preceding days, Von Zwehl's besieging force had been progressively strengthened by the arrival of additional heavy artillery, of new stocks of munitions and finally by the arrival of the 13th Reserve Division (General von Kuhne). The German heavy artillery had become overwhelmingly strong,[9] and the besiegers' infantry was now sufficiently numerous to venture an assault against the enfeebled French positions. Two aeroplanes, which joined Von Zwehl's command on the 2nd, brought revealing reports to the German commander of the damaging effect of the long bombardment.

On September 3rd the situation of the besiegers seemed wholly favorable and there seemed no reason to postpone further a serious assault against the fortress. There were pressing reasons for haste, for the High Command itself demanded immediate action, so that the besieging forces, now some 45,000 strong, could be used to reinforce the main body of the German armies to the south. On September 2nd Major Bauer, one of the most trusted officers of the Operations Section of the General Staff, had arrived from Luxembourg at Von Zwehl's headquarters at Binche to explain the general situation and the importance of prompt action.

"The situation on the western front has become critical," Bauer told Von Zwehl, "Maubeuge is a thorn in our side. It is both immobilizing important forces which are needed elsewhere and preventing the reëstablishment of rail communications to supply our right wing armies. I have orders to come here to get a first-hand view of your situation and to urge the rapid capture of the fortress."

In addition to the pressure thus exerted by the High Command, Von Bülow, whose II Army was crossing the Marne on the heels of the retreating French, was urgently calling for the return of the 26th Brigade he had loaned to Von Zwehl. In the face of Bauer's urging, enthusiastically supported by the impetuous Von Steinmetz, Von Zwehl determined to press forward without further delay. During the night of September 3rd the German infantry advanced and entrenched in positions only a few hundred yards from the outer works of the northeastern sector of the fortress, subjecting the defenders throughout the day of the 4th to a vigorous rifle and machine-gun fire, in addition to the artillery bombardment which continued unabated. In the night of the 4th trench mortars, moved up into close proximity to the German front lines, added to the discomfort and peril of the hard-pressed garrison.

As a result of six days of continuous shell fire, the forts of Sarts and Boussois, and the works of Bersillies and Salmagne had been all but destroyed and the other northern and eastern defences of Maubeuge had been seriously damaged. Fournier's report to the Minister of War[10] on September 4th, despatched by carrier-pigeon at 9:30 A.M., was pessimistic in the extreme:

"Forts of Sarts, Boussois, Cerfontaine crushed. Temporary works rendered untenable by extremely powerful artillery fire which destroys all shelters. Impossible for infantry to march or even to hold under this fire. Principal zone of defense has become valueless around half its perimeter. Central defences bombarded for several nights, numerous fires, hospitals full. Wireless destroyed last night. Situation extremely critical."

Later, at 12:10 P.M., the same day the Governor sent another message, even more despairing in tenor:

"Strong-points of the northern and eastern fronts are completely demolished by powerful artillery including 21, 28 and 38 cm. mortars. Our artillery neutralized. Central defenses bombarded last night. Defense forces at the end of their strength. Assault is beginning near Salmagne. Situation critical."

Carrier pigeons were available in Paris, and the wireless of Maubeuge could still receive messages, though unable to transmit them, but no reply was vouchsafed to either of Fournier's communications. To the end Fournier received no word of encouragement or information, and remained in complete ignorance of the general situation and of Joffre's plan for a great counter-offensive that developed into the Battle of the Marne.

In the course of the afternoon the Fort des Sarts, reduced to crumbling ruins under the rain of heavy calibre shells, was abandoned by its defenders, and a few hours later the company of Territorials holding the temporary works of Salmagne, unable longer to withstand the merciless bombardment, gave way precipitately, permitting the enemy infantry to occupy the entrenchments without combat. So violent had the German fire become that it was no longer possible to supply the permanent batteries in the northeastern sector with munitions; and the guns between the Sambre and the Brussels road, after being rendered useless, were abandoned to the enemy, a total loss of 64 pieces. Thenceforth the infantry in that sector were compelled to depend for artillery support upon such meagre assistance as they could obtain from the 75 mm. guns of the mobile reserve, nearly half of which had already been put out of action.

In an atmosphere of profound depression, the Governor summoned his senior officers that night to a council of war at the citadel. A plan to utilize at least a part of the garrison in a desperate effort to cut through the besieging lines to the south or west appears to have been discussed, but the idea was abandoned, and the council voted unanimously to continue the defense. Nevertheless, as a measure of precaution, Fournier issued the order which had been ready since early morning for each regiment to send its colors to the depot in the city, so that they could be

[9] Four Bns. 100 mm.; 2 Bns. 130 mm.; 2 Bns. 150 mm. howitzers; 8 Bns. 210 mm. mortars; 2 Bns. 305 mm.; 1 Bn. 305 mm. tractors; 1 Bn. 420 mm.; Total: 72 pieces of heavy and very heavy calibre.

[10] As Governor of a fortress, under French regulations, Fournier reported direct to the Minister of War rather than to the Commander-in-Chief.

burned to save them from falling into the enemy's hands. At the same time, he directed General Ville, who had superseded Winckelmayer in command of the mobile reserve, to man the support positions along the whole northern and eastern front and to defend his ground foot by foot with the utmost vigor.

The next morning a German aviator flew over the city and dropped a note calling on the Governor to surrender.

"They seem to be in a great hurry. Let them come and take us," was Fournier's only comment, and he ordered the defense to continue.

The day of September 5th proved a disastrous one for the garrison. Determined to press matters to a victorious conclusion in the shortest possible time, Von Zwehl's infantry everywhere conducted their assaults with the greatest energy. Though south of the Sambre a counter-attack drove the besiegers out of the village of Rocq, which they had temporarily occupied, the day's results in the northeastern sector more than made up for this minor French success. The outer works of Boussois, and the center of resistance of Bersillies fell into German hands. At Salmagne the defenders, a single infantry company commanded by Captain Eliet, beat off two assaults, only to succumb at last before a third executed by a whole battalion, after 130 out of 180 men had fallen. In summary, although the fort of Boussois itself still held out, its capture was obviously no more than a matter of hours, and the defenses of the whole northeast angle of the fortress had collapsed, leaving only the support positions between Elesmes and Assevant, held by the mobile reserve, between the besiegers and the central defenses of the city. The evacuation of the permanent battery positions around the center of resistance of Rocq left 22 more guns to the enemy.

At six o'clock on the morning of September 6th—at the very hour when the Battle of the Marne was opening along the vast front from Paris to Verdun—the Fort of Boussois fell into the besiegers' hands. Though its masonry defenses had suffered greatly under the 305 mm. shells which had rained upon them, the condition of the fort was not yet such as to preclude any possibility of defense. 13 guns and 6 machine guns, with an ample supply of munitions, remained undamaged. Behind the thick walls, even in their damaged condition, the resistance could readily have been prolonged for another 24 hours, or perhaps longer, and the fort could have been taken by infantry assault only at the price of prohibitive losses. With no intention or expectation of immediate surrender, the commander of the fort, Captain Thabard, had issued orders and taken dispositions for a continuation of the defense, but his garrison, a Territorial engineer company, was fed up. On two occasions, once on the 4th and again on the 5th, it had driven back enemy infantry approaching the fort at a cost to the garrison of a dozen killed and a score wounded, including two officers, but the fall of the neighboring works had left Boussois all but cut off from the main defenses and there was no doctor to care for the wounded. Convinced that further resistance would result in their deaths, the men of the garrison appealed to their commander through a deputation, urging him for the sake of their wives and children to hoist the white flag at once. Thabard sternly ordered them to return to duty, but their morale was gone and the heart had gone out of their defense. Early in the morning of the 6th, a German infantry company reconnoitering the outer entrenchments perceived a napkin fluttering over the northern defenses. Pushing rapidly forward the German commander entered the main courtyard through a breach in the walls, without receiving a shot, and the garrison surrendered without the least resistance. Hastily summoned by his orderly, Thabard found that matters had entirely passed out of his hands and that the fort was already in possession of the enemy. The fall of Boussois sealed the fate of Maubeuge and made complete capitulation only a matter of hours.

In his report of 6:20 A.M. on September 6th, Fournier transmitted new, but hardly more encouraging information to the Minister of War:

"Information on the German siege artillery: calibres up to 40 cm., range in excess of 13 kilometres, shells pierce even concrete shelters. Germans deliver this fire of extraordinary power without showing their infantry. Violent bombardment of the fortress has continued night and day for a week. Troops have behaved admirably, but are becoming worn out every day by reason of lack of shelter. Situation more and more critical. Our wireless receives, but cannot transmit."

During the day the principal assaults fell on the general reserve. In the morning the villages of Maireux and Elesmes fell before the besiegers' assaults and in the afternoon the French likewise evacuated Assevant. The German attacks which had now extended south of the Sambre resulted in the fall of the center of resistance of Rocq and of the fort and center of resistance of Cerfontaine.

Recalling the example of the Belgian General Leman at Liege, Fournier seriously considered the advisability of establishing his headquarters in the fort of Bourdon, which was still undamaged, and continuing the resistance from there with the best of such elements as were available, but the news of heavy losses sustained during the day and of the German advances, which had placed nearly half of the fortress in the enemy's hands, caused him to abandon this plan and to call another council of war to consider the advisability of capitulation. All the senior officers, with the exception of General Ville, were present and each rendered his considered opinion that further resistance was useless. Nevertheless, the Governor rejected their advice and issued orders to hold out to the last extremity. The regimental colors and the archives of the fortress were burned and two depots of munitions, in imminent danger of capture, destroyed.

At 9:30 in the morning of September 7th General Ville reported that his troops could still retire for another four or five hundred metres, but that thereafter further resistance would be unavailing to prevent the besiegers entering the city. Shortly afterwards the works of Heron

Fontaine and the fort of Leveau, in the northwestern sector fell into the besiegers' hands. At 11:20 Fournier despatched his last message to the Minister of War:

"Enemy occupies two-thirds of the interior of the entrenched camp. Troops of the defense driven back on Hautmont, attacked from all sides; last strong-points now taken in reverse; longer resistance impossible; surrender of fortress imminent. Troops have behaved admirably."

An hour later, upon the Governor's order, a white flag was hoisted on the steeple of the church in the center of the city, and Captain Grenier, Chief of the Intelligence Section of Fournier's staff, was sent under a flag of truce to request a twenty-four hour armistice in order to fix conditions of capitulation.

Less than two hours later, after considerable difficulty in crossing the lines, Grenier presented himself to Von Zwehl at Vent-de-Bise Farm, some three kilometres east of the fort of Boussois, and stated his mission. The German commander promptly rejected the requested armistice, and directed Grenier to return within four hours fully empowered to agree to terms of surrender.

"The fortress must surrender with all its works and matériel," Von Zwehl told the French envoy, "The garrison will become prisoners of war. I cannot suspend the bombardment until your return, for we haven't a moment to lose."

In point of fact the besiegers were no less anxious to conclude matters than the French, for their munitions were running low and only a few moments before Grenier's arrival a premptory order had reached Von Zwehl from Von Bülow directing the immediate return of the 26th Brigade. Von Zwehl had no option but to obey and within the next twelve hours the brigade would have been on its way to rejoin the II Army, leaving the whole southern front of the fortress uncovered and opening a wide avenue of escape to the defenders. The "last quarter of an hour" which so often decides the fate of battles had come, but the French, ignorant of the turn of events along the Marne, had already given way and the fortunes of war favored the Germans.

At six o'clock the same evening Grenier was back at Von Zewhl's headquarters and the capitulation of the fortress had been signed. In substance the terms amounted to unconditional surrender. "In recognition of the bravery of his defense, I permit General Fournier, Governor of the fortress of Baubeuge, to retain his sword," Von Zwehl wrote, but this was his only concession.

In view of the lateness of the hour it was decided that the actual surrender of the fortress should not take place until the following morning—a gain of twelve hours for the French that was by no means negligible—but on both sides the order to cease firing was given immediately upon Grenier's return to his lines, and shortly after six o'clock in the evening of September 7th the siege of Maubeuge came to an end.

Early the next morning the garrison laid down its arms and for more than six hours passed in review before General Von Zwehl and Prince Frederick Leopold of Prussia on its way to prison camps beyond the Rhine. 45,636 officers and men became prisoners of war, and 400 to 450 guns, with 75,000 to 80,000 shells, fell into the hands of the Germans, as well as large stores of equipment and material of all kinds. The French losses during the siege amounted to approximately 5,000 of whom 1,000 were killed. No official figures are available of the losses sustained by the besieging forces, but there seems to be no doubt that they were materially less.

Despite peremptory orders that Fournier issued in an effort to adhere strictly to the terms of his convention of capitulation, not all of the garrison were willing to accept captivity. On the morning of the 7th, before the white flag had appeared on the church steeple of Maubeuge, but when it had nevertheless become obvious that the surrender would not long be delayed, a miscellaneous detachment of all arms and ranks, nearly twelve hundred men in all, struck out for liberty from the fort of Hautmont, in the southwest corner of the defenses under the command of Commandant Charlier. After many vicissitudes the majority succeeded in reaching the French lines in safety. After serving gallantly throughout the war, being several times decorated and promoted to colonel in recognition of his services, Charlier was tried after the armistice for abandoning his post, but was unanimously acquitted.

One can look in retrospect at the defenses of Maubeuge with mixed emotions. On the one hand it provides many inspiring examples of personal heroism, of loyalty and devotion to duty, but from the viewpoint of the professional soldier it lies open to criticism on many counts. Although at the moment of surrender more than two-thirds of the defenses were in the enemy's hands, two forts, Bourdiau and Hautmont, and three permanent works, Ferrière la Petite, Grévaux and Feignies, remained intact, and indeed had never been subjected to serious bombardment. A substantial part of the garrison had never been engaged at all. The 3rd Territorial Infantry, for example, which was stationed in the southern sector of the fortress, did not sustain a single casualty during the course of the siege, and two squadrons of cavalry surrendered, not only with arms and equipment complete, but with their horses still alive, without ever having gone into action. The same was true of the artillery. A group of twelve 220 mm. mortars, supplied with 600 rounds of ammunition per piece, remained unused and fell into the enemy's hands without having fired a shot. Many of the guns delivered to the Germans were undamaged or damaged so slightly as to be readily reconditioned, and the Allied armies, attacking the heights of the Aisne a few weeks later, faced the fire of French 120 mm. and 155 mm. cannon transported from Maubeuge.

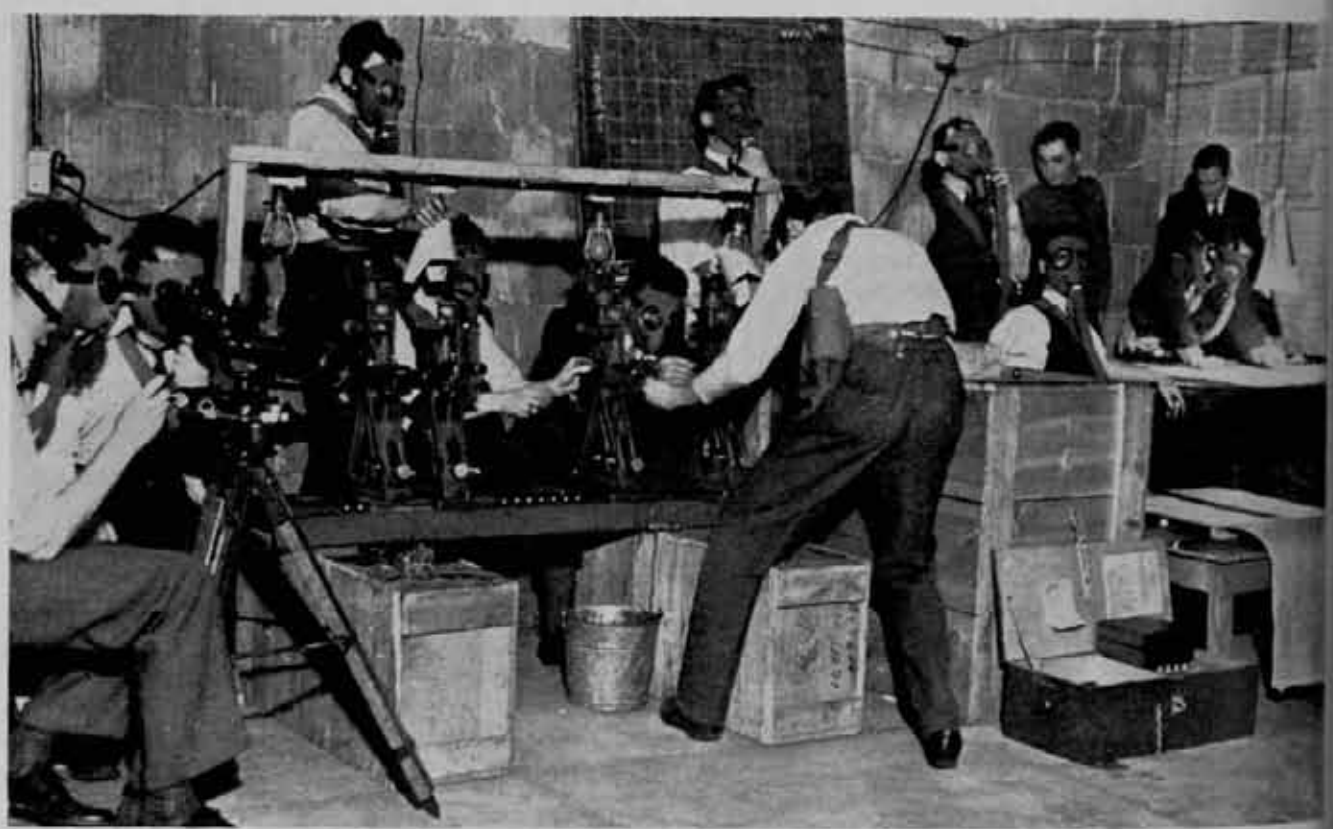
Tactically Fournier conducted his defense along sound conventional principles, but it was wholly lacking in imagination. Throughout the siege the western front of the fortress, in particular, remained sparsely guarded by scattered units of German cavalry, yet Fournier made no effort to exploit his adversary's weakness in this quarter,

even by a diversion, for which he had ample troops available and which would have afforded at least temporary relief to the hard-pressed northeastern sector.

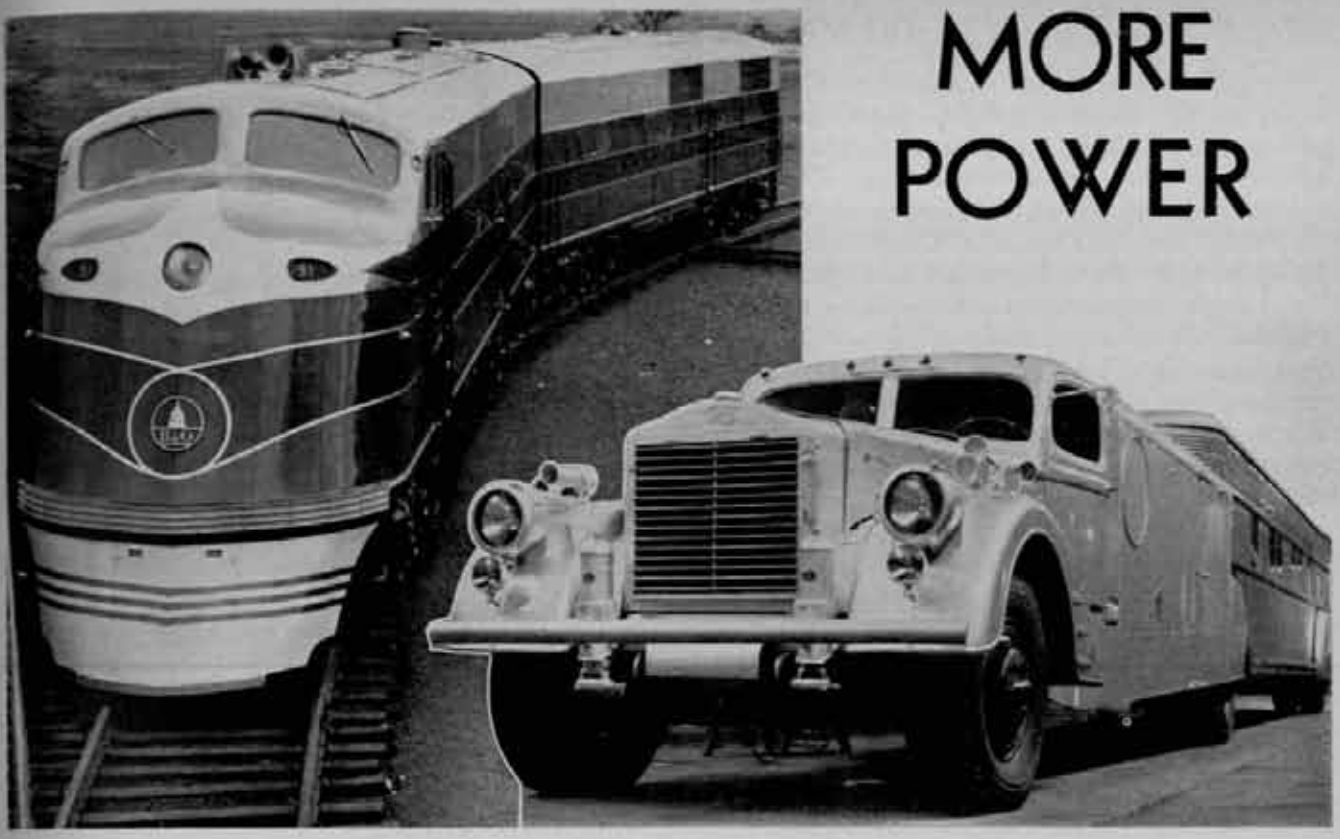
In short the Governor of Maubeuge may fairly be criticized not only for having failed to carry out his resistance to the last extremity but for having failed to utilize to the fullest extent the means of resistance placed at his disposal. It seems hardly likely that whatever he had done the fortress could have been saved or the surrender avoided, but it seems fair to suppose that under the direction of a more energetic and imaginative commander the resistance might have been prolonged for another twenty-four or forty-eight hours. When it is recalled that Von Zwehl's 7th Reserve Corps arrived from Maubeuge on the heights of the Aisne with hardly an hour to spare to fill the breach between Von Kluck's and Von Bülow's armies and to save the German armies from impending disaster, the importance of this element of time becomes apparent.

A Court of Inquiry held after the war under the presidency of General Guillaumat recommended the court-martial of General Fournier and his principal officers. In the subsequent proceedings all were acquitted. It was a popular verdict, for beyond all question the Governor of Maubeuge was a brave and gallant officer. His defense of the fortress committed to his charge, whatever its shortcomings, retained the attention of enemy forces amounting to more than an Army Corps for a period of ten full days, and by so doing rendered an important contribution to the Allied victory that turned back the tide of German invasion.

GAS!



The battery continues to function. The 607th Coast Artillery, Organized Reserves, 2d Corps Area, believes in keeping up to the minute in its inactive duty training.



MORE POWER

By CAPTAIN RILEY F. ENNIS, INFANTRY

LIKE A SILVER STREAK the Diesel-powered Burlington Zephyr glides across the grade crossing at Beverly along the Missouri River—where not so many months ago a steam-drawn passenger train rattled by. In the great Caterpillar Tractor plant at Peoria, Illinois, Diesel engines are "dropped" into a majority of the tractors—5 years ago they were an oddity. The blunt-nosed, Diesel-powered trawlers, that plow out of Boston Harbor, are replacing the picturesque fishing smacks with their cloud of white canvas. A Diesel-powered passenger car was driven all the way across the continent from Los Angeles to New York at a fuel cost of $7.63.

The dramatic performance of the Diesel engine is catching the public fancy. A pullman acquaintance summed up the popular estimate of this engine—"Those damned Diesels are powerful things. They burn crude oil, don't they?"

Glancing at the billowy gray cigar smoke which enshrouded our table at Marzetti's Restaurant in Columbus, Ohio, Mr. Ritchie remarked: "This is how many advertising and sales managers describe the black smoke, that, at times, comes from the exhaust pipe of their Diesel engines."

A well-known man in the motor industry and an executive of the Waukesha Motor Company, Mr. Ritchie has an uncommon faculty for reducing intricate engineering features to simple sketches. And as he warmed to his subject, he began a series of sketches that soon covered the table cloth. His illustrative conversation ran something like this—

In the gasoline engine the air and fuel are mixed outside the cylinder.

The low combustion pressures of 325 pounds per square inch and the fact that the air and fuel are mixed outside the cylinder makes the gasoline engine cheap and relatively easy to build.

In the Diesel engine the air and fuel are mixed in an infinitesimal fraction of a second within the cylinder. The fuel starts to burn as soon as it is injected without the aid of electrical ignition—like the ignition of flashing grease in the frying pan—by the tremendous heat of compression.

The high combustion pressures of 750 pounds per square inch or more, the injection system, and the fact that the air and fuel are mixed in the cylinder makes the Diesel engine an expensive and difficult one to build.

In the gasoline engine as the piston moves upward, it squeezes the air-fuel charge into 1/6 of its volume; while in the Diesel engine the air is compressed to 1/16 of its volume.

Like a spring, the more the air-fuel charge or air is compressed, the greater will be its reaction on recoil. In the gasoline engine after combustion, the hot gasses expand 6 times while in the Diesel engine they expand 16 times. This is why the Diesel engine seems to have more punch, develops higher pressures than the gasoline engine.

Unfailing performance and high endurance

With the fork he had been using for sketching poised in the air, Mr. Ritchie continued—But the combustion pressure around 800 pounds per square inch is only the ideal one for which engineers are striving. If all the factors affecting injection and combustion are not correct, the pressure may streak upward to as high as 2,000 pounds per square inch. This, of course, is the nightmare of the Diesel engine designer. And as he emphasized this point, I recalled the remark of Professor Stinson out at Ohio State University: "Half of the Diesel manufacturers do not know what in the Hell their maximum pressures are and many of them do not have instruments accurate enough to measure them."

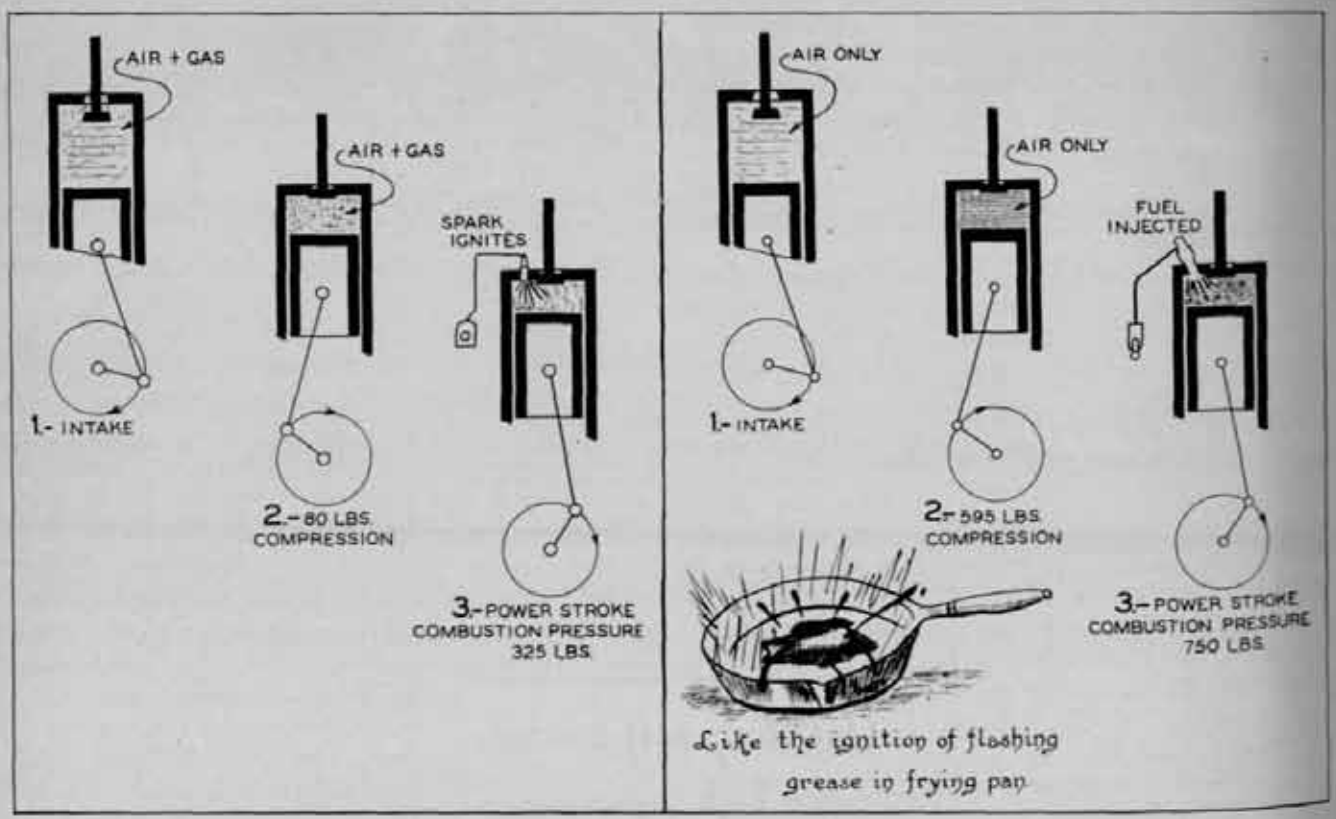
At the Hercules Motor Company in Canton, Ohio, I learned the many difficulties that they had had in harnessing the high pressures developed in the Diesel engine. This company makes a small, high-speed Diesel, which General Motors, Dodge and others are placing in their light trucks for export. The executives and engineers feel that this engine is a good one, but have their fingers crossed. Not so many months ago, they found themselves at the end of the road—the best gasoline engine crankshafts were not standing up under the high Diesel pressures and the best "high-lead" bearings obtainable were going to pieces. At this crisis in the development of the engine, the Tocco method for hardening crankshafts was introduced in the industry and the bearing manufacturer found a new way of making "high-lead" bearings. This was just one of the many engineering bugs that had to be licked. Other companies have had their share. The engineers of the Waukesha Motor Company went to the Fiat plant in Italy to find the solution to their knotty problem of cylinder wall design.

On the other side of Canton, Ohio, at the Timken Roller Bearing plant, I gained some ideas as to why the engine manufacturer pays a couple of dollars for a carburetor for a gasoline engine and a couple hundred dollars for a fuel injection system for a Diesel engine. This company has spent over a million dollars on the development of their Diesel fuel injection system and on the construction of a new plant in Columbus, Ohio. Thus they have gambled on the future of the Diesel engine in the automotive field.

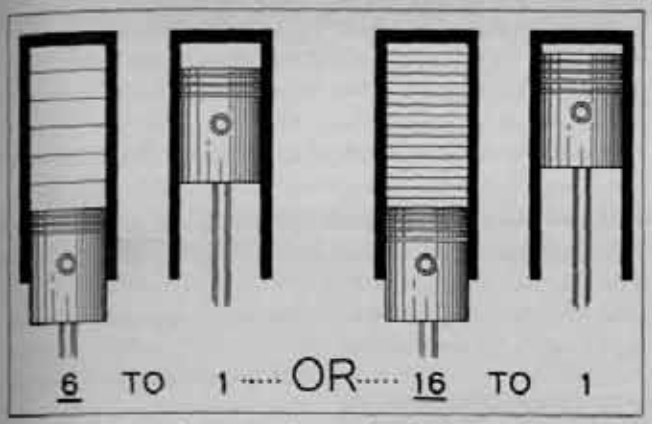
The relatively small Canton plant is a laboratory both for injection system design and manufacturing methods. The spotlessly clean, tiled-wall plant is air conditioned. The majority of the employees are youngsters for the company is looking ahead to the day when it will need experienced foremen, superintendents, and executives. Along the far side of the plant are the machines which lap the little plungers of the pumps to fit into their barrels (or cylinders) with a clearance of twenty-five millionths of an inch or 2 to 3 thousandths fraction of a human hair.

The type of injection system being developed by the Timken Company is the most common type and is similar to that manufactured by the Bosch Company and the Caterpillar Company. A fuel pump, line and injector are provided for each cylinder of the engine.

The pump which has a bore of 7 millimeters or more,



Gasoline Engine *Diesel Engine*



A comparison of compression ratios of the gasoline engine and the Diesel engine.

must develop a fuel pressure of between 1,300 and 2,500 pounds per square inch. This great pressure opens the valve of the injector (or spray nozzle), which breaks up and drives into the cylinder, where the pressure may be 800 or more pounds, a charge of fuel which for small engines is about the size of the sharpened end of a lead pencil. This small amount of fuel must be accurately metered to within 3 per cent so that each cylinder will receive the same amount of fuel, and so develop the same amount of power.

The workmanship and equipment required for the manufacture of Diesel injection systems surpasses that demanded in the making of the finest watches. In the field several particles of grit a thousandth of an inch in thickness may destroy a pump.

Mr. Edwards, chief engineer of this budding division of the great Timken Company, is a young man. He was the last chief engineer of the Packard aircraft Diesel engine development. His description of how a great engineering staff at the Packard Company spent years and several millions of dollars in the development of their engine, only to have the entire project dropped at the height of the depression, intrigued me. For the day I left Fort Benning, Georgia, 3 tanks, powered with a similar engine, arrived.

As a youngster I had watched the slow, low-speed Diesel engine in the municipal power plant in Bellefontaine, Ohio. I could not find an explanation as to why this engine, which weighed tons and had enormous pistons, developed about the same horsepower as the gasoline engine in the touring car parked along the curb. However, the Diesel engine operated day after day, month after month, year after year, with very few interruptions; while many of the gasoline engines, which passed along the street in motor cars, were junked.

But in the third of a century which witnessed the tedious development of the Diesel engine, the gasoline engine in the horseless carriage changed the face of the earth and the conditions of life upon the earth more than any other creation of man.

In 1883, Gottlieb Daimler conceived the construction of a small, high-speed gasoline engine with light moving parts. At the time various oil and gas engines were of heavy construction, rotating at 150 to 200 revolutions per minute. He obtained 800 to 1,000 revolutions per minute without great sacrifice of durability and smoothness.

Daimler's idea was to substitute ten blows on the head of a small piston for one bludgeon-like blow on the head of a large piston.

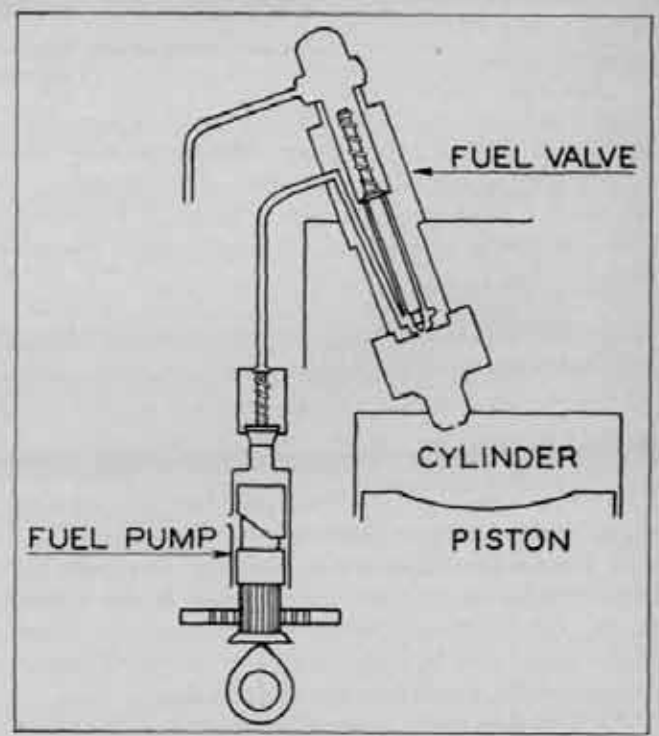
As material and design improved, the speed of Daimler's type of engine was increased from 1,000 to 4,000 revolutions per minute which is not at all uncommon today. And during the same period combustion pressures were increased from 100 pounds per square inch to approximately 400 pounds per square inch.

High speed and high compression ratios are largely responsible for the small, compact, and powerful gasoline engine of today. During the period of the rapid development of the gasoline engine, the Diesel engine was handicapped by its high combustion pressures and by the difficulties encountered in mixing the fuel and air inside the combustion chamber. High pressures were harnessed by bulky and inferior materials, and low speeds were compensated for by large cylinders.

Charles F. Kettering, vice president, General Motors Corporation, and director of General Motors Research Laboratory, commented on the Diesel engine development in the May issue of the *Scientific American:*

> Many developments which appear to be unsuccessful are merely awaiting progress in some other field to turn them into an overnight sensation. The first Diesel engine was built over 40 years ago. It could not be called an important development, however, until a few years ago. Undoubtedly, various things were responsible for its ultimate success, but the progress in metallurgy alone is sufficient to account for a great deal of it.

An engineer from the Caterpillar Company remarked:



Common type injection system for Diesel engine.

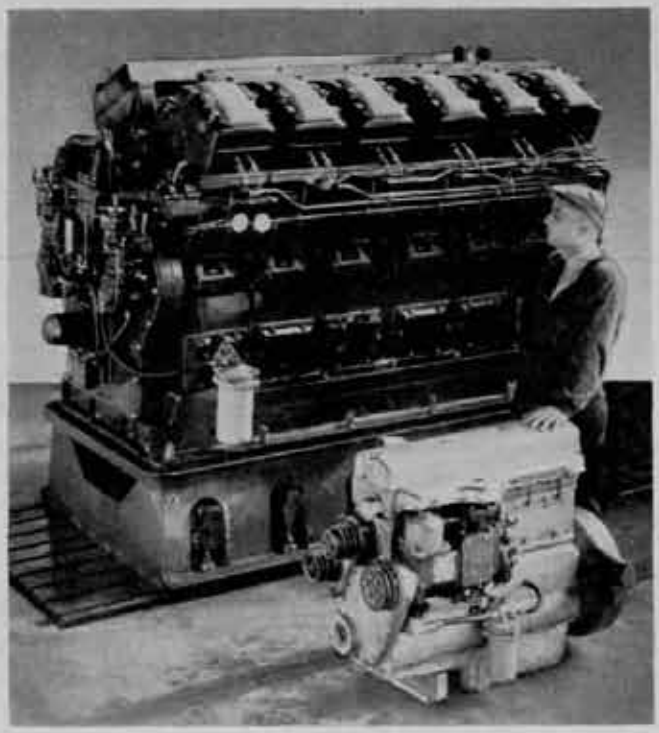
"Ten years ago we did not have the materials with which to build our Diesel engine. Today after only 5 years of production, this company builds more Diesel engines than any other two Diesel manufacturers in the world."

But the engines of the Caterpillar Company are of the medium speed type, turning over between 850 and 1,300 revolutions per minute. Their relative low speeds and weight make them impractical for use in automotive vehicles.

The weight and speed differential has slowly been minimized until now the Diesel looms like a practical competitor of the gasoline engine.

The Cummins Engine Company, the Hercules Motor Company and the Waukesha Motor Company are now building engines with a governed top speed above 2,000 revolutions per minute suitable for installation in motor trucks.

C. L. Cummins, president of the Cummins Engine Company of Columbus, Indiana, has made many contributions to the development of the high-speed Diesel engine. His ambition is to some day attempt to build a Diesel-powered passenger car whose unfailing performance and endurance will overcome the Diesel handicap of higher first cost over the standard gasoline engine.



A comparison in size between the smallest and the largest Cummins Diesel.

Today in this country, the high initial cost of Diesel-powered trucks limits their economical application to heavy vehicles on long and regular freight and passenger hauls. One model of a Diamond T truck powered with a Hercules Diesel engine cost $1,000 more than a similar gasoline-powered truck.

The operator must pay for the additional cost of the Diesel truck out of fuel savings. In the average automotive installation the Diesel engine will perform the same work with about 30 to 50% fewer gallons of fuel than needed for a gasoline engine. If the Diesel fuel costs 6 cents per gallon and gasoline 12 cents per gallon, the Diesel engine will perform the same duty as a gasoline engine with a saving in fuel cost between 60 and 70%.

In Europe the difference in fuel cost has made the Diesel engine much more popular than in the United States. In this country where the operator of a Diesel engine would save $3 a day, in Europe, due to the higher cost of fuel, he would save $11 to $12 a day.

An inter-state truck operator complained: "The Diesel fuel oil I get in one state smells, looks and performs differently than that which I get in another state." The lubrication engineer, who was standing in our group, explained: "Diesel fuel oil is at about the same point of development as gasoline was between 1918 and 1920."

It took 15 years to standardize gasoline. Today the car owner can drive into almost any filling station and buy a uniform premium, standard or third grade gasoline.

Stoves and furnaces demand different kinds of fuel. The combustion chamber in the internal combustion engine can be compared with a stove. In 1920 there were many types of combustion chambers in gasoline engines and more blends of fuel. And the slow process of standardization of combustion chamber design and fuel blend was just getting under way.

Today the standardization of fuel blend and combustion chamber design for the high-speed Diesel is also getting under way. And, as in the case of gasoline in 1920, there is much to be learned through research about the Diesel fuel oil.

Kerosene quickly bursts into flame, and tar burns slowly when thrown on an open fire. Diesel fuel oil, when injected into a combustion chamber, must be heated to the point where it will burst into flame and burn in about 1/350 of a second when an engine is operating at 2,000 revolutions per minute. So in researching Diesel fuel oil, the scientist is first seeking the fuel that will quickly burst into flames. He also seeks to better understand the characteristics of fuel so that it may be refined and blended to ignite in the same manner and at the same temperature as a standard reference fuel.

Dirty fuel is the greatest enemy of the Diesel engine. All the Bosch pump assemblies except one, repaired by the Atlanta agency of this company, failed because of dirty fuel. The average cost of repair was over $100.

The Caterpillar Company eliminated much of the dirt from fuel oil by an educational campaign and coöperation which extended down to making and selling at cost, tanks for the storage of fuel. Their pamphlet *Clean Fuel* has been praised by operators and competitors.

The average commercial fleet operator is a hardboiled individual. In a moment of exasperation, a mid-west operator exclaimed: "Do you suppose I operate those damned Diesel engines because I like them? If you want to find me, go out on the highway and look for the biggest and blackest cloud of smoke and I will be in the middle of it.

The only reason I use them is because they make me money."

The point is that the high-speed Diesel engine proved profitable to him and is proving profitable to other good operators, who are willing to study the characteristics of the engine and properly maintain it.

The demand for cheap power is forcing and will continue to force the development of the Diesel engine.

In reading much and talking to many, I have felt the force of the collision between the inertia that lets well-enough alone and the ambition that strives for betterment.

Many in the industry fear that the unbound enthusiasm of many columnists, trade magazines and Diesel trade-school instructors, who have written much that is untempered by reality, may hamper the certain progress of an industry that is now under way. They have oversold many and will oversell more on the high-speed Diesel engine.

It has been found that the over-enthusiastic purchasers frequently have been disappointed. On the other hand, those who have understood its characteristics, limitations, and problems of maintenance, have, in most instances, made money through its operation.

I left Canton, Ohio, after a week's visit at the Hercules Motor Company, with the feeling that the point of view of the executives of this company was prophetic. The gasoline engine is their bread and butter. And they expect that it will be for many more years. It is cheap and dependable and at almost every crossroad there is a mechanic, who can make temporary repairs and service it. Mr. Weekes, vice president of the company, prophesied that in the next few years gasoline engine compression ratios will be greatly increased. If he is correct, the difference in efficiency between the gasoline and the high-speed Diesel engine will be minimized.

On the other hand, they have spent hundreds of thousands of dollars on the development of their Diesel engine. And this year they probably will build more of the automotive type of high-speed Diesel engines than any other manufacturer. They believe that their engine is the most promising in the industry. Having gone through the period of the development of a new engine, they are anxious that their sales increase at a healthy and normal rate, and that over-enthusiasm will not place the engine in service where its results might prove disappointing.

The exacting standards of material and workmanship required in the manufacture of the high-speed Diesel engine seriously impairs its inherent over-all economy. At present, its possible application is limited to long-haul freight and bus routes. The cost of the engine must be reduced if it is to replace many of the gasoline engines which can be built for a fraction of a $100.

Rudolf Diesel said before the American Society of Automotive Engineers in 1912: "The Diesel engine has doubled the resources of mankind as regards power production, and has made new and hitherto unutilized products of nature available for motor power."

How many of the engines of Rudolf Diesel will replace those of Gottlieb Daimler in the next 10 years depends largely upon the ability of Yankee ingenuity to supply material and devise the manufacturing methods that will reduce the cost of the high-speed Diesel engine and increase its practical speed.

British self-propelled AA mounts

DIFFICULTY IS OPPORTUNITY

By General Johnson Hagood

◆ ◆ ◆ ◆ *These men did their big work while young*

A SPLENDID OPPORTUNITY to initiate and carry forward a renaissance of the seacoast defense confronts the young officers of the Coast Artillery. Essential progress has been limited during the past twenty-five years, and the field is wide open, not only for the regulars, but for the National Guardsmen and Reserves.

Other countries are moving forward. The navy is moving forward. Italy is busily engaged in building forts in the Mediterranean. And the American Coast Artillery should move forward.

The seacoast defenses were confronted by a difficult situation fifty years ago. We still had the black powder and the smooth-bore guns of the Civil War. Grover Cleveland called for a reorganization, and with the authority of Congress, appointed a board of experts under the leadership of Secretary Endicott of the Navy. That board submitted its report in 1886, and it was under the inspiration of the Endicott Board that the present system of seacoast defense was developed in all of its essential details.

But the officers of that day did not just sit around and wait for some one to tell them what to do. Every man in the Artillery, including not only the officers, but also many of the noncommissioned officers, started out on the big hunt for new ideas and for new devices and methods.

For let it be remembered, that at that time not only did we have no such modern institutions as airplanes, radio, and sound photography, but we did not even have gas engines, automobiles, electric lights, or telephones. In fact, railroad locomotives still were burning wood.

It might be interesting to the young officers of today to look backward and see what the young officers were up to in 1897.

I shall cite the case of a young man who could well be taken as the run of the mill, the average lieutenant as they had them in those days. As a West Point cadet, he had devoted himself largely to social affairs, and had served for three years as first hop manager. But in the military line, he only reached the grade of lance corporal, having been busted for crawling a plebe while acting as right guide, and causing his platoon to stray out of the column. He succeeded, however, in holding his position as a private in the front rank up to the time when he graduated somewhere in the upper third of his class.

In those days there was no such thing as a single list for promotion. Moreover, the number of officers in the several grades of the different arms were not the same. So that when the young graduate came to choose an arm, he not only had to consider the character of the service and the stations at which he was likely to serve, but had also to consider his chances of promotion.

After figuring it all out, I decided to go in the Cavalry. Among the tactical officers, there was one who, as I recollect, belonged to the 3d Cavalry. He had a very good looking wife—exceptionally good looking. And a few days before graduation he skinned my room mate for "loitering" on his porch after the hop, also for missing taps. So we decided that if that was the kind of people they had in the Cavalry, we would go into some other arm. Thus we changed our yellow stripes to red.

I joined the old 2d Artillery, and went to a one-company post in New England, where I was immediately detailed as adjutant. The senior first lieutenant was the post quartermaster. He had graduated from West Point in the class of '67—six years before I was born, and did not become a captain until 1898. The junior first lieutenant (there was a double line of first lieutenants) was a very much younger man. He did not graduate from West Point until I was well along towards walking and talking. The captain was a veteran of the Civil War.

Promotion, then as now, was a great topic of conversation. A man was regarded as fortunate if he could see a majority before his sixty-fourth birthday. So I figured out my own prospects, and wrote it all down on the fly leaf of a 1895 edition of the Army Regulations:

First Lieutenant	4th July,	1907
Captain[1]	30th November,	1928
Major	7th November,	1934
Lieutenant Colonel.....	30th September,	1936
Retired	16th June,	1937

A short time after this—fall of 1897—I was transferred to the 1st Artillery under orders to take station at Sullivan's Island (now Fort Moultrie), South Carolina, and it is here that my story begins.

I was the first officer to arrive. No Federal garrison had been in Charleston Harbor, since Anderson had evacuated Fort Sumter in 1861. The old guns lay scattered about where they had fallen from the ramparts. An engineer officer was on the ground with a large force of civilian employees, building new batteries, and some of the emplacements had been completed. Four ten-inch disappearing guns with their carriages; eight twelve-inch mor-

[1]Due to the Spanish War, the World War, and the good offices of Lady Luck, I became a captain in 1901, brigadier general in 1918, and major general in 1925.

tars, together with tons upon tons of equipment and parts of all kinds, had been shipped down from the North, and put ashore by the contractors without regard to any classification or order. Some of it was in crates, some in boxes, and some in gunny sacks. But most of it was on the loose, and had been dumped down in the sand.

I was detailed as ordnance officer, and placed in charge of getting all this wild mess of machinery together and of mounting the guns and mortars. There were no orders, no instructions, no policies, not even a list of parts, and everything had to be done by main strength and awkwardness.

The Spanish War came on. The Spanish fleet was in the West Indies. One of the old captains, watching the men work, late one afternoon, said to me, "My boy, keep the muzzles of those guns towards the open sea. No matter if they be lying in the sand or jacked up on those skids. Also keep a round of ammunition handy. Never let it be said that the enemy came in here, and that the 1st Artillery did not shoot." That was the spirit! "Shoot at 'em! And if you can't hit 'em, shoot at 'em anyway!"

The fleet did not come in, and in due course of time, the war was settled in other fields. Those of us who did not get to Cuba or the Philippines burned our hearts out with the thoughts that our chances for the future were nil.

The post settled down to the dull routine. I became a first lieutenant, and succeeded to the command of the mortar battery—Capron.

There were no service schools, as we now understand them. And we had no garrison schools. There was a school at Fort Leavenworth, known as the Infantry and Cavalry School, which was attended by a few officers of those arms. And there was a school at Fort Monroe, where the captains of the batteries were the teachers, and the lieutenants of the batteries were the students. But the only thing required of officers in the way of professional study was the annual reading of a paper before the officers' lyceum, which included the solution of a military problem selected by the officer himself.

The problem selected by me for the year 1899 is reproduced below. Its interest, if any, lies in the fact that it shows the type of work being done by young lieutenants of three years' service, and because, so far as known, it was the first practical suggestion for dividing the field of fire for mortars into zones and for making up the powder charges for these zones in advance. The old thirteen-inch muzzle loading cast iron mortars of the Civil War were always fired at the same angle of elevation—about 45°—and the range was increased or decreased by varying the amount of powder.

The new breech loading mortars that we had just installed could be varied in elevation from about 45° to about 60°. But the powder was still issued to the battery commander in bulk.[2] There were two kinds of powder: One was called "Sphero Hexagonal," an old-fashioned black powder, composed of charcoal, sulphur, and niter, which was used for the short ranges. And a more modern powder called "Brown Prismatic," which was also a charcoal powder, but was slow burning.

The issues presented in this problem seem to be very obvious and simple now, but at that time they were novel, and the work was pioneer. We had none of the present day equipment, no telescopic range finders, plotting boards, range boards, deflection boards, and so forth. We took our ballistic tables and books of logarithms out to the battery and we figured it out for ourselves.

Here follows the problem:

BATTERY CAPRON IN THE DEFENSE OF CHARLESTON HARBOR

Officers' Lyceum, Fort Moultrie, S. C.

By Lieut. Johnson Hagood, 1st Artillery

(NOTE: The introductory remarks and preliminary discussion are omitted.)

The water area (entrance to Charleston Harbor) is too large to mine, and is not covered by other batteries, so that it must be defended by Battery Capron alone—sixteen twelve-inch mortars—probably a difficult task for a mortar battery, and probably an impossible one with the number of officers and men available for that purpose.[3] The personnel, though, would not be exposed to the fire of the fleet. No damage would be done to the works, and, on the other hand, one shell falling on the deck of a ship would disable it completely. With plenty of ammunition, then, Capron's mortars would be able to undertake the task of keeping a fleet from assembling within this area, which is undoubtedly the key to the harbor.

The defense of this particular area then should be the primary purpose of Battery Capron, and no effort should be spared to develop its greatest efficiency for work in this particular field.

The mortar range tables have, as an argument, the angle of elevation and weight of the powder charge. The battery commander has the option of twenty different angles of elevation with twenty different corresponding powder charges to reach any of the particular ranges indicated in the table, but he has no information as to the angles of elevation, and the corresponding powder charges for range differences of less than a quarter of a mile.

It takes a long time to make up the cartridges, and the work has to be done very carefully on account of the shape of the prisms.[4] It would therefore seem to be impracticable to have a different weight of powder charge for every different range, and it would be absurd to construct the mortars in such a fashion that they could be adjusted for variations of one minute in elevation, and then to set them at 45° or at 60°, and obtain the desired range by putting in or taking out an ounce or a pound of powder.

In the solution of this problem, I have tried to construct a chart with six zones, in one or another of which the attacking fleet would be likely to appear. I proposed to designate these zones by the weight of the powder charge that would be used therein. For example, the forty-four pound zone would extend from 4,100 yards to 4,900 yards, and in a table to be constructed at one side of the chart, would be shown the angle of elevation which would be used to reach any particular range within the zone of a forty-four pound charge.

But I have been unable to obtain the necessary data to construct such a chart.

I have found a range table computed by Major Ingalls, in

[2]Some of it in kegs, and some in zinc lined boxes.

[3]Two officers and sixty-five men.

[4]The powder would not burn properly unless the hole in the center of each prism was exactly lined up with the prism above and below.

which the range was used as an argument, but this table is computed only for the 800-pound projectile, and only for ranges of from 1,700 yards to 6,000 yards. This table shows eight different weights of powder that could be used, and, if we decide to use charges of these weights, they should be made up in advance from powder on hand in such quantities as would be most probably needed for our particular problem. Major Ingall's table, however, shows nothing for the 1,000-pound projectile.

Supplementing the Ingall's table, I have computed the necessary data to provide powder charges for three additional zones. This is based upon information contained in the *Manual for Heavy Artillery*, by Captain W. P. Duvall. This makes eleven zones in all. But it is not known whether these charges will accurately cover all the ranges in the zones to which they have been assigned.

I have here a little sketch[5] as a suggestion for a much larger chart. This sketch shows the harbor divided into the minimum number of zones, that would cover the whole field. Each zone has but one powder charge, and we can cover all the desired ranges by varying the angle of elevation.

There would have to be two such charts, one for the 800-pound projectile, and one for the 1,000-pound projectile. Because the zone marked on the sketch as the fifty-pound zone for the 800-pound projectile would be entirely different in width and ranges from the fifty-pound zone for the 1,000-pound projectile. It would be advisable, however, to have as many of the charges as possible made up of weights that could be used either for a distant zone with a 800-pound projectile or for a near-by zone with a 1,000-pound projectile.

The cartridges would then be marked with their zone numbers and conveniently stored in the magazine.

The gunners of the Battery should have at their finger tips the ranges corresponding to the different powder charges. There would probably be twelve different cartridges in all,[6] five of Sphero Hexagonal, and seven of Brown Prismatic. This would be sufficient to cover the entire field. . . .

Sig. JOHNSON HAGOOD,
First Lieutenant, 1st Artillery.

The above problem with its solution shows what was going on in the mind of one little average lieutenant, doing straight battery duty at Fort Moultrie, S. C. At the next post up the coast, Fort Caswell, N.C., a classmate, Lieutenant Edwin Landon, was devising the present method of conducting target practice at moving targets. Up to that time, both in the Coast Artillery and in the Navy, they had always fired at stationary targets, anchored in shallow water. In the Navy, as I recollect, the usual range was around 2,000 yards.

Still farther up the coast in the bigger field at Fort Monroe and in New York harbor, Lieutenant I. N. Lewis (afterwards of machine-gun fame) had invented the depression range finder. Lieutenant W. C. Rafferty had devised his relocator, which was the forerunner of the Whistler-Hearn plotting board, devised by Captain Clint C. Hearn with the assistance of Major Garland N. Whistler. Whistler himself, while a lieutenant (he served for thirty-one years in that grade without any apparent loss of morale) had spent seven years in the development of smokeless powder, and afterwards devised a depression range finder in competition with Lewis. Captain Ingalls developed his works on interior and exterior Ballistics, which marked him as a world authority upon that subject. Lieutenant Ludlow wrote the logarithmic tables that were used (perhaps are still used) at West Point. A little later, Van Beck (a corporal at Fort Monroe) devised a new scheme for firing mortars by means of a so-called "mortar arm" installed on the plotting board. Based upon Van Beck's idea, and also upon certain principles worked out by Whistler, Captain Johnson Hagood devised the present mortar deflection board. In the meantime, Captain P. P. Bishop had designed a mortar arm, which was used at Fort Monroe and considered the best thing of its kind in its day.

And then there was Captain Arthur Murray (afterwards Chief of Coast Artillery), who wrote the first Court-Martial Manual, Captain William Crozier (a former Artillery officer), who invented the disappearing gun carriage; and such men as Pratt with his range board; R. P. Davis with his submarine mines; H. C. Davis; W. C. Davis; E. M. Weaver (afterwards Chief of Coast Artillery); H. C. Harris; William Chamberlaine, the Widow Lundeen (so-called by cadets because of his gentle voice); Alston Hamilton (who explored the ballistic field beyond Ingalls); H. E. Cloke; C. E. Kilbourne; S. D. Embick (now Deputy Chief of Staff); and others.

All of these were Coast Artillerymen, tried and true, who did big work, and some of them became national and international authorities upon different phases of coast defense.

These men did their big work while young. They were all under forty, most of them under thirty, and many of them just shavetails out of West Point.

They say that captains think in terms of the last war, generals in terms of the war before the last—where are the second lieutenants who are thinking in terms of the *next*?

[5]Sketch not submitted with article.
[6]Twelve zones was the number finally decided upon and used for many years.

YOU MAY WELL *be proud of your Army. It belongs to you. Prepared for emergency in peace and war, it is your insurance for the safety of your lives, the happiness of your homes, and the integrity of your institutions.*—THE HONORABLE LOUIS JOHNSON, The Assistant Secretary of War.

SWORD OF THE BORDER

By Fletcher Pratt

There seemed to be no limit to his stomach for combat

FATE tried to conceal him under one of the most common of names; Time, by pitching him into the most unmilitary period in the history of our peaceful republic; his parents, by bringing him up as a Quaker; the commanding general of the U. S. Army, by reporting him as the most stupid and insubordinate officer under his command; and the government, by giving him neither men nor horses nor guns. Yet he saved our northern frontier twice; he won one of the most desperate battles in American history, and with raw militia at his back he broke the veterans who had stood unwavering before Napoleon. Not Sheridan nor Longstreet nor Mad Anthony Wayne more furiously rode the whirlwind. Gentlemen, I give you General Jacob Brown, the best battle-captain in the history of the nation.

A pleasant-faced man with rather sharp features and curling hair looks at us out of his portraits; there is a keen eye, an erect carriage and a skeptical line to the mouth. He was born into a family Quaker for many generations, in Bucks County, Pennsylvania, a month after Lexington, son of a prosperous farmer who fished in the troubled waters of commercial speculation in the years following the Revolution and lost all his money. His education, says a man who knew him young "was accurate and useful so far as it went, without aspiring to elegant literature or mere speculative science." He supplemented it by reading everything he could lay his hands on, and when the family fortunes shipwrecked at the time of his eighteenth birthday, young Jacob Brown easily fulfilled the requirements for becoming a country school teacher, a trade which he followed for three years.

At that period the Ordinance of 1787 had recently gone through and the West was opening to ambition. Brown went to Cincinnati and had enough mathematical equipment to get a post as a surveyor. It is interesting to note that he followed Washington in this profession; and that biographies of such otherwise diverse captains as Frederick the Great, Napoleon, and Julius Caesar speak of the "surveyor's eye"—the sense of distance and direction possessed by these men. Perhaps there is here some clue to the secret of leadership in battle.

Yet Jacob Brown was still far from battles and the thought of battles when he came east again after two years of failure to make his fortune in Ohio, and secured the position of head of the New York Friends' School. The life does not seem to have afforded enough scope for his intellectual activity, which was considerable; he left the post to take one as Alexander Hamilton's secretary. The table conversation at that house must frequently have turned on the Revolution and its military history; at all events we are told that it was at this period that Brown began to read Quintus Curtius and the strange military-philosophical works of the Maréchal de Saxe. His commercial fortunes also improved about this time, and in 1799 he bought "several thousand acres" of land near Watertown, N. Y., and formed there a small settlement which he called Brownville.

As the squire of the district and county court judge, he was elected colonel of the local militia in 1809, apparently less because he was thought able to command a regiment in war than because his big estate and comfortable house made a good spot to hold the quarterly drinking-bouts which passed under the name of "militia exercises." He was politically active at the period, holding several pocket boroughs in the northern part of the state, and his appointment as brigadier general in the state service by Governor Tompkins in 1811 was in the nature of a reward for services rendered at the polls, and not because he had shown military ability, for which, indeed, there had been no opportunity.

The appointment made him *ex officio* military commander of the northern district of the state and when news of the declaration of war was followed by that of a proposed British descent on Ogdensburg, it was Brown's duty to keep them off. His men (militia) and munitions were all at Sackett's Harbor, some distance away, with the roads so deep in October mire as to be positively impassable. The British had naval command of the lake and a fleet cruising on it, but Brown boldly loaded his force into bateaux and pulled along the shore. He remarked that he could always make land when topsails came over the horizon, and if the British stopped to attack his little force he would deal them such a buffet as would make them forget Ogdensburg. The topsails did not come until he made Ogdensburg. There Brown received the landing party with an amateurish but energetic fire, and after a few languid efforts, the British went away.

Major General Jacob Jennings Brown

That closed Brown's service till the following spring, when a rather peculiar strategic situation brought him out again. The American naval and military base on Ontario was Sackett's Harbor at the eastern end, faced across the lake by the British base of Kingston. Winter building had given the United States command of the water, but instead of striking at the enemy base, Chauncey, commanding the fleet and Dearborn the army, decided to trot off to the western end of their little inland sea for an attack on the Niagara frontier and Toronto, then called York. Lieutenant Colonel Backus of the "Albany draggons" was in charge of a small detachment and a hospital at Sackett's. He should have been in general charge, but Brown was a landed proprietor of considerable substance and Dearborn, a toady if there ever was one, asked the latter to take charge of the post if any emergency arose.

Fortunate blunder! — For the British learned of the American preoccupation at the wrong end of the line and Sir George Prevost, Governor of Lower Canada, came down on Sackett's Harbor with all the force he could muster. He had a fleet, not large by any absolute standard, but of overwhelming power in relation to the defense; for a landing party he had some six hundred lobster-back regulars and three hundred marines and sailors. The British sails were visible in the offing on the evening of May 27, but the airs fell light and baffling, and they could not close. All that night and the succeeding day messengers were out rousing the countryside. When the morning of the 29th came up, sunshiny and hot, Brown was at Sackett's and in command. He had four hundred regulars, invalids, of whom half were sufficiently convalescent to fight; a regiment of Albany cavalry, two hundred fifty strong, who fell in line dismounted, and five hundred militia, whose experience was limited to the quarterly keg-tapping aforementioned.

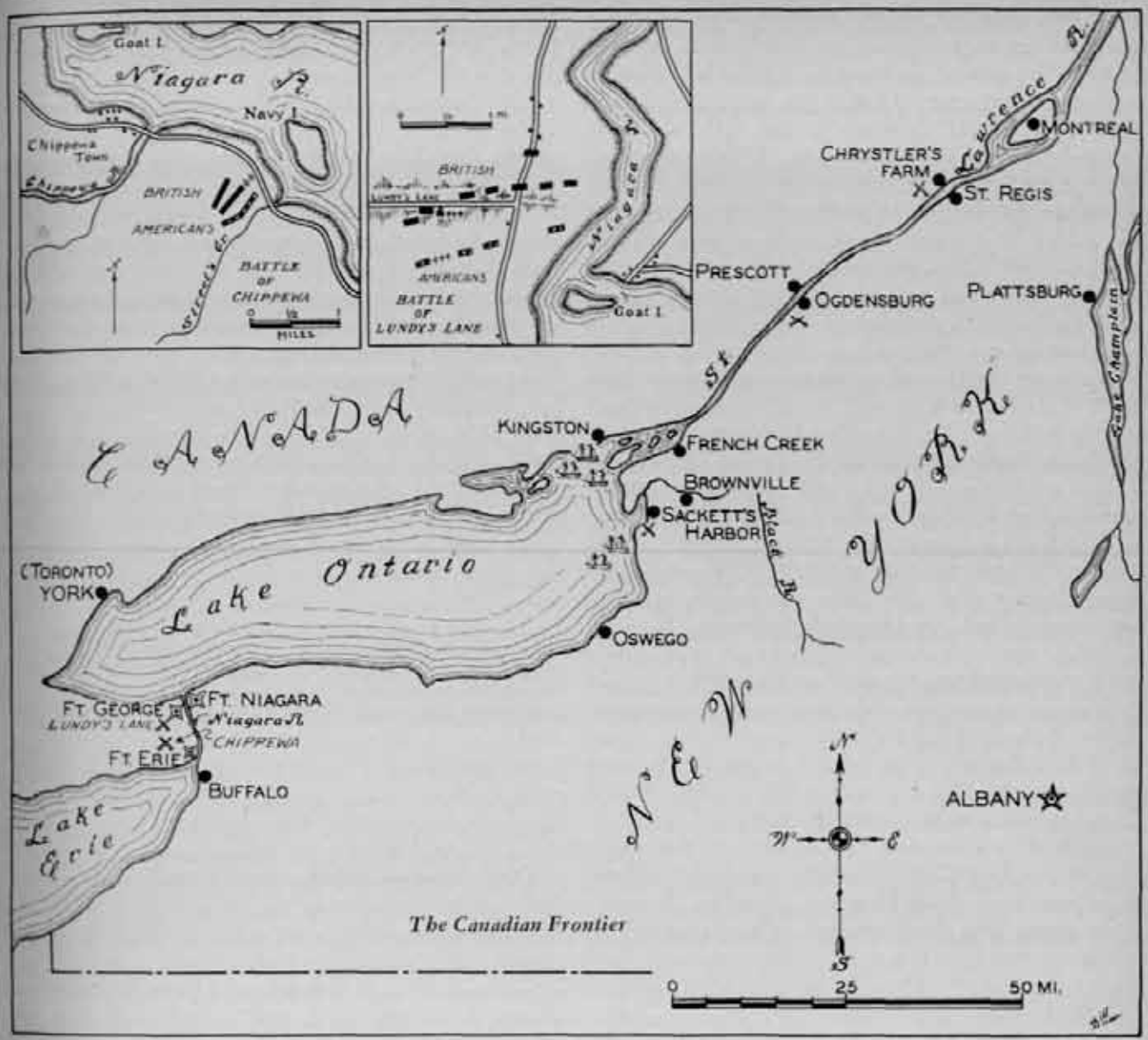
The only place where a landing could be made was on a spit west of the town, whence a broad beach led some distance toward the line of barracks that formed the outer boundary. Along these buildings Brown deployed the regulars under Backus, with a couple of guns. He posted the militia at the landing point behind a gravel bank. Guilford was the obvious model, where that other fighting Quaker, Nathanael Greene, had placed his militia in the front line, sure they would run, hopeful they would not do so till they had delivered a couple of telling volleys.

Colonel Baynes of the British 100th Regiment led the landing party and advance; his report speaks of a "heavy and galling fire, which made it impossible for us to wait for the artillery to be landed and come up" so that he had to charge out of hand and with infantry only against the gravel bank. In fact, the "heavy and galling fire" was a single ragged volley; as soon as the militiamen found their guns empty, they became obsessed with the fear the British would be among them before they could reload, and vanished into the woods on their left.

The attackers cheered and came on; the fleet warped in and began to cannonade the flank of the little line of regulars. The naval lieutenant in charge of the building yard, foreseeing that they could not hold out long, set fire to everything, so that Backus' tiny group fought with the town and dockyard blazing in their rear and double their strength of enemies closing on their front. They fought well; but the British got a lodgement at one of the barracks and prepared to sweep out the line; Backus was mortally wounded, Brown nowhere to be seen.

As a matter of fact he was off in the woods addressing most un-Quakerly expressions to the fugitive militia. Just what expressions they were, just what he did beside yell at them we do not know. Psychological compulsion, leadership, call it anything you like; at all events, just as Sir George Prevost reached out to grasp his victory, the militia suddenly came storming out of the forest into his flank with fixed bayonets and Brown at their head. They did not fire a shot; simply growled and flung themselves through a scattering volley onto the British regulars from whom they had run not half an hour before. Colonel Baynes ordered a precipitate retreat, covered by the ships. He had lost 259 men, nearly a third of the force, and Prevost, when criticized for not countermanding the retirement order, pointed out with some energy that he was in an excellent position to lose the whole force if he stayed.

The armies were diminutive, but the results prodigious; certainly the victor saved Sackett's Harbor and probably the whole northern frontier. And in the existing state of affairs, it is difficult to see how the United States could have recovered from the loss of their one good base on the lakes. For Sackett's Harbor was the point through which went all the supplies for Oliver Perry, who had not yet



The Canadian Frontier

fought the battle of Lake Erie, and for Harrison, who had not yet driven the British from Detroit. Secretary of War Armstrong, greatly impressed by Brown's rare talent for making militia fight, rewarded him with a snap promotion to brigadier general of the United States Army and the command of one of the four brigades being organized for the "conquest of Canada" that fall.

The officer in general charge and ranking leader of the army of invasion was General James Wilkinson, traitor, spy, liar, and hopeless incompetent, completely antithetic to the militia general of the north. He had not been in camp with him a month before he was demanding Brown's removal because the latter refused to serve under a personal friend of the commander's, General Boyd, and because he was as ignorant as insubordinate. "He knows not enough of military duty to post the guards in a camp," wrote Wilkinson, "and he compelled his batteries to form in a hollow for the advantage of elevating the pieces to fire at the opposing heights."

That last item is too odd to be imaginary; one can only wonder what in the world Brown was thinking of—but the point is that Wilkinson's criticism can be admitted as perfectly just without denying Brown's usefulness as an officer. Winfield Scott, certainly with no animus against the fighting Quaker, said much the same thing in more friendly fashion—"Not a technical soldier; that is, he knew little of organization, tactics, police, etc.," but thought him of great value, for he was "full of zeal and vigor."

And he had something else as well. In those lugubrious fall months while the high generals wrangled over this plan and that, their men dying like flies under pouring rains and "lake fever" (whatever that was), Brown's brigade had fewer men on sick report than any other, and was the only one that kept its strength. Why? We have one flash of insight into his methods. Alone among the brigade commanders he made his men build proper huts with fireplaces, drainage, and clean latrines. They worshipped him. Wilkinson complained he was coddling the privates for political purposes. Wilkinson would.

In November the expedition finally got untracked and wandered vaguely down the St. Lawrence, with its commanding general spending his days in bed aboard a bateau, weeping that he had a flux when called on to make decisions and sustaining himself with rum. The British fired at them from the bluffs. At first the opposition was not serious, but it showed an annoying tendency to coalesce. On the 7th, Macomb, with the small reserve, was landed on the north bank to drive them off. He could not handle the situation he found, so on the next morning Brown's brigade also was put ashore, and by night had bruised a path through the gathering clouds of Canadian militia.

Wilkinson next turned his attention to Captain Mulcaster of the British navy who was following the expedition up with some 800 men. Since it seemed that some reputation might be gained by driving him off, Wilkinson put another brigade and a half ashore under his favorite Boyd, to turn back against Mulcaster, while Brown was instructed to keep straight on away from the battle. On the 11th came the clash at Chrystler's Farm—it represents perhaps the lowest point the American regular army ever reached. In a blinding sleet storm, Boyd fed his triply superior force into the fight in small parties, saw them riddled one by one, and himself led the disgraceful rout that ensued. Mulcaster might have cleaned up the whole force but for the brilliant covering charge of Walbach's small cavalry regiment, and the skill and steadiness with which Brown, who had marched without orders toward the guns, covered the retreat.

The expedition, however, was ended, and that winter there was a housecleaning among the higher officers. Wilkinson, Boyd, Wade Hampton, Dearborn, all the old period pieces from the Revolution, were shoved into retirement and to their horror Jacob Brown was appointed major general of the United States and commander at Sackett's Harbor.

Secretary Armstrong appears to have had a clear sense of Brown's limitations as well as his merits, for he gave him for brigadiers two of the strictest professional soldiers in the service—Ripley and Winfield Scott. It was a happy combination.

The campaign of 1814 started badly when Brown permitted the timorous Commodore Chauncey, with whom he had been instructed to confer, to convince him that nothing could be accomplished against Kingston. Accordingly he moved his troops to the Niagara frontier. A talk with Scott and Armstrong showed him the strategic error of trying to lop off a branch when he could strike for the trunk of the tree. "I am the most unhappy man in the world," he wrote, and hurried back to have the matter out with the naval commander.

But the latter was one of those officers whom nothing can persuade to fight unless odds-on. He flatly refused to give naval support for a move on Kingston or any other point until midsummer had brought his new battleship from the building ways. So Brown had to return to Niagara and make the best of things there. Meanwhile, Scott, left in charge of the little army, had drilled the troops well. But the strategic situation his commander found at the Niagara was bad.

The Americans held only the ashes of burned Buffalo at the Lake Erie inlet of the Niagara. Facing that place, on the Canadian side, was a strong, but half-complete work, Fort Erie, in British hands; at the Ontario outlet of the river were similarly paired fortifications, Niagara on the American side, George on the Canadian, both excellently planned, well provided with guns, and both in British hands. This gave the British three corners of a quadrangle, split down the center by the river, which was passable only at the fortified points. Their commander, General Riall, had something over 4,000 men, all regulars and veterans. His mobile force, however, numbered not more than 2,800 men; the others were parcelled out in garrison.

Brown's men, though nominally regulars, were actually the greenest of recruits, with no drill but what Scott had given them during the three spring months. This force comprised three brigades:

SCOTT'S

Organization	Commander	Recruited in	Number
9th Inf.	Maj. Leavenworth	Massachusetts	642
11th Inf.	Maj. McNeil	Vermont	577
22d Inf.	Maj. Brady	Pennsylvania	287
25th Inf.	Maj. Jesup	Connecticut	619
Staff			4
			2,129

RIPLEY'S

Organization	Commander	Recruited in	Number
21st Inf.	Maj. Miller	Massachusetts	917
23d Inf.	Maj. McFarland	New York	496
Staff			2
			1,415
Artillery	Maj. Hindman		327

PORTER'S

Pennsylvania militia	600
	4,471

The size of the 21st Regiment is accounted for by the fact that it included some detachments from the 19th. The total number of effectives was certainly not over 3,500 and probably much less, when the campaign began in July.

The war in Europe was drawing to a close and heavy reinforcements were already on the sea for Riall; his plan was simply to wait until he got them and then crush the Americans. On our side Chauncey's new warship was nearly completed. It would give him command of the water and he had promised Brown a naval blockade and bombardment of Fort George for the early part of the month if the army were at hand to coöperate. Brown therefore planned a quick stroke at Fort Erie, a sweep down the Canadian side of the river and a siege of Fort George to chime with the arrival of the fleet. Fort Niagara would fall of its own weight once its companion piece was gone.

The move began on the first day of the month. Scott

landing below Fort Erie, Ripley crossed above. The two pinched out the area between them, taking 170 prisoners, and sustaining no casualties. Riall, who had not thought the Americans so bold, was taken by surprise. He gathered up what troops he had, not over 1,500 men, and came forward to hold the line of the Chippewa River, which flows into the Niagara some sixteen miles below Fort Erie.

Brown threw forward Porter's militia and a handful of Indian allies as scouts, with the design of feeling along the Chippewa for a spot where a crossing might be forced. They encountered Riall's skirmishers, Indians and Canadian militia in about the same number and there was a little desultory firing. Scott was back at a smaller stream, Street's Creek, holding a parade. He had with him the three small guns of Towson's battery. Ripley was in camp behind Scott and Brown up on reconnaissance. The date was July 4.

Riall's experience of this war had been that Americans always ran when vigorously attacked by British regulars. He ploved his 1,500 into column, whipped them across the Chippewa hard by its mouth and punched through the scattered scouts of Porter's brigade with a cloud of militia and Indians round his front. Porter's men went back in disorder. Brown galloping past Scott to bring up Ripley, shouted, "You are going to have a battle!"

Scott remarked that he did not think there were three hundred British within miles, but scarcely had he got his men across Street's Creek and into a crescent formation when Riall topped the last rise and came down toward him with two 24-pounders and a big howitzer banging away. The Englishman got the surprise of his life. Not only did these Americans fail to run, they received him with volleys hotter than he gave. His column hesitated, came to a halt and hung fixed in the semicircle of fire. Towson's little battery duelled fiercely with the British guns, mastered them, blew up an ammunition wagon in the English rear and turned in on their column of assault just as Scott, catching a hint of wavering in the line opposed to him, rode out in front with his sword swinging for a counter-charge.

Brown came rushing across the creek with Ripley's men to put in on the American left for a sweep, but before they reached position it was all over; Riall had lost 515 men, a third of his force, and was behind the Chippewa trying to rally what he had left. The American casualties, including Porter's, were only 297.

Brown followed his opponent in crisply, touched the shore of Lake Ontario and there received the dismaying news that Chauncey's new two-decker was not ready and would not be before September. The navy could give him no help of any kind. Meanwhile the British had been heavily reinforced by a corps of Peninsular veterans under Major General Gordon Drummond, an officer who had made a considerable reputation in Spain.

The precise extent of the British additions and their plan of campaign was unknown to Brown. He fell back to the Chippewa River, Scott's brigade holding there for observation with the rest behind. On July 25 Drummond and Riall were ready; the former came forward and established himself in a strong position along Lundy's Lane, at right angles to the flow of the Niagara, with 1,200 men and six pieces of artillery. Three miles behind him was Drummond in person with the reserve of his forces, another 1,200 men and two guns. Up near Fort George were 1,700 more men under a British Colonel Scott, all ready to cross to Fort Niagara. Their plan was simple and should have been effective; Riall to hold hard in his prepared position, Scott to cross and turn the Americans out of their position at the river mouth or trap them in Fort Erie, Drummond to throw his reserve in with whichever force met the more opposition.

Winfield Scott and his brigade were 1,400 strong with those same three little guns of Towson's; Ripley was behind near Fort Erie with 1,200 men and Porter near the same spot with about 600 militia, maybe less. The American position was truly desperate; they had not enough men and artillery to put up a defense and there were no good defensive positions; heavily outnumbered at every point, they had no place to which they could retire nearer than Albany.

The best device Brown could think of was to keep the British so occupied that they could not finish their turning maneuver. As soon as he had plumbed the situation he ordered Scott to hit Riall with all his strength. At the same time he ordered Ripley's brigade forward and followed with Porter. He was staking everything on one blow.

Scott formed the 9th on his left wing, with Towson's three guns next, facing Riall's battery; then the 11th, the 22d and the 25th, the latter's right against the river. The setting sun threw long shadows across the field as they took their positions in the hollow below Lundy's Lane. There was a brief cannonade; Riall, a trifle disturbed by the unshaken bearing of those regiments he had so good cause to remember, had just ordered a retreat when Drummond in person arrived with his division, giving the British a two-to-one superiority in numbers.

Scott came right on. In the center the fighting was fierce, but the three regiments could accomplish nothing against slope, numbers, and cannon; but on the right Scott himself burst through the British line at the head of Jesup's men, hurled back their flank, wounded Riall and captured him, and completely broke up one of the British regiments before artillery from the flank and Drummond's heavier weight drove him out again.

Towson's guns had now been silenced, but Scott ordered another charge and then another; three charges we count on the right and center before nine o'clock. Scott himself took a wound that finished him for the rest of the war; Majors McNeil and Brady were down; the 9th, 11th, and 22d had lost nearly all their officers and organization, but Major Leavenworth formed what was left of them into one single mass and was planning a last-ditch defense in the hollow against the now advancing British

when Brown came up on the run with Ripley and Porter. He seized the situation at a glance; nothing would go right until he got rid of that British battery which was tearing his center to pieces. Meanwhile Drummond had called in the British Colonel Scott and there were now over 3,000 men along Lundy's Lane, less than 2,000 below it.

"Can you take those guns?" Brown asked Major Miller.

"I'll try, sir," said Miller in the words that have become a regimental motto, and went up the hill into the dark with the 21st. Brown gave him all the help possible, himself leading the 23d as an advance echelon on Miller's right, Porter and the militia going forward on the left in loose skirmishing formation around a big stone church. Under cover of their advance Miller went right into the muzzles of the guns and bayonetted the cannoneers at their pieces. Then with militia on one side, and the 23d on the other, he formed a new line, not twenty paces from the British while "the space between was all one sheet of flame." The raw Americans stood it better than the Peninsulars; Drummond's men gave up and went tumbling down the reverse slope.

It was 10 o'clock, but the stubborn fight went on. The British regulars were not used to being treated in so cavalier a fashion. Drummond got them in order and came back with a furious charge—"You could see the figures on their buttons in the light of the guns"—was beaten, came again, again was beaten, but returned still a third time. Brown was wounded now, too, and in a faint; so was Leavenworth. There was hardly an officer left in the American army which was all one mixed line, militia and regulars together.

As the last English wave rolled back, Drummond's confused ranks began firing into one another and collapsed. The battle was won and the whole British army was taken had there been a regiment of cavalry or the tiniest reserve. But there was not and Ripley, left in command, counted his own desperate state and ordered a retreat to Fort Erie.

The wagoners sent back for the captured British cannon found that a British wagon corps had had the same idea and earlier; and when Brown recovered consciousness and heard of it, he called Ripley a coward and sent for General Gaines to take command till he should be on his feet again.

The charge was not just, as Ripley had proved before and would again, but this was a tiny wrangle; the important thing was that Drummond's hopeful movement was stopped as though he had been poleaxed. He had lost 878 men in the battle (Brown lost 853), and insisting to his dying day that he had fought not less than 5,000 Americans, won commendation from the Cabinet for his "gallant stand against superior forces." "I never saw such determined charges," said the man who had faced Junot and Murat.

He was immediately and heavily reinforced; strategically his turning maneuver was as good as ever, but Lundy's Lane had embedded itself in his mind. He did not dare try anything till he had gotten rid of the little American force. Therefore he came down to lay siege to Fort Erie, where Gaines could muster but 2,125 men, including some militia that came up. On August 15, the English tried a midnight surprise; it ended in a frightful disaster (Ripley seems to have predicted it to the day and almost the minute) with 900 British casualties against only 84 American. A boat-landing off Buffalo ran into a company of squirrel-killing Kentucky riflemen who emptied two of the boats so rapidly that the rest pulled away in a hurry.

At the beginning of September the swing was toward the American side, the more so since Brown was recovered. He held a council of war, wishful to attack the British lines. The regular officers, particularly Ripley, objected that the lines were well planned, adequately supplied with artillery and defended by some of the best troops in the British army, including the Scots Highlanders. Assault was madness. Brown began to fidget, finally snapped that the council was closed and sent off for some more militia. He got about a thousand which gave him a total of 3,000 against Drummond's 4,500. This seemed to the fighting Quaker about the proper proportions for battle.

Colonel Wood of the engineers, under cover of the racket made by the siege artillery, cut a path through the brush to a point within 150 yards of the battery on the extreme British right. On the morning of September 17 Brown took this path with his militia and the little remnant of the 23d, which was to serve as stiffening and example for the rest. Major Miller had orders to throw a column at the British center as soon as the militia began to shoot.

The attack went off like clockwork. The Scots stood their ground, but the untrained, rowdy militia—the same men who failed every other general of the war, followed Brown in on them and in a wave of fury, took losses that would have staggered most regulars (over a third!), killed the Scots where they stood, captured the battery and spiked its guns. Miller's column punched through the second battery and spiked that too; there was a little fighting around the third, but Brown pulled out before getting too deeply involved.

That finished Major General Gordon Drummond. He was a good officer and a bold man, but the sortie had cost him 700 more casualties, bringing his battle losses to more than 3,000 for the campaign. And there seemed no limit to his opponent's stomach for combat, nor to his ability to inflict further damage. Then, too the British artillery was spoiled or spiked. Nor had Brown neglected to burn their barracks during the sortie and the autumn rains had set in; his own men were housed in comfortable huts. Finally, it is probable that Drummond knew Brown was being reinforced at no distant date for it was difficult to keep any big news quiet along the border. By sum total the British position had become untenable; a week after Brown's sortie Drummond beat a retreat to his fortresses.

The following week General Izard came tramping into

Buffalo with 7,000 regulars, including a strong brigade of that cavalry for the lack of which on the night of Lundy's Lane Brown had wept. It is a matter of speculation as to what might have happened after another spring, of course, but in view of what Brown accomplished with inferior forces, no cavalry and little artillery, the likelihood is that with superiority in all three arms, he would have made things extremely warm for his opponents.

He was prevented by the end of the war, which also ended active service for him, though he remained in the army, becoming its head in 1821. In 1828, still chief, he died of the after-effects of his Lundy's Lane wound, leaving behind a record of service second to none, but a reputation overshadowed by that of the more colorful and politically-minded Andrew Jackson. Yet it is not mere wonder-hunting to say that Brown did more than Jackson; for New Orleans was fought after the war was over, while Sackett's Harbor and Lundy's Lane were won at its height. The loss of either might well have entailed the fall of the whole northwest, and certainly would have afforded a solid basis for the claim to a foothold south of the lakes that the British put forward with such persistence at the conference in Ghent.

When it comes to analyzing the reasons for Brown's achievement, as startling as it was brilliant, one is a little at a loss. It is the easy, and the common habit among military writers, to attribute everything to Scott and to set Brown down as a sterling fighter with but a single military idea—that of getting in contact with the enemy and hitting him as hard as possible. But this picture will not quite do; Brown won at Sackett's Harbor before he had Scott and in the Fort Erie sortie after Scott was gone.

Chippewa was largely Scott's victory; the discipline he put into the raw recruits did much to win Lundy's Lane; but it is surely taking nothing from the credit due him and his men to say that they behaved on both fields as they never did before and never did again. And nobody but Brown ever thought of leading militia in a charge against veteran Scots, or would have gotten away with it had they done so.

There was, in short, some ineluctable secret of leadership, something in Brown's presence and manner, that made green country-boys fight like the devil, and it would be worth a good deal to know that secret. But it would be silly to account for Brown's success on this basis alone. Scott complained of the general's ignorance of tactics, yet Brown's major tactics were, on the whole, better than Scott's. At Chippewa, Scott's plan of a crescent resting on the river with the right wing supported by artillery was good; yet Brown had a better one—to hold hard in the center, bring Ripley in on the left and knock Riall's whole column into the Niagara. At Lundy's Lane Scott conceived the classical plan of breaking down a flank, the flank where the enemy thought himself strongest; but it was Brown who saw that the big British battery in the center would queer any flanking sweep while it stood, and that its fall would entail the wreck of the whole line —and he saw it in an instant, in the darkness of the night, in the midst of battle. Again at Sackett's Harbor, it would have been both easier and more normal for Brown to bring his rallied militia in on the line where the regulars were holding, but no, he had to lead those troops, already once broken, in a cold-metal charge against Prevost's sensitive wing. The essence of Brown's concept may be expressed by saying that while Scott played, and played well, to beat the enemy, Brown meant nothing less than his destruction at every stroke.

This suggests then, that major tactics is something innate and not to be learned; all these ideas came out of Brown's own head, without benefit of military education. One would expect the same native genius to make him a good strategist also; but oddly enough this turns out to be his weak point.

Then there is another suggestion in Brown's career, perhaps even more important. The fact that the general's political influence in his home district was an influence of affection, makes it clear that he treated the tenants of his estate much as he later treated the soldiers who fought so well for him; that is, with an attention to their physical well being even rarer then than it is now. It was not only Scott's drill that made the men of Lundy's Lane follow their Quaker up the hill; it was those comfortable huts and the fight the general had made to provide good food and good clothes.

Yet neither these nor any other details can be tortured into a Jacob Brown formula. His secret was the secret of all great leaders and what man can discover that?

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»»»»»»»Airplanes Can be Stopped

By Major Robert N. Mackin, C.A.C.

We have all read in articles in magazines and in the daily press, and have heard on the radio, strong statements and claims as to the capabilities of military air forces. We have been told repeatedly for years that airplanes will win the next war; that the next war will be fought in the air; that ground armies are obsolete. We have seen New York City and other great centers of population depopulated and reduced to ashes—so on and so on.

In many countries, particularly in Europe, but also to a lesser extent in the United States, the general public and many persons in the military and naval forces, not knowing airplane capabilities or limitations, have been strongly influenced by this propaganda and are suffering right now from a bad case of airplane jitters.

Sensible and thinking persons desiring to evaluate these claims for military air forces have had at hand no counter-claims and no adequate presentation of the other side of the picture. There has been little or no rebuttal.

The writer of this article wishes to present herein a general review of the activities of military airplanes in war since the opening of the World War and to draw from that review certain conclusions as to the present capabilities of that means of making war. Then, with that evaluation of military aviation in mind, there will be shown what means there are available today to combat the activities of military aviation—how airplanes can be stopped.

This discussion will be confined basically to that class of military aviation known as combat aviation—the destructive forces in the air. Military observation aviation has proved itself again and again in the past as an extremely important aid to the commanders of military forces in their search for military intelligence and has definitely won its place in an effective war machine.

Returning to combat aviation, let us consider its various classes; what they have done in the past and what they may be able to do now and in the near future. The capabilities of aviation in the distant future come within the realm of pure guessing.

While the nations of the world differ as to the names which they give to the various branches of their combat aviation, they all employ three basic types of airplanes each of which is employed in a separate and distinct manner. The airplanes of which these three classes are composed may be described as follows:

First, the pursuit or fighter airplane which is light, fast, highly maneuverable and designed for combat in air with other airplanes. The airplane carries two or more machine guns.

Second, the light bombardment or attack airplane, which is fast, light, highly maneuverable and designed to attack establishments and forces on the ground with small bombs, gas, smoke, and machine-gun fire, and operate at very low altitudes.

Third, the bombardment airplane, which is large, heavy and fast and designed to carry and drop several bombs of considerable weight or a large number of small bombs. The airplane is designed for self-defense in the air and carries a number of machine guns for this purpose but combat with forces on the ground is not contemplated other than that carried on by bombing from high altitudes.

For the sake of brevity and clarity let us give these three classes of combat aviation the designations which are used by the United States Army Air Corps—pursuit, attack, and bombardment aviation.

Pursuit Aviation

As stated above, pursuit aviation is designed to fight other airplanes. When employed in any other manner it assumes the rôle of either observation, attack, or bombardment aviation. We may reduce the complexity of our study if we consider first the past activities and present capabilities of pursuit and then proceed to a more detailed study of attack and bombardment—those airplanes which are equipped to hurl explosives, chemicals and other missiles at objectives on the earth's surface.

Those of us over thirty-five all remember the daring exploits of Eddie Rickenbacker, Baron Richthofen, Rene Fonck, and other aces in their pursuit machines. These men undoubtedly made the air less safe for their enemies and were morale disturbers when occasionally they strafed ground forces. In the same class, but more restricted in their operations, were the pursuit machines which were maintained and operated for the defense of London, Paris and other cities. This defensive pursuit took to the air when attacking airplanes approached the cities and endeavored to intercept and destroy the attackers. Considering the employment of this defensive pursuit in the defense of London and vicinity against attacking air-

Antiaircraft artillery is the foundation of air defense

planes from December 21, 1914, to May 19, 1918, we find that a total of 1,816 machines, an average of 34 machines per attack, took to the air to intercept groups of enemy airplanes in fifty-three attacks. Ten enemy airplanes were brought down by the defensive pursuit during all these engagements and twelve of the defending machines were lost through collisions or other causes.[1] These figures deserve full consideration by those concerned with the antiaircraft defense of a terrestrial objective. Twenty years ago aviation experienced great difficulty in finding enemy airplanes in air in daylight. In darkness it was an impossible task. The task is just as difficult today. Under any condition, defensive pursuit aviation is ineffective unless it is supported by an elaborate control and illumination system on the ground. If conditions do not permit the installation of such a ground system, the wisdom of employing defensive pursuit aviation is questionable.

Haile Selassie did not possess an air force, so pursuit aviation played no part in the war in Ethiopia.

In the present civil war in Spain pursuit aviation has played an important rôle in the employment of aviation by both sides. Shortly after the outbreak of the conflict Italian pursuit successfully convoyed German bombardment airplanes in numerous attacks on Government cities and establishments—General Franco had superiority in the air. At the beginning of this year, however, Russian pursuit airplanes began to appear in numbers and by means of their greater speed and maneuverability and by sound tactical employment soon made their presence felt. By February of this year air superiority had changed hands and Russian pursuit played no small part in bringing about that change. Thus we see improvement in matériel and tactics increasing the effectiveness and importance of pursuit aviation.

We are justified in concluding from this brief review of pursuit aviation in war that that branch of combat aviation has earned a place in a properly organized air force.

Attack Aviation

Now for those airplanes which are the basic cause of airplane jitters—attack and bombardment aviation.

Many ex-members of the American Expeditionary Forces remember with emotion the red-nosed planes of the Richthofen Flying Circus which swooped down, spitting fire from machine guns at the troop columns on the roads and drove them to cover in the nearest ditch. That was attack aviation. In addition to troop columns; ammunition dumps, small bridges, cantonments, railroads and similar establishments were assaulted by this class of aviation with varying success. The airplanes and their weapons were under constant change and development as were their tactics. Toward the end of the war attack aviation approached real effectiveness and in at least one notable instance was very successful. In Palestine, Allenby dispatched a group of attack airplanes to harass the fleeing Turks. A force of the latter were caught in a narrow mountain pass by the airplanes and the ensuing slaughter and confusion were terrible.

In the Ethiopian Campaign practically all the Italian combat aviation was employed in the rôle of attack aviation and that theater of war formed a splendid laboratory for the student of attack aviation, even though the Ethiopians had no air force and few antiaircraft weapons. Troop columns, troop assembly points, caravans, towns, supply centers, and intrenched positions were attacked. Reliable reports place the effective Italian air force strength on both Ethiopian fronts at 400 airplanes of which some 350 planes were employed in the rôle of attack aviation. What was accomplished by this force? What was its effect upon the outcome of the conflict?

While not even the most enthusiastic proponent of air forces would claim that the Italian air force was, by its own powers, responsible for the Italian victory, undoubtedly the harassment and attrition caused by air attacks speeded the termination of the war and assisted the Italian high command in obtaining a decision within the span of one dry season. Of particular value were air assaults on retreating Ethiopian forces when retreats in several cases were turned into routs with complete disorganization of the fleeing forces. Note the effectiveness of attack aviation in pursuit as was the case in Palestine.

However, these results were not accomplished without loss to Italian aviation. At least sixteen airplanes were shot down by the fire of Ethiopian machine guns and rifles, and the wings and fusilages of a majority of the remainder were pierced by bullets. As the war progressed the untrained hordes of Haile Selassie lost much of their fear of attacking airplanes and instead of throwing themselves prostrate, those who possessed firearms met the aerial enemy with bullets. In addition to this active defense against aircraft, the Ethiopians soon became adept at employing passive defense. They learned to separate into small groups and seek cover in the broken ground and under trees. At the sound of an airplane motor they would rapidly clear a trail of men and animals or empty a village of its inhabitants, scatter and seek cover. They also learned to conceal their supplies and ammunition from air observation to avoid having them bombed. This use of passive defense resulted from fear and not through discipline, but was extremely effective nevertheless.

To accomplish its missions attack aviation was compelled to fly low—well within the effective range of even obsolete small arms. The attrition of attack aviation employed against modern, well-trained troops armed with great numbers of automatic small arms can well be visualized by the reader.

In the Spanish Civil War we find that both sides seem to have concentrated on pursuit and bombardment aviation to a large degree. A limited number of combination reconnaissance and light bombing airplanes constitute all the attack aviation available on either side. Frequently these planes have been reinforced by pursuit ships in engagements in support of ground forces. The value of this

[1] *Air Defence*, by Major General E. B. Ashmore, Commander, London Air Defence Area.

(attack) aviation in such employment cannot accurately be estimated at this time as reports are too conflicting. One reliable observer states that attack aviation in support of ground forces has rendered some real service but that the necessary lack of continuity of impulse in the assaults by the attack aviation—single blows without follow-up—have rendered that service a very transitory one. In the battle of Guadalajara government planes undoubtedly scored a signal success in their attack of a long column of troop-bearing trucks. There appears to have been little or no defensive fire from the ground. We cannot at this time draw any sound conclusions as to the attack aviation from the Spanish War. We do know that there has been considerable flying at low altitudes by combat aviation which has resulted in very serious airplane losses through the fire of small automatic cannon and machine guns.

Bombardment Aviation

Bombardment aviation was employed extensively from early in the World War—not in the great masses which are visualized today, but still in appreciable numbers. In three Zeppelin attacks on London in the fall of 1916 the Germans employed fourteen, nine and eleven Zeppelins respectively. In the airplane attacks they used groups of 18-18-24-26-21-18-25-18-24-18-33 airplanes, to mention several attacks. Many of these airplanes were Gothas having two motors and a wing span of seventy-eight feet. They were capable of carrying 1,000 pounds of bombs at 12,000 feet altitude. That was twenty-one years ago.

Both the Allies and the Central Powers launched bombardment attacks in each other's rear areas, particularly on munitions plants, regulating stations, ammunition depots, Zeppelin, airplane and submarine bases.

In the light of our perspective today, these attacks were certainly not decisive. On neither side was there a lack of supplies or ammunition at any time due to these bombardment attacks. The submarine bases at Zebrugge and Ostend continued to function uninterruptedly. The Mezieres-Montmedy Railroad, so important to the Germans in October and November, 1918, only ceased to operate when it came under our artillery fire, although we had air superiority at the time.

In the attacks on cities, bombardment was certainly not decisive in its action. Let us review the bombardment attacks on London as typical: First, Zeppelins were employed but such attacks were finally abandoned as being too costly. Then *day* airplane raids were employed but these ceased in August of 1917. Then *night* raids replaced the day raids until all raids ceased in May, 1918. There were no raids during the last six months of the war. The total casualties were five hundred and forty-one killed with a total property damage of $10,000,000.00.

The German aerial attacks caused the retention in England of a large defensive air force and considerable antiaircraft artillery but possibly the most important effect of the raids was the stopping of all work in munitions plants for some hours after the alarm was sounded. General Ashmore, who commanded the air defense of London after July, 1917, states that the raids enraged the populace, who called for reprisals in German territory[2]—certainly there was no effect of weakening the will to fight.

The proponents of air forces may properly say that airplanes have gone a long way in development since the World War. That is true. So let us consider bombardment aviation in the recent Ethiopian, and the present Spanish, wars.

In Ethiopia the only proper bombardment target was the railroad from Addis Ababa to French Somaliland, which was not attacked, probably for diplomatic reasons. The city of Addis Ababa was immune from attack probably for the same reasons. The Italian bombardment aviation was of necessity employed as attack aviation as previously described.

In Spain, as all are aware, there has been a great deal of aerial bombardment by both sides. They have bombed each other's cities, ammunition dumps, railroads, airdromes, and supply establishments, but still the war goes on with the armies facing each other in the dirt on the hills of Spain. The air forces engaged in Spain have been and are of considerable size and contain a large proportion of bombardment. A recent official release from General Franco's headquarters states that three hundred and fifty-five Government airplanes have been shot down or lost from other causes up to April 23, 1937. We do know that at least sixty-eight Government airplanes were lost between October 14, 1936, and January 4, 1937. Since air superiority changed hands in February, the air forces have approached equality during the conflict. Certainly a conservative estimate would credit each side with two hundred or more airplanes. For the size of the ground forces engaged in Spain the ratio of bombardment aviation engaged is probably as great as any two nations in the world could employ now, with existing air forces, and possibly for some time to come. Most of the bombardment airplanes in use in Spain are modern and the crews have had extensive training in war. There is excellent pursuit protection on both sides. We certainly are justified in drawing conclusions from the Spanish War as to the effectiveness of bombardment aviation.

Twenty years after the aerial bombardment of London, we find the effect of the bombing of a civilian population to be the same as it was in the case of London. The citizenry of Madrid have lost their initial fear of the terror in the skies—they have become accustomed to the bombing—life goes on—the morale of the citizen has not been decreased and the ground forces still remain locked in combat. One may truthfully say that the bombing of Madrid proper has been an entire waste of strength by the Insurgent air forces. The proper objective of a military force always has been and always will be the hostile force and no decisive result will be obtained by the terrorizing of a portion of the civilian population. Human beings can become used to almost any thing except dying

[2] *Air Defence*, by Major General E. B. Ashmore, Commander, London Air Defence Area.

—they are extremely adaptable and soon learn to develop resistance and a nonchalant attitude towards bombs and machine-gun fire.

Some of the bombs dropped in Madrid have been quite large, with great penetrating qualities and have been very destructive. High modern buildings have been pierced to the cellars and bombs have even penetrated to the subway where it was close to the street level. A government release states that nine hundred and eighty buildings were destroyed, 1,490 persons killed and 3,200 wounded in Madrid up to March 20, 1937. In a ten-week period Madrid was bombed thirty-three times. Some of these attacks were launched at proper military objectives in Madrid but the mass of the great destructive power was wasted. Possibly General Franco has become aware of this fact because aerial bombardment of Madrid has practically ceased.

Probably many of these attacks were launched at Madrid because the great area of that city would insure hits. Bombing has not been very accurate on either side in Spain. The bombardiers in the planes have had little difficulty in hitting those targets which cover large areas but small targets which require precision in bombing have seldom been hit. For example, the important railway station at Portbou and the high bridge at San Miguel de Culera about a mile away have often been the objective of Insurgent aerial bombardment but have emerged unscathed. No hits have been obtained and trains continue to roll over this extremely important bottleneck on the Government's main line of communication with France. This lack of accuracy in bombing could not have been due to the Government antiaircraft defense, which throughout the territory held by the Government has been deficient in quantity, notoriously defective in manufacture and has been poorly served.

An entirely different antiaircraft picture is presented over Insurgent territory. Here the German antiaircraft artillery has been consistently effective and has brought down a number of Government planes. The latter are now definitely afraid of antiaircraft fire from the ground. The German guns, electrically controlled from almost-human mechanical directors, firing with great rapidity high-explosive shells set to burst upon reaching the airplane; their small quick-firing cannon sending up shells which burst upon impact with any part of the airplane; and their rapid-fire machine guns of heavy caliber delivering streams of well-aimed fire, have provided a splendid defense against Government aircraft. One reliable report goes so far as to say that, of all the ships brought down over rebel territory, eighty per cent were destroyed by antiaircraft fire from the ground. Even without accepting these figures, all experts now agree that, in the great war laboratory in Spain, antiaircraft artillery has proved its value beyond all question and has firmly established its status as the foundation of sound antiaircraft defense.

To return to the employment of bombardment airplanes—we find that they have been consistently seeking low altitudes from which to drop their missiles. Undoubtedly the winter weather in Spain, with its heavy, low clouds, has been responsible for some of this low flying, but the increased accuracy obtainable at lower altitudes has been at least partially responsible for the bombardment operations at low altitudes. We have heard repeatedly in the press of this country of future bombardment attacks from very high altitudes—at above 20,000 feet—but while many of the bombing planes operating in Spain are modern in every respect, we see no sign of this high-altitude bombing. Probably a strong reason for the bomber seeking to operate at lower altitudes is the fact that at above 15,000 feet the crews of the bombers must be supplied with oxygen. The bombardment airplanes in Spain have been operating in large compact groups as a means of defense against enemy pursuit airplanes but these compact formations have presented splendid targets for the antiaircraft artillery guns and smaller weapons on the ground.

What have we learned from this study of the employment of combat aviation in three wars? We have learned:

First, that combat aviation cannot, by its own powers, obtain a decision in war, even when unopposed by an enemy air force;

Second, that the objectives of combat aviation must be selected with great care to avoid a waste of its strength;

Third, that aerial bombardment of civilian centers of population only results in the strengthening of the determination of that population to continue to fight;

Fourth, that modern pursuit aviation can exert an important influence in obtaining air superiority;

Fifth, that attack aviation is very effective when employed against vulnerable establishments or troops in defiles, particularly in pursuit;

Sixth, that bombardment aviation possesses great destructive powers but that precision bombing is difficult; and

Lastly, that while combat aviation cannot obtain a decision by itself, it has its rôle in warfare and, properly directed, can become a strong additional weapon in the hands of a commander; but, like that other weapon of the commander—field artillery, which combat aviation most closely resembles—it can be neutralized and rendered ineffective.

Airplanes can be stopped. There are available in the world today agencies, both of an active and of a passive nature, with which planes may be successfully combatted. The deterring effect of these agencies, together with the inherent weaknesses of airplanes, can prevent military aviation from becoming a decisive factor in warfare—can insure the safety of the great mass of our civilian population and limit aerial warfare to the zone of operation of the fighting ground forces. When we say that airplanes can be stopped we do not mean that all can be stopped. The space—the blue dome—in which they operate is so vast, so limitless, that one or two airplanes can always slip through even the strongest defense, but it must be borne in mind that but one or two airplanes cannot deliver decisive blows.

We can draw some further conclusions from our study of military aviation in war which may be expressed as follows:

First, that passive defense is an excellent means of antiaircraft defense;

Second, that the rifle of the soldier is an excellent antiaircraft weapon; and

Third, modern antiaircraft artillery fire is effective in war.

All of us are aware of the large air forces being built up by all the modern nations of the world. While estimates vary, it is believed that none of the major powers will possess, in a year or two, less than two or three thousand airplanes. These air forces will be used, make no mistake about that. If war does come we will be attacked from the air. How shall we meet these attacks?

Considering those attacks from the air which will be launched at localities and establishments on the ground in rear of the zone occupied by the fighting forces — in rear areas — we will establish a defense in the following manner (Figure 1). Observers will be located in concentric rings with stations about six to eight miles apart on each ring to send early warning to an intelligence center at the defended area of the approach of enemy aircraft. This fan of observing posts will cover all enemy routes of approach, and the outer ring of observers will be sufficiently distant from the defended area so as to give twenty or thirty minutes' warning in order to warn the defense and to enable defensive pursuit airplanes to take off from airdromes to intercept and engage the oncoming enemy. These observing posts will not be manned by soldiers, but by civilians such as lighthouse keepers, traffic policemen, letter carriers, telephone operators, and boy and girl scouts. Seaward, the observers will operate from boats equipped with radio. Such an information network was tried out in this country in 1933 and worked efficiently, and today in England, Germany, France, in Spain and in Italy, similar networks are permanent establishments and are being subjected to regular tests. When Premier Baldwin stated that England's frontier was on the Rhine, the necessity for such a network, reaching to the continent, was in his mind.

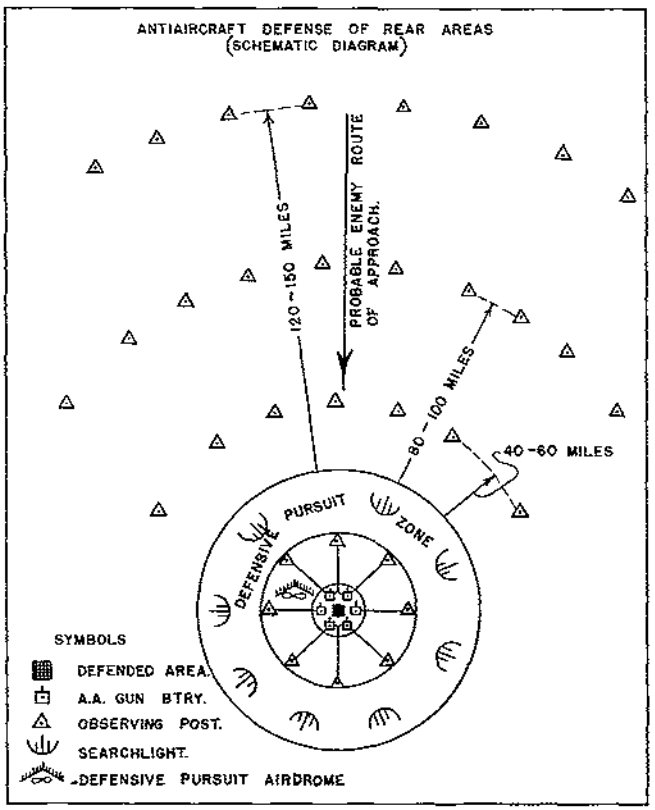


Figure 1

To return to the diagram: At night, in the zone assigned to pursuit aviation, numbers of powerful searchlights with airplane position-locators will illuminate the enemy for the pursuit. Close about the defended area will be a defense of antiaircraft artillery with its own local intelligence service; with over-lapping fire from its weapons, and searchlights to furnish illumination at night. Passive defense will be employed to the utmost. If our defended establishment is a factory, streets will be painted on the roofs of factories and factories painted on concrete streets. At night there will be absolute control of all lighting from a central control room, and also from this same room, located close to the intelligence center previously mentioned, there will be a radio transmitter to send warning to all of the approach of the aerial enemy.

Referring to Figure 2 we see a diagrammatic representation of the antiaircraft artillery gun defense of our protected establishment. In this defense the batteries are so placed that their fire is concentrated in that zone where the bombardiers must maintain the bombers at a constant speed, direction, and altitude in order to aim the bomb sight, and it will be noted that the gun defense becomes stronger as the airplanes traverse this zone and approach that point at which the bombs must be dropped. Should the bombers fly low they will be met by streams of fire from the small quick-fire cannon and the rapid-fire machine guns distributed thickly about the defended establishment. Such a defense should, from the results already obtained in Spain, make air attacks by the enemy so costly in men and machines as to shortly cause them to cease altogether.

In our training camps we will train all soldiers in both passive and active defense against aircraft. We will train them how to fire at aircraft; to fire in groups by the simple pointing of a finger by the squad, platoon or company commander; not to fire when they are alone in order to avoid promiscuous shooting; not to fire low but to wait until the airplane is nearly overhead and so avoid casualties among soldiers in the vicinity; to fire only on approaching airplanes, since an airplane which has passed presents no danger; not to fire at airplanes obviously beyond reach of their weapons, nor to fire on airplanes engaged in combat.

We will train the troops to make all their movements under the cover of darkness; to refrain from the use of lights; when moving, to break up all units into the small-

est possible groups, and to use all possible roads; we will train them so that when airplane flares are dropped overhead they will remain immobile and not look up; we will train them to use cover at all times—trees, shrubbery, houses; we will train them to arrange their camping spots in those areas covered by antiaircraft fire and to arrange their movements through such areas whenever possible, and when an open area must be traversed, to carry out all movements through those areas in small groups at the maximum possible speed.

We will tactically dispose our antiaircraft artillery guns to the best advantage and, to combat the low-flying enemy, we will train all commanders in the coördination of the antiaircraft fires of the machine guns of all branches —antiaircraft artillery, field artillery, cavalry, and so on, so as to place as widely as possible a coverage of fire over the entire area occupied by the troops. We will establish in the combat zone an aircraft warning service to fit the situation but employing the same basic principles as in the warning service established for the defense of rear areas.

Each unit from the platoon upward will employ air guards, one or two men dispatched each to the front, to the flanks and to the rear to warn by an unmistakable signal (for example, a siren) of the approach of enemy aircraft.

By those means we may effectively combat the coming air attacks—whatever may be the enemy's objective.

Have we, in the United States, the warning system, the defensive pursuit aviation and the antiaircraft artillery?

We have a splendid telephone, telegraph and radio network for our warning service. Congress, in annual appropriations, is providing for the defensive pursuit aviation. What antiaircraft artillery we have is the equal of any in the world but we have not now a sufficient proportional quantity of it to provide a sound and adequate defense in this important arm. It is possible that this deficiency in antiaircraft artillery has been due to uncertainty as to the effectiveness of antiaircraft artillery in war. Will modern antiaircraft artillery justify its use by actually destroying or neutralizing modern airplanes in sufficient numbers?

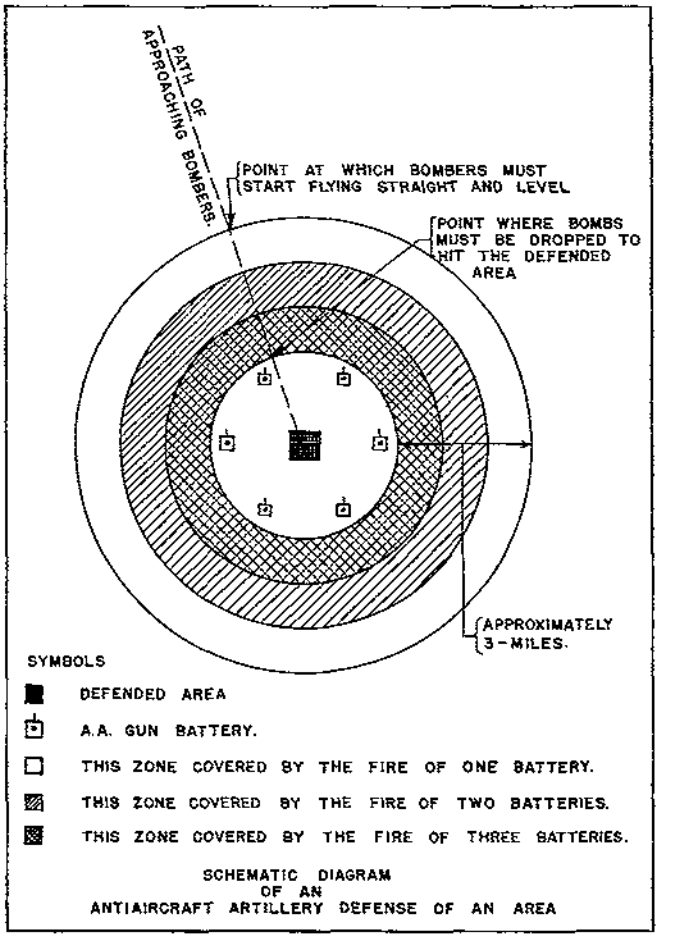


Figure 2

That question has been answered conclusively. The work of the German antiaircraft artillery in Spain has convinced military experts, without exception, of the effectiveness of this arm.

It is understood that steps are now being taken by the Government to supply the deficiency in antiaircraft artillery. Antiaircraft artillery is made of steel—it will not deteriorate but will last for decades. Any money which the Government may spend in antiaircraft artillery would be a permanent investment—a sound investment in insurance against attack from the air on our homes, our factories, our railways, our bridges, and our troops in the field.

THE STRENGTH OF AN ARMY, *like the power in mechanics, is estimated by multiplying the mass by the rapidity; a rapid march augments the morale of an army, and increases its means of victory. Press on!*—NAPOLEON.

An Eighteenth Century Foch

★ By LIEUTENANT COLONEL A. H. BURNE, D.S.O. ★

IF IT BE AGREED that the leading military attributes of Marshal Foch were a passionate belief in the virtues of the offensive, the power of *morale* and the belief that firmness of will-power commands victory, then he had his prototype in the Russian general Suvorov. By this I do not mean that the Russian partook of the moral grandeur of the Frenchman, but merely that in the above qualities Foch more nearly resembled Suvorov than any other commander of whom we have knowledge. The latter was not, taking it all in all, a great man, though efforts have been made to prove him one. He certainly had flashes of genius, but to describe him as "Next to Frederick the Great, Napoleon and Wellington, unquestionably the greatest soldier of the last half of the eighteenth century" as has been claimed for him, is to rate him too high. Three-quarters mountebank and buffoon, he paradoxically owed much of his success to this side of his character. For his untutored peasant soldiers were of the type to whom theatricality appealed. By this curious bond Suvorov held the allegiance and confidence of his troops. But his eccentricity was not entirely "put on" for the benefit of his troops; he extended his buffoonery to the intimacy of his own table and closet. A whole book could be filled with the relation of his antics. When the British Ambassador, Lord Minto came to pay him a visit of ceremony, dressed in full ceremonial attire, he was astounded to be greeted by a little wizened old man, attired solely in a pair of scarlet breeches and an extremely dirty white shirt. The English Lord describes gravely in his despatch to the Foreign Office how this repulsive object waltzed up to him, seized him in both arms and planted a hearty kiss on each cheek; he solemnly adds that with great difficulty he avoided being saluted on the lips also! The spectacle must have been comical in the extreme. Somewhat similar was the occasion when a distinguished foreigner of great stature was presented to the little man. Without the slightest hesitation Suvorov jumped on to a chair from which point of vantage he was enabled to indulge in his desired osculation. No wonder he did not appeal to English tastes and sensibilities; and it is not surprising that Minto roundly designated him "an ignorant designing mountebank" and in still more drastic terms "the most perfect Bedlamite that was ever allowed at large"; while Wickham, the English envoy, wrote summarily: "This man can never again be employed in command." Nor was he. How then can we dare to couple his name with that of Marshal Foch? At the outset it must be conceded that the above quoted strictures were occasioned at the end of his final and most harassing campaign, when Suvorov was in his seventieth year — a disastrous campaign to which his physical and mental powers had not proved equal: indeed at the climax he completely broke down and burst into tears. We can start, with a certain physical resemblance between the two commanders. The portrait in Mr. Blease's biography (the only English biography we possess) does not bring this out but the *Correspondence* of W. Wickham, the British envoy, contains an engraving that is full of "character." There is a well chiselled head, penetrating eyes, large mobile mouth and firm jaw. The note of eccentricity is present in the appearance of his hair, which bears more resemblance to the plume of a cockatoo than to anything else. Both men were also small of stature.

Alexander Vasilievich Suvorov, Count Suvorov Rimnisky, Prince Italsky.

But it is in the man's utterances, both oral and written, rather than in his personal appearance, that his resemblance to the great Frenchman is most in evidence. Both commanders were in the habit of expressing themselves in short staccato stabs, verging at times on incoherence. And not only the manner but the matter was similar. Consider the following passages, taken almost at random from Suvorov's utterances and writ-

"Attack, strike, cut down, hurra, drums, music!"

ings. "The true law of the art of war is to fall direct upon the enemy." Thus he expresses his burning faith in the virtue of the offensive. Throughout his campaigns he invariably took the offensive, till it became almost a fetish with him. "Shoot rarely, and when you do, aim. With the bayonet strike hard; the bullet misses, the bayonet does not. The bullet's a fool, the bayonet's a fine lad. . . . Never pull up in an attack." "The word 'halt' not to be used. It is neither for drill nor battle. Attack, strike, cut down, hurra, drums, music!" This astonishing sentence occurs in his instructions to the troops at the outset of his most successful campaign—that of 1799 in Italy.

His belief in the power and importance of *morale* was at least as strong as that of Foch. Imbue your men with the belief that they are more powerful than their opponents and all the rest is easy. When it was represented to him in the course of his forced march to the Trebbia that his companies had dwindled from 100 to 40 in numbers, he merely exclaimed: "Only 40 to a company? Macdonald [his French opponent] will only have 20! Forward. Victory! Hurra!"

But not only did he inculcate into his men the blind belief that they could not be defeated; he impregnated his own mind with the same almost fanatical conviction. Nowhere was this trait better exhibited than at the battle of the Trebbia—the finest achievement of his career. It therefore merits careful examination. In June, 1799, Suvorov had concentrated the bulk of his army at Alessandria on the Po, expecting to be attacked by Moreau from the south. But on the 13th he heard that Macdonald was advancing from the east, and there was imminent danger of his being crushed between the two French armies, operating on exterior lines. Suvorov instantly decided to attack Macdonald before the two Frenchmen could get within combining distance—the correct strategy of course for an army acting on interior lines. He carried out his decision with characteristic energy and speed. Pressing forward the next morning, and crossing the field that was destined exactly a year later to be the scene of the great battle of Marengo, he marched with implacable tenacity of purpose. Men fell with exhaustion by the roadside, but Suvorov galloped up and down the column, screaming: "Forward! Forward! Forward! The head doesn't wait for the tail!" His men, partaking of his own infectious spirit and determination, strode onward and actually reached the battlefield, 53 miles away, in 36 hours. If ever the French proverb: *"Tel chef, telle troupe"* was justified it was here. Marching straight into action Suvorov threw Macdonald back across the Trebbia before evening. But next morning Macdonald returned to the attack, and fierce fighting, indecisive in result, lasted all day. On the third day Macdonald once more attacked, and this time things went badly for the Russians. "All seemed lost. Rosenberg galloped up to Suvorov, who was lying on a great stone in shirt, breeches and boots. 'Try and pick up this stone,' said the Field Marshal. 'You cannot! No more can you make Russians retreat!' He told Rosenberg not to withdraw a single step and sent an order to Melas to push forward on the left." How like Foch at the Marshes of St. Gond, or at the First Battle of Ypres!

By nightfall stalemate had set in, and Suvorov's troops were utterly exhausted. His reaction to this situation was to congratulate his generals on their third "victory" and to declare that on the morrow they would give Macdonald his third lesson—reminiscent of the best Foch tradition.

But during the night alarming news came in. Moreau was coming up in the rear, and his patrols were only 25 miles distant. Next day they might even gain touch with Macdonald. What was to be done? There were three possible courses: (1) To make one last effort to drive Macdonald back, before Moreau could arrive. (2) To leave a covering force in touch with Macdonald, and go to meet Moreau. (3) To cross to the north bank of the River Po, and endeavour with its protection to extricate his army while yet there was time.

The third course seems the most prudent one under the circumstances but it was not in Suvorov's nature to retreat. Had he not, only a few days previously, sent written instructions to Bagration which included the sentence "Do you unlearn the troops how to retreat"? Suvorov therefore decided on the renewal of the offensive; again adopting the sound strategical course for an army on interior lines he decided to finish with his present opponent before turning against the new one. On the morrow, therefore, the battle was to be resumed. But when morning came the French army had vanished! Suvorov had won the greatest victory of his career by sheer moral determination. Possibly Foch had this example in mind when he emitted his dictum: "A battle won is one in which one refuses to acknowledge oneself defeated."

Before concluding I cannot resist the temptation to give a few more examples of the utterances of this picturesque and remarkable individual. The following so closely resembles one of Napoleon's most famous maxims ("Fortune is a woman, etc.") that it seems almost impossible that the Corsican cannot have been acquainted with it. "Fortune has a bald occiput, and a few dangling locks on her forehead. She travels like lightning—fail to catch her locks, never again will she return." Suvorov was fond of classical allusions; on one occasion he addressed a surgeon whose skill was not of a high order with the terse adjuration: "Cease to enrich Charon!"

He suffered much from the wobblings and interference of civilian War Councils, and his opinion of them seems to have been not dissimilar to that of Haig and Robertson. "Projectors" he called these amateur strategists. "Would that I had full power to take advantage of circumstances, and no one would interfere, especially those who have not served in war—Projectors. Take away their pens, paper and factiousness. Mollycoddles and pat-talkers!"

But Haig or Pershing would not have been so rude!

Human personality is a texture woven of many threads, and if we can divorce from our minds the vision of Suvorov the buffoon we shall find in Suvorov the soldier much that is of abiding value to the military student.

Sun, the Master, had plenty on the ball

"The wise general who acts and wins is informed beforehand"

THE MILITARY SUN ROSE EARL

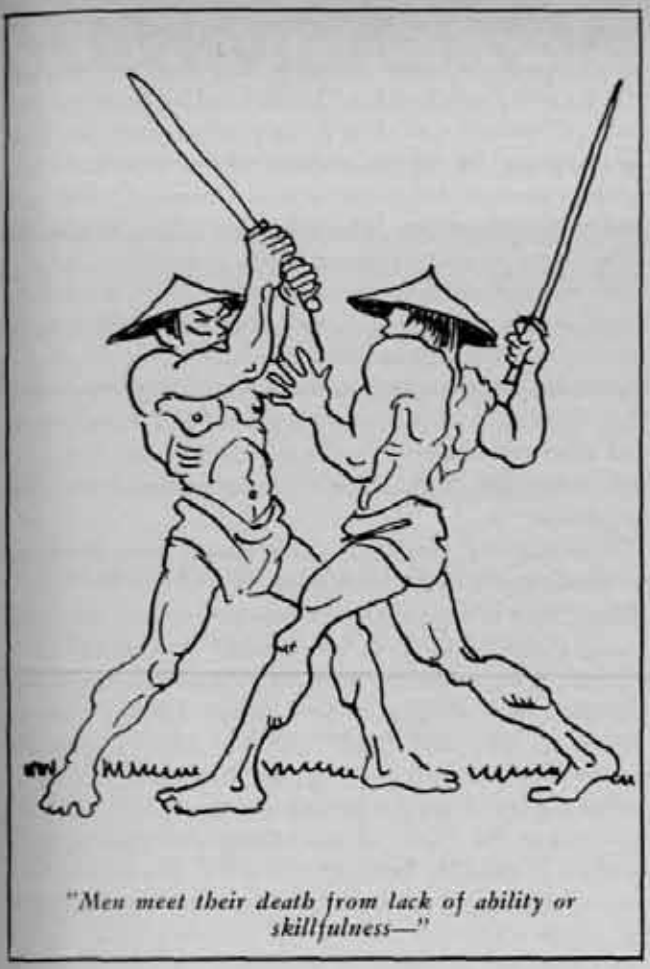
TWO thousand four hundred years ago a Chinese conducted the equivalent of our Command and General Staff School. So good was this heathen that his contemporaries respectfully and reverently spoke of him as "Sun the Master." To him they listened and his words they placed in writing. From this we have a military classic whose principles are sound and cannot be bettered. Moreover this was done when our ancestors were clad in skins and painting their bodies a brilliant blue.

What better or more striking definition of soft-spot tactics could we have than: "Water leaves dry the high places and seeks the hollows. An army turns from strength, and attacks emptiness"? It is not military jargon perhaps, but try to express the idea yourself in shorter or better terms—just try. Or could we ask for a better statement of our shop-worn, "It depends upon the situation," than "Vary the stratagem according to the circumstances." Or, where can we find better advice than "The leader who changes his tactics in accordance with his adversary, and thereby controls the issue, may be called the god of war"? That is surely good, yet it antedates by more than 2,000 years a brilliant Corsican's remorseful remark that because he failed to change his tactics he met defeat. Therefore his advice, "Change your tactics every ten years." Even Napoleon, it appears, would have profited from reading Sun.

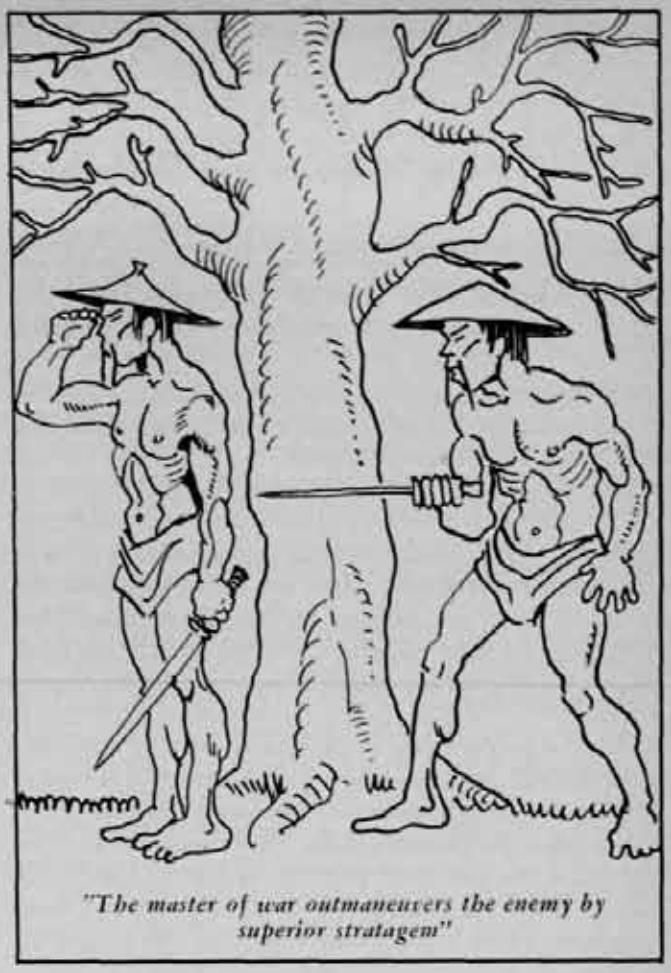
Had this *Book of War* been written in Latin some eight hundred years later, or about the time the Roman Vegetius was compiling his *Epitome of the Military Art*, the leading soldiers of the Middle Ages might still have stuffed Vegetius into their saddle bags—as has been stated recently by an historian—but the wiser and more successful ones would have carried Sun.

Sun, unlike Vegetius, was not a theoretical soldier, or a compiler of military technique. On the contrary, his principles come from a lifelong observation and analysis of a world war. Though the scope of his knowledge was vast, he knew how to synthesize—to draw principles. His vision was as penetrating as the cosmic ray. Sun's knowledge was equal to the best military thought of today. With it he won wars, not battles. For, as he observes shrewdly: "Upon one victory has an Empire been established, while those who have gained five victories have been worn out." At once one thinks of the last great war which almost wore out an entire civilization.

This amazing Chinese would have been a capable ad-



"Men meet their death from lack of ability or skillfulness—"



"The master of war outmaneuvers the enemy by superior stratagem"

N THE EAST

By Captain William H. Schildroth, INFANTRY

versary for any Roman aristocrat ever honored with the title of Imperator. Caesar may have stopped the Germans at the Rhine but had he met Sun the Master there, the seven hills of Rome would now be topped with pagodas.

Sun had an estimate of the situation simpler and better than the one used today. In it he considers the mission, the opposing forces, the terrain, and particularly, such vital intangible factors as: the personality of the general pitted against him, the type of men in both armies, the relations between the State and the Army—in short all those impalpable elements so hard to evaluate that the modern wise men seldom mention them. To Sun the rear of an army was not the line of communication but the people themselves.

Sun was also a psychologist and a good, practical one. Consequently, he makes no effort to superimpose on all, the peculiar intellectual processes of one. Neither does he advocate strapping one's mind in an iron form such as "The Estimate of the Situation." He does not contend that practice in dealing with such a form will bring one to a quick and correct decision. Not at all. Sun knew that no form for thinking can take the place of thinking. But he does say: "These things lead to victory—study them:

"Ground, the handmaid of victory.

"Ability to estimate the enemy and plan the victory.

"An eye for steepness, command, and distances.

"Knowledge of the troops, thine own and the enemy's."

What staff-ridden general assisted by a group of psychologists could better pick out the essentials for success? This Chinese soldier had plenty on the ball.

Sun was not a militarist. He knew war's horror and cost, yet he believed in preparedness, and he placed training where it belonged with this remark, "Men meet their death from lack of ability or skillfulness, wherefore training is the first requirement of war." Yet a modern statesman—mark it well—spoke glibly of waging a war with a million men who would spring to arms between sunrise and sunset. Time, sometimes, does little else except march on.

Sun was a master of open warfare. The advance on a broad front, the preconceived, predetermined maneuver, the envelopments of von Schlieffen, the conceptions of Napoleon, the offensive-defensive combinations of Wellington and Lee, were all understood by him. And he indicated that he knew, in language too simply stated to be misunderstood. Can we find fault with this:

"There is nothing more difficult than battle tactics. Their difficulty lies in the calculation of time and distance, and the reversals of misfortune." (Note the "reversals of misfortune." Was not Grouchy's delay at Waterloo one of those reversals?)

Or this—

"The master of war *outmaneuvers* the enemy by superior stratagem." Bill Sherman in the midst of the Atlanta campaign would undoubtedly have earned the praise of Sun.

Or this—

"In battle the enemy is engaged with the frontal and defeated by the enveloping force."

Or this—

"If there be four armies and each army take a different road, the enemy will be puzzled, and know not in what quarter to be prepared. Then one army will hold the enemy in front, with another cut his rear, with two more with gags in their mouths [silently] attack his weak point, whether on the right or on the left. Success is certain."

All this might easily be the latest doctrine from any modern staff school, needing only to be couched in canned language to be palatable and familiar brain food.

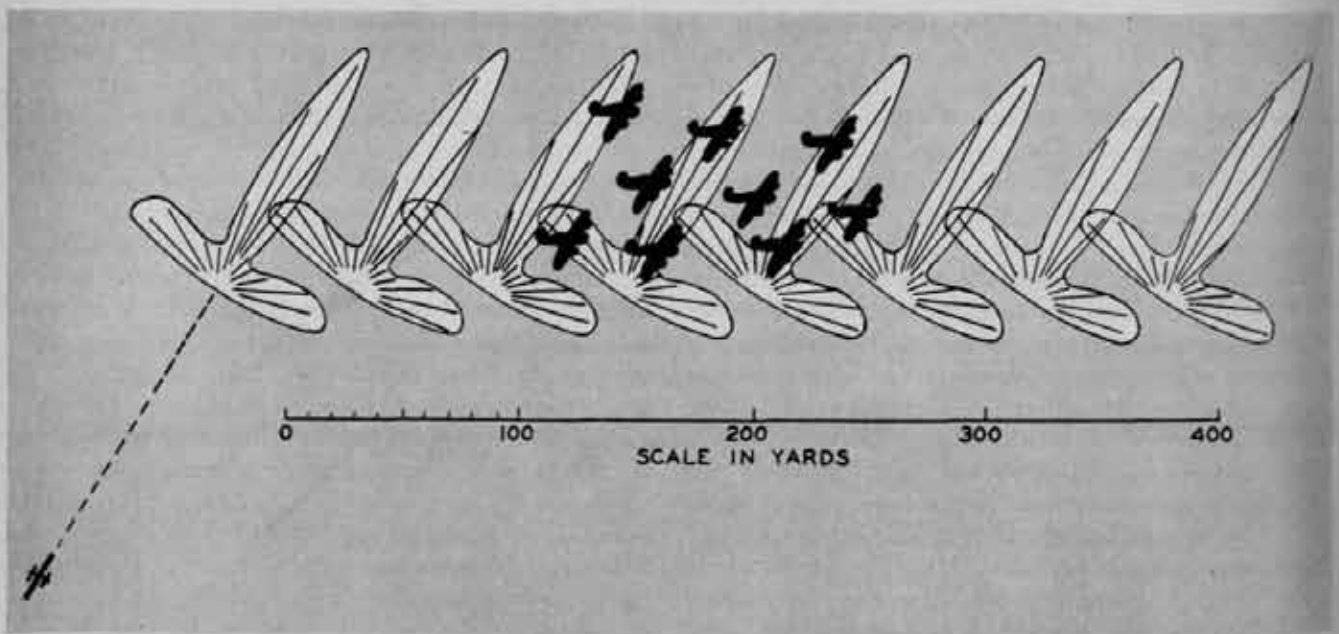
Sun was a professional soldier. He hated political interference. (Yes, the feud between soldier and politician goes back that far.) On one occasion when given a practical demonstration of his skill in order to sell his services to a king, Sun ordered the King's favorite wife to carry out certain instructions. Upon her failure to obey, Sun ordered her executed. The King remonstrated. But Sun, pointing out the danger of political and petticoat interference, insisted that the sentence be enforced. The king had to do without Sun or his favorite . . . and he chose to keep Sun. After all, there were other women.

Knowledge of the enemy, Sun wisely avers, is not to be obtained by invoking gods and demons, nor is it to be gotten by calculation or past experience. Once obtained it should be properly used. So Sun says, "It is through men that knowledge of the enemy is gained and the wise general who acts and wins is informed beforehand. For upon the knowledge of the enemy the movement of the army depends."

One may well ask, "Why, with all this store of military wisdom, hasn't China been more successful in her wars?" The answer is apparent when one understands the deadening effect of Chinese philosophy. But regardless of China's martial history, Sun the Master remains a top-flight military thinker. Indeed, many an idea that we accept as true and label "modern" was propounded twenty-four hundred years ago by the Chinese sage.

After all, perhaps the greatest lesson we can learn from Sun is that the theory of war is neither a mystery nor a modern monopoly, but that the art of conducting it is ever new, and that those few who master it carry the mark of genius.

Why They are Brought Down



Frequency and volume of bursts of a 3-inch AA battery, computed for a plane speed of 250 mph. The bombardment formation is drawn to scale.

SUMMER COMPLAINT ★ ★ ★ ★

★ ★ ★ ★ ★ ★ By Captain Gunner

ONCE MORE THE SABER has been coated with vaseline, the uniforms have been seasoned with mothballs and laid away in the footlocker, and the mental alarm clock is being adjusted to rising at seven-thirty instead of six. The 1937 ORC camp is over, and Captain Gunner, who was such a glittering figure on the parade ground, is Mr. Gunner, the mug at the third desk from the left end.

Captain Gunner returned from camp browner, seven pounds heavier, eighty dollars richer—but darn little wiser, in a military sense.

It is eleven years since he first slogged through the sand at Fort Meade as a basic CMTC candidate, and seven years since the P.M.S.&T. at the University handed him a paper that said he was a second lieutenant in the Coast Artillery Reserve. He has worked over a thousand subcourse hours, has attended innumerable lectures, and in other ways has been exposed to military larnin'.

But—and here, gentlemen, is a "but" as is a but—he has never seen a battery in march order. He has never oriented a battery. He has never taken down and reassembled a machine gun. He has never participated in a military convoy. He has never looked through an instrument at a spotting station.

Some day, the nations are going to get tired of sticking their tongues out at each other and are going to start trading punches, and how is Captain Gunner going to feel when somebody hands him two hundred men and some tentage and tells him to make a battery out of it? He's going to spend some time right then wishing that those interminable hours spent in summer training camp listening to officers from his own regiment talking on subjects covered much better by TR's and Special Texts had been spent in making the fullest possible use of the matériel and the personnel of the regular army post.

To those Olympians who sit in marble halls and decide that reserve training should be conducted by the Reserve officers themselves, I tip my hat. After all, in case of war, the Reserve officers will have to conduct the training. But why, O Lord, not confine this very fine theory to inactive training, where nothing better is available anyhow, and permit us to get the utmost from those too-infrequent summer training periods? Why force us to sit for eons in stuffy classrooms listening to one of our number spout hesitatingly on some subject he just dug out of an outdated book, when within shouting distance are regular army officers who know the subject, know it cold, and know how to present it?

Why should a Reserve captain, who for fifty weeks a year spends his waking hours drawing briefs or selling automobiles, be scheduled to give a lecture on machine-gun defense? What does he know about it that we don't? What can he learn about it that we cannot? It is unfair to him and unfair to us. All of us should be spending that precious hour listening to an officer who has worked with the problem and knows it. Or better yet, we are there with the matériel—why not go into a practical application? We can get our fill of theory back home at unit meetings. And we have no matériel at home.

No fooling, all the funny stories to the contrary, the vast majority of Reserve officers are serious about their avocation. We want to learn. We want, if war must happen, to be able to lead our troops in battle without the weight on our conscience of men killed and battles lost because of our ignorance. Our training at best can be inadequate, so why make us learn with our hands tied behind our backs? The blind leading the blind is a beautiful, touching picture, but a darned poor basis for training officers of half our wartime army.

I mean this as no criticism of the Reserve officers themselves. Those unhappy souls who deliver the lectures do their best, but their best isn't good enough. When any regular post is flooded by the milk and honey of military knowledge, why force the Reserve officers to exist on the regurgitated scraps of last winter's conferences?

At the 1937 camp of my regiment, we listened to two lectures by regular army officers, one a Chemical Warfare Service officer and the other an instructor in the Coast Artillery School. There was meat in these two talks, stuff we could sink our teeth into. We got something out of them. Of the talks (approximately ten) given by members of our own regiment, one of them was worth the time. It is significant that the Reserve major who gave this lecture is a teacher by profession, and a war veteran.

While we were sitting in the classroom, teetering on backless stools, matériel worth millions of dollars was idle, begging for us to work with it. We will not be that close to matériel for another year, many of us for several years. And I'll bet that the next time I'm on the post I'll get no closer to it than I did this time, and I'll get just as sleepy listening to the same lectures, on the same subjects.

I ask, on bended knee, that some time before M day, I may be given an opportunity to see an antiaircraft battery moving along a road, to clear a machine-gun stoppage with mine own hands, to find out what signal starts and what signal stops a convoy, to try my hand at camouflaging a position, and to try to operate a data computer wearing a gas mask. If this be too much to ask, then, O Lord, I ask that I might be transferred to some job counting shoes in the Quartermaster Corps.

Captain Gunner returned from camp little the wiser

China Tour

TIENTSIN (Above): Japanese machine gunners help a supply train through.

(Photo by Acme)

SHANGHAI: Japanese antiaircraft guns search China's skies.

(Photo by Acme)

(International News Photo)

SHANGHAI (... Japanese marine... a wary eye for ... in the world's ... largest city

HONGKEW (Left): Japanese throw up a strongpoint within the city.

TIENTSIN (Below): Japanese this dual service tank in North Chi Note railroad adapters.

(Wide World Photo)

(Press Pictures, Inc.)

PEIPING (Below): Japan goes through the wire.

PROPOSED 3-INCH AA GUN

◆ American Ordnance Corporation ◆

PRACTICAL LOADING OPERATIONS, especially those encountered during high angle firings, coupled with other essential requirements make it almost mandatory that the trunnions of antiaircraft guns be located well above the ground and well to the rear. These same requirements result normally in a comparatively long recoil.

High trunnions and long recoil cause considerable upsetting moment when a gun is fired at low elevations. To offset this upsetting moment it is necessary to provide a heavy mount and foundation or anchorage. In the past, mobile guns have, as a result, weighed as much as 15,000 to 16,000 pounds. Great weight imposes a distinct handicap on mobility and makes the operation of the gun difficult.

Mobile antiaircraft guns, because of their normal missions, should be capable of being moved with facility and rapidity. Guns with excessive weight are at a distinct disadvantage and any great reduction in weight should prove an asset.

Convinced that a solution of the weight reduction problem was possible, Commander Gregory C. Davison, U. S. Navy, retired, constructed a gun of a new and novel design. The American Ordnance Corporation 3-inch Mark III antiaircraft gun which is described in this article is based upon this design. The mount consists of a fabricated steel pedestal carrying on its upper end roller bearings on which a counter-poised beam is mounted. A long recoil with low trunnions simplifies the anchorage problem by maintaining the center of gravity of the unit in the axis of the mount at all times. The pedestal terminates at its lower end in a casting which carries roller bearings for the gun trunnions, and is mounted on heavy roller bearings on which the unit traverses 360° in azimuth. The forward end of the fabricated counterpoised beam is connected by linkage to the gun cradle and the rear end carries a lead counterpoise which balances the weight of the gun, recoil mechanism and cradle. The cradle is trunnioned at its rear end and carries the gun and recoil mechanism.

The pedestal roller bearings are housed in a steel baseplate fitted with three adjustable ground pads which serve to distribute the weight of the unit and provide means for levelling the mount on irregular ground.

An anchorage is attached to the baseplate after adjustment to uneven ground conditions has been made by means of the adjustable ground pads. This consists of three short spreaders connected by tie rods with turnbuckle connections. Additional anchorage may be obtained by ground pins and spades engaging the ends of the spreaders.

Two control stations are provided integral with the mount; one for elevation and depression, and one for training in azimuth. Each station is equipped with a telescopic sight mounted on the pedestal at a convenient height. Any system of position finding may be used as desired.

The breech mechanism is of the conventional sliding wedge, semi-automatic type whereby the opening of the breech serves to automatically eject the spent cartridge case.

The patented design of the hydro-pneumatic recoil system makes provision for large variations from normal in the gas pressure and in the quantity of oil required for operation. No spring action is involved in the return of the gun to battery and only one packing joint is necessary to maintain liquid tightness. Owing to the simple and rugged design of the system, danger of derangement in the field is minimized. The simplicity of the recoil mechanism allows for ordinary repairs by personnel in the field.

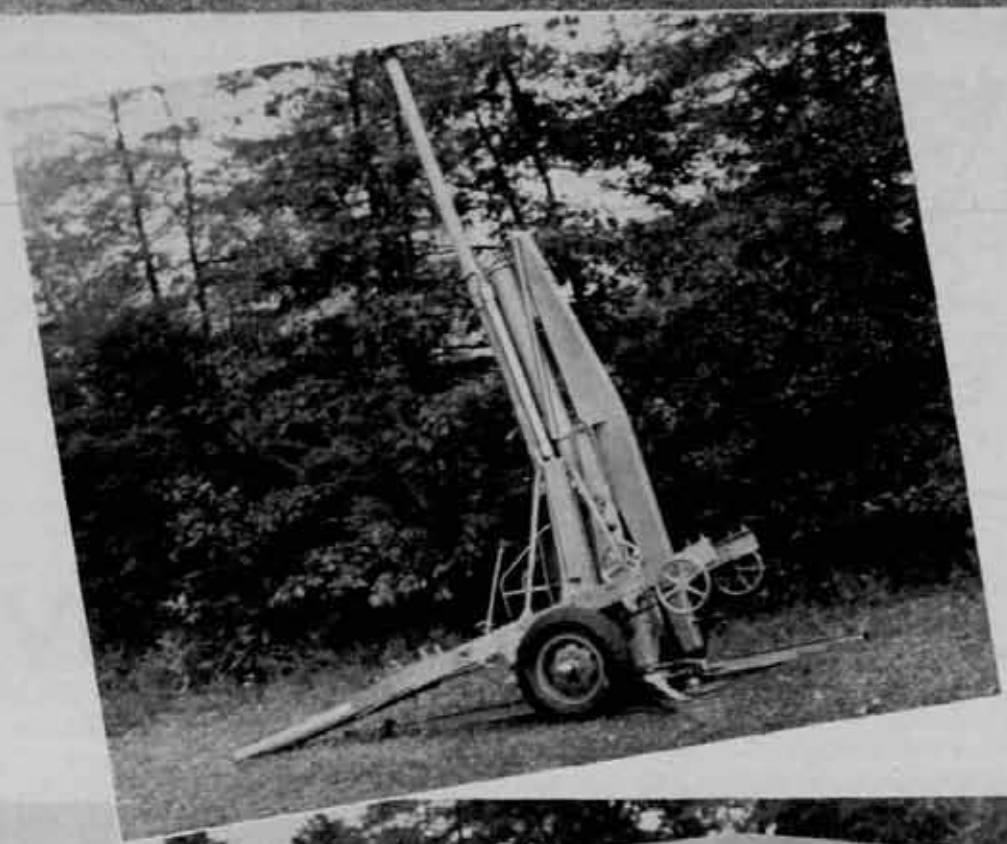
The field carriage is of the single axle type with the center of gravity of load located over the axle. The carriage, mounted on steel wheels is equipped with balloon tires, and carries the necessary mechanism, operated by handwheels, for quickly raising and tilting the gun so that it may be promptly emplaced in position.

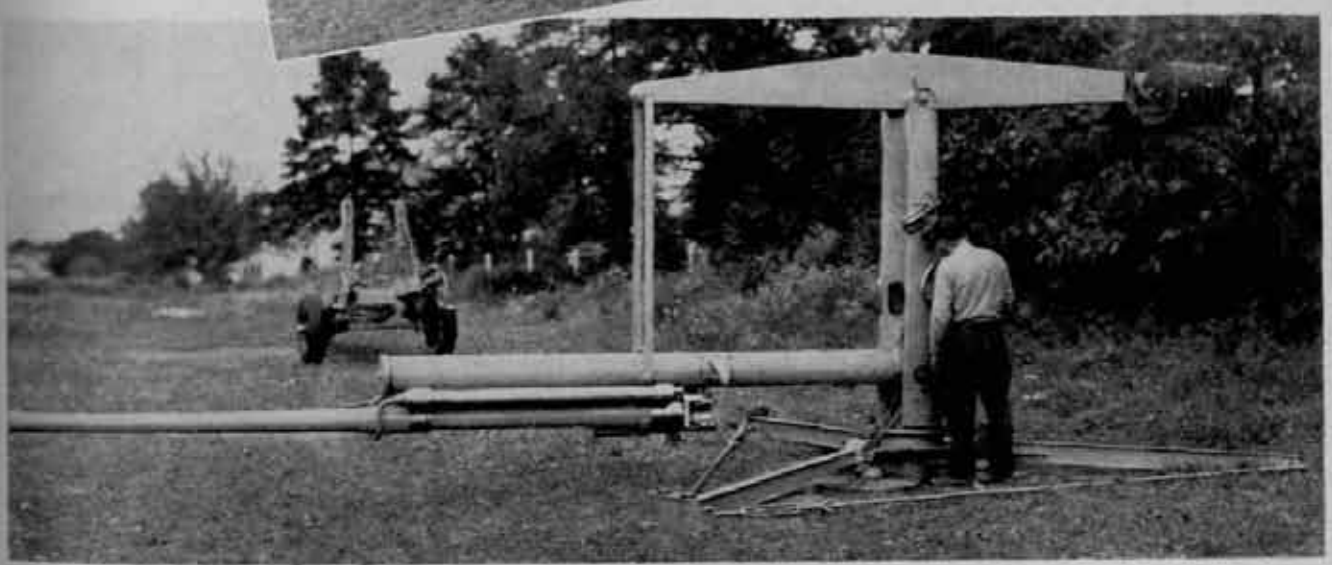
A trained gun crew can place the gun from its carrying position on the field carriage to an emplaced position ready for firing under ordinary conditions in five to six minutes.

A minimum of time is required for elevation and training due to the balanced features of the mount. The great inertia of the system as a whole provides for the elimination of many of the variable errors commonly known as "jump" and "whip."

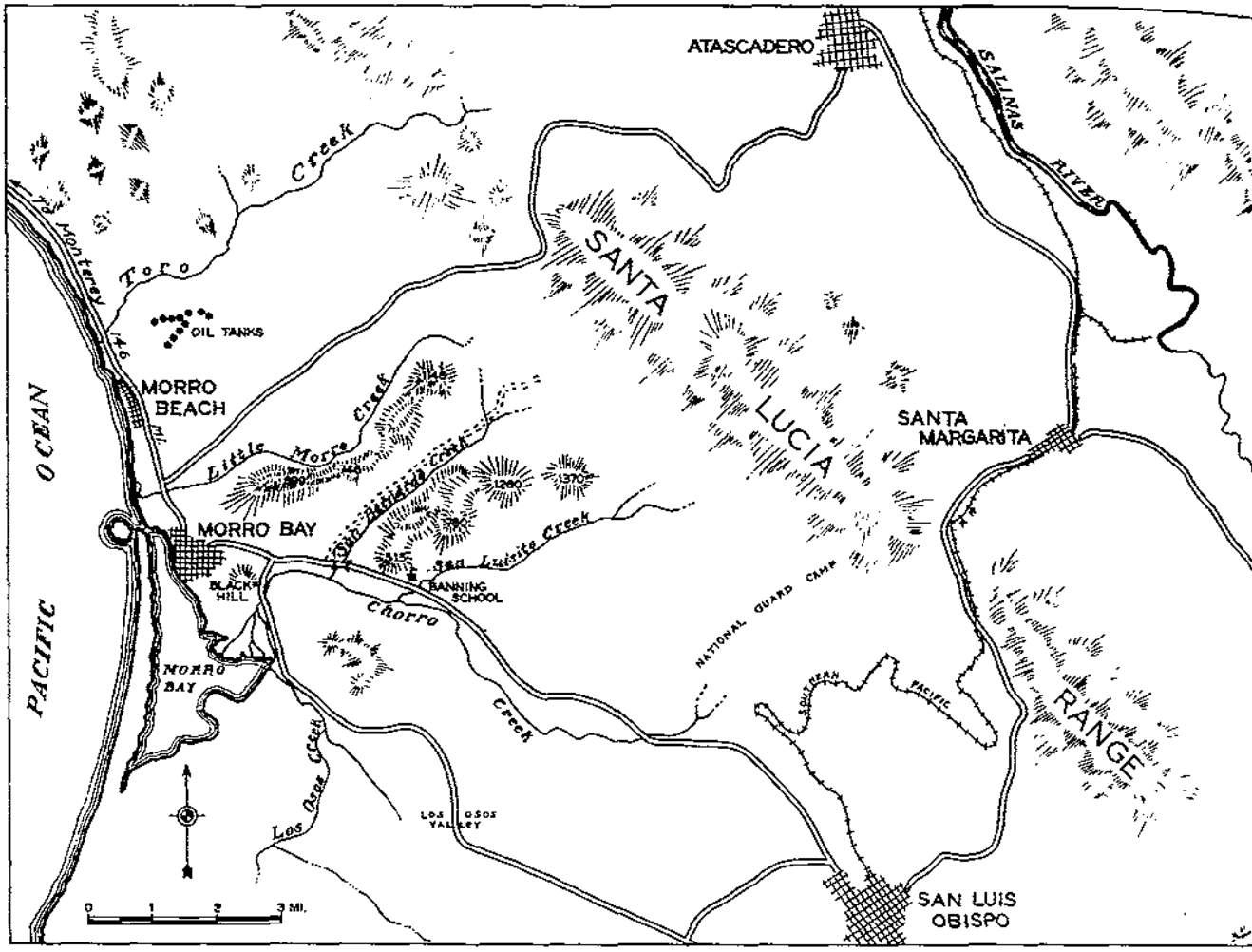
The principle characteristics of the gun and mount are as follows:

Caliber	3"
Travel of projectile in bore	128"
Weight of projectile	13 lbs.
Weight of powder charge	4.375 lbs.
Muzzle velocity	2,725 foot seconds
Muzzle energy	1,530,000 foot lbs.
Maximum pressure in bore	36,000 lbs. per sq. in.
Normal static gas pressure in recoil	800 lbs. per sq. in
Mean force of recoil	12,000 pounds
Length of field carriage	193"
Lift of elevating jacks	20.5"
Wheel tread	67.5"
Ground clearance	15.75"
Stability on side hill	45°
Elevation Range	−5° + 85°
Weight of gun and mount as transported	3,180 lbs.
Weight of field carriage	1,560 lbs.
Total weight of gun and carriage	4,740 lbs.
Weight of anchorage	600 lbs.
Weight of counterpoise	2,020 lbs.
Maximum weight separately transported	2,620 lbs.
Total weight emplaced in field	5,800 lbs.





Upper: The gun in travelling position.
Center: The gun in antiaircraft firing position.
Lower: The gun in ground firing position. This suggests use as an antitank weapon.



FOURTH ARMY MANEUVERS

By Colonel R. H. Williams, C.A.C.

THIS EXERCISE is of interest to Coast Artillerymen because units of the Regular Army, National Guard, and the Officers' Reserve Corps of the Coast Artillery participated.

The exercise was held west and northwest of San Luis Obispo, California. The terrain is hilly, rising from approximately sea level to hills over one thousand feet above sea level. Between the hills are creeks, usually dry at this time of year. Except for highways bordering the area there are no improved roads. For the most part the hills and valleys were in grass and straw. Some sub-areas were under cultivation and marked "Troops will not enter here." Heavy fogs hung over most of the area during the nights and early mornings.

The troops were divided into two forces.

BLUE

The 6th Brigade, a force of approximately 3,800, commanded by Brigadier General Walter C. Sweeney, Regular Army, consisted of Regular Army units:

30th Infantry
38th Infantry
11th Cavalry
2d Battalion, 76th Field Artillery (75-mm. guns)
3d Quartermaster Regiment (Companies A and E)
63d Coast Artillery (AA)

BROWN

40th Division, strength about 9,000, National Guard units from California, Utah, and Nevada, commanded by Major General Walter P. Story, National Guard.

Headquarters and Headquarters Detachment
Special Troops:
- 40th Tank Company
- 40th Military Police Company
- 40th Signal Company

79th Infantry Brigade
- 159th Infantry

More antiaircraft was needed

184th Infantry
80th Infantry Brigade
160th Infantry
185th Infantry
65th Field Artillery Brigade
143d Field Artillery (75-mm. guns)
145th Field Artillery (75-mm. guns)
222d Field Artillery (155-mm. guns)
115th Quartermaster Regiment (1 company)
115th Medical Regiment (2 companies)
115th Engineer Regiment (2d Battalion)
40th Division Aviation.
Attached Troops:
250th Coast Artillery (155-mm. guns)
2d Battalion 144th Field Artillery (155-mm. guns)
251st Coast Artillery (AA)

In connection with units of the National Guard, physical condition was of importance, for, with the short time in camp prior to the maneuvers, men taken from civilian occupations cannot become hardened to sustained physical effort. Moreover, the National Guard has a recruiting problem to be considered and it would seem best to avoid excessive demands during the camp period. This was one of the reasons for a daily period of suspension of the exercises.

The immediate result of the terrain selected was to give the field exercise essentially the character of an engagement in a defile where maneuver room for flanking action was either non-existent or extremely limited. This simplified the exercise and directed attention to the tactical handling of troops and gave practice in the fundamental tactics and technique of the arms rather than to major tactics and strategy.

The 40th division, although actually at the National Guard Camp, was assumed to arrive there in increments from the south. To start the exercise in a natural manner, each force was given a jump-off line, beyond which no reconnaissance or movement was to be made until specified hours. The two forces were each given offensive and defensive missions in order to promote a variety and natural sequence of types of action.

While it was believed that this would result in certain situations, the instructions to the umpires stated that the exercises would be so umpired as to leave the maximum possible initiative to the force commanders and that the amount of control would be only that necessary to attain the desired objectives without unreasonable situations.

The general situation stated that Blue had landed strong forces at Monterey, California, established a base at that point and was operating to the north toward San Francisco. Brown was concentrating in the Los Angeles-San Luis Obispo area. The organization of the Blue and Brown forces is similar, except that the strength of the Brown infantry units is about two-thirds that of the Blue. The road and railroad between San Luis Obispo and Atascadero have been effectively damaged and will not be available for use.

Special Situation Brown: The 40th Division, reinforced, is concentrating northwest of San Luis Obispo with the mission of protecting the rail facilities at San Luis Obispo and securing the oil shipping installations north of Morro Bay. On the evening of 8 August the Commanding General, 40th Division, has established his command post at the National Guard Camp and the Division Special units, less Tank Company have arrived thereat. The 159th Infantry, with 1st Bn., 143d F.A. attached, is bivouacked for the night 8-9 August east of San Luisito Creek. One company is in the Los Osos Valley. The remainder of the 79th Brigade and 143d F.A. will complete their concentration so as to be able to advance west from that camp at 12:00 noon, 9 August. The remaining elements of the division will complete their concentration so as to be able to advance west from the National Guard Camp at 7:00 AM 10 August.

Special Situation Blue: The 6th Brigade, reinforced, by the 11th Cavalry and 2d Bn., 76th F.A., has moved south from Monterey, via the Salinas River Valley, with the mission of seizing the oil tanks four miles north of Morro Bay, securing important rail facilities at San Luis Obispo and preventing any possible advance to the north. On the evening of 8 August the elements of the 6th Brigade were disposed as follows: Cavalry and artillery bivouacked for the night 8-9 August north of Toro Creek; Brigade headquarters, motorized infantry regiments and the anti-aircraft regiment bivouacked on the night of 8-9 August at Atascadero; observation squadron based at Paso Robles.

First Day

The time schedule for the exercise *after* the jump-off on the first day was as follows: Exercises to be suspended daily at the discretion of the chief umpire and to be resumed at 3:30 AM the following morning. Troops were authorized to move to bivouac at the hour of suspension but to return to their original positions by 3:30 AM the following day. This was to permit redisposition of units between 3:30 AM and daylight which normally would have taken place under the cover of darkness.

The Brown Plan, 159th Infantry, called for pushing forward a covering force of two companies to the high ground west of San Bernardo Creek north of the main road, with the remainder of the regiment to occupy the high ground east of San Bernardo Creek. One company remained in reserve near the main highway bridge over San Bernardo Creek. The other company in trucks with two 37-mm. guns and a platoon of machine guns arrived at Banning School prior to 7:00 AM but could not get by the umpire watchmen before the jump-off hour. It advanced west from the main road with one 75-mm. accompanying gun at 7:00 AM. The 37-mm. guns were mounted in trucks which advanced by leap-frogging as protection against armored cars. This detachment arrived opposite Black Hill at 7:30 AM. A squad with 37-mm. guns covered the road just north of the main highway. The remainder of the company occupied the ridge north of the road.

At 7:45 two Blue cavalry scout cars approached from the west and were held up by the Browns at the road junction northeast of Black Hill.

Umpire ruling resulted in one Brown 37-mm. gun and one Blue scout car being ruled out for 30 minutes.

By 8:10 AM a squad of cavalry approached the road junction from the west and were forced to withdraw behind cover.

At 8:25 a Blue detachment of one infantry company and a platoon of machine guns from the 38th Infantry motor reconnaissance detachment which had left Atascadero at 7:30 AM arrived at a point about 1,000 yards west of the road junction. This unit was held up by the umpires until 9:00 AM due to Brown fire from near the road junction. The position of the Brown detachment at the road junction in turn was held to be untenable and it was forced to withdraw behind San Barnardo Creek. The Blue Infantry at 9:00 AM started an attack on the Brown detachment occupying the main ridge northeast of the road junction and by 10:00 AM, the cavalry filtered over the high ground to the north of that vicinity and by 11:15 had reached the line of San Bernardo Creek.

The Blue 30th Infantry left Atascadero at 8:45 AM over the Atascadero-Morro Bay road and after being attacked by Brown GHQ aviation arrived at the road junction of the unimproved road leading into the headwaters of the Little Morro Creek at 10:00 AM. This regiment detrucked there and moved across country to the head of San Bernardo Creek Valley at about 11:30 AM, a remarkably fast detrucking operation, and short forced march splendidly executed.

Blue Cavalry had meanwhile reached San Bernardo Creek along its entire length. The arrival of the 30th Infantry on the north forced the withdrawal of the small Brown covering detachment on that flank and the maneuver was suspended at 12:00 noon on the line of San Bernardo Creek. An engagement of a cavalry detachment and a company of the 159th Infantry from Los Osos Valley ended in a stalemate in the defile just southeast of Black Hill.

The above movement of the 30th Infantry will interest the Coast Artillery. The Atascadero-Morro Bay road is seventeen miles long. In places it is well protected by covering trees. From Atascadero for a distance of approximately ten miles the road is winding and at places is cut through hills so as to practically form a gorge. High and low hills border it on both sides.

Antiaircraft machine guns were placed at advantageous places to cover all of the vulnerable areas. The .30 caliber machine guns were placed on as high ground as possible to increase their effective range. Eight .50 caliber machine guns and twelve .30 caliber machine guns were used. The 63d Coast Artillery (AA) was the antiaircraft unit. By order of the Blue Commander no camouflage of any sort was used as he wished to have the Infantry being moved over the road in trucks to actually see the antiaircraft defense provided for their protection. This was for the sake of morale.

On the morning of 9 August all antiaircraft machine guns were in position and manned. At 9:15 AM the air attack on the road began. Eighteen attack airplanes took part in the attack. They flew over the road at altitudes of approximately 200 to 600 feet, in single file, and at intervals between planes of about one-half minute. This allowed each machine gun, especially those of .50 caliber to pick up each plane at approximately 45° elevation, and extreme range, fire on it up to 90° elevation, then deliberately pick up the next plane and repeat this action for each plane in succession. Under like conditions in war it is believed the attack would have been repulsed and the majority of the airplanes destroyed.

At 2:10 PM the same day, a similar attack was made at the same place by nineteen airplanes, the only difference being the altitudes of the planes which were approximately 1,000 to 1,500 feet. It is believed also this attack would have been defeated with heavy loss to the air force.

Whether the attack was against the motorized troops or to block the road by bombs is not known.

The motor trucks with troops were moved over the road at a good speed and at considerable intervals between trucks.

Second Day

The plan of the Commanding General, 40th Division, was to employ the 79th Brigade, supported by the 143d Field Artillery, to defend the general line of San Bernardo Creek, and to cover the development of the remainder of the division. The Commander, 79th Brigade, decided to hold the position with one regiment of the 159th Infantry, keeping the 184th Infantry in brigade reserve east, preparing a second position in rear of San Luisito Creek to be used only if forced to withdraw. The 184th Infantry and remainder of 143d F.A. had arrived on the battlefield during the afternoon of 9 August.

The plan of the Blue Commanding General was to attack at daylight (4:45 AM), to drive the Browns east of San Luisito Creek and secure the line of Hill 515-Hill 1280, with regiments abreast, 38th Infantry on the right, enveloping the Brown northeast flank; the 11th Cavalry to be used to make a wide envelopment around Brown north flank.

The initial developments proceeded substantially according to the announced plans, with a few minor changes. On account of the fact that the Blue plan contemplated the employment of the cavalry outside the limits of the maneuver area, control was exercised to cause it to attack in the general direction southeast from upper end of San Bernardo Creek. The Blue commander released the 1st Battalion, 30th Infantry, from brigade reserve to the regimental commander, and designated the 3d Battalion, 38th Infantry, as brigade reserve, with location in the draw 100 yards northeast of Black Hill.

Blue troops crossed the line of departure (road along San Bernardo Creek), at the prescribed hour, encountering slight resistance in the zone of the 38th Infantry. Heavy fog reduced visibility until about 9:00 AM. The

actual result of the limitation placed on the direction of attack of the 11th Cavalry was to cause it to enter the line on the left of the 1st Battalion, 30th Infantry, or between the two front line battalions of that regiment. The cavalry moved from its initial location in Little Morro Creek Valley around by an unimproved road to the north of Hill 1148, starting at 4:00 AM, so that it arrived abreast of the 2d Battalion, 30th Infantry, on the right flank at 7:00 AM.

The attack of the 38th Infantry made more progress than was anticipated, securing a foothold on Hill 515 about 7:00 AM. The 1st Battalion, 159th Infantry, in regimental reserve, counterattacked at 7:30 in a northwesterly direction, recapturing the hill, which it held until 8:45 AM. Its withdrawal at that time was considered necessary chiefly on account of the advance of the Blue attack on Hill 780 and to the north thereof.

At 7:00 AM the remaining elements of the Brown Division started movement from the National Guard Area, artillery units in the lead. Additional artillery support commenced to enter the fight about 8:00 AM, but on account of fog, batteries were obliged to use map data for all firing until about 9:00 AM.

By 9:10 AM the Blue 38th Infantry had captured the series of knolls from Hill 515 to the north and northeast and was slowly advancing.

On the Blue left, there was considerable intermingling of cavalry and infantry units, for the reason before mentioned. This had the general result of a leap-frogging action—elements of the 2d Battalion, 30th Infantry and the 11th Cavalry both attacking in a general southwesterly direction from Hill 1370.

This pressure on the Brown right, held by the 3d Battalion, 159th Infantry, caused the brigade commander to extend the line, using the 3d Battalion, 184th Infantry, and to order a counterattack in that sector by the 1st and 2d Battalions, 184th Infantry. The latter battalions formed on an east-west line approximately 1,200 yards in length, its center about 1,800 yards south of east of Hill 780, but due to the outflanking action of the Blue cavalry approaching their right rear down the San Luisito Valley, they were forced to withdraw to positions south of the creek.

The reports from the 11th Cavalry were exceptionally frequent, clear and comprehensive. An excellent overlay of his situation was received from a corporal observer that showed visibility areas, targets taken under fire, general activity in the Brown positions, and dense troop movements within machine-gun range along the San Luisito Creek road.

The maneuver was suspended at 10:30 AM on the line of San Luisito Creek.

At 7:00 PM, 10 August, Brown GHQ 17th Attack Group (approximately 13 airplanes) bombed the Blue supply installation at Atascadero with sixty-seven 100-lb. demolition type bombs which landed in the vicinity of the railroad station doing considerable damage and setting fire to the town. As the planes had their running lights on, picking them up by the searchlight was no problem. However, if conditions existed in war as they were at this time the attack would unquestionably have been successful and with slight loss to the attackers.

Only five searchlights and four 3-inch guns were available to defend the 6th Brigade Headquarters and the railhead at Atascadero from the bombers. The weakness of the antiaircraft defense stood out like a sore thumb when the searchlights, placed around the 360 degrees of a circle with a 600-yard radius went into action. At best only five planes could be illuminated with only one battery of four guns to fire at them. It is pertinent to say here that both commanding generals needed more antiaircraft throughout the exercise and said so.

A matter of interest was the camouflage of the battery. It was situated in a field of straw, some of which was used over the camouflage nets. An air officer stated he could not locate the battery from the air. Then airplane photos of the positions were taken. The vertical photos failed to disclose the battery, but the oblique photos showed it up clearly.

Third Day

The Blue Commander's decision for 11 August was to delay the 40th Division, not at full strength, in successive positions. The first delaying position along the high ground just north of San Luisito Creek; the second position north of Morro Creek.

The delaying position was occupied by regiments abreast, the 38th Infantry on the south, the 30th Infantry on the north. The main line of resistance ran generally along the east and southeastern slopes of Hills 515, 780, 1280, and 1370.

The 3d Battalion, 38th Infantry, in brigade reserve, was to organize a position on the ridge 1,000 yards northeast of Black Hill and be prepared to occupy that position to cover the withdrawal if one should be ordered.

The 11th Cavalry was divided into two groups each composed of a reinforced squadron. The 2d Squadron was to move to positions in the draw east of Hill 1280 prepared to cover any withdrawal on the Blue north. Later, at 5:00 AM, the entire 11th Cavalry was ordered to move to a point in Little Morro Creek 1,500 yards west of Hill 699. The 1st Squadron, reinforced, arrived there at 6:50 AM. The 2d Squadron arrived at a point in Little Morro Creek about 1,000 yards north of Hill 748 at 9:36 AM, where it stopped.

The decision of the Brown Commander was to attack with brigades abreast, penetrate the Blue position and drive Blue to the northwest. Time of attack 5:00 AM. Formation: Brigades abreast, 80th Brigade on the north, the 79th Brigade on the south; the 184th Infantry and 40th Tank Company in division reserve; the artillery to support the attack; the main effort of the division to be made in the center.

The attack advanced rather rapidly against the very strong Blue position and excellent disposition of troops. At 8:40 AM, the division reserve was ordered to the woods

northeast of Banning School with orders to prepare for an attack on Hill 515, which it later was ordered to start shortly before the suspension of the maneuvers.

At 9:36 AM, the 2d Squadron, 11th Cavalry, north of Hill 748 was joined by the 1st Squadron which meanwhile had been ordered to proceed up Little Morro Creek for that purpose. Together they moved forward to block a gap in the Blue line in the center.

The maneuver was suspended for the day on a line running northeast from Hill 515 to the southern slopes of Hill 1280.

Fourth Day

Both Brown and Blue continued their plans of the previous day. During the night, Blue broke contact and withdrew to a position north of Morro Creek with covering detachments on the high ground north of San Bernardo Creek. Brown pushed its follow-up at daybreak and soon had contact with the Blue covering detachments. It immediately ordered a pursuit with main column advancing on the highway. As soon as this was started the maneuver was declared ended at 6:30 AM, without advance notice.

The mission of the 251st Coast Artillery (AA), California National Guard, was to protect the railhead at San Luis Obispo and the 40th Division concentration area from air attack. Manifestly with the equipment available—two 3-inch antiaircraft guns; one searchlight and eight antiaircraft machine guns—it was not possible to carry out this mission. However, the regiment did excellent work under the circumstances and received valuable field training. An interesting event with a good antiaircraft lesson took place during the exercise on August 9th. The Blue (enemy) airplanes bombed a forward 3-inch antiaircraft gun position of this regiment, and in the opinion of the umpire did sufficient damage to the battery to put it out of commission for the time being.

The battery was moved to an adjoining hill, emplaced under a tree and well camouflaged. A dummy battery was constructed on the old battery site. On August 10th two air bombardments were made on the dummy position, and none on the new position, much to the delight of the 251st. It was a splendid example of the value of concealment and dummy positions in warfare.

The 250th Coast Artillery (155-mm. guns), although a seacoast unit, performed in an excellent manner. Twelve 155-mm. guns were moved over the roads from San Francisco to San Luis Obispo without mishap. Heavy grades had to be conquered. During the exercise guns were placed in the tactical positions designated for them without fuss. They had to be moved in some cases over steep hills without roads of any kind. Natural camouflage was effectively used for every gun.

The final remarks of the Chief Umpire, Colonel Waldo C. Potter, F.A., are interesting and valuable. He stated:

"I want to call your attention to the following points:

"Contact between adjacent units in line must be carefully maintained in order to prevent out-flanking and infiltration. The enemy might not be as considerate as umpires were at times during these maneuvers.

"All staffs should bear in mind that they exist not only to assist the commander but that they also have the very important duty of assisting troops.

"The use of motor vehicles to transport troops in gaining contact with the enemy is apt to result in losses which are rarely offset by any gain in time.

"Fatigued troops which have been in front line action much longer than other available troops should be relieved by the latter.

"The direction and location of the main effort of a force should be such as to give the maximum results. Main efforts along Chorro Creek Valley, including a biting off of the ends of the successive ridges terminating at that valley, would have given the best results in the larger actions in these exercises.

"Do not give too much credence to rumors of what the enemy or some one else may do. Estimate the situation instead.

"And last. Do not extend your lines in either a defensive or offensive situation to the extent that the line has little or no resistance in the defense or power in the attack due to the thinness of its firepower. And use your reserves in time."

The exercise was closed by the Fourth Army Commander, Major General George S. Simonds, with the remark: "I crown Walter the Conqueror as the winner of the battle."

MANY OF YOU *have an intimate personal knowledge of war. You need not be told of its horrors, its desolation, and its destruction. All of you, I know, share my fervent hope that our country may never experience another conflict. We want only to keep the peace. In doing so we must be prepared to defend our peace. A reasonably adequate defense establishment is one guaranty against war that we cannot afford to neglect.*—HONORABLE HARRY H. WOODRING, SECRETARY OF WAR.

★ ★ ★ ★ TROPHIES ★ ★ ★ ★

THE REGIMENTAL TROPHY

NOW THAT THE scores are in and the computations completed, The JOURNAL takes pleasure in announcing the winner of the Coast Artillery Association Trophy, awarded annually to that Reserve regiment which makes the best record during the extension course school year.

For the season ending June 30, 1937, the winner is the 535th Coast Artillery (AA), an outfit from the Hoosier state, with the remarkable score of 97.50. Although the 535th was behind the 974th Coast Artillery from the Eighth Corps Area in total number of credit hours earned, it ranked higher in the computation of the three factors which are considered when the award is made. These factors are:

1. The total number of credit hours earned by means of completed extension school courses, with a maximum limit of 100 hours for any one officer.
2. Number of officers who have earned 40 or more credit hours by means of completed extension school courses during the year.
3. Number of officers who have completed the extension school courses required for a certificate of capacity for promotion to the next higher grade.

In making the computations the strength factor is based on the average monthly officer strength of the regiment from October to May, inclusive. No regiment with an officer strength of less than 20 is eligible for the award.

It will be seen that the award places a definite premium on extension school industry as related to peacetime Reserve training and preparation for war. In other words, the winners are not merely piling up credit hours; they are keeping a large number of officers on the active list (the 40-hour requirement), and are preparing officers to take over the responsibilities of the next higher grade (the certificate-of-capacity factor). Hence, the Association's annual award has a place in the training scheme of the Coast Artillery Reserve that cannot be underestimated.

This explanation is interpolated to make clear that competition of this nature is not merely an indoor sport for a few score "grinds," but rather an earnest attempt on the part of a large number of officers to prepare themselves for war.

The 535th Coast Artillery (AA) belongs to the 202d Artillery Brigade of the Fifth Corps Area. Regimental headquarters is located at Indianapolis, Indiana, and the personnel of the regiment is drawn from that state. The 535th Coast Artillery was constituted in January, 1922, therefore its battle honors remain a matter for the future.

The regiment is commanded by Colonel Bowman Elder, CA-Res., and has for instructor Major Napoleon Boudreau, CAC. Colonel Elder is a native of the Hoosier state and a graduate of the University of Pennsylvania. He was first commissioned a lieutenant in the Coast Artillery Reserve Corps in November of 1917, serving overseas from July 30, 1918, to February 22, 1919. Shortly before leaving for France he was promoted to captain. Almost immediately after his separation from the service in 1919, Colonel Elder (then captain) accepted appointment in the Officers' Reserve Corps. By July of 1926 he had progressed through the various grades to his present rank of colonel, and the command of a capable hard-working regiment.

Col. Bowman Elder

Colonel Elder has been actively engaged in many business and civic enterprises. For four years he was a member of the national executive committee of the American Legion and he headed the committee that took charge of the largest organized peacetime movement in history—the 1927 convention of the American Legion held at Paris,

STANDING OF THE CORPS AREAS

Corps Area	No. Units	Average Strength Per Unit	Total Number Credit Hours	Average Number Credit Hours Per Unit	Average Number Credit Hours Per Individual	Relative Standing of Corps Areas. (Sum of regimental ratings divided by numbers of units.)
First	15	43	13,100	873	20	20.74
Second	13	48	10,371	798	17	20.73
Third	12	75	18,873	1,573	21	25.73
Fourth	9	126	12,697	1,411	11	13.33
Fifth	8	52	7,863	983	19	21.67
Sixth	9	65	5,608	623	10	8.71
Seventh	8	98	16,883	2,110	22	37.15
Eighth	4	63	6,423	1,606	25	36.54
Ninth	19	51	32,337	1,702	33	36.16

otherwise known as the second American Expeditionary Forces.

Colonel Elder has been decorated with the Legion of Honor by France and the Order of Polonia Restitute by Poland.

The three accompanying tables give a picture of how the corps areas, the ten leading regiments in the United States, and the three leading regiments within each corps area stood when the final tabulation was made.

Major General A. H. Sunderland, Chief of Coast Artillery and President of the Coast Artillery Association, has written the following letter to Colonel Bowman Elder commanding the 535th Coast Artillery:

Colonel Bowman Elder
622 Chamber of Commerce Bldg.
Indianapolis, Ind.

My dear Colonel Elder:

I take pleasure in informing you that the Executive Council of the U. S. Coast Artillery Association has designated the 535th C.A. (AA) as the winner of the trophy awarded annually to a regiment of the Organized Reserves for outstanding performance in extension school work.

Your regiment's performance in winning this much sought after honor indicates that its members possess a very high sense of duty and that they have given freely of their own time to better prepare themselves to perform their wartime duties.

For this outstanding and meritorious performance I desire to extend to you, and through you to your officers, my personal commendation and congratulations and also those of the Coast Artillery Association.

The Secretary of our Association has been directed to order the trophy and he will inform you when it is ready for delivery.

Truly,

A. H. Sunderland,
Major General,
President.

Standing of the First Ten Regiments

	Regiment	Average Strength	Total Number Credit Hours	Score	Corps Area
1.	535th	62	4,391	97.50	Fifth
2.	974th	74	4,470	81.29	Eighth
3.	960th	65	3,469	74.52	Seventh
4.	507th	55	2,743	67.25	Seventh
5.	509th	55	2,540	63.79	Ninth
6.	6th	67	3,418	61.31	Ninth
7.	519th	54	2,650	51.01	Ninth
8.	976th	46	2,270	49.15	Ninth
9.	57th	70	2,273	47.30	Ninth
10.	977th	63	2,753	45.88	Ninth

Standing of First Three Regiments in Each Corps Area

First Corps Area

606th	37
542d	31
906th	28

Second Corps Area

514th	40
620th	28
539th	27

Third Corps Area

916th	40
503d	35
917th	34

Fourth Corps Area

13th	19
545th	17
534th	14

Fifth Corps Area

535th	98
932d	23
505th	19

Sixth Corps Area

506th	12
526th	11
532d	9.71

Seventh Corps Area

960th	75
507th	67
958th	42

Eighth Corps Area

974th	81
972d	25
69th	23

Ninth Corps Area

509th	64
6th	61
519th	51

★ ★ ★

INDIVIDUAL TROPHY

As always, the competition for the Coast Artillery Association individual trophy was keen. First place, after having been won four times in a row by a Californian, went to a hard-working officer from the State of Massachusetts. The man who took the trophy from West to East with a record-breaking score of 1,248 credit hours is Captain Karl M. Pearson, 606th Coast Artillery, of Haverhill, Massachusetts. Captain Pearson turned in a remarkable performance, his total being more than double that of his nearest competitor. Moreover, those 1,248

credit hours are not only the 1937 high, they are the all-time high for the individual trophy. Without doubt, Captain Pearson has given the future contenders for the individual trophy a mark to shoot at.

Captain Pearson is teacher of history at Haverhill High School. He is a graduate of Bowdoin College with the degree of A.B. and has received the degree of A.M. from Harvard. He is married and has two children.

His military career began in 1923 when he enlisted in the 307th Company, C.A.C. (later became Battery C, 240th C.A.) Maine National Guard. In January of 1925 he was appointed sergeant, and took the Blue Course, CMTC at Fort Terry in August of that year. He received his appointment as second lieutenant, Coast Artillery Corps Reserve in March, 1926, and has since progressed to the grade of captain, holding a certificate of capacity for major.

Capt. Karl M. Pearson

Captain Pearson is a graduate of the National Guard and Reserve Officers' Course of the Coast Artillery School and is at present enrolled in the Extension Course of the Command and General Staff School. He has participated in numerous active duty tours.

He will be remembered as the winner of the 1st Corps Area award of the Association Trophy in 1935.

Second place goes to Major Caldwell Dumas, 540th Coast Artillery, of Paris, Tennessee. Major Dumas turned in completed subcourses aggregating 510 credit hours, a highly creditable performance in any Extension Course competition.

The rest of the story is told by the accompanying tabulation, which lists the high man in each of the nine corps areas. The Executive Council and The JOURNAL extend sincere congratulations to these nine industrious Coast Artillerymen. Major General A. H. Sunderland, Chief of Coast Artillery and President of the Association, has voiced his appreciation in the following letter to each of the winning officers:

August 2, 1937.

Captain Karl M. Pearson, 606th C.A.
86 Montclair Road
Haverhill, Mass.

My dear Captain Pearson:

The U. S. Coast Artillery Association is to award a saber to the Coast Artillery Reserve officer in each Corps Area who has accumulated the greatest number of credit hours during the last school year by means of completed extension school work.

It is a pleasure to inform you that you have been designated as the winner of this trophy in the First Corps Area.

I wish to thank you for your professional zeal and interest and to commend you for the excellent results attained. It is hoped that your fine work will serve as an example and an incentive to others.

In due time, the saber will be forwarded to you by the Secretary of the Association.

Truly,

A. H. SUNDERLAND,
Major General,
President.

Corps Area	Name	Organization	Address	No. Subcourses	No. Lessons	No. Hours
First	Capt. Karl M. Pearson	606th CA	86 Montclair Road Haverhill, Mass.	59	420	1,248
Second	Capt. Harold L. Stiebel	620th CA	Apt. 13-C, 1 Fifth Avenue New York, N. Y.	6	68	187
Third	1st Lt. James M. LaVier, Jr.	916th CA	3219 Park Ave. Richmond, Va.	4	71	189
Fourth	Major Caldwell Dumas	540th CA	403 Washington Ave. Paris, Tenn.	7	46	510
Fifth	1st Lt. Paul E. Middleton	535th CA	308 West Ohio St. Indianapolis, Ind.	19	123	305
Sixth	1st Lt. John D. Flewelling	526th CA	312 Mary St. Union City, Mich.	4	34	232
Seventh	1st Lt. Frederick W. Hayer		506 South Denver Kansas City, Mo.	10	67	185
Eighth	1st Lt. Henry E. Stradley, Jr.	974th CA	1269 Clayton St. Denver, Colorado.	24	168	469
Ninth	Capt. William P. Robinson	519th CA	324 South Venita Pasadena, Calif.	18	134	401

Coast Artillery Activities

OFFICE OF CHIEF OF COAST ARTILLERY

Chief of Coast Artillery
MAJOR GENERAL A. H. SUNDERLAND

Executive
COLONEL JOSEPH A. GREEN

Personnel Section
MAJOR CLARE H. ARMSTRONG

Matériel and Finance Section
MAJOR C. W. BUNDY
MAJOR H. B. HOLMES, JR.
MAJOR S. L. MCCROSKEY

Organization and Training Section
COLONEL HORACE F. SPURGIN
MAJOR AARON BRADSHAW, JR.
MAJOR W. H. WARREN

Plans and Projects Section
LIEUT. COL. JOHN L. HOMER

Notes from the Chief's Office

THE Secretary of War announced recently that all Coast Artillery organizations, except antiaircraft machine-gun batteries, are to be armed in both peace and war with U. S. caliber .30 rifles and an appropriate number of automatic rifles. This affects the basic allowances of antiaircraft, tractor drawn and railway regiments and mine planters, although a great many organizations already have rifles for ceremonies and other purposes. Organizations in foreign possessions will continue to be armed according to special tables of organization. The exact number of automatic rifles per organization has not yet been decided. When this is determined it will be announced through the medium of changes in tables of basic allowances and tables of organization. The principal reason for this change is to provide a more efficient weapon for individual protection against low-flying hostile aircraft. The Field Artillery has allotted approximately six automatic rifles to each battery in lieu of machine guns previously assigned for the antiaircraft protection of the battery. The next step, though not yet approved, is the authorization of small-arms firing by Coast Artillery troops against towed aerial targets. The Infantry now conducts such firings.

* * *

An antiaircraft machine-gun battalion, consisting of a headquarters and headquarters battery and two machine-gun batteries, is to operate with the new infantry division that is to be tested in the VIII Corps Area in September. No antiaircraft artillery is at present an organic part of the test division. The personnel of the machine-gun battalion will be furnished by the 69th Coast Artillery (AA) stationed at Fort Crockett, Texas. Each machine-gun battery will have six caliber .50 machine guns per platoon instead of four. It is anticipated that as a result of the test much valuable information will be obtained both as to the proper organization of an antiaircraft machine-gun battery and the tactical employment of the battalion when operating with a mobile force in the field.

* * *

Tables of organization for railway artillery are being revised at the Coast Artillery School. The present tables do not show both the peace- and wartime allotment of personnel and major articles of equipment in the same table and do not include the requisite break-down of the various subdivisions of each unit. When approved the tables will be valuable in determining matériel requirements and planning.

* * *

The following texts on the tactical employment of antiaircraft artillery have been prepared during the past year. Heretofore there have been only two texts, the *Field Manual* and *Special Text No. 34, Tactics and Technique for Antiaircraft Artillery (1933)*; the latter is to be replaced by the revised *Field Manual*, as a text for Army Extension Courses.

TITLE	PREPARED AT	FOR SALE BY
The Tactical Employment of Antiaircraft Artillery in the Independent Division and Corps.	Command and General Staff School, Fort Leavenworth.	Command and General Staff School, Fort Leavenworth.
ANTIAIRCRAFT DEFENSE	PREPARED AT	FOR SALE BY
**Coast Artillery Field Manual, Volume II, Antiaircraft Artillery, Part One, Tactics (Revised)*	Coast Artillery School, Fort Monroe.	Superintendent of Documents, Government Printing Office, Washington, D. C.

*It is anticipated that the *Field Manual* will be ready for distribution by the Adjutant General some time prior to July 1, 1938.

Approximately fifty per cent of the target practices for 1937 have been received in the Office, Chief of Coast Artillery and have been forwarded to the President, Coast Artillery Board, for complete analysis. The scores in most cases are higher than those obtained in 1936 and show a marked improvement in some localities.

* * *

A new Table of Basic Allowances, Coast Artillery Corps, was published on July 1, 1937. In this revision of the table, equipment for training purposes is listed in a section separate from the sections for the various supply services. Copies of the tables have been distributed and should now be available to all Coast Artillery organizations.

* * *

The first of the new M-4 antiaircraft directors will be delivered to the Coast Artillery Board for test some time in September, 1937. The M-4 director is quite similar, in principle, to its predecessor the M-3. However, it differs quite radically in mechanical features. It is smaller and lighter, and includes several refinements never before seen in director construction. In designing the new director, particular attention was paid to reducing the problems of quantity production, which have heretofore caused some worry. Also every effort has been made to eliminate the undesirable features of preceding types. Preliminary examination and tests indicate that the M-4 director represents a real advance in director design.

* * *

Reports from the field indicate certain shortcomings in standard antiaircraft searchlight equipment. Two of the most important of these are discussed below.

a. Loss of Orientation. Experience has shown that the orientation of the searchlight with respect to the control station and sound locator is frequently lost due to various causes, perhaps the most troublesome of which is the low voltage in the D.E.C. circuits during the period the arc is being struck. Also it has been reported that operation of the searching hand wheel causes a cumulative loss of orientation too great to be tolerated. To overcome the difficulties a new method of control has been devised, which provides for a continuous check back, at the control station, showing the relative position of searchlight and sound locator at all times. Any loss of orientation can therefore be noted and corrected at the control station. In order to reduce the difficulties with equipment already in service it is proposed to provide new power leads for the D.E.C. long enough to be connected at the power plant instead of at the searchlight. The greater part of the IR drop, during the arc striking period occurs in the searchlight power cables. It is expected that the proposed change will provide voltage in the D.E.C. sufficiently high to operate the central system even while the arc is being struck.

b. A zinc alloy metal is used in the selsyn motor frames and end brackets. This metal has a tendency to grow or deform and cause binding of moving parts. Such condition has been particularly troublesome in the Panama Canal Department. A program for the early replacement of these frames and end brackets has been inaugurated.

Fort Monroe

BRIGADIER GENERAL JOHN W. GULICK, U. S. Army, *Commanding*

COLONEL W. E. SHEDD, JR.
Commanding, Harbor Defenses of Chesapeake Bay and 2d Coast Artillery

COLONEL EUGENE B. WALKER
Commanding 51st Coast Artillery

LIEUTENANT COLONEL FREDERICK A. PRICE
Commanding 52d Coast Artillery

By 2d Lieutenant H. Bennett Whipple

COLONEL HORACE F. SPURGIN, harbor defense commander and post executive has been ordered to the office of the Chief of Coast Artillery effective September 1st. The post keenly feels the loss of a capable and fine officer but at the same time rejoices that the incoming harbor defense commander is a replacement of such high standing. Colonel William E. Shedd, Jr., now President of the Coast Artillery Board, comes to the harbor defenses on October 1st. Colonel Shedd is popular, of high professional reputation, and the defenses are glad to welcome him.

In the meantime, Colonel Eugene B. Walker, 51st Coast Artillery, holds down the position of harbor defense commander in addition to his other duties. This is a strenuous season for our new commanding officer for the summer camps are breaking up, reports must be rendered and a great deal of work must be done with the batteries to get them back in shape after a hard summer.

COAST ARTILLERY SCHOOL

The school season has returned once more. Some forty officers are moving on the post and are trying to get their households organized so they can study efficiently when the time comes. Many students will find it difficult to find quiet spots in their quarters, especially those living on the top floor of the 100 building and those with children living in the Tuileries. There is little possibility that these officers will draw better quarters during the school year. The reason for the scarcity of quarters is the fact that our bachelors are getting married. There are very few regular officers slated for Randolph Hall this year.

Left: Cadets sightseeing at Fort Monroe. Right: Midshipman and Cadet, aboard U.S.S. **New York** *in Hampton Roads.*

The Cadet Visit

The Cadets arrived on August 14th for a seven-day stay during which period the post was turned over to them. Three Coast Artillery officers accompanied the Cadets, Major A. H. Campbell, Captain Donald McLean, and Lieutenant E. W. Hempstead. These officers worked hard to make the Cadets see the Coast Artillery as it really is. The Cadets entered Fort Monroe on their "special" being proudly pushed by our noisy whistle-tooting "General Pershing." A few words spoken by General Gulick welcomed the young men to the post and giving them an idea of what to expect. A tour of the post and a lecture on antiaircraft by Major R. M. Mackin finished the day for the Cadets. The training of the Pointers was in the hands of Major Paul French who had for his assistants the four battery commanders concerned in the firing: Captain M. W. Tracy and Lieutenant W. F. Spurgin with 155 batteries, Captain V. M. Kimm with his 8-inch railway gun battery and Lieutenant A. C. Peterson with his 3-inch A.A. outfit. The Cadets fired excellent shoots with each type of armament and in addition each one had a crack at machine-gunning a sleeve target towed by a plane. The West Pointers worked very hard during the day, so hard in fact that it was surprising to witness how many turned out for the evening's activities. Groups visited the U.S.S. *New York* anchored in Hampton Roads, the shipyards at Newport News where they went aboard the new carrier U.S.S. *Yorktown*, and historic spots on the Peninsula.

The Chamberlin Hotel entertained the Cadets on the roof one night with a good orchestra and a snappy floor show. All other nights, except one reserved for a moonlight sail on the mine planter, were spent dancing at the Beach Club. The weather, the personnel of the post, the neighboring town and even the moon, were all dominated by the Cadets, and seemed to enjoy it. General Gulick invited the Midshipmen, whose squadron was anchored in Hampton Roads to all Cadet activities.

Immediately after the departure of the Cadets, Lieutenant A. C. Peterson left the A.A. battery which he commanded and became aide to General Gulick. Lieutenant A. L. Fuller, former aide, joins this year's class at the School.

Captain O. H. Kyster takes over Lieutenant Peterson's battery during an important period. On September 1st, Battery "C," of the 2d moves to Fort Story for two months where it will be utilized by the Coast Artillery Board for various antiaircraft tests. Three Coast Artillery Board officers are in charge of the tests. Captains Hobart Hewett, C. H. Van Schuyler and Fred Chamberlain.

West Point Preparatory School

The Third Corps Area West Point Preparatory School opens at Fort Monroe on September 13th. Applicants from Bolling Field, Fort Belvoir, Fort Hoyle and many other stations have taken the entrance examination in the past few days. Sixty-one of the ninety-odd applicants are stationed here. Captain Lloyd Shepard, post school officer and 2d Lieutenant H. J. Katz, the senior W.P.P.S. instructor for the coming year, have been completing the task of grading the entrance examinations. The reputation of this Fort Monroe school reaches greater heights each year. Last year every man selected to represent the

school at the end of the term passed mentally and only a few were tossed out because of minor physical defects. Over and above those men who actually represented this school there were many who obtained Congressional appointments and qualified mentally in the entrance examination. It is hoped that the school for next year will better the record of the last school.

Navy Party

On August 23d Admiral Wilson Brown, in command of the Midshipmen Training Squadron, invited the Commanding General and the officers and ladies of the post to a dance aboard the U.S.S. *Wyoming* and the U.S.S. *New York*. The mine planter *Schofield* carried the party to the Naval Operating Base from which point the group was gathered up by the Navy. The Army and Navy have been enjoying each other's company on many recent occasions at the Fort Monroe Beach Club, the Chamberlin Hotel and on the Navy side of Hampton Roads.

Arrivals and Departures

Since the first of the year practically every office has new occupants, from that of the commanding general on down to that of the lowest ranking second lieutenant. Colonel W. S. Bowen becomes president of the C.A. Board, Colonel W. R. Nichols replaces Lt. Colonel G. F. Moore as executive, Third Coast Artillery District. Colonel Moore is now stationed at Texas A. & M. Colonel Reginald Cocroft is now on duty with the O.R.C. at the Third C. A. District and Major Lloyd W. Geoppert replaces Major Bucher as post adjutant.

All in all, a resident of Fort Monroe six months ago would feel a stranger among the present personnel. Captain J. D. Moss of "A" Battery of the 2d is the only battery commander who was with his battery three months ago. As one high ranking officer stated: "Fort Monroe is not a model Coast Artillery station, it is merely a transient camp for officers coming from and going to foreign service and the Coast Artillery School."

Hawaiian Separate Coast Artillery Brigade

Brigade Commander, Brigadier General James A. Woodruff

Chief of Staff, Colonel Robert Arthur, C.A.C.

S-1, Major M. S. Daniels, A.G.D.
S-2, Captain William H. Dunham, C.A.C.
S-3, Lieutenant Colonel Ralph E. Haines, C.A.C.
S-4, Lieutenant Colonel Arthur E. Rowland, C.A.C.

Lieutenant Colonel Henry C. Davis, Jr., C.A.C.
Com. and Engineer Officer

Colonel Ralph M. Mitchell
Sixty-fourth Coast Artillery (AA)

Harbor Defenses of Pearl Harbor
Colonel Earl Biscoe
15th C.A.

Harbor Defenses of Honolulu
Colonel G. A. Wildrick
16th C.A.

By Lieutenant John J. Stark, A.D.C.

Aloha Review for General Drum

THE outstanding event of the July-August period was the Aloha Review for General Drum, who left this command on the July 30th transport. The review was the largest held to date and presented a magnificent spectacle out on the famous division review field at Schofield Barracks.

The brigade, under the command of Brigadier General J. A. Woodruff, took part in the review as follows:

The antiaircraft regiment, under the command of Colonel Ralph M. Mitchell, 64th C.A. (AA); the harbor defense regiment under the command of Colonel Earl Biscoe, 15th C.A.; and the 155-mm. regiment under the command of Colonel George A. Wildrick, 16th C.A. The entire brigade gave a display of precision, snap, and modern artillery equipment seldom seen. The units which stole the show, according to spectators, were the massed band of this brigade and the 41st Coast Artillery

In the reviewing stand at the Aloha Review for General Drum. Left to right: Colonels Ulio, Prichard; Generals Woodruff, Foy, Moses, Trott, Drum, Major; Governor Poindexter; Admiral Murfin

Aloha Review for General Drum—41st C.A. (8-inch railway guns) passing in review.

railway battalion, which steamed by the reviewing stand drawn by its own vividly painted locomotive. Other outstanding and interesting features included the regimental commanders' shiny new cars which had just arrived, and the mechanized antiaircraft equipment with which the 64th Coast Artillery (AA) is equipped. The massed band was composed of the three bands from the downtown posts — Forts Shafter, Kamehameha, and Ruger. It presented a striking appearance with its brilliant red helmets and red cross-belts and, of course, was the largest single band of the six or more that took part in the review. With the exception of the massed band, the entire brigade was motorized, much to the chagrin of the doughboys of the Infantry brigades who filed by under their own motive power.

The largest crowd ever to visit a review at Schofield Barracks attended the spectacle, and the many notables included Governor Joseph B. Poindexter of the Territory of Hawaii, Rear Admiral Orin G. Murfin, commanding the local naval establishment, and other prominent civil and military officials. The massed formation was commanded by Major General Andrew Moses, who commands the department.

Fort Kamehameha recently had the honor of bestowing the Silver Star and Purple Heart for meritorious service in the World War upon one of its soldiers—Staff Sergeant Gawril Kosewich. The presentation was made by Colonel Earl Biscoe, commanding the harbor defenses of Pearl Harbor, and the entire harbor defenses passed in review in honor of the newly decorated sergeant.

Summer Target Practice

While most of our brothers-in-arms in other parts may be sweltering under the summer sun, the cool trade winds are blowing in Hawaii and our summer target practice season is being carried out under very pleasant climatic conditions. Some of the antiaircraft searchlight and gun battery commanders may take exception to this statement but, on the whole, the climate over here remains balmy.

Many outfits have not completed their target practice seasons, and we list their scores below:

Org.	*Armament*	*Battery Commander*	*Score*
A 41	8" Railway	Captain Wm. A. Weddell	54.1
B 41	8" Railway	Lieut. Robt. F. Tomlin	73.7
B 15	12" Barbette	Captain Carl W. Holcomb	198.1
C 15	Ex-Calibre 155-mm.	Captain Paul A. Jaccard	146.5
A 15	Ex-Calibre 155-mm.	Captain Paul A. Harris	128.0
I 64	.50 Caliber MG	Captain Frederic L. Hayden	116.1
			101.5
			82.5
			157.0
			87.9
			55.5
	.30 Calibre		142.8
			159.8
			110.9
	.30 Calibre (Night time, without illumination)		27.7
			45.6
			35.8
A 64	AA Searchlight	Captain John I. Hincke	207.2
			205.5
			205.7
E 64	AA Searchlight	Captain Leslie W. Jefferson	198.6
			198.0
			195.1

Several batteries from Forts Ruger and DeRussy have just completed their additional antiaircraft searchlight practices and we should be able to include their scores in our next letter.

Corregidor

BRIGADIER GENERAL P. P. BISHOP, *Commanding*
COLONEL T. A. TERRY, C.A.C., *Executive*

59th Coast Artillery
COLONEL GEORGE RUHLEN

60th Coast Artillery
COLONEL J. H. CUNNINGHAM

91st Coast Artillery (PS)
LIEUTENANT COLONEL R. S. DODSON

92d Coast Artillery (PS)
LIEUTENANT COLONEL ALBERT H. WARREN

By Major R. E. Phillips, C.A.C.

TWENTY INCHES of rainfall in July, most of it in the last week, brought Corregidor's rainy season record up to average, after a rather weak start. Typhoon signal number 2 was hoisted July 2d and again on July 21st. Nothing violent developed either time and after two or three days of moderate wind and rain, outdoor activities were resumed in full. Demands of the newcomers to be shown a real typhoon remain unfilled thus far.

The golf course is being used about to capacity and badminton in the Club retains its popularity with all those who despise a sunburn.

The high points during the quarter were the trips by the 59th and the 60th Coast Artillery to Manila, to march in the parade on July 5th, and the visit of the United States High Commissioner, the Honorable Paul V. McNutt, on July 14th. The High Commissioner's party included Colonel R. W. Briggs, chief of staff of the Philippine Department representing the department commander, military aides and wives of the visitors. The garrison devoted itself exclusively to the entertainment of the visitors with a fair degree of success as evidenced by the following letter:

My dear General Bishop:

While the memory of our very pleasant visit to your post is fresh in my mind, I wish to record the splendid impression your command made upon me and all members of my party. The program you planned afforded us an exceptional opportunity to see one of the largest posts in the Army administered as I think one should be administered. We were also struck by the soldierly appearance of your men, both in and out of ranks, as well as by their thorough knowledge of their duties in carrying out the various demonstrations. Efficiency of the highest order was reflected in all that we saw.

As General Holbrook was unable to be present, I have taken the liberty of sending him a copy of this letter.

Mrs. McNutt joins me in kindest regards to you and Mrs. Bishop.

Very cordially yours,
(Signed) PAUL V. MCNUTT,
United States High Commissioner.

The party arrived about 10:30 AM and made a motor trip around the island stopping to inspect various beach defense, submarine mine, seacoast and antiaircraft artillery installations. The 60th Coast Artillery paraded its armament and vehicles and six troops of uniformed Filipino Boy Scouts staged a demonstration on the Topside Parade which won extended applause of the High Commissioner and all the spctators.

After lunch a formal review was tendered the High Commissioner followed by a reception at the Club. The party departed for Manila at 5:00 PM, after many expressions of pleasure and thanks.

A check-up following arrival of the July 3d transport showed all but three of the officers' quarters to be occupied. All the newcomers went to the regiments. The sailing of the *Grant* meant little to the garrison since all our people had departed long since for visits to Japan and China where they were scheduled to board the transport.

The annual meeting of the Club on July 26th resulted in the election of the following to the new Board of Directors:

Major R. E. Phillips, C.A.C.,
Major J. J. Firestone, Q.M.C.,
Major M. E. Conable, C.A.C.,
1st Lieutenant K. J. Woodbury, C.A.C.

An abundance of items from the regiments necessitates curtailing of this general report in their favor.

Escort of Honor for High Commissioner McNutt at Corregidor

Fifty-Ninth Coast Artillery

By Major E. R. Barrows

The primary mission for June and July was the instruction and qualification of gunners. Final reports are not yet available but a high percentage of qualifications is expected. Instruction on antiaircraft machine guns has been started. We hope to beat last year's excellent record. Some time was devoted to close order drill using a special mass formation in preparation for the 4th of July parade in Manila. Five batteries of the 59th and four of the 60th formed a provisional regiment, commanded by Major Morgan. After being reviewed by High Commissioner McNutt, General Holbrook and other military and civilian dignitaries the troops were formed on the New Luneta and listened to an address by the High Commissioner. The 59th furnished the regimental commander and one battalion for the escort of honor when High Commissioner McNutt visited Corregidor on July 14th. The regiment participated in the brigade review for the High Commissioner. Everyone spoke very highly of the appearance and marching of the troops.

The first typhoon of the season greeted the July transport with the result that she was late in arriving at Manila. Although it was thought at first that the heavy wind and seas would prevent the docking she finally did so and personnel for Corregidor was transferred to the planter for two and one-half hours more of "pitch and toss." This boat was particularly welcome in that it brought us Colonel Ruhlen, our new regimental commander. Major J. T. Campbell and family and Lieutenant Drake were also welcomed to the 59th.

Sixtieth Coast Artillery

By Captain W. L. Richardson

The 60th Coast Artillery was joined by Lieutenant Colonel R .T. Gibson, Captain J. T. Wrean, Lieutenants H. J. Harrison, C. W. Hildebrandt, and J. W. Romlein on July 3d, a welcome event considering the acute shortage of officers for some time past.

Having painted and polished up a considerable number of guns, searchlights, machine guns and vehicles for two Manila parades which had to be cancelled, the regiment was finally given an opportunity to display this equipment in a motorized review for the American High Commissioner, Honorable Paul V. McNutt, on the occasion of his visit to Corregidor on July 14th. He expressed himself as being very much interested in and pleased by the exhibit.

Because the rainy season is here with considerable force and effectiveness, military training is confined mostly to gunners' instruction and indoor preparation for machine-gun target practices scheduled for October, and outside work is limited to keeping the roads, trails and drains open.

Ninety-First Coast Artillery (PS)

By Lieutenant R. M. Miner

The 91st has been devoting the period during the months of July, August, and September in cleaning house after its most successful target practice season. Gunners' instruction and examinations have been completed, all batteries having more than the usual number of recruits to start out on their careers. When one realizes the Filipino language is not adapted to Coast Artillery terms one can see that the task of gunners' instruction is rather a problem. All batteries are now preparing for their beach defense firings in August and the antiaircraft machine-gun firing in September.

The regiment welcomed four officers and their families who arrived on the July transport—Major Benjamin Bowering, Captain Arthur L. Lavery and Lieutenants Joseph C. Moore and John B. Morgan. As no one is scheduled to leave for about a year, we expect to become well organized in many fields.

Ninety-Second Coast Artillery (PS)

By Lieutenant William F. McKee

The 92d Coast Artillery (PS) received four new officers when the *Grant* arrived on July 3d. Major Robert M. Carswell has been assigned to command the 3d (Guard) Battalion, in charge of the civil prisoners and the stockade. Major Hubert A. McMorrow has been assigned as executive officer of the regiment. 2d Lieutenants Cecil E. Spann, Jr., and Clifford F. Cordes, Jr., have been assigned to Batteries "C" and "B," respectively.

On July 4th, the 92d was further augmented by the arrival of Miss Nancy Jean Hardy, daughter of Lieutenant and Mrs. Robert M. Hardy.

Lieutenant Colonel Richmond T. Gibson was relieved from command of the 3d (Guard) Battalion upon the arrival of Major Carswell and has been assigned to the 60th Coast Artillery.

On May 31st, Sergeant Casimiro Latorre, Battery "D," 92d Coast Artillery (PS), was retired after thirty years of honorable service. Sergeant Latorre's record includes a citation for bravery while in action against the Moros in 1912.

It is with genuine regret that the regiment loses the services of Colonel Gibson and Sergeant Latorre.

On July 1st, the regiment celebrated its organization day with appropriate ceremonies at the Kindley Field beach. The contests and races were topped off with a barbecue. That evening, the regimental fund entertained the soldiers and their families at the Bottomside Ciné with the moving picture "Maytime."

The regiment is actively preparing for the additional assignment antiaircraft machine-gun practices in November and the beach defense firings scheduled to follow this indoor season which ends in August. A great deal of interest has been demonstrated by officers and enlisted men, and excellent results are the dream of all.

Panama Canal Department

Department Artillery Officer
COLONEL LEWIS TURTLE, C.A.C.

Fort Amador
COLONEL FORREST E. WILLIFORD
4th C.A. (AA)

Fort Sherman
COLONEL WILLIAM T. CARPENTER
1st C.A.

Fort Randolph
COLONEL CHARLES B. MEYER
1st C.A.

Fort Amador

By Lieutenant Charles J. Bondley, Jr., C.A.C.

TRAINING

THE 4th Coast Artillery (AA) has completed its annual seacoast practices, and is now preparing for a busy dry season when antiaircraft practices will be fired and maneuvers conducted. Most of the organizations have finished their current small-arms practices, and the results obtained were excellent.

The 16-inch gun practice was fired according to schedule on June 19th. Battery "I" made a fine showing. No trouble was encountered with the matériel during the practice, and only a small error in spotting kept this battery out of the Knox Trophy class. The score was 130.6, which is excellent considering the comparatively low range at which the battery was forced to fire. A high-speed target was used.

Three days before the 16-inch practice, Battery "G," made what is believed to be one of the best scores ever attained with the 14-inch railway battery at this station. The score was 128.0.

Battery "D," having completed mine practice, as reported in the last letter, fired a 6-inch disappearing carriage battery, and made a very good showing. The score was 110.6. We hope that this score will give the battery an "E" for this year when coupled with the very high mine score previously attained.

Antiaircraft machine-gun practices were completed when "G" Battery fired on August 31st. Good results were obtained. An improved machine-gun sight developed by Major A. M. Jackson was used by Batteries "A," "B," and "G" in their practices. Details regarding the new development cannot be given at this time as it is not entirely perfected, but it is believed to be an outstanding type of antiaircraft machine-gun sight. It increases the number of men required in the gun crew, but leaves the gunner free to operate the gun. Its operation is based upon central tracer control, and corrections are transmitted to the gun in a simple and fool-proof manner.

Gunners' examinations will be held in the near future and the batteries are devoting time to the training of gunners for the exams. Antiaircraft artillery training will begin in earnest in a month or so. Numerous recruits have arrived recently, and are being rapidly absorbed. The high type of recruit we now receive, enables the recruit training period to be shortened, without a decrease in efficiency.

SOCIAL

Frequent dinners, parties, dances and receptions result in better understanding between officers. Club dances were held on June 19th, July 3d, and August 7th. The affair on August 7th was a hard-times party, and was one of the most popular and well-attended dances of the season.

Beer parties in the batteries keep up the morale of the men. Fishing trips to the Pearlas Islands, picnics to Morro Island, as well as week-end trips to La Venta, are frequent. The department has recently completed a rest camp on Morro Island, which is ideal for officers and men recuperating from illness. This island was used by Morgan as a base in the old days. A large sand bar, under several feet of water at high tide, connects it with Taboga.

* * *

Fort Sherman

By Captain W. C. Rutter, 1st C.A.

ACTIVITIES for the past two months have been many and varied. Lieutenant Colonel Ralph W. Wilson, our executive officer, and Mrs. Wilson, sailed from Cristobal on May 15 for New York. After three-months' leave he will report for duty with the ROTC, University of Pittsburgh. Captain Frank G. Marchman, post quartermaster, left with his family on June 26th for duty with the Organized Reserves at Fort Hayes. Lieutenant Ira W. Cory sailed on June 29th for Fort Monroe and duty as a student in next year's regular course. A farewell ceremony was held at the dock for each departing officer and family.

"C" and "H" Batteries fired successful target practices with their 12-inch guns during June. "H" Battery boasts of destroying a target at a range of 23,000 yards.

On July 2d a Monte Carlo party was held in the playshed for the benefit of the Fort Sherman Welfare Fund and the Atlantic Side Army Women's Emergency Relief Association. The party was a huge success; nickel beer, roulette, poker, craps, raffles, auctions, sandwiches, soft drinks and doughnuts all enjoying a rush of business.

Road construction moved forward during the past two months. It is now possible to drive a car from Fort Sherman proper to the mouth of the Chagres River. This is a welcome addition, and provides a pleasant evening drive.

Several hundred papaya trees have been planted at various places on the reservation and a banana plantation has been started with about five hundred trees set out. In a short time there will be plenty of tropical fruits for everyone, growing in our own back yard.

We are looking forward with great pleasure to the approaching visit of the Chief of Coast Artillery to this Department.

There have been several changes in the officer personnel of Fort Sherman during the past two months. Captain H. E. Strickland departed for duty with the ROTC at the University of Cincinnati. Captain Harry F. Townsend has reported here and has been assigned to command Battery "H" relieving 1st Lieutenant Merle R. Thompson who leaves for Fort Sheridan. 2d Lieutenant John G. Nelson arrived here from Fort Winfield Scott and has been assigned to Battery "F."

Major Henry F. Grimm, Jr., has been transferred from Fort Sherman to Fort DeLesseps where he has assumed the duties of adjutant and artillery officer of the Atlantic Sector.

San Francisco

COLONEL H. T. BURGIN, 6th Coast Artillery,
Commanding

By Major Willard Irvine

MAJOR GENERAL A. H. SUNDERLAND and Mrs. Sunderland will arrive in San Francisco September 28 from Panama. General Sunderland will inspect the Coast Artillery posts of the Pacific Coast and will preside at the national meeting of the Coast Artillery Association in San Francisco, October 1 and 2. The program for the meeting has been announced and three hundred officers are expected to attend.

Brigadier General Joseph P. Tracy, accompanied by his executive, Colonel C. K. Wing, and his aide, Captain C. C. Carter, recently visited the Fourth Army Maneuvers at San Luis Obispo.

In honor of Colonel and Mrs. H. T. Burgin, the officers and ladies of Fort Winfield Scott gave a tea and reception at the Officers' Club. Guests were present from the Presidio, Fort Mason, and San Francisco.

Eighty members of the San Francisco Chapter of the Coast Artillery Association held a dinner and business meeting August 23 at the armory of the 250th Coast Artillery, California National Guard. After dinner Colonel R. E. Mittelstaedt turned the meeting over to Lieutenant Colonel William W. Briete, 57th CA, Vice President of the Association. Officers elected for next year were: President: Major John L. Farley, 250th CA, Calif., N.G.; Vice President: Major Chas. P. Knights, 627th CA; Secretary and Treasurer: 1st Lieutenant I. J. Robertson, 250th CA, Calif., N.G.; Board of Directors: Colonel A. L. Loustalot, CAC; Major C. H. Potts, 250th CA, Calif., N.G.; 1st Lieutenant Frank C. Emery, 57th CA.

The executive committee appointed for arrangements for the national meeting of the Association in San Francisco October 1-2 consists of: Colonel A. L. Loustalot, CAC, chairman; Major Willard Irvine, 6th C.A.; Captain Lester Cole, 57th CA; 1st Lieutenant I. J. Robertson, 250th CA, Calif., N.G.

Colonel and Mrs. Francis H. Lincoln arrived on the U.S.A.T. *Republic* August 23. Colonel Lincoln, recently on duty in Washington as assistant chief of staff, G-2 has been assigned as executive of the Ninth Coast Artillery District. Major Leroy A. Whittaker now on duty at Fort Shafter, Hawaii, has been assigned to the 6th Coast Artillery. 1st Lieutenant and Mrs. Joe C. East have recently arrived from Fort Monroe.

The 63d Coast Artillery, Lieutenant Colonel Claude Theile commanding, arrived at Fort Scott from the Fourth Army Maneuvers at San Luis Obispo in Southern California for a week-end lay-over. They were en route to Fort Lewis, Washington, for further maneuvers in continuation of their extensive tour of field service.

Every other Thursday at 4:00 o'clock in the afternoon the Fort Winfield Scott military band goes on the air over KPO, San Francisco. Under the leadership of Warrant Officer W. J. Hershenow the band presents a well-rounded musical program. This program has been bimonthly since 1934. Outstanding performers of the band are: clarinetist, Sergeant Novaceck, baritonist, Sergeant Valle, and drummer, Private First Class Janert.

The 628th Coast Artillery (HD) under the command of Lieutenant Colonel Felix M. Usis, CA-Res., assisted by Major Carl Adams acting as unit instructor and executive, trained at Fort Funston in June. States represented in this regiment were Idaho, Utah, Nevada, and California. Selecting a brief period of fair visibility on a foggy day the Reserve officers manning a battery of 155-mm. guns (except for breech details) opened fire on two pyramidal targets towed by the tug *Slocum*. The rear target was demolished by the third shot. Fire was then shifted to the second target which was damaged and saved from complete destruction only by fog that rolled in before the last shot could be fired.

The West Point Preparatory School for the Ninth Corps Area, located at Fort Winfield Scott, opened its sixth session August 23 with 42 students. Colonel H. T. Burgin is commandant, Captain W. S. Lawton, assistant commandant; and 2d Lieutenant H. P. Persons, Jr., 6th Coast Artillery and 2d Lieutenant N. B. Broyles, 30th Infantry, are instructors. Twenty-four of last year's class are now Cadets at the U. S. Military Academy.

Battery "A" (Mines) was absent from Fort Scott for seven weeks attending maneuvers with the Fourth Army. They went, not to fire antiaircraft guns or machine guns, or to display antiaircraft searchlights, or to fire 155-mm. guns, but as a headquarters company for the camp at San Luis Obispo, of which Colonel Willis Shippam, CAC, was the headquarters commandant, and Major William G. Brey the adjutant. Battery "A's" duties were operating officers' messes, tending camp, and functioning as radio operators and chauffeurs for umpires. These duties were performed in a manner that received official commendation. Now that they are back at Fort Scott the battery will fire antiaircraft machine guns in September and a mine practice in November.

Quarterly, for a period of a month to six weeks, Fort

Funston becomes a CCC Reception Center, enrolling, processing, and shipping men to camps in California. In July 600 enrollees were accommodated under the direction of 1st Lieutenant Wm. H. Ball and Staff Sergeant W. E. Corley, 6th Coast Artillery.

Old Fort Point, located on the south side of the narrowest part of the harbor's entrance, was a self-contained fort built about a century ago to withstand a prolonged siege from sea or land. The San Francisco approach to the Golden Gate Bridge now forms a concrete dome over it. But the fort, built of brick and stone, has been left intact and is in a fair state of preservation. A citizen committee of San Francisco, with representatives from several civic organizations under chairman Joseph B. Straus, has been formed for the purpose of creating a national monument and public museum at the old site, along the lines of the Fort Ticonderoga Museum.

Many changes in personnel have occurred. Captain R. R. Hendrix turned over the command of Battery A (Mines) to Captain Leo D. Vichules, formerly at Fort Baker, to become artillery engineer and ordnance officer, succeeding Captains Vandersluis and Shelton. 1st Lieutenant Joe C. East commands Headquarters Battery and is the post exchange officer. 1st Lieutenant Wm. H. Ball is assistant adjutant in charge of a CCC Reception Center and commands Battery "E."

Recent visitors have been: Colonel and Mrs. B. H. L. Williams, en route from Honolulu to Fort Barrancas, Florida; Colonel and Mrs. E. H. Thompson, recently on duty in New York City, destined for the Harbor Defenses of the Columbia; Major and Mrs. Gerald B. Robison, on their way from Hawaii to Fort Monroe, Virginia; Major and Mrs. C. S. Harris and daughter Beverley, from Fort Shafter, motoring to Fort Crockett, Texas; and Major and Mrs. Harold P. Detwiler and son Donald, travelling from Panama to Los Angeles.

Lieutenant John G. Nelson, who was assigned to the 6th Coast Artillery from the University of Minnesota one year ago under the Thomason Act, has been commissioned in the Regular Army and sailed in August for Panama. This year's Reserve officers assigned for duty are: Lieutenants Dana P. Cook, Philip H. Farley, and Louis C. Saylor, University of California, Berkeley; Lieutenant Harrison W. Kramer, University of Washington; and Lieutenant Newell R. Bullen, Utah State Agricultural College.

* * *

Trekking Through Texas With the 69th

THE 69th Coast Artillery (AA) made its annual week's march beginning June 28 and ending July 6. The trip, while free from any special outstanding incidents, was excellent for training and is believed of interest to Coast Artillery mobile units.

The first day's trip was from Galveston to Camp Bullis via Fort Sam Houston. Just outside of San Antonio, the marching column was photographed from the air in order to check the intervals between trucks. In general the intervals were found to be very good.

The following day the march was made to Fort Clark, station of Headquarters 1st Cavalry Brigade and the 5th Cavalry, General Kenyon Joyce commanding. This phase of the trip presented the most difficulty and the most interest. Two bridges between San Antonio and Uvalde were too weak to carry the guns and prime movers, which necessitated fording one stream which required the combined efforts of two prime movers. The second bridge necessitated a 20-mile detour on a nearly impassable unimproved and narrow road with many sharp curves. On the return trip although made at night these difficulties were overcome in about half the time required on the out trip.

Times have changed from the days of 1910 when the Army consisted of the so-called "Mobile Army" and the Coast Artillery—a Coast Artillery regiment moving over 400 miles in two days to visit a Cavalry post.

The march started at midnight in order to gain experience in night work and to avoid heat. The column halted at daybreak on the outskirts of San Antonio for breakfast, the guns catching up there one hour after the halt. The march was resumed for Austin at 8:00 AM.

The following day, July 3d, the regiment marched to Dallas and was quartered at the Exposition in the Agricultural Building, officers in comfortable quarters in the live stock building (goat, sheep and swine section), which was of course empty before we occupied it.

Two days of rest and recreation followed giving all a chance to see the many and varied exhibits and amusements. A retreat parade was held in front of the Texas State Building on July 4th, preceded by an exhibition of antiaircraft matériel.

The march resumed at 11:00 PM was in the nature of a forced march. Kitchens (gasoline operated), were sent ahead at 8:00 PM. Arrived College Station, Texas A & M, 8:00 AM, two hours for breakfast. Forced march by batteries to Galveston, all batteries in by 4:00 AM, 6th July. All trucks rolling under own power.

The regimental commander's car was equipped with a radio set—report was made to him from the radio truck at the rear of the column each half hour, reporting any difficulties and the location of the tail of column.

Officers' Quarters at Dallas

In every march the kitchens were sent ahead and a hot meal awaited the troops on arrival.

The maintenance section with parts and repair truck followed the column making the repairs that battery maintenance sections could not make. The fact that all trucks rolled in under their own power speaks for the effectiveness of the system.

The following lessons were learned:

a. Duplex searchlight units cannot sustain a speed of more than 25 miles per hour in hot weather without heating up.

b. Sound locators cannot be towed without risk and "road lagging" at more than 30 miles per hour.

c. Guns should be placed at front of column—they are less flexible than other units.

d. Continued attention must be given and corrective measures taken on the spot to insure proper intervals.

e. Every unit must have a tank truck of some kind, improvised or otherwise. In order to speed up gassing a long column, a 250-gallon tank was carried by each battery so that units could be gassed simultaneously.

f. Principal delays are caused by gassing. Two difficulties were encountered:

(1) Filling from tankers, especially when tanks get low.

(2) Filling from commercial sources who are not used to speedily filling a column. (Column should be entirely gassed in 30 minutes if this work is well conducted.)

g. Motorcycles are of great value for traffic control while passing through cities.

* * *

250th Takes the Field

By Captain S. R. Dows

THE Fourth Army Maneuvers are history. The Coast Artilleryman will be most interested in the part taken by units of the Corps. Antiaircraft carried on its normal functions but the application of Field Artillery missions to seacoast guns was something out of the ordinary.

The 250th Coast Artillery is a National Guard regiment which has had twelve years of experience in motor transportation, field communications, and firing on moving targets up to 14,000 yards at sea. However, the maneuvers were entirely land problems with the "enemy" already established on shore. The 250th Coast Artillery was called on to use its guns as Field Artillery weapons. The job was well done.

Attached to the 40th Division for support, the regiment was placed in the 65th Field Artillery Brigade as a groupment of 155-mm. guns. The 2d Battalion, 144th F.A., similarly equipped, was attached to the groupment. The balance of the brigade was composed of the 143d and 145th F. A. (75-mm. guns) and the 222d F.A. (155-mm. howitzers).

Targets were assigned by the brigade to the groupment as the situation required. The principal missions, after the initial preparation preceding each offensive were interdiction, especially of rear roads, and counterbattery. It was gratifying to see each target as easily handled as though Field Artillery methods were common to seacoast units. But there was a reason.

Colonel R. E. Mittelstaedt commanding the regiment foresaw the problem early in the year and laid down a definite policy. The preparation for the field problems was careful and procedure fully prescribed during the school sessions prior to camp. No battery was *required* to follow these procedures. Initiative is too valuable. But no discussion of methods was permitted. A battery commander could use his own or the regimental method. As a result we all learned one way to handle a problem and that way was assumed to be correct. Such a procedure is contrary to our normal routine but it worked for the special problem.

Reconnaissance was taken up in schools. A three-day officers' camp supplemented the armory training. During

The 250th C.A. at church service in the field.

the first week of camp this phase was extended to battalion and regimental problems. We selected and occupied positions all over the area. In the maneuver our four battalions covered the terrain in such a way that there was not a square inch of dead area and our observation posts commanded the best possible view of the terrain.

Camouflage and cover were discussed in the same series of schools. Camouflage discipline was drilled into the entire command. The guns were emplaced to take full advantage of natural protection and established routes. During the entire four days of the maneuver, with the air full of "enemy" eyes, not one battery of the regiment was located. Even our own officers, who know the positions, had difficulty locating either guns or bivouac areas. It must be admitted that we had no muzzle blast to contend with, but we had taken measures to overcome this difficulty.

Motor transportation was an important item. The new prime movers were driven by our men for the first time in the 1936 Armistice Day Celebration. Slow-speed straight driving involved nothing more than traffic control. This year the guns were equipped with bearings for 15 mph average speed. Electric brakes were added for control of the guns. High-speed control on the highways, and maneuvering guns into positions, were added problems. All these matters were considered in schools. Drivers were qualified by rigid examination and practical driving tests. On the highway the motor columns followed schedules precisely and made the 240-mile trip to and from camp without incident. For years we had used tractors to handle the guns, and were in doubt about the prime mover's ability to maneuver. The guns were emplaced in every conceivable position—in creek beds, on hills, under trees—but in every case we found the prime mover satisfactory.

Some additional equipment seems desirable. Motorcycles and radio for control on the road appear essential. Special light trucks for mechanics would release reconnaissance trucks for their designated functions. At least one light fast truck should be provided in each battalion to span the interval between cargo and reconnaissance trucks.

Communications are essential to any operation. Our facilities for laying wire are nil. The 143d F.A. had a power outfit, received just before camp, and it was a lifesaver for them. Our men still spend days manhandling wire and we are forced to select O.P.s which can be reached in the available time. The 40th Signal Company took over our personnel and equipment during the first few days and insisted on a thorough check-up of all phones and switchboards. They helped us a great deal. We drew a lot of good wire and fresh batteries and as a result the phones worked nicely. Radio sets were manned 24 hours a day but the control of the net was such that our use of the equipment was banned. Not more than a dozen messages were sent by air—principally because the phones worked perfectly.

This was largely a staff war. G-2 was busy during the entire period. Extensive schooling for regimental and battalion intelligence officers developed the procedure for collecting and disseminating information. Necessity for accurate and complete reports was stressed. The service worked well during operations. Reports came in quickly and it was gratifying to see succeeding reports confirming posted information. 250th Coast Artillery observing posts contributed greatly by reporting "enemy" movements. Our high powered azimuth instruments came in very handy for watching "enemy" infantry and cavalry movements.

Fire control was carefully covered in schools prior to camp. It was evident from the first that observation of fire would be the exception so we prepared for registration fire, zone and schedule fire, and to use all possible observation. All targets were referred to the grid system and assigned by coördinates. The accuracy of these target assignments was limited by the information available. "Enemy" batteries were located by various means. G-2 took the best data available and passed it on. Considerable checking showed the maps to be none too accurate so it is probable much of our fire would have been less effective than it should be. It is unfortunate there was no opportunity to check the data by actual firings. The adjustment methods upon which we were relying would have taken care of the situation but more accurate observation must be provided if the maximum accuracy is to be derived from 155-mm. guns. The airplane is the answer but we are told planes will probably not be available. The necessity for aerial observation is apparent in all firings whether on land or at sea.

G-3 got a good workout. All G-3 and S-3 sections were training to effect carefully prepared orders in the quickest possible time. For a 155-mm. gun unit, plans and operations comprise consideration of routes, positions, missions, blind areas and dead areas. For making dead area charts we drew up a family of trajectories to the 1/20,000 scale of our battle maps. With a little practice, all our men were making dead area charts or overlays in no time at all.

Orientation is one of the primary problems of firing. Our battalion reconnaissance officers established an orienting line for each battery whenever a position was to be occupied. But it was the problem of the batteries to locate the coördinates of the directing gun, compute all firing data, establish aiming points and orient their guns to the orienting line. The battalion reconnaissance officer was equipped with transit and plane table. Battery officers used plane tables and aiming circles for their orientation work. The aiming circle makes an admirable transit.

Although a maneuver of this sort is largely tactical with little training for enlisted men, our participation involved so many novel features it was easy to hold the interest of all throughout the entire two weeks of hard work. The first day we rather timidly pulled the guns a little off the beaten path but when the regiment went into the maneuvers proper, guns were being pushed, pulled, and dragged into all manner of positions from which they

could fire without being observed. Twenty years ago the Coast Artillery answered the call to augment Field Artillery. This summer demonstrated that the present-day equipment is ready for the field and that Coast Artillery methods are excellent training for all targets—land or sea.

We were only a very small part of a large maneuver. But the event was a large one in our experience. We learned many things of value and will long carry pleasant memories of 1937 at San Luis Obispo.

Fort Totten

LIEUTENANT COLONEL E. E. BENNETT, *Commanding*

By Captain J. H. Madison, C.A.C.

THE summer has been filled with varied activities for the members of the 62d Coast Artillery (AA), who have spent the past four months travelling to different places in the Second Corps Area in connection with the training of civilian components and the firing of the annual target practices.

At the opening of the outdoor training season, about April 1st, the departure of units from Fort Totten began. These movements continued throughout the summer, and there are several missions yet to be completed, after which the regiment will commence the winter indoor training

On July 1st, a basic training camp for Reserve officers went into operation with 24 students reporting for their training at Fort Totten. Lieutenant Colonel E. E. Bennett commanded the camp; Lieutenant Colonel Fred M. Green, was executive and unit instructor; Major L. D. Farnsworth was assistant executive and adjutant; Captains L. A. White, J. L. Hogan, and C. W. Gettys commanded troops of the 62d Coast Artillery who were conducting the camp and acted as instructors. Batteries B, E, and Combat Train, 1st Battalion, formed the provisional battalion.

After a week at Fort Totten, during which the Reserve officers were instructed in administrative and tactical subjects, a field camp was established at Fort Tilden, and target practices were fired. After completing this assignment, the troops returned to Fort Totten, two days later departing for Fort Ontario, to train with New York National Guard regiments on the shore of Lake Ontario.

The sudden death of Brigadier General Frank K. Fergusson, post and regimental commander, on July 18th brought sorrow to each officer and soldier of the garrison. His burial at West Point, with full military honors was attended by large delegations of his many friends both civilian and military.

Batteries C and F, returned to Fort Totten on July 31st and were immediately assigned to the training of the 539th and 910th Regiments, Coast Artillery Reserve. They left the post on August 3d, together with detachments from the regimental command post section and the regimental supply section, and established camp at Fort Tilden. Target practices were fired by the Reserve regiments and a detachment of searchlights from Battery A joined the camp to provide searchlight instruction. The provisional battalion and the training camp remained at Fort Tilden for a week, and then left for Camp Upton, where camp was established for the final phases of the tactical training of the two Reserve regiments.

Late in the afternoon of August 11th, the troops returned to Fort Totten with the Reserve officers. Arriving home in time for a late supper, the officers and soldiers immediately started preparations for a quick departure.

Early on the morning of August 13th all batteries at Fort Totten entrucked and rolled through the main gate en route to Fort Ontario, to join the organizations already there for the firing of annual target practices.

The convoy to Troy, New York, almost 200 miles, was made in excellent time. The regiment spent the night in that city as guest of the 105th Infantry, New York National Guard. The state convention of the American Legion was in progress, and legionnaires from Long Island and Manhattan welcomed the members of the 62d Coast Artillery. When the regiment pulled out of Troy at daylight, the sidewalks were lined with Legionnaires who wished it good luck.

After arrival at Fort Ontario the regiment moved into a camp already established on the reservation, and, emplacing the guns on the shore of Lake Ontario about two miles from camp, prepared to start firing target practices. The planes from the 97th Observation Squadron of Mitchell Field, assigned to the task of towing targets, arrived at Fulton the next day.

Brigadier General W. K. Wilson, commandant of the Second Coast Artillery District, visited Fort Ontario to inspect the regiment and see the batteries at target practice, but a sudden electrical storm that brought torrential rain and a very high wind delayed the target practices so much that he was unable to see the guns in action.

During the four months of training missions, the regiment's motor vehicles had travelled more than 80,000 miles—with less than a half-dozen minor accidents.

But the return to Fort Totten did not mark the end of the season's activities. After one day at home, the 2d Battalion, commanded by Major E. H. Taliaferro, Jr., left for Governors Island to perform guard duty during the absence of the 16th Infantry.

Battery A (the searchlight battery), will leave about the middle of the month for Camp Upton, where it will have its annual target practices. If present plans are carried out, one of the gun batteries will depart soon for Fort Bragg on the last training mission of the summer.

It is expected that all of the regiment will return to Fort Totten before the end of October, at which time the indoor training season will begin.

News and Comment

THE UNITED STATES COAST ARTILLERY ASSOCIATION

"The purpose of the Association shall be to promote the efficiency of the Coast Artillery Corps by maintaining its standards and traditions, by disseminating professional knowledge, by inspiring greater effort towards the improvement of matériel and methods of training, and by fostering mutual understanding, respect and coöperation among all arms, branches and components of the Regular Army, National Guard, Organized Reserves and Reserve Officers' Training Corps."

Pay Increase

All efforts to bring about the much needed pay increase for junior officers have been without avail. The opposition to increased pay has been ascribed to the growth of governmental sentiment for more economy. Recently a constructive move on the part of Representative Phillips of Connecticut, was the introduction of a resolution to investigate the pay situation of the several services. An impartial investigation will show that the present scale of pay is unjust, and should indicate the need for correction of the existing inequalities. The pay schedule should be revised upward so that no group will profit at the expense of another. The pay of junior officers is inadequate, and this fact is realized by all officers who have given serious consideration to the problem.

The need for a revision of the pay schedule was lately brought forth strongly in the presss when various labor leaders contended that the pay for labor is insufficient. They asserted that although it appears that labor has received an increase of almost 100% during the last decade that it has been more than offset by the rising cost of living. If this be true, there is certainly a strong basis for a claim for an increase in pay for the members of the military profession. The rate of pay for many of the junior officers is lower than it would have been under the 1908 schedule. In other words, some officers are drawing less money today than they would have drawn thirty years ago. A comparison of living costs will show the seriousness of the situation. Inadequacy and inequality of pay are the greatest destroyers of morale and progress.

* * *

Circulation Getters

CIRCULATION is as necessary to the health of a periodical as it is to the well-being of the human body. We are pleased to report that The JOURNAL's health is good. This good health is evidenced by a climbing circulation. Moreover, we expect in the very near future to be able to tell you that we have reached the 3,000 mark.

However, there are still a few Coast Artillerymen who apparently feel that they can get along without The JOURNAL. Any one of our readers will be glad to tell these non-subscribers just how wrong they are. In fact our volunteer agents are now doing so and, what is more, are signing up new subscribers in such numbers as to make sure the goal we have set will be reached.

During the past summer camp season our good friends of old have continued their successful work. We list some of their names below, and express our appreciation to all of our old reliables for putting The COAST ARTILLERY JOURNAL on the map.

Colonel C. C. Dawes, 202d C.A. Ill. N.G.
Colonel R. E. Mittelstaedt, 250th C.A. Calif. N.G.
Colonel C. J. Smith, 213th C.A. Pa. N.G.
Colonel J. H. Sherman, 251st C.A. Calif. N.G.
Colonel R. H. Williams, C.A.C.
Colonel Earl C. Webster, 243d C.A. R.I. N.G.
Lt. Col. E. H. Metzger, C.A.C.
Lt. Col. G. W. Oertly, 251st C.A. Calif. N.G.
Major R. J. VanBuskirk, C.A.C.
Major Kenneth Rowntree, C.A.C.
Major A. D. Chipman, C.A.C.
Major E. C. Seaman, C.A.C.
Major C. S. Doney, C.A.C.

Major R. E. DeMerritt, C.A.C.
Capt. W. C. McFadden, C.A.C.
Capt. R. N. Russell, C.A.C.

Our veteran circulation getters have been joined by a crew of newcomers during the summer training season. Although new at the business, the recruits have obtained good results. We feel the rest of the Corps should know these men. That we have so many Coast Artillerymen who are willing to go to no small amount of personal trouble for the good of the Association should be a source of pride to all. Here they are—the men who are keeping The JOURNAL in the forefront of military magazines:

Colonel L. P. Horsfall, C.A.C.
Lt. Col. F. M. Green, C.A.C.
Major Willard Irvine, C.A.C.
Major J. M. Donnelly, 602d C.A.-Res.
Major C. D. Hindle, C.A.C.
Major E. B. McCarthy, C.A.C.
Major T. R. Parker, C.A.C.
Major W. M. Wertz, C.A.C.
Capt. Marden A. Herbert, 251st C.A. Calif. N.G.
Capt. G. J. Loupret, C.A.C.
Capt. D. J. Rutherford, C.A.C.
Capt. A. P. Sullivan, C.A.C.
Lt. A. B. Roberson, CA-Res.
Lt. D. H. Schmidt, CA-Res.

Then there is a large group of workers whose names are unknown to us but who continually boost The JOURNAL. To them, as well as those listed, we express our pleasure for their staunch support.

If any of our readers, as a side line, feel like getting into the magazine circulation business a postal card to the editor will bring them sample copies and subscription blanks. The business department of The JOURNAL had a busy summer, but a busy winter is what we are looking forward to. If you are willing to help, you can. How about it?

Changes in the Chief's Office

THE organization and training section of the Chief's office lost a capable head with the departure for Hawaii of Lieutenant Colonel Cedric M. S. Skene. Colonel Skene has satisfactorily discharged the important functions under his supervision. The fine condition of the organization and training affairs of the Corps bears witness to his sound judgment, ripe experience, and untiring energy.

Colonel Skene brings to the Hawaiian Department a record of twenty-five years of faithful service. Shortly after graduation from Yale with the degree of Ph.B. in 1911, he was commissioned a second lieutenant of Coast Artillery. Colonel Skene is a graduate of the Advanced Course of the Coast Artillery School and a distinguished graduate of the Leavenworth class of 1926.

He served in Europe for over two years during the World War. After duty as Assistant G-1 and G-1 at Le Mans he became a member of the Haskell Mission which did important work in Russia in the post-war years. He returned to the United States in December of 1920. Among other assignments he has been on duty as instructor and head of the department of tactics at the Coast Artillery School where his pleasing personality and helpful attitude endeared him to many.

Colonel Skene's replacement is Colonel Horace F. Spurgin who comes from duty as commanding officer at Fort Monroe. Colonel Spurgin's matured experience of thirty years of soldiering, field and otherwise, portends excellent results for the organization and training section.

Upon graduation from the Military Academy in 1906, Colonel Spurgin served a year as an Infantryman and then transferred to the Coast Artillery. His military education includes graduation from the War College and the Command and General Staff School and service in action.

During the World War Colonel Spurgin sailed for France in August, 1917. He commanded the 2d Battalion, 6th Coast Artillery, the first battalion of GPF's to be manned by Americans. Many later GPF outfits learned their business from the 2d Battalion, since for a time it was the training battalion at Camp de Souge and Libourne.

During the Meuse-Argonne affair Colonel Spurgin was on the regimental staff of the 57th Coast Artillery and on the staff of the Army Artillery.

For five years he served as senior instructor in Coast Artillery Tactics at West Point. Here, incidentally, he duplicated in part some of the service of his father, many years the capable commissary officer at West Point, and known to thousands as "Spike-tail" Spurgin.

Colonel Spurgin has instructed at Leavenworth and at the War College, which indicates the caliber of the new chief of the organization and training section. His creative ability and unusual energy will not be curbed by a desk job.

Diesel Electric Drive Mine Planter

THE U. S. Army Mine Planter *Lt. Col. Ellery Niles*, built by the Pusey Jones Corporation in Wilmington, Delaware, was launched on June 22, 1937. This unique and interesting vessel is complete and modern in every detail, and has facilities for the handling of two groups of mines.

It is the only Diesel electric-drive boat that has been built for submarine mine and cable service. Its over-all length is 184 feet. Three main engines capable of delivering continuously not less than 550 B.H.P. at 500 rpm are the principal source of power. They are capable of maintaining a speed of 13 statute miles an hour. Directly connected with each 550 B.H.P. engine is a generator having an output of 300 kw.

This boat contains the following unique features:

A radio direction finder.
A Sperry Gyro-compass.
Loud-speaking announcing system for the entire boat.

Air-conditioned living quarters.
A fathometer depth finding apparatus.
A new design electric-driven power-cable reel.
Deck tracks with trucks for the moving of mines and other heavy equipment.

Coast Artillery Association Convention

COAST ARTILLERYMEN representing every section of the country will converge on San Francisco for the annual convention of the United States Coast Artillery Association to be held Friday and Saturday, October 1st and 2d, 1937.

As we go to press, General Sunderland, Chief of Coast Artillery and President of the Association, is en route to San Francisco, accompanied by Mrs. Sunderland. A reception in their honor is scheduled as the opening event of the convention.

Forts Winfield Scott, Baker, Barry, and Funston have been bending their efforts to provide entertainment and sight-seeing activities that will take care of virtually all the time at the disposal of those attending the convention. As those who have partaken of West Coast hospitality can testify, the meeting will be one to be remembered.

Among the highlights of the two-day assembly, other than the reception for the Chief, will be a review by the 6th Coast Artillery, trips to the installations around San Francisco Bay, and a luncheon at the Fort Scott Officers' Club. Tennis or golf will provide entertainment for the athletically inclined on the afternoon of the second day of the convention.

Immediately after the business meeting on October 2d, all hands will gather for the dinner at the Fairmont Hotel. The combination of good food and good fellowship will give the artillerymen something to talk about for the ensuing year.

The JOURNAL extends its best wishes to the annual get-together of the Corps. We know that the success of the meeting is assured and that it will result in a membership increase and further success for your magazine.

The schedule tentatively outlined by the committee in charge of events follows. Impossible to schedule but sure to occur will be many meetings of folks who have not seen each other in years—only Army people know what these meetings mean.

PROGRAM

FRIDAY, OCTOBER 1

9:00 P.M.—Reception for the Chief of Coast Artillery and Mrs. A. H. Sunderland, at Officers' Club, Fort Winfield Scott.

SATURDAY, OCTOBER 2

9:30 A.M.—Review, 6th Coast Artillery, Fort Winfield Scott.
10:00 A.M.—Embus for Forts Baker and Barry.
10:15-12:00 M.—Visits to Forts Baker and Barry.
12:30 P.M.—Luncheon, Officers' Club, Fort Scott.
2:15 P.M.—Embus for Fort Funston.
2:45-3:15 P.M.—Inspection AA Battery (Proof firing) and 155-mm. Gun Battery on concrete emplacements.

or

Trip on Mine Planter around San Francisco Bay.

or

Golf at The Presidio Golf Club.

or

Tennis at Fort Winfield Scott.

6:00 P.M.—Business Meeting.
7:00 P.M.—Dinner at Fairmont Hotel.

What Our Readers Think

A Coast Artilleryman who knows his advertising tells the editor where to get off:

> The composition of the ads is about the poorest thing I have seen. If you check back you will find the same form fifteen or twenty years ago. They need more punch to sell.

True enough. Our last issue tried to rectify a few of these matters; in time we will get them all. The blow to the prestige of the advertising department was somewhat softened by a number of pats on the back. Here is a comment from a subscriber for the past two decades:

> As a subscriber of almost twenty years standing and having a collection of the JOURNAL extending over thirty-five years, I believe that with the number just issued it has reached its all-time high in usefulness and interest.

Here is a comment from an officer who believes in knowing what the other fellow is doing:

> I believe that the JOURNAL has been benefited by the policy of using articles pertaining to the service at large and not confining the subject matter to technical matter exclusively.

One of our readers thinks that the magazine will bear reading more than once:

> I have read the entire JOURNAL and intend to repeat in the next few days. I can well say that it is worth more than it has ever been before. In fact I will say that this one issue is a good money's worth.

Another subscriber finds that The JOURNAL is of use to him in his work with the civilian components:

> I think the JOURNAL is now a top-notch magazine and would like to see it in the hands of every Reserve officer in the Portland district. I believe it tends to stimulate interest in the Corps and makes my contact work easier.

It must be so, for another subscriber concurs:

> For those of us on DOL the JOURNAL is a real life-saver as we are out of touch with artillery progress.

A correspondent of many years' experience at the White House finds a military magazine worth reading:

> Your last issue just received and read. Please accept my commendations for turning out an interesting and worthwhile number and I know that continuous improvement is in sight.

Kind words from a sergeant major who believes in keeping well informed:

Intensely interesting from front to back page, the last issue of the JOURNAL is a masterpiece of composition and make-up.

The JOURNAL's readers in the Officers' Reserve Corps have been considerably augmented here of late. One of them voices his approval in a letter:

The JOURNALS contain good, instructive articles and I enjoy them a lot.

From the Retired List we get evidence that The JOURNAL is still necessary after leaving the active list:

Check herewith. The *law* got me last Nov. 30 and laid me on the shelf; but I think I must still have the JOURNAL to keep my mind active—it hasn't retired yet.

Our sales force of volunteer subscription rustlers should feel encouraged by the following from a new subscriber to The JOURNAL. Here is his reaction:

Inclosed is a money order for $3.00 and a form card renewing my subscription to the COAST ARTILLERY JOURNAL. I find the JOURNAL well worth the small cost, interestingly instructive and highly entertaining.

AA Instruction for R.O.T.C. Units

THE shortage of modern equipment for training in the various R.O.T.C. units has interfered greatly with their progress. Funds have been limited and essential equipment could not be procured.

The Chief of Coast Artillery is endeavoring to overcome the difficulties that have arisen. He has recommended that the 61st C.A., 62d C.A., 2d C.A., 63d C.A., and the 69th C.A. with their modern antiaircraft material be made available for this essential training.

That all Coast Artillery R.O.T.C. units will be provided with facilities for instruction in modern antiaircraft material is an indication that progress is being made.

AA Firings Over Land Areas

DUE to the limitations imposed by safety and other requirements, all antiaircraft gun target practices are now conducted over water areas. This procedure has several distinct disadvantages, among which are:

a. Forcing the target into predetermined and limited channels of approach, rather than allowing it to come, as in war, from any direction.

b. Limiting the antiaircraft artillery in the location of fire-control stations, for example:

(1) Since the battery front is limited by the water, the whole fire-control installation in front of the battery position is missing. Under these conditions an antiaircraft battery theoretically has no front.

(2) Spotters cannot be located under or beyond the target, which are usually the most ideal locations for rapid and accurate spotting.

(3) Only limited training can be conducted with fire-control methods which might utilize data from outlying stations.

(4) Complete communication systems are not laid out.

Thus problems concerning installation, maintenance, and the proper types of equipment are not solved in normal fashion. Safety installations for forward observers cannot usually be determined.

The Chief of Coast Artillery has recently taken positive action to develop sound doctrines to govern future antiaircraft firings and to promulgate them to the service. All future firings wherever practicable should be held under conditions approaching those to be expected in war.

AA Defense

Two pamphlets recently issued by the Command and General Staff School Press should command attention of all Coast Artillerymen. They are *Antiaircraft Defense (Tentative)* and *The Tactical Employment of Antiaircraft Artillery in the Independent Division and Corps (Tentative)*. The pamphlet on antiaircraft defense contains a definition of the inclusive term "antiaircraft defense" and discusses the classes of defense measures with their coördination. It contains a chapter on the defense of troops and also one on the defense supply installations.

The pamphlet on the tactical employment of antiaircraft artillery contains the following chapters:

General Technical Information
General Considerations Governing Tactical Employment
Protection of Stationary Troops
Protection of Movements
Protection of Movement of Foot and Animal Elements
Protection of Motor Movements
Protection of Installations
Tactical Employment of Antiaircraft Artillery in Various Types of Operations
Concentration and Advance
Offensive Operations
Defensive Operations
Retrograde Movements
Special Operations

Hard Questions

EXTRACT translation from an article by Louis Garros in the July 1st number of *La Revue de France* entitled "Les Leçons Militaires de la Guerre d'Espagne"—

The effectiveness of aviation has been notably reduced by the improvements in antiaircraft defense. Born during the War, the antiaircraft defense has made surprising progress. Of each hundred planes shot down in Spain, seventy are victims of the antiaircraft defense and only thirty are brought down by planes.

Remember that the normal altitude for observation from a plane is 1,500 meters; but with the twin machine guns now in use in France, at a range of 1,500 meters, the percentage of hits is 35. With a rapidity of fire of 600 shots per minute, figure it out, and you will find that the plane can expect to receive 210 projectiles in its vitals per minute!

The observers *know* this. So, should they go higher up? If they do, how much can they see? Will air observation be as useful?

Hard questions!

Coast Artillery Board Notes

Any individual, whether or not he is a member of the service, is invited to submit constructive suggestions relating to problems under study by the Coast Artillery Board, or to present any new problems that properly may be considered by the Board. Communications should be addressed to the President, Coast Artillery Board, Fort Monroe, Virginia.

SECTION I

Projects Completed Since List Issue of The Journal

PROJECT NO. 1094—TIME INTERVAL APPARATUS EE-85-T6.—This equipment was described in detail in the July-August issue of THE JOURNAL. It was found that certain minor improvements were necessary to increase the sturdiness and reliability of the equipment and to permit its easy adjustment in the field. The Board recommended that these improvements be incorporated in the design and the apparatus be classified as a required type, standard article and issued to mobile seacoast artillery organization.

PROJECT NO. 1095—SHOCK ABSORBING DEVICE FOR ANTIAIRCRAFT DIRECTORS.—Tests of this device, which was described in the July-August number of THE JOURNAL, were completed in July. At the same time comparative tests were conducted with the director protected by an improvised mounting and with no protection furnished except that afforded by the vehicle tires and springs. Information was obtained from the commanding officers of the 61st, 62d, and 69th Coast Artillery (AA) relating to the means employed in their regiments for the protection of directors in compliance with Circular 4, War Department, 1937.

In the improvised mounting referred to above, the principal shock absorbing element consisted of sections of a salvaged tire casing placed between the bottom of the director and the floor of the truck. The instrument was held in position by four holding-down bolts. Several rubber washers were required on each holding-down bolt between the nut and the bracket on the director in order to absorb the shock when the director moved upward. This method gave satisfactory protection to the instrument while in transit and it has the advantage of simplicity.

During the road tests, the Ordnance Department shock absorbing platform functioned very satisfactorily. The director oscillated in the rubber mountings even on roads which would have been considered smooth for a passenger car. On a stretch of shell road which had worn so as to give a "wash board" effect, the director appeared to "float" in its rubber mounting while the truck body vibrated to such an extent that it was most uncomfortable for a passenger riding therein.

Upon completion of the tests, the Board concluded that the Ordnance Department shock absorbing platform was the most satisfactory of the several methods proposed or tested, and that one of these devices, with a few minor modifications, should be issued with each T8E3, M3, and M4 director.

PROJECT NO. 1098—TRAINING SLIDES FOR STEREOSCOPIC TESTER M1.—In the March-April, 1937, number of THE JOURNAL, Captain R. W. Crichlow, Coast Artillery Corps, described a simple stereoscope to be used for the training of stereoscopic observers. After some study of this device it was decided that it should be built as an auxiliary slide to be used with the Stereoscopic Tester M1 (Keystone). One of these training slides was built by the Ordnance Department and submitted for test. Though a number of minor modifications were found to be necessary, the Board concluded that this training slide was a very simple, inexpensive, and satisfactory device for the preliminary training of stereoscopic observers. It was recommended that the manufacture and issue of one of these devices with each Stereoscopic Tester M1 be expedited.

* * *

SECTION II

Projects Under Consideration

PROJECT NO. 1096—TIME INTERVAL APPARATUS EE-86-T1.—This equipment is designed to furnish time intervals for the elements of a fixed harbor defense. The design now under test consists of a time source, a time

interval transmitter and the necessary time interval bells. The time source is essentially an electrically wound clock which closes an electrical circuit to the time interval transmitter twice each second. At the transmitter the half-second impulses are converted to one-second impulses and used to drive electromagnetically a cam shaft which is capable of furnishing time signals at intervals of one, three, five, ten, fifteen, twenty, and thirty seconds. Two warning signals are provided before each ten-, fifteen-, twenty-, and thirty-second signal. Relays in the transmitter provide an easy means for synchronizing two or more time interval systems within a harbor defense.

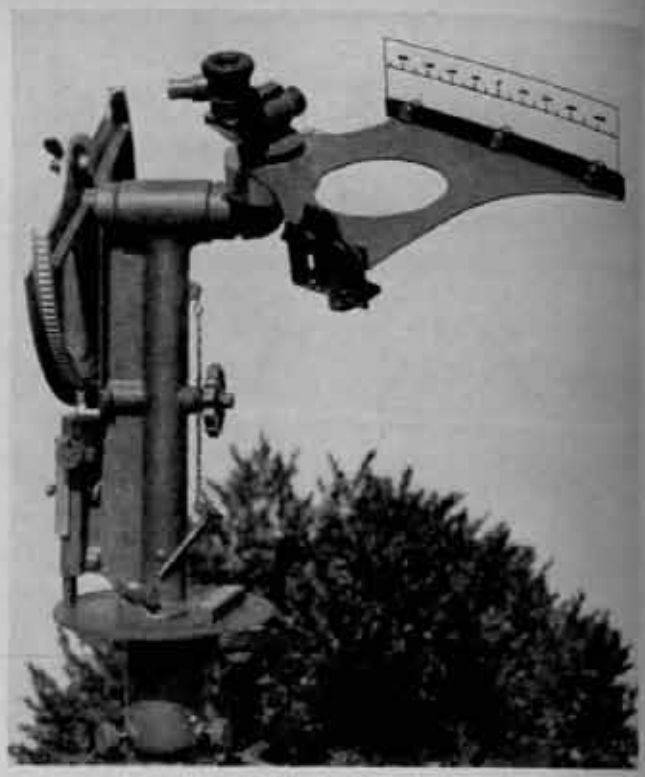
PROJECT NO. 1103—EMERGENCY FIRE CONTROL SYSTEM FOR ANTIAIRCRAFT GUNS.—This project involves the test of an emergency fire control system for antiaircraft guns, built around a new and improved lead computor designed by Major Gordon B. Welch, Ordnance Department. As stated in the July-August issue of The COAST ARTILLERY JOURNAL, such a system is highly desirable for use in case of failure of any part of the standard fire control system. This project will include tests by actual firings of an emergency system adaptable to the following conditions:

a. Failure of the standard director.
b. Failure of director and data transmission system.
c. Complete failure of standard fire control system.

PROJECT NO. 1105—ANTIAIRCRAFT SPOTTING METHODS AND INSTRUMENTS.—As a result of a recent study, the Board feels that it is possible to develop an instrument for flank spotting which will be simple and will be more suitable for the purpose than the antiaircraft Battery Commander's Observation Instrument M1. The present project contemplates a service test of several such instruments, together with the various spotting methods which they involve. The instruments to be tested are as follows:

a. Grill, Model 1917M1. A description of this instrument is given in Ordnance publication No. 1106, *Service Handbook of the Grill, Models of 1917 and 1917M1.* This device enables the observer to read deviations in reference numbers, which are then converted into terms of yards altitude by a simple slide rule setting. The grill is maintained in a horizontal plane and inherent errors are obvious; however, the Board feels that the spotting method involved warrants a thorough test.

b. Modified Altimeter. This is an instrument designed for spotting by the angular unit method. The standard Elbow Telescope M1 of the altimeter has been replaced by the Elbow Telescope M1A1 which has a mil scale etched on the reticle. For operation, the altimeter is set up at the flank station and so oriented that the curve disk is constantly perpendicular to the base line. The observer tracks the target by the motions ordinarily used for the altimeter, thereby being enabled to read deviations in the slant plane containing the base line and the target. These deviations are converted into yards altitude by means of a table of multiplying factors. The field of view of the telescope permits the reading of deviations as great as eighty mils. For greater deviations, an auxiliary scale, similar in principle to a range rake, is mounted so as to rotate about an axis concentric with the tracking telescope.



Modified altimeter

c. Altitude Grill 64th Coast Artillery (AA). This instrument is similar to one used by Battery G, 64th Coast Artillery, in its 1936 record practices. The device is a mechanical representation, to scale, of the firing situation. It consists of a tripod on which is mounted an azimuth circle, a horizontal "base line" arm equipped with a sliding peep sight, and a vertical grid containing a number of equidistant horizontal wires and a corresponding scale giving readings in yards altitude. The base line arm and one edge of the grid are both pivoted at the center of the azimuth circle, which represents the gun position. For operation, the base line is first set off by moving the sliding peep sight to the proper graduation on the base line arm scale and the arm is then oriented to the azimuth of the base line. The peep sight now represents the O_2 position. The vertical grid is kept oriented to the azimuth of the plane of fire by data transmitted at 100-mil intervals from the battery position. The spotter places his eye at the peep sight and by observing the number of horizontal wires between the target and the burst is enabled to announce the resultant deviation in terms of altitude. The scale of the instrument is such that the distance between adjacent wires represents 100 yards. Therefore, by estimation, it is possible to spot deviations with reasonable accuracy to the nearest twenty-five yards in altitude. The principal advantage of this device is that it does away with the use of the multiplying factors used in the angular unit method and permits spots to be read directly in terms of altitude.

Altitude Grill, 64th C.A. (AA)

The above mentioned instruments will be tested in the near future during the firing of approximately 1,000 rounds of 3-inch antiaircraft shrapnel in connection with other projects. Base lines varying in length from 1,000 to 5,000 yards will be used in order to determine the limitations of each device tested. For the sake of comparison, the same rounds will also be spotted by a stereoscopic height finder.

* * *

SECTION III

Miscellaneous

Multiplying Factors for Angular Unit Method.—The table of multiplying factors shown on page 110 of the Coast Artillery Field Manual, Volume II, Part II, is applicable for spotting and adjustment of fire when the base line is from 3,000 to 6,000 yards in length and the target altitude is from 2,000 to 7,000 yards. The Board has found it necessary to compute additional factors extending this table to include targets at 1,000 yards in altitude and base lines down to a minimum of 1,000 yards in length. The Board will furnish these new values to any battery commander who may desire them.

GHQ Air Force-63d Coast Artillery (AA) Joint Exercises.—The Board has had available for study during the past month a report of the GHQ Air Force-63d Coast Artillery (AA) Joint Exercises, held at Muroc, California, during the period May 10-May 24, 1937. These exercises were carefully planned, excellently conducted and of great training value to the troops involved. Conclusions reached in regard to the following points which were brought out during the maneuvers are believed to be of particular interest and are worthy of consideration in the planning and conduct of future joint exercises:

a. The value of passive defense measures, particularly careful camouflage, strict camouflage discipline and use of dummy and alternate positions.

b. The importance of coördination of the regimental antiaircraft artillery intelligence service (AAAIS) with the aircraft warning service (AWS).

c. The influence of searchlight illumination on accuracy of bombing when the bomber is partially or wholly blinded by the searchlight beam during the bomb-sighting operation.

d. The necessity for thorough coördination between the antiaircraft artillery and friendly pursuit aviation.

e. The apparent ineffectiveness of smoke screens, laid down by hostile planes, on the operations of elements of the antiaircraft defense.

Transportation of Height Finders M1.—Recently, at the end of a five-hundred-mile march of an antiaircraft unit, the M1 height finder was found to have been damaged. It is believed that this damage was caused by lack of strength in the rubber mountings of the traveling carriage of the height finder tube. Apparently these mountings permitted sufficient movement of the tube so that it pounded against its carriage. Eventually, one of the two brackets holding the porter bars at one end of the height finder tube and two cross members of the same end of the traveling carriage were broken. Although the height finder tube was rotated out of its normal position, and the objective ends of one of the tracking binoculars were battered, the optical system of the height finder tube was not thrown out of adjustment and the height finder was used in target practices. In order to avoid a duplication of this damage, battery commanders should inspect the traveling carriages of their height finder tubes for any indication of pounding between the tube and the fixed portion of the traveling carriage.

Height Finder Tube, showing broken bracket for porter bars.

Coast Artillery Orders

(Covering the Period July 1 to August 31, 1937)

Colonel Earl Biscoe, from Hawaii, to 2d C.A. District, New York. Previous orders revoked.

Colonel W. S. Bowen, from 2d C.A. District, New York, to President C.A. Board, Fort Monroe.

Colonel H. W. T. Eglin, from office of the Assistant Secretary of War, Washington, D. C., to 62d Fort Totten, October 1.

Colonel F. K. Fergusson, appointed Brigadier General, July 18, date of his death.

Colonel W. E. Shedd, Jr., from President, C.A. Board, Fort Monroe, to 2d, Fort Monroe.

Colonel F. H. Smith, General Staff Corps, appointed Brigadier General, July 1.

Lieutenant Colonel K. F. Baldwin promoted Colonel July 1.

Lieutenant Colonel R. B. Cocroft, from 7th, Fort Hancock, to Org. Res. 3d Corps Area, Fort Monroe.

Lieutenant Colonel T. C. Cook promoted Colonel August 1.

Lieutenant Colonel Franklin Kemble, from University of New Hampshire, Durham, to recruiting, Harrisburg.

Lieutenant Colonel O. H. Longino promoted Colonel August 3.

Lieutenant Colonel W. R. Nichols, from Org. Res. 3d Corps Area, Fort Monroe, to 3d C.A District, Fort Monroe

Lieutenant Colonel P. H. Ottosen promoted Colonel August 7.

Lieutenant Colonel R. N. Perley, Inspector General's Department, retired August 31, upon his own application.

Lieutenant Colonel E. H. Thompson promoted Colonel August 19.

Lieutenant Colonel E. W. Turner, from the Philippines, to 6th, Fort Winfield Scott.

Lieutenant Colonel C. K. Wing promoted Colonel July 1.

Major W. McD. Chapin promoted Lieutenant Colonel July 19.

Major C. S. Doney promoted Lieutenant Colonel August 7.

Major J. B. Hafer, from 13th, Fort Barrancas, to the Philippines, sailing New York, January 6.

Major A. W. Jones, from 3d, Fort Stevens, to the Philippines, sailing San Francisco, January 29.

Major Frederick Lofquist, from Hawaii, to 3d, Fort Stevens, Oregon.

Major W. W. Rhein, from Panama, to 7th, Fort Hancock.

Major E. C. Seaman, from instructor, C.A. Pa. National Guard, Allentown, to Panama, sailing New York, November 3. Previous orders amended.

Major L. A. Whittaker, from Hawaii, to 6th, Fort Winfield Scott.

Captain G. W. Brent promoted Major July 1.

Captain H. D. Cassard promoted Major July 1.

Captain E. G. Cowen promoted Major July 1.

Captain R. T. Chaplin promoted Major July 1.

Captain B. C. Dailey promoted Major July 1.

Captain L. L. Davis promoted Major July 1.

Captain R. E. DeMerritt promoted Major July 1.

Captain K. P. Flagg promoted Major July 1.

Captain W. B. Hawthorne, from U.S.A. M.P. *Joseph Henry*, Fort Hancock, to U.S.A.M.P. *General John M. Schofield*, Fort Monroe.

Captain W. D. Hohenthal promoted Major July 1.

Captain F. A. Hollingshead, from 69th, Fort Crockett, to Agri. & Mech. College of Texas, College Station, Texas.

Captain J. W. Huyssoon, from U.S.M.A., West Point, to student, Georgetown University Law School, Washington, D. C., and detail in Judge Advocate General's Department.

Captain L. W. Jefferson promoted Major July 1.

Captain H. W. Lins promoted Major July 1.

Captain J. R. Lowder promoted Major July 1.

Captain Samuel McCullough promoted Major July 1.

Captain R. J. Moulton, transferred to Quartermaster Corps, July 23.

Captain Glenn Newman, from 7th, Fort DuPont, to the Philippines, sailing New York, January 6.

Captain A. L. Parmelee promoted Major July 1.

Captain W. F. Putnam, Jr., promoted Major July 1.

Captain M. M. Read promoted Major July 1.

Captain Samuel Rubin, from Fort Winfield Scott, to commanding officer, U.S.A. M.P. *Ellery W. Niles*, San Francisco.

Captain W. W. Scott promoted Major July 1.

Captain E. L. Supple promoted Major July 1.

Captain J. A. Weeks, transferred to Quartermaster Corps, July 28.

First Lieutenant A. D. Gough, from 2d, Fort Monroe, to Hawaii, sailing New York, January 6.

First Lieutenant C. J. Hauck, Jr., from U.S.M.A., West Point, to student, Georgetown University Law School, Washington, D. C., and detail in Judge Advocate General's Department.

First Lieutenant H. R. McKenzie, transferred to Quartermaster Corps, August 23.

First Lieutenant R. W. Moore, from 61st, Fort Sheridan, to student, Georgetown University Law School, Washington, D. C., and detail in Judge Advocate General's Department.

First Lieutenant J. G. Reynolds, from 61st, Fort Sheridan, to Third Corps Area, Baltimore, to duty as property auditor.

First Lieutenant Peter Schmick, from 52d, Fort Monroe, to Hawaii, sailing New York, November 27.

Second Lieutenant G. R. Ames to 52d, Fort Monroe.

Second Lieutenant W. W. Bailey to 6th, Fort Winfield Scott.

Second Lieutenant S. J. Cherubin, to 52d, Fort Hancock.

Second Lieutenant M. H. Clark to 62d, Fort Totten.

Second Lieutenant W. C. Conway to Randolph Field, Texas.

Second Lieutenant W. G. Easton to Hawaii, sailing New York, October 20.

Second Lieutenant P. H. Enlank to 61st, Fort Sheridan.

Second Lieutenant R. H. Fitzgerald to 51st, Fort Monroe.

Second Lieutenant M. S. George, to 51st, Fort Monroe.

Second Lieutenant J. McM. Gulick to 52d, Fort Monroe.

Second Lieutenant L. A. Hall to Hawaii, sailing New York, October 20.

Second Lieutenant M. J. Hickok, Jr. to 62d, Fort Totten.

Second Lieutenant W. H. Jordan, from 52d, to 7th, Fort Hancock.

Second Lieutenant G. F. Leist to the Philippines, sailing New York, January 6.

Second Lieutenant V. E. Mansfield to 62d, Fort Totten.

Second Lieutenant T. McG. Metz to 2d, Fort Monroe.

Second Lieutenant O. A. Moomaw, to Panama, sailing New York, September 25. Previous orders amended.

Second Lieutenant T. D. Neier to 6th Fort Winfield Scott.

Second Lieutenant D. B. Nye to 2d Fort Monroe.

Second Lieutenant C. S. O'Malley, Jr. to 6th, Fort Winfield Scott.

Second Lieutenant C. L. Register to Hawaii, sailing New York, October 20.

Second Lieutenant A. D. Robbins, from Air Corps Primary Flying School, Randolph Field, to Panama, sailing New York, September 25.

Second Lieutenant R. W. Rumph to 62d, Fort Totten.

Second Lieutenant K. R. Schweidel, from Hawaii, to Air Corps Training Center, Randolph Field, October 1. Previous orders revoked.

Second Lieutenant J. A. Scott, Jr. to 63d, Fort MacArthur.

Second Lieutenant D. W. Shive to 62d, Fort Totten.

Second Lieutenant H. M. Spengler to 63d, Fort MacArthur.

Second Lieutenant O. B. Steely to 61st, Fort Sheridan.

Second Lieutenant G. V. Underwood, Jr. to 6th Fort Winfield Scott.

Second Lieutenant W. J. Worcester to 52d, Fort Monroe.

Second Lieutenant C. G. Young to 52d, Fort Hancock.

The Contributors

Lieutenant Colonel A. H. BURNE, D.S.O., is associate editor of that excellent magazine *The Fighting Forces*. His fine battle studies and military essays appear with great regularity in that and other British service publications.

This fall Colonel Burne plans a trip to America—his first we believe—to gather material for a new book dealing with selected Civil War leaders.

Captain RILEY F. ENNIS is an instructor in the Tank section of the Infantry School. The material for "More Power" was gathered during visits to the plants of Diesel engine manufacturers, talks with engineers, and in a survey course on the Diesel engine at Ohio State University.

Captain Ennis is keenly interested in the Civil War and has written several articles on the campaigns of Sherman.

CAPTAIN GUNNER is the pseudonym of a captain, Coast Artillery Corps Reserve. Although he infers that he returned from active duty little the wiser, we hold to the opinion that an officer who displays such keen interest in the training scheme could not leave camp without having profited somewhat.

The career of that distinguished Coast Artilleryman, Major General JOHNSON HAGOOD, is too well known to rehearse here. His article in the current number is timely, thought-provoking, and definitely plots a course for the junior officer.

Major ROBERT N. MACKIN, Coast Artillery Corps hails from New Jersey. His military career began in 1912 when he was appointed second lieutenant, Coast Artillery, in the New York National Guard. During the World War he served in the grades of captain and major, vacating his temporary commission in 1920 to accept appointment as captain of Coast Artillery, Regular Army.

Since 1920, Major Mackin has graduated from the Advanced Course of the Coast Artillery School (1930), and the Command and General Staff School (1934). At present he is senior instructor, antiaircraft section, the Coast Artillery School.

FLETCHER PRATT, a native New Yorker, was educated at Hobart College and Sorbonne, Paris. He is the author of numerous articles which have appeared in magazines of national circulation.

The books written by Mr. Pratt include *Hail Caesar!* (biography of Julius Caesar), *Cunning Mulatto* (detective stories), *Ordeal by Fire* (history of the Civil War), and *Heroic Years* (from the Jefferson administration through the War of 1812). Mr. Pratt's interest in Jacob Brown was aroused by work done in connection with the last-named book.

Captain WILLIAM H. SCHILDROTH, is a graduate of USMA, '23, The Infantry School Advanced Course, '34, and the Command and General Staff School, '36. At the moment he is teaching the fine points of rifle marksmanship and machine gunnery to the new class at The Infantry School. His first contribution to The JOURNAL appears in this issue under the title "The Military Sun Rose Early in the East." We expect the wisecrackers to have a field day with that title.

The March-April number of The JOURNAL carried a biographical sketch of SEWELL T. TYNG in connection with his article in that issue entitled "Flag of Truce." In his current offering he gives us a new slant on the siege of Maubeuge which should interest all artillerymen. Mr. Tyng is an authority on the opening days of the World War and has written a book, *The Campaign of the Marne*, dealing with the events of that period of time.

Colonel R. H. WILLIAMS, Coast Artillery Corps, was one of the official observers at the Fourth Army Maneuvers. He is a graduate of the Coast Artillery School and the Army War College. He is a member of the initial general staff corps eligible list and has served two tours with the General Staff Corps.

Colonel Williams was awarded the Distinguished Service Medal for displaying rare ability in the organization and administration of the G-2 Section, I Army Corps, and his zeal and ability as G-2 of the Third Army.

Book Reviews

EUROPE IN ARMS. By Liddell Hart. London: Faber and Faber, Limited, 1937. 348 pages; $2.50.

This book is a collection of well written essays bearing either directly or indirectly on the fact that Europe is re-arming. Hence the title.

The material utilized consists partly of articles contributed by the author to *The Times* (London) during the past two years, as its military correspondent and adviser on defense in general; partly of articles contributed to various British and American reviews, military and general, or to *The New York Times;* and partly of new matter.

The book comprises an introductory chapter and four parts: Forces, Problems, Measures, and Forecasts.

The introductory chapter is a timely plea for the re-introduction of idealism as the basis of defense preparation. "The professed patriots," writes our author, "have concentrated on a doctrine of national self-preservation, and their appeals have had a metallic ring. This marks a relapse. Two generations back, Kipling provided British people with a gospel of Empire which raised Imperialism above mere materialism: today its crudity palls, but it has found no replacement. There is need for a new vision—one bigger than Kipling's, and better. Need, also, for the sense of a mission—not so much to rule as to influence by example. To gain this we must grasp the elements that matter in our tradition—above all, the spirit of freedom. . . . If fascism and communism can raise enthusiasm among the young, how much better sources have we from which to generate it."

These are wise words and words that we would do well to take to heart. Mr. Baldwin had such thoughts in mind when he observed recently that there was no reason why democracy "should not be every whit as efficient, working by conviction and freewill, as any dictatorship working under pressure and contortion."

Part I—Forces—comprises chapters on: The Air Forces of Europe; The Armies of Europe—The Totalitarian Powers; the French Army; The British Army; the Re-armament of Britain.

Part II—Problems—consists of chapters concerning: The Tactical Problem—and a New Solution; The Capital Ship; the Future of the Mediterranean; the Rôle of the British Army; The Limitation of Arms; Military Training; The Higher Direction of Forces; and The Higher Education of Officers.

The unfortunate professional soldier comes in for considerable castigation in some of the chapters in Part II. In this connection we cannot resist reminding the author of his own words. In the opening chapter of the book he writes. "The first need is to achieve a clearer idea of differing points of view. The ardent believer in defense by arms must try to understand the intellectual position of the pacifist, instead of hurling denunciations which miss the mark while marring the atmosphere. The ardent lover of peace must respond, by giving due weight to the practical case for armed defense."

These, also, are wise words. But why, in his own field, does not our author practice what he preaches? Liddell Hart's methods have undoubtedly been successful; he has provoked thought in the army and, as a military critic, has captured a wide public. But we wonder whether the time has not arrived when he should concentrate on the more difficult task of promoting rather than provoking thought. We are quite ready to admit that many of his denunciations do hit or partially hit the mark but some miss the mark and it is these that mar the atmosphere.

In Part III—Measures—the following studies are included: Combined Defense; Reflections on Defense; The Changing Army; The Brakes on Recruiting; The Territorial Army—Its Strength and Weakness; The Volunteer in the Car—An Army Motor Reserve.

Part IV—Forecasts—deals with: The Last War and the Next; A German View of the Next War; The Abyssinian War—and its Bearing on Future Warfare; Would Another War End Civilization.

Your reviewer is a self-confessed Liddell Hart fan. He looks forward to each new book written by this gifted author and both enjoys and profits by their study, even if such enjoyment and profit is attained perhaps as much by disagreement as by agreement.

This book covers a very wide field and examines many of the most controversial questions of the day. It is worthy of a place on every officer's bookshelf and we trust the author will continue, periodically, to group his shorter studies into book form. The continuity of theme in such books is perhaps difficult to maintain but that does not in any way detract from their value.

Canadian Defense Quarterly, July, 1937

* * *

ENGLAND EXPECTS EVERY AMERICAN TO DO HIS DUTY. By Quincy Howe. New York: Simon and Schuster, 1937. 239 pages; appendix; index; $2.00.

The author believes that England is approaching the twilight of the Imperial Day and that its one hope of survival is an alliance—written or unwritten—with the United States. As far as we are concerned, Mr. Howe

does not believe that such an alliance would be worth the trouble.

He argues that we would do well to follow a rigid and strict isolationist policy, based on the premise that the United States could, in a pinch, stand against the world, self-sufficient from both a military and economic standpoint.

Those interested in the foreign policies of Great Britain and the United States will find a fresh viewpoint in this book.

* * *

THE FEDERAL UNION. A History of the United States to 1865. By John D. Hicks. New York: Houghton Mifflin Company, 1937. 734 pages; 48 illustrations; 34 maps; index; $4.75.

A portrayal of the social, economic, and political history of the United States from its earliest days to the end of the Civil War. The author is Professor of History in the University of Wisconsin, and for eighteen years gave a survey course in American history for university students classed as "sophomores and above."

Professor Hicks has turned out a workmanlike and accurate job. His book should prove of value as a reference work for the student. The bibliography is unusually extensive and gives a sound basis for further reading.

* * *

ZEPPELIN. By Captain Ernst A. Lehmann. New York: Longmans, Green and Co., 1937. 365 pages; 19 illustrations; $3.00.

Not the least of the thirty-six individual tragedies of the flaming end of the *Hindenburg* was the death of the world-famous leader in airship development, Captain Ernst A. Lehmann. Captain Lehmann had been associated with Zeppelin operation for the greater part of his life and had commanded numerous air vessels in peace and war. He had completed his book shortly before the last voyage of the *Hindenburg*.

He tells of the early days of Zeppelin manufacture and the struggles of Count Zeppelin to gain official recognition for his invention. A large part of the book concerns itself with the wartime operations of the dirigibles. The many accounts of raids over England are indeed thrilling. Absorbing too, is the story of what the Zeppelins did during the battle of Jutland; for the information they furnished influenced in large measure the tactics of the German admiral. A vivid chapter recounts the voyage over Africa in 1917 of the *L* 59 in its abortive effort to carry supplies to the German East African forces. The *L* 59 covered 4,225 miles in uninterrupted flight, stayed aloft ninety-five hours, and landed with enough fuel to continue in flight for 3,750 miles. The author makes the point that even as early as 1917 the long-range possibilities of the Zeppelin had been demonstrated—although the story of the flight was not to be known to the world for years.

The final chapter was written by Commander Charles E. Rosendahl, U. S. Navy, the authority on dirigible operation on this side of the Atlantic. Commander Rosendahl describes the tragic end of the *Hindenburg* and ana-

lyzes the possible causes of the disaster. Finally, he pays tribute to the author, who was, moreover, his friend.

Zeppelin is definitely a contribution to the literature of the air. The work of the pioneers has been modestly and ably told by one best qualified to do so. The book is recommended to all interested in aircraft and its possibilities in peace and war.

✓ ✓ ✓

HENRY CLAY. By Bernard Mayo. Boston: The Houghton Mifflin Company, 1937. 570 pages; 22 illustrations; bibliography; index; $4.50.

This is the story of the witty and eloquent young statesman who came from the Kentucky frontier to enliven national politics and to give us "Mr. Clay's War"—otherwise known as the War of 1812. This volume is the first of a projected three-volume life and takes up the career of Clay to the day that war is declared against England.

The author is Professor of History in the National University, Washington, D. C. Professor Mayo displays not only sound scholarship and an immense amount of careful research but a command of prose that will insure pleasure as well as profit in the reading of *Henry Clay*.

The book is recommended to readers of political and frontier biography. It is especially noteworthy in that it gives an extensive, yet lucid, explanation of why we went to war in 1812.

✓ ✓ ✓

THE STORY OF SECRET SERVICE. By Richard Wilmer Rowan. Garden City, N. Y.: Doubleday Doran and Company, 1937. 732 pages; illustrated; $3.50.

This is the story of thirty-three centuries of secret service and of the personalities of that work from Rahab the harlot of Jericho, to Mata Hari the dancer from Java. Mr. Rowan has been interested in the subject for a good many years and if anyone could be called an "expert" it is he. He published his first book in 1928 and his pen has been in regular production ever since. We have now this volume of some seven hundred pages, copiously annotated and covering the activities of the secret service almost from the beginnings of recorded history. It is an interesting book, the product of twenty years of study.

Methods of warfare today are not as they were, but in three thousand years secret service has changed little. Mithridates, Genghis Khan, Alexander, and Scipio Africanus—all employed secret agents and it is their doings and those of their military brethren which make the more interesting subjects in this book. Here are they all gathered together—Alva in the Netherlands, Napoleon in Italy, Bismarck's generals in France—in a chronicle of their failures and successes which, observes the author, are frequently in proportion to the reliance they placed on the reports of their agents. But he is not concerned solely with military espionage; political secret service has long been a weapon and tool of rulers and those with ambition to rule. The Assassins and the Society of Jesus were once secret service systems. Napoleon's Fouche was a system all to himself. He outlasted his master and was for a time one of the leaders of the government after Waterloo. Bismarck had his Wilhelm Stieber who as much as any one man decided the time for the Franco-Prussian war. Questions of policy are decided by the leaders but those

decisions are sometimes shaped by the reports of secret agents.

The author has written of spying of all kinds and he has an enthusiasm for his subject which is almost contagious. It is more than curious that the success of military leaders has been proportionate to the ability of their agents. This, of course, is not wholly certain, but the corollary—the lack of success when there were no secret agents—leads readily to the conclusion that an adequate intelligence service was ever necessary to the successful outcome of a campaign. We have had too many examples in our own times of opportunities lost to commanders because of their lack of even elementary intelligence organizations.

This history is well worth reading. It is, says Mr. Rowan, not yet complete. But here are those who moved on the back stairs of history—and so made it. Tomorrow there will be others. J. S.

SIR RICHARD GRENVILLE OF THE *REVENGE*. By A. L. Rowse. Boston: The Houghton Mifflin Company, 1937. 365 pages; 9 illustrations; index: $3.50.

This is the first full-length biography of the great Elizabethan adventurer. New light has been thrown on the exciting life of the hero of the *Revenge* by the discovery of hitherto unpublished papers in the Spanish archives. These papers give the Spanish side of the last fight of the *Revenge* in the great battle off the Azores.

Grenville will be remembered by those who recall their early American history, as the founder of the ill-starred first Virginia Colony planted on Roanoke Island in 1585. The full story of that initial effort to settle in the Middle Atlantic States is graphically told.

Readers of live biography and maritime adventure will enjoy vicarious sailing with Sir Richard in the days when Spanish galleons were a profitable—and risky—quarry.

AIR STRATEGY. By Lieutenant General N. N. Golovine (In collaboration with a technical expert). London: Gale and Polden, Limited. 1936. 114 pages; 8 figures. $3.00.

General Golovine has written an instructive and interesting book of air strategy. As a point of departure he has analyzed the doctrine of air power as evolved by the Italian extremist, the late General Douhet, and pointed out the fallacies existing in Douhet's thesis. For instance, Douhet's idea that an air force could break the morale of the enemy is discarded utterly. That Golovine is right is clearly shown by the Spanish civil war. At the same time, he gives Douhet his just due as a far-seeing and penetrating thinker, who early posed the air problem on broad lines. From this point he develops his own theory of air strategy.

His air arm, or as he calls it, the Independent Air Force

for Strategic Offensive is to comprise two-seater fighter planes called destroyers (a new type plane) armed with automatic cannon; scouting planes of high speed and service ceiling; and high-speed, high performance bombers. He also envisages multi-seat fighters in certain cases as an escort to protect heavy, slow bomber formations. Also he still finds a need for single-seat pursuit ships—interceptor fighters he calls them—for destructive purposes. For particular purposes even airships, flying boats or other type aircraft may be added to the air force.

From his study he comes to the definite conclusions that every country must develop its own particular air doctrine as is done for land and sea forces. This, in his opinion, has not been done except by Germany and the Soviet Union. The following quotation will indicate his trend of thought:

> . . . In general, there is apparent an almost instinctive endeavour to create a strategic air force based on principles which, at first, were not fully understood, and have often been misinterpreted. In particular, the doctrine adopted by each nation has suffered from characteristic errors, which may roughly be classified as follows:
>
> 1. Too much theory: the resulting organization is not in conformity with the original doctrine. Example: Douhet's doctrine and the Italian Air Force.
>
> 2. Political and strategic aims not clearly defined. Example: Great Britain.
>
> 3. Technical progress overlooked and too much attention paid to military theories. Example: France.
>
> 4. Lack of strategic ideas and too much attention paid to technical achievements. Example: U.S.A.

He believes that America has an excellent naval air force but the Army, while equipped with excellent aircraft, is without a clear "Air Doctrine" and though complete in its limited field has but little value "beyond that of an Army Service with no definite object, unless the possible repetition of events in 1917-18 be admitted."

This does not exactly cover the facts. The G.H.Q. Air Force of the United States is more than an army service. However, due allowance must be given the author for the fact that the Air Force is a new organization, only taking shape when the book was laid down.

The author's analysis of the problem of British air strategy seems to be sound but the political consideration on which he bases his outline of air strategy is shaky in spots. To count on Japan to counterbalance the United States and thus enable "Great Britain to maintain absolute supremacy in the Eastern Atlantic Zone and relative predominance in its southern parts and in the Southern Pacific," is stretching things a bit far. To envisage the United States and Japan as natural enemies is a sort of wishful thinking. After all, Japan and the United States are good customers and good neighbors. Japan's chief competitor in the East is the nation which has the greatest investment there and that isn't the United States. It is Great Britain; and the Japanese know it if British writers and certain Anglophiles are blandly blind to it.

The technical portions of the book are excellent and the writers make out a good case for their conception of air

strategy. However, it is believed they give too much weight to the defensive value of aircraft, such as interceptor fighters. Advanced opinion and the latest tests indicate the tremendous speed of modern bombers makes it extremely difficult to spot them in time to enable the pursuit ships to take off and intercept the bombing formation.

On the whole the writers have been doing some advanced thinking. The battle fleet of the air, as they envisage it—fast scouts, powerfully armed destroyer or battle planes, and high-speed bombers—is something to think seriously about. The writer ventures a prediction that something akin to a "destroyer airplane" but larger in size will be developed and used within the next few years. J. H. B.

* * *

MODERN WAR AND DEFENCE RECONSTRUCTION. By Major J. R. Kennedy. London: Hutchinson and Co., 1936. 304 pages; x appendices; Index. $4.00.

In his latest book Major Kennedy, the aggressive British critic and former editor of *The Army, Navy, and Air Force Gazette,* examines the state of Great Britain's defenses, and the politics that he deems responsible for their neglect. In conclusion, he writes several chapters outlining a suggested policy of defense reconstruction, and from these the book gets its name.

Major Kennedy knows the inner political channels of his country's defense departments better than any of the other well-known British military critics of the day, and far better, of course, than any foreign critic would have reason to know them. Yet his description of what he calls the "floundering" policies of those responsible for the national defense parallels closely what other writers have said in less detail on the matter.

His main plea is centered upon the wastefulness and folly of Britain's new program of spending. If seven billion dollars is to be spent, he believes the money should go largely to build up a great air force, since airplanes now form the primary arm of all fighting forces. He is also strong for the tank on land and the submarine at sea. But more important in his mind than any presently conceivable land or sea instrument of warfare is the airplane, simply because it is three dimensional and has several times the speed of the others. In making his points, however, Major Kennedy is inclined to accept too high an estimate of the capabilities of the airplane and tank, and to slight their limitations.

At the same time, he decries one air tendency that is a main point of discussion today in every air force in the world—the trend toward great powerful bombers and away from fast fighting ships. He believes that this drift means only another race between projectile and armor, this time in the air instead of on the water. Unfortunately, he does not go into this point with the thoroughness

it deserves. Likewise, in his discussion of thermite bombs, by means of which he says that London could be burned down in a single day, Major Kennedy neglects to say what might be done in defense against thermite attacks, provided it is done before it is too late.

Major Kennedy is inclined to rush in, at times, rather than weigh matters with full care. But when lethargy, reaction, and "floundering" threaten national safety, as this author believes they do, certainly some freedom of argument is pardonable.

J. L. G.

* * *

NORTHWEST PASSAGE. By Kenneth Roberts. Garden City, N. Y.: Doubleday, Doran & Co., 1937. 709 pages. $2.75.

Northwest Passage deals with a man who might have been as great a character in North America as Ghengis Khan was in Asia. He had the brilliancy, the stamina, the courage, and the ability to command. What he lacked was the shyness to liquor, debts, and women.

As Americans, we should all read this book. It gives a clear picture of life in America when the English and the French were battling for supremacy. We dare not hazard a guess as to the present position of the United States had these French and Indian conflicts turned out differently than they did.

The book deals with Major Robert Rogers, of Robert's Rangers fame. He was a man who had such a keen insight into Indian character that he knew what the Indians were going to do before they had even decided to do it. Such a knack should prove invaluable whether fighting the Indians or trying to rule them. It did. Even after his massacre of the Indian village of St. Francis, the redskins still looked to him as their god.

There is an unusually vivid description of the long, fatiguing march on St. Francis and the subsequent massacre of the Indian settlement. It tells of the nine-day march through the swamps with very little food and no chance to dry off—of the treachery of the Mohawk Indians who had been trained by Johnson—of the hundreds of English scalps swinging in the breeze at St. Francis—of the burning of the village in a brilliant sunrise. It describes these scenes so graphically that we smell the stench of burning flesh, see the streaming of blood, and hear the death wails of the Indians as they fall into the river in a vain attempt at escape.

Yet, when we read these passages, we say, "Good!" because we look back at the numerous massacres of white villages that emanated from St. Francis.

Major Rogers led this attack. He did it as a stepping stone toward the accomplishment of his one great ambition—that of discovering the Northwest Passage from England. Even if the short cut to China and India had existed, Major Roberts would not have discovered it. Politics, greed, liquor, debts, and women step into the picture and forever quash the scheme of discovery.

M. G. W.

INITIATIVE