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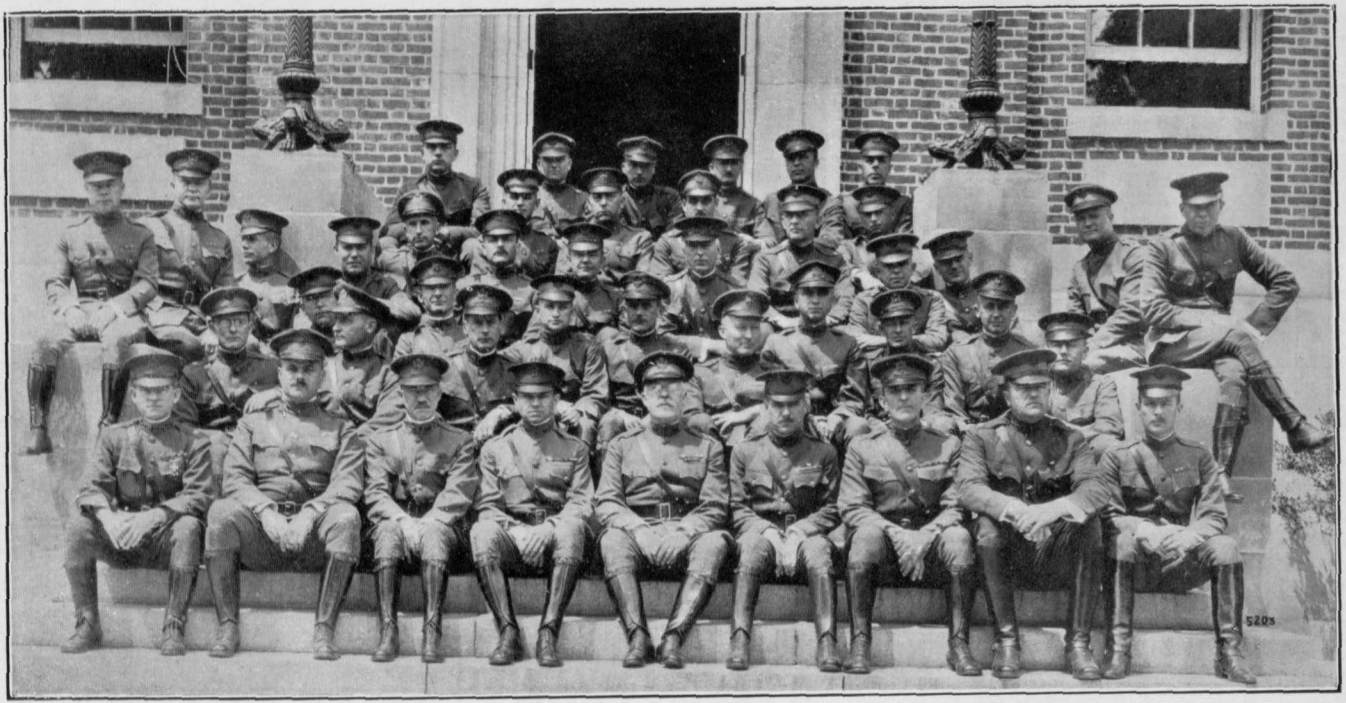

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The Coast Artillery Journal

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The Dardanelles Expedition

By Lieut. Colonel Walter H. Johnson, Infantry, (D. O. L.)

Editor's Note.—This paper is the first in a series of studies prepared by student officers in the Command Course, Army War College, 1922-1923, and which the JOURNAL has been so fortunate as to secure through the consent of the Commandant, Army War College, and the authors of the several papers.

THE NARRATIVE

"In war nothing is got but by calculation; anything not thought out in all its details effects no results."
(*Napoleon's War Maxims*).

PREFACE

FACTS only are presented in the following. These were culled from what were considered to be the most reliable of the sources named in the accompanying bibliography. For the sake of clearness, the comments, criticisms, opinions and deductions are presented in the "Discussion" and are, therefore, omitted in the narrative. In the latter, however, one may readily see the growth of the idea concerning the Dardanelles Expedition; the lack of up to date and completed plans prepared by competent military and naval advisers, i.e., the completed calculation alluded to by Napoleon.

If, from the following, the reader's mind is refreshed concerning the larger survey of the causes and conduct of the Expedition or if he becomes oriented in the broader phases of the operations under discussion and at the same time grasps the meaning of General Callwell's terse remark:

" * * We drifted into the big military attack. * * " (*)

the main object of this narrative will have been accomplished. Careful record of the authority for each statement herein presented has been retained and is available as it must be admitted that some are open, it

(*) General Callwell was Director of the Military Operations Department of the British War Office.

may be, to a diversity of opinion despite the fact that authoritative sources were drawn upon. Inserts as to the broader phases of operations on other fronts have been made under appropriate headings and dates.

The Origin of the Dardanelles Expedition

The first mention of a Dardanelles Expedition came from Mr. Winston Churchill, who, on September 1, 1914, informed General Douglas, Chief of the Imperial General Staff (British) that he had arranged, the day before, with Lord Kitchener for the working out of a plan for the seizure, by means of a Greek Army, of the Gallipoli Peninsula with a view to admitting a British fleet to the Sea of Marmora. This plan was never worked out. On the contrary, the idea as presented was not favorably reported upon by the British Director of Military Operations, whose expert opinion as to the difficulties of such an operation was sustained by studies made in 1906 by the British General Staff.

The German Armies were pushing against the British and French lines, making for the Channel and for Paris. In the near East, after obtaining the *Goeben* and the *Breslau* in August, the Turk was fairly certain as to which side to take. Toward the end of October the Turkish war party, under Enver Pasha, Minister of War, sent the Turkish fleet out. It speedily returned claiming to have received fire, on October 28, from the Russians. A day later Turkish torpedo boats bombarded Odessa and Theodosia and the Turks invaded the Sinai Peninsula. Early in September both the Navy and the Army in Turkey passed into German control.

On October 31, 1914, Turkey declared war. England and France followed with like action on November 5th and 6th, respectively. Three days prior to the latter date a combined British and French squadron had fired upon the batteries at the mouth of the Dardanelles and the latter had replied. On the 18th of the same month the *Goeben* was damaged in a sea fight in the Black Sea. On the 10th of December the same ship attempted to bombard Batum but was driven by the Russian fleet into the cover offered by the Bosphorus. Three days later a British submarine proceeded up the Dardanelles and sunk an old Turkish battleship.

By November 23, 1914, the British-Indian operations at the mouth of the Tigris and Euphrates and the possible danger to Egypt appear to have revived Mr. Churchill's original idea and on November 25, he presented to the British War Council his thought relative to a blow at the Turk toward Constantinople saying that it should be done if only as a feint. But again a military expert, Lord Kitchener, for good military reasons, succeeded as Secretary for War, in turning aside Mr. Churchill's idea. After events show that the latter—then first Lord of the Admiralty—although he "* * put the project aside and thought no more about it at the time * *," had strong views on the subject and was a power in the War Council.

In the meantime Russia had been engaged with the enemy on several fronts. By the end of the year she was resisting Hindenburg's frontal attack toward Warsaw. In the Caucasus the Russian forces, which were crossing the frontier in the direction of Erzeroum, were threatened by Turkish forces attempting to strike at Kars and the rear of the Russian forces.

The Russian situation looked serious. On January 2, 1915, a telegram was received from the British Ambassador at Petrograd indicating that the Russian Government desired help. This again revived the question of extending the operations at the Dardanelles, and although the Russians had actually defeated the 9th, 10th and 11th Turkish Corps in the theater indicated above and had removed the threat on their rear, information to that effect was not received until later.

On January 3, Mr. Churchill inquired by telegraph of the commander of the naval forces off the Dardanelles (Admiral Carden) as follows:

"Do you think that it is practicable operation to force the Dardanelles by use of ships alone? The importance of the results would justify severe loss. (The Dardanelles Campaign—Nevinson, p. 24)

To the above a reply was received dated January 5, to the effect that the Dardanelles could not be rushed but that they might be forced by extended operations with a large number of ships. On January 3, the British War Office promised the Russian Government that a demonstration should be made against the Turks. On January 28 a naval attack on the Dardanelles was sanctioned by the British War Council. At this time the Secretary for War indicated that military forces could not be made available for a considerable time. In consequence of the view so presented a joint naval and military operation was not then authorized. About this time, however, the Turkish expedition against the Suez Canal met defeat—Djemal Pasha's attack near Ismailia—at the hands of the troops defending Egypt and the Canal. Anxiety as to that theater ended. The bulk of the British troops in Egypt were, therefore, available for other service.

During February the War Council returned to a consideration of the operation involving military forces at the Dardanelles. On February 16, it was decided to send the 29th Division at the earliest possible date to Lemnos. On February 19 the Staff study of *1906* was presented and considered. From then on a military landing on some scale was contemplated, although as early as January 13th a decision was reached to the effect that in case of stalemate on the Western Front in the spring of 1915:

"* * * British troops should be detached to another theatre and objective * * *." (Final Report—Dardanelles Commission, p. 6)

but the specific theater was not mentioned. There had been, therefore, ample time for the usual preparation of plans by the General Staff. As will be noted in the following, such plans were never prepared.

On February 20 two Australasian Divisions in Egypt were ordered to prepare for service at the Dardanelles and by the end of that month a French Division and the Royal Naval Division were ready to embark. The troops then in Egypt, as has been stated, had proved more than sufficient for defense, but the need of defending Egypt from the Turks, attacking from the direction of Syria had before this brought about the assemblage of a considerable army in the Nile Delta. India had sent a quota and Territorial troops had been sent from England. Troops from Australia and New Zealand had arrived and others were *en route.* The 29th Division was to have left England on February 22, but at that time the Germans were making their third drive on Warsaw. If it was successful German forces might be transferred to the Western Front where the French were engaged in Champagne and between the Moselle and the Meuse and where, between March 10th and 14th, the British were preparing and executing the attack at Neuve Chapelle.

On February 23, Sir William Birdwood was directed to confer with Admiral Carden. Telegrams which subsequently passed between him and the Secretary for War show that Lord Kitchener still intended the troops to be used for minor operations only.

On March 10th consideration by the War Council as to the size of the operation at the Dardanelles was continued. On that date Lord Kitchener informed the War Council as to the approximate strength of the total forces available for use against Constantinople. (About 128,100. See List on page 34.) But nine days later, the day after the great naval attack at the Dardanelles by the combined British and French fleet, reliable evidence shows that no general plan for the use of the military forces had been prepared by the General Staff.

" * * * When asked by the Prime Minister at the War Council whether any general plan and scheme of disembarkation had been worked out, Lord Kitchener said that, though the question had been examined in the war Office, sufficient information was not forthcoming for the preparation of a detailed scheme for landing, which would be undertaken by Sir Ian Hamilton in concert with the Naval Commander-in-Chief * * *." (Final Report—Dardanelles Commission, Part II, p. 9)

In the meantime, on March 12th, General Sir Ian Hamilton was appointed Military Commander to command the Mediterranean Expeditionary Force. The information furnished him before leaving was limited to the following:

Official handbooks.

Outline of a plan which had been worked out by the *Greek* General Staff several years before for an attack on the Dardanelles.

A statement by Lord Kitchener relative to entrenchments on the Peninsula.

A map—which afterward proved to be inaccurate.

A list of written instructions. (Copy in full appended hereto. See page 33.)

Several days before—February 26—Colonel Maucorps, late French Military Attaché at Constantinople, reported certain important information relative to the fortifications and garrison known to be on Gallipoli Peninsula. This information, the British General Staff study of 1906 and some later data pertaining thereto prepared by the Navy, were not furnished General Hamilton nor was his Chief of Staff able to obtain other than very meager information at the British War Office before their departure on March 13th.

The officer just mentioned arrived at Mudros on March 17 when the General learned from the naval authorities that the Peninsula was being rapidly fortified by thousands of Turks under German Staff direction. They were working all night each night on trenches, redoubts and entanglements. All probable landing places were commanded by lines of trenches and all such places were well within effective range of field guns and howitzers. This information was transmitted to Lord Kitchener on March 18th.

On March 16th the 29th Division actually began its departure from England. On March 17th, General Paget, then engaged on a special mission to the Balkans, telegraphed to Lord Kitchener that the operations at the Dardanelles had made a deep impression and the possibility of Bulgaria attacking any Balkan State that might side with the Entente was past.

Naval Operations

A number of the older ships had been sent for operations against the Dardanelles. By February 1 the squadron there had grown to be a strong combined fleet in which the new super-Dreadnaught, the *Queen Elizabeth* was the most powerful. (See table on page 34.) The island of Tenedos had been seized and Lemnos—nominally held by Greece, which tolerated the British use—furnished the Bay of Mudros which was being used as an advance base for naval operations. (See Fig. 1.) In connection with these operations and in amplification of information which may be gleaned from the accompanying maps a brief description of the fortifications, topography and landmarks in the vicinity of the Straits is essential to a clear understanding of the Naval operations.

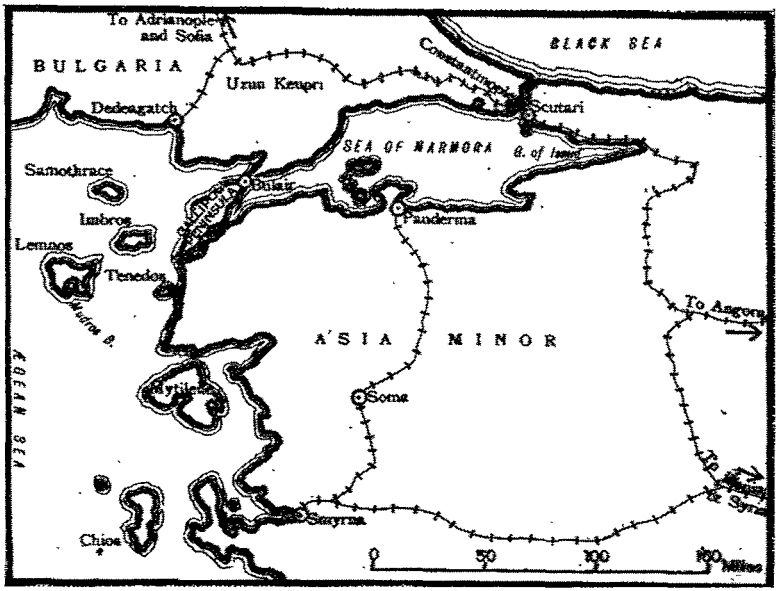
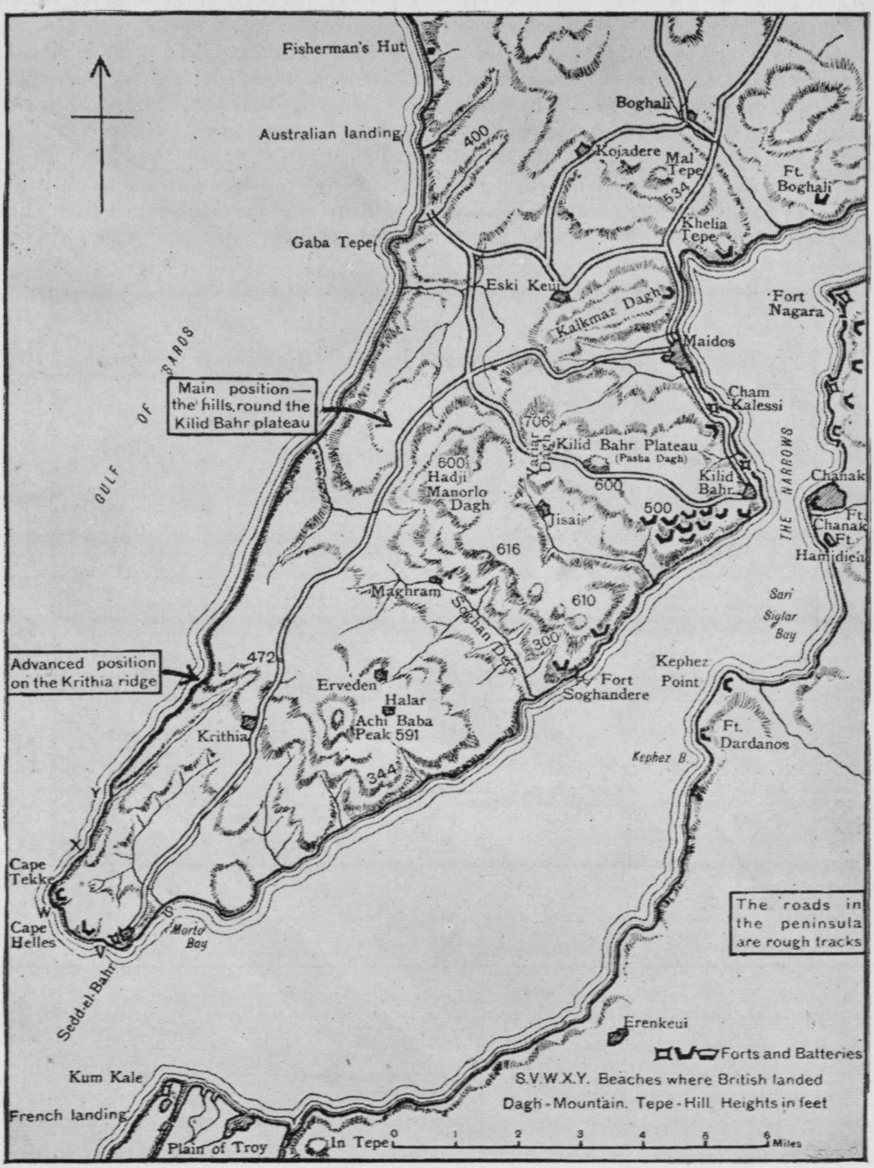


FIG. 1.

TOPOGRAPHY OF THE STRAITS

The north shore is formed by the Peninsula of Gallipoli, some fifty miles long varying in width from two to twelve miles. The country is a mass of rocky ridges rising in places to a height of 700 feet. Most of the land is covered with thick scrub. There is little cultivation and few roads are available. At the head of the Dardanelles, on the European side, is the town and harbor of Gallipoli. The southern shore is also hilly. Near the entrance, on the Asiatic side there is a flat and marshy plain, to the east of which are hills which reach a height of 3000 feet. On both sides of the Straits the high ground commands the passage. On the north side the hills form a cliff with small beaches here and there at the base. There is practically no tide but a strong current runs continually down the Straits from the Sea of Marmora. There is no source of supply for drinking water in amounts necessary available on the lower half of the Peninsula.



Fisherman's Hut
Australian landing
400
Boghali
Kojadere
Mal Tepe
534
Ft. Boghali
Khelia Tepe
Gaba Tepe
Eski Keui
Kalkmaz Dagh
Fort Nagara
Maidos
GULF OF SAROS
Main position—the hills, round the Kilid Bahr plateau
Cham Kalessi
706
Kilid Bahr Plateau
(Pasha Dagh)
600
Hadji Manorlo Dagh
600
Kilid Bahr
Chanak
THE NARROWS
500
Jisai
Ft. Chanak
Ft. Hamidieh
616
Maghram
610
Sari Siglar Bay
300
Advanced position on the Krithia ridge
472
Kephez Point
Fort Soghandere
Erveden
Halar
Achi Baba Peak 591
Krithia
Ft. Dardanos
Kephez B.
344
Y
X
Cape Tekke
W
Cape Helles
S
V
Morto Bay
Sedd-el-Bahr
The roads in the peninsula are rough tracks
Erenkeui
Forts and Batteries
Kum Kale
S.V.W.X.Y. Beaches where British landed
Dagh-Mountain. Tepe-Hill. Heights in feet
French landing
Plain of Troy
In Tepe
0 1 2 3 4 5 6 Miles

FIG. 2.

LANDMARKS AND FORTIFICATIONS (See Figure 2)

There were two groups of forts. The first at the entrance—on the north side—Cape Helles (two 9.2-in. guns) and Sedd-el-Bahr (six 10.2-in. guns) with one or two adjacent batteries; on the south side were Kum Kale (four 10.2-in. guns) and Orkanieh (two 9.2-in. guns). The second group was at the Narrows—fourteen miles from the entrance to the Straits. At the entrance of the Narrows were the forts Chanak and Hamidieh on the Asiatic side and Kilid Bahr on the European. On slopes above the latter were batteries, some commanding the approach to the Narrows. Near Kephez Point, before reaching the Narrows, were Fort Dardanos, on the Asiatic side, and Fort Soghandere on the Peninsula. Along both sides but especially between Chanak and Fort Nagara beyond the Narrows, the low ground was lined with batteries. Beyond the Narrows were several other forts and batteries. The higher

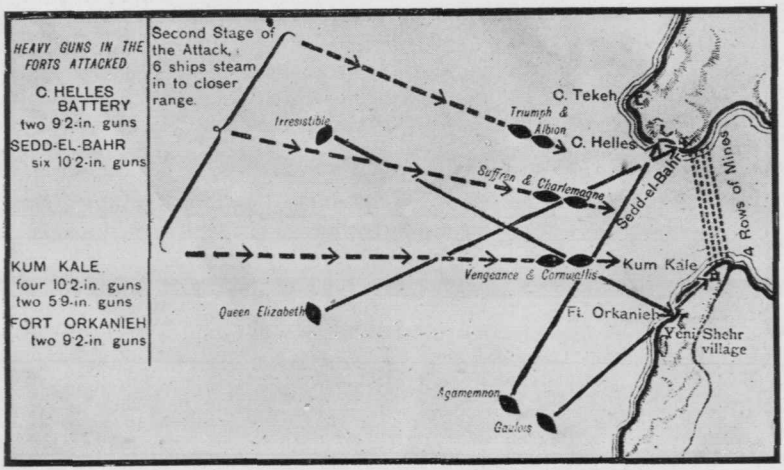


FIG. 3. ATTACK ON THE OUTER FORTS (DARDANELLES)

hills shown in Figure 2 were all landmarks which proved to be important throughout the campaign. The channel was obstructed by submarine mines.

NAVAL OPERATIONS (Continued—See Figure 3)

On February 19, 1915, eight ships of the combined fleet—under Vice Admiral Carden (British) and Rear Admiral Gueratte (French)—attacked the outer forts at long range at 8:00 A. M. The firing kept up all the morning. The forts made no reply. At about 3:00 P. M., the fleet closed in and the forts then opened fire. By sundown the batteries on the European side were again quiet but Kum Kale was still firing. The light failed and the fleet withdrew. No damage had been done the fleet.

On February 25 the weather, which had been bad for several days, cleared. Four ships of the fleet resumed the long range bombardment on the outer forts. The latter were outmatched. Again in the afternoon the fleet closed in. By 5:00 P. M. the last gun was fired by the Turks. It appeared that these forts were silenced. At dusk the fleet

withdrew. The *Agamemnon* was struck once, that hit being the only one causing damage to the fleet on the 25th.

On the 26th the work was resumed and the mine field was cleared for a distance of four miles up the Straits. Three of the battleships steamed in between the headlands and opened fire at long range on Fort Dardanos (four 5.9-in. guns). The latter and some unlocated batteries along the shore replied. Marines were sent ashore and completed the destruction of the guns in the forts at the entrance. The entrance of the Dardanelles was thus clear for additional operations. The press of France and England wrote as though the fall of the outer forts had decided the fate of Constantinople but the real defense of the Dardanelles—the forts at the Narrows—had not been harmed. Nevertheless, this publicity had its political effect as has been mentioned in connection with the March 17th message sent by General Paget.

Again there were a few days of bad weather. On March 4th the ships were again in action. Some attacked the forts inside the Straits and a French cruiser demolished a lookout station at Cape Gaba Tepe. On March 5th there was a naval demonstration against Smyrna. On the 6th and 7th the bombardments were continued at the Dardanelles, part of the fleet firing over Gaba Tepe toward Chanak with aeroplanes directing their fire and part firing on Fort Dardanos, which was then believed to have been silenced.

On the 10th and 11th of March the defenses at Bulair were shelled and the forts along the Dardanelles "silenced." The damage to many of these was repaired, however, and they were ready for business on the 18th.

THE GREAT NAVAL ATTACK (See Figures 4, 5, and 6)

On the 18th of March the great effort was made. Weather, clear. At 10:45 A. M. the *Queen Elizabeth*, *Inflexible*, *Agamemnon*, *Triumph* and *Prince George* steamed up the Straits toward the Narrows. The first three engaged Forts Chanak and Hamidieh and the batteries opposite, while the other two fired at Soghandere, Dardanos and Kephez Point. After one and one-half hours firing, during which the ships were fired upon by the forts and by howitzers and field guns on the heights, the French squadron (*Bouvet*, *Charlemagne*, *Gaulois*, and *Suffren*) came into action, steaming in to attack the forts at short range. (See Figure 5.) The forts once more were forced to cease firing.

The third squadron (*Albion*, *Irresistible*, *Majestic*, *Ocean*, *Swiftsure*, *Agincourt* and *Vengeance*) at 1:45 P. M. steamed toward Chanak. The French ships were withdrawn to make room for them. (Figure 6.) In the process of this change all the forts suddenly opened fire. The *Bouvet* was struck by shells and by a mine and sank. The Turks were now sending floating mines down with the current. Mine-sweepers were at work ahead of the fleet.

One and one-half hours after the *Bouvet* sank the *Irresistible* struck a mine. Her crew was taken off by the destroyers. She sank an hour later (at 5:50 P. M.) and at 6:05 P. M. another mine struck the *Ocean* which sank at once. Other ships, especially the *Gaulois* and the *Inflexible* had been severely punished. At sunset most of the forts were still in action. The fleet withdrew. The attack failed with a loss of three battleships and over 2000 men. It was thought that the ships alone could never force the passage. The enemy view at a later date as to a naval passage of the Straits is shown in the following:

Marshal Liman von Sanders: "The attack on the Straits by the Navy alone, I don't think could ever have succeeded owing to the mines. I proposed to flood the Straits broadcast with mines, and it was my view that these were the main defence of the Dardanelles, and that the function of the guns in the forts was simply to protect the minefields from interference." (The Dardanelles—Callwell, page 357)

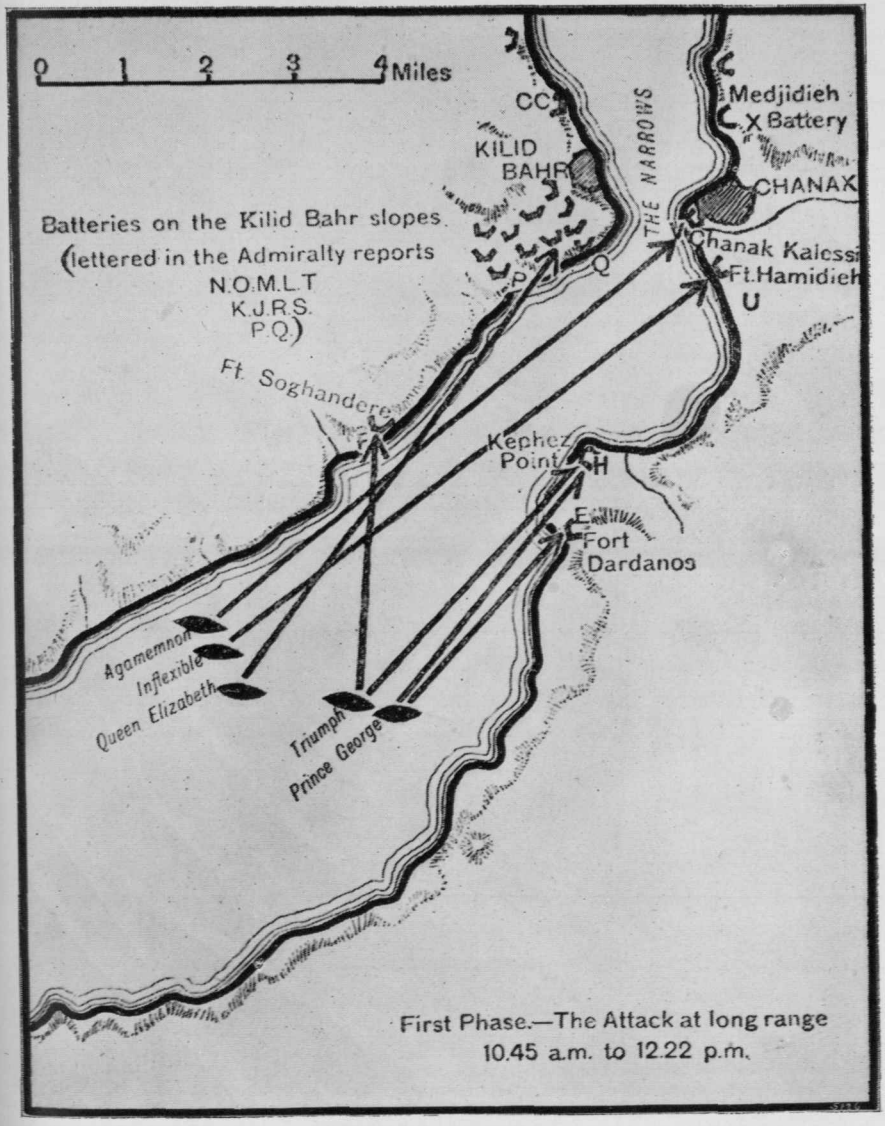


FIG. 4.

Enver Pasha: (Is reported to have said) " * * If the English had only had the courage to rush more ships through the Dardanelles: they could have got to Constantinople; but their delay enabled us thoroughly to fortify the Peninsula, and in six weeks' time we had taken down there over 200 Austrian Skoda guns * *." (The Dardanelles Campaign—Nevinson, page 62)

Preliminaries to the Land Operations

General Hamilton had arrived at Mudros on the 17th of March and had witnessed the naval attempt. Almost every day during the next

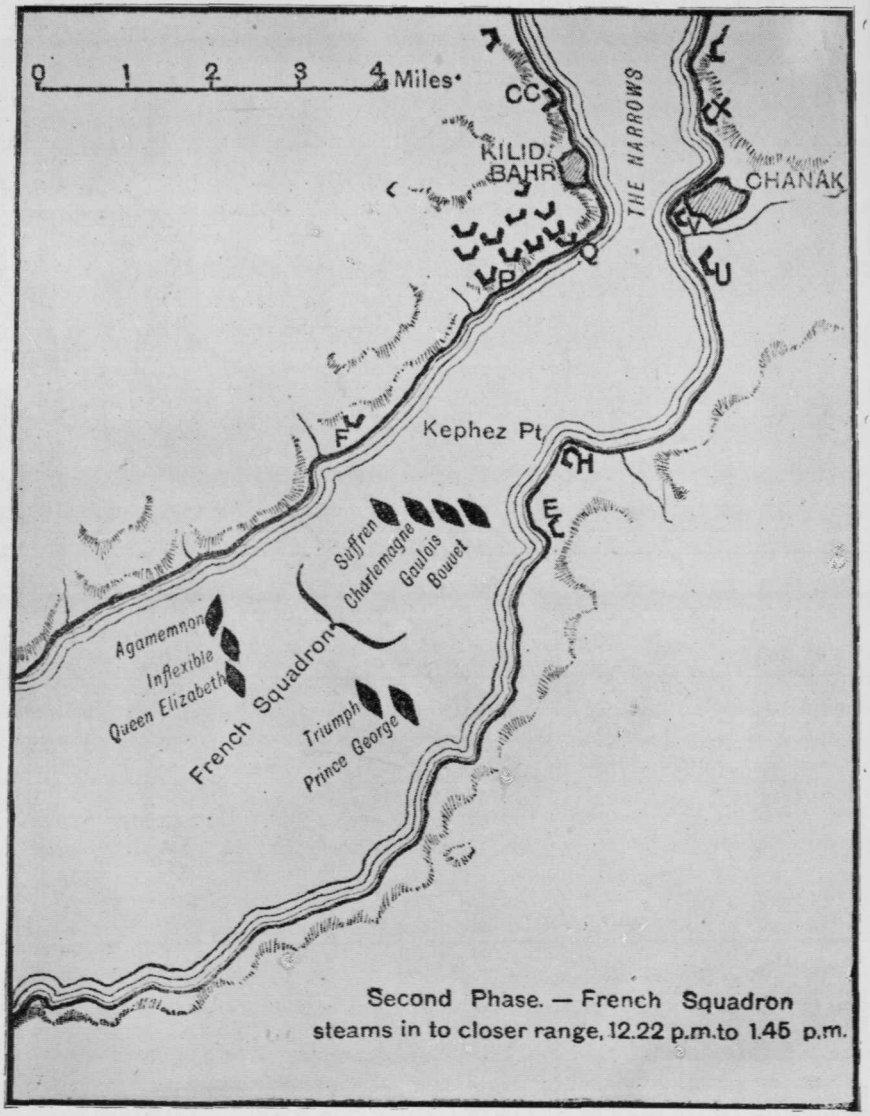


Fig. 5 The Attack on the Narrows (2)

four weeks one or more ships entered the Straits and opened fire to prevent the Turks repairing the forts at the entrance and to protect the mine-sweepers which were kept constantly at work, but the attempt to force a way through by the navy alone was not repeated.

Estimates of the Turkish Forces

At the outbreak of the war there were 200,000 Turkish soldiers in Constantinople. In February it was estimated that there were over

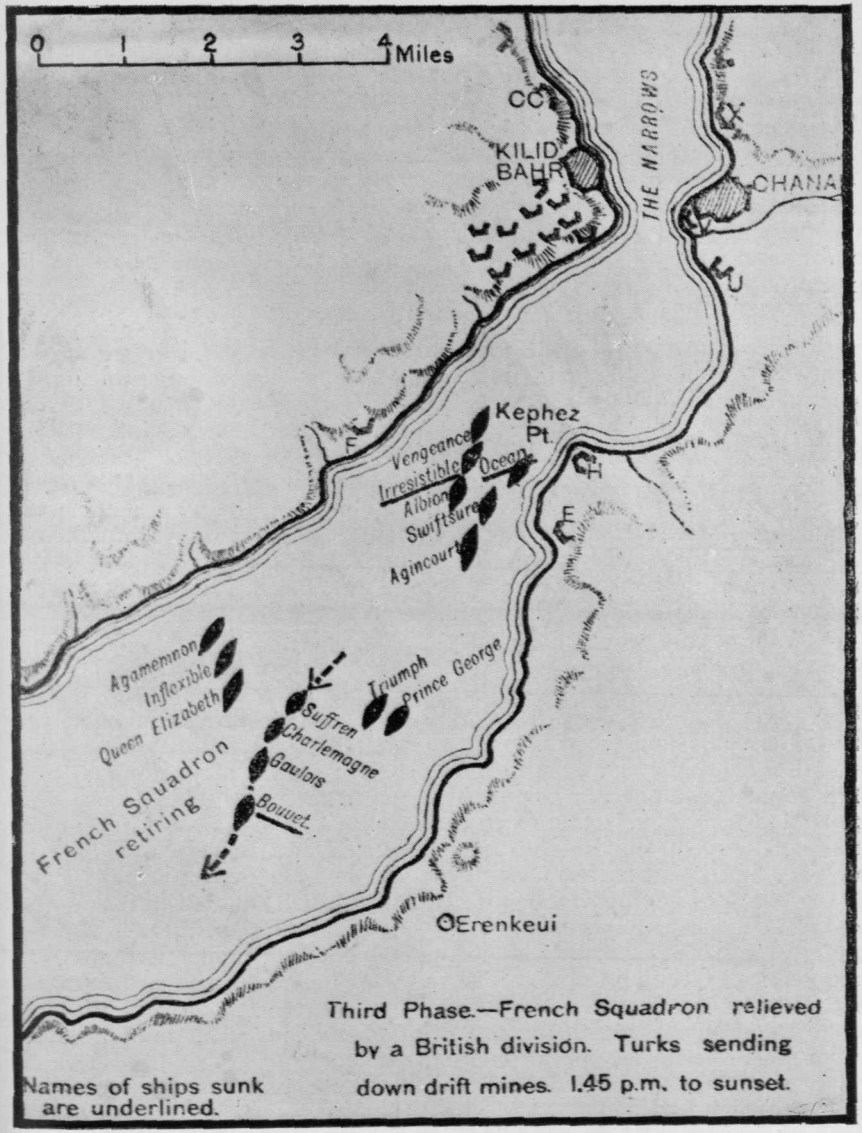


Fig. 6. The Attack on the Narrows (3)

half a million men available for the defense of the Straits. In March of 1915 the Turkish forces were distributed as follows:

In European Turkey, including Gallipoli Peninsula there were nine divisions (120,000); in Smyrna, Asiatic side of the Dardanelles, two

strong divisions and some depot battalions (40,000); in the Caucasus, seventeen weak divisions (190,000); in Syria and Palestine, five divisions (70,000); in Mesopotamia, at least three divisions.

The Allied Forces

When finally arranged before the landing these made in all some seven divisions with a few additional units. These divisions were not, however, at full war strength and they were weak in artillery. The divisions were the following: The 29th Division, the Royal Naval Division. the 42d East Lancashire Division, an Australian Division, a Division of Australians and New Zealanders, and two French Divisions. The total numbered not over 100,000 as assembled in Egypt and, as will be mentioned, the force was even smaller when the actual landing took place. A Russian Army Corps was assembled in the Odessa area and was expected to cooperate as soon as the Dardanelles would be captured.

The Allied Bases

Mudros had a fine anchorage but was impossible except as an advance base. The inlet had but a narrow entrance and the anchorage was sheltered in bad weather. As a base, however, Mudros lacked the docks and other appliances for unloading and loading ships. Those facilities were available at Alexandria. At the time of the great naval attack some of the troops and supplies had already reached Mudros. The men were overcrowded and animals were dying. There were difficulties as to fresh water. A movement of some kind was imperative. Upon learning that the troops would have to live several weeks on the transports at Lemnos, Lord Kitchener, on March 18th, sanctioned a change to Alexandria for the main base.

The Transports

After witnessing the naval attack on March 18th and after a conference on March 22d with Admiral de Robeck who commanded the fleet, General Hamilton concluded to reorganize the military forces and reload such ships as might be necessary to insure a coordinated and well regulated landing. No detailed plan had been thought out and there had been no practice as to the form of landing, the 29th Division had not arrived, the weather was unsettled and there was a lack of military and naval material necessary for any landing on a large scale. Paragraph 2 of his instructions dated March 13th (quoted in full at the end of this paper) required the assembly of his force before any serious undertaking could be carried out. As has been shown Lemnos was impossible for that purpose. The military forces he was to command had been shipped at distant ports without those responsible knowing what the troops were to do and even before Hamilton himself knew what form the initial operation would take.

It was, therefore, ordered that, with the exception of one Australian brigade which had landed at Mudros, the forces and the transports put back to the better equipped port of Alexandria where the reorganization and reloading were carried out.

War Council and Cabinet Action During this Period

The result of the March 22 conference and General Hamilton's decision were cabled by the latter to the Secretary of State for War

and by Admiral de Robeck to Mr. Churchill on March 23. Subsequent cablegrams further explained the situation. On March 27 Mr. Churchill sent a message to Admiral de Robeck which, in part, was as follows:

"* * That the result might have been achieved without involving the Army, according to the original plan had been my hope, but I see clearly that a combined operation is now essential * *." (Final Report—Dardanelles Commission, Par. 24, p. 14, Part II)

Between March 19 and May 14 the War Council had no meetings. During the same period the Cabinet met thirteen times. At eleven of these meetings questions relative to the operations at the Dardanelles were considered. The exact date, after the failure of the navy on March 18, upon which military operations on the Peninsula were definitely decided upon is not known. The operations and the policy involved were known to the Cabinet. With the exception of the blanket approval in the decision of January 13, previously referred to, the War Council gave no approval, and with the exception of that which may have been given by Lord Kitchener, therefore, no expert military advice was asked or given. Political reasons governed. At no time was a general and well thought out military plan with its relation to other military operations prepared. After the naval defeat on March 18th the War Council (March 19) authorized Mr. Churchill to inform Admiral de Robeck that he could continue the naval operations "if he thought fit." On the same date Lord Kitchener instructed General Hamilton, in a reply to the latter's message of the same day:

"* * * You know my views that the passage of the Dardanelles must be forced, and that if large military operations on the Gallipoli Peninsula are necessary to clear the way, those operations must be undertaken after careful consideration of local defences and must be carried through * *." (Callwell, p. 57)

Other Fronts and Political Considerations

The failure on the Western front to penetrate the German lines at the battle of Neuve Chapelle and in the Champagne indicated that the "stalemate" mentioned in the blanket authority heretofore mentioned had set in. The Cabinet, therefore, had ample authority to act as it did. During this period negotiations with Italy and the fear that the abandonment of the Dardanelles campaign might have a bad effect on Russia and in the Balkans were political considerations, although as the Russians had followed heavy fighting in the Carpathian passes and had captured Przemysl on March 22 their prospects were for the moment somewhat brighter. In April the expedition to Mesopotamia, plans for which were prepared by the General Staff of the Indian Army, had got under way and had landed at the head of the Persian Gulf. It was hoped that this force would in time connect its operations with the operations of the Russian army of the Caucasus. Far reaching political results were expected.

At Alexandria

Had it been intended to abandon the enterprise the proper breaking point was after the naval defeat on March 18th, but for the reasons stated the expedition was unloaded at Alexandria. Training continued as the forces assembled. Lemnos was retained as the advance base. Up to April 7th, however, the General Staff was not free to go ahead with operations plans as it should have been. General Hamilton comments upon that fact in his diary as follows: (On page 64 Gallipoli Dairy)

" * * Greatly handicapped by absence of an Administrative or Q. Staff. The General Staff are working double shifts, at a task for which they have never been trained * * ."

Back to the Advanced Base

On April 7th General Hamilton moved his headquarters to Mudros. By the middle of April the expedition began to arrive in the Bay. Part of it was landed upon arrival, on Lemnos. The rest upon arrival remained on board the transports. One transport was sunk by a Turkish destroyer *en route* from Alexandria. After the troops arrived, day and night practice in the landing of men, horses and guns was held under the direction of Naval Officers. The Indian Brigade was left in Egypt. The total force was somewhat under 70,000. Of this about 60,000 could be used in action. Plans were made for a landing on Gallipoli on April 23 but because of bad weather the operation was delayed until the night 24-25 April, and for the day of April 25th.

Distribution of the Turkish Force and Its Preparations

Marshal Liman von Sanders was appointed by the Turkish Government to command the military forces defending the Dardanelles. He had the 5th Turkish Army with some additional units. These were distributed as follows: (Figures 1 and 2) One Division (9th) to defend Helles. Another extending from Cape Gaba Tepe northward. One Division (5th) at Bulair and one (7th) near Gallipoli. Another (19th) in reserve near Boghali and Maidos. A total of five divisions on the European side. On the Asiatic side were two divisions. One (3d) near Kum Kale and Yeni Shehr and one (11th) in reserve in the vicinity of Besika Bay. Essad Pasha commanded these and was later also given command of the southern half of the Peninsula. As stated entrenchments had been constructed covering possible landing places. Wire entanglements had been constructed; special work had been done to develop road communications on the Peninsula; bridges were built, ammunition and supply depots were established and hospital arrangements were organized. A dock was built at Nagara Point with a view to bettering communications between the European and Asiatic shores.

General Plan of Attack

Part of the force to disembark north of Gaba Tepe. Another part to disembark at beaches V, W, and X (Figures 2 and 7) with minor landings at beaches S and Y. A feint on an important scale was to be made in the Gulf of Saros near Enos and another toward Bulair to prevent Turkish troops from being sent from the north. French troops were to disembark on the Asiatic shore near Kum Kale. Effort at concealment was sought by means of the feint mentioned and by a demonstration by the battleships in the direction of Besika Bay on the Asiatic side of the Dardanelles. The landings were to be simultaneous. The Australian and New Zealand Army Corps landing—north of Gaba Tepe—was called the Anzac landing. The first troops to land in each place were designated as covering forces. At Anzac this force was to overcome Turkish resistance and occupy Sari Bahr heights (Figure 9), thus cover the left of the main Anzac force which was to assault Mal Tepe (See Figure 2).

At the Helles landings the troops, after overcoming the shore resistance were to occupy Krithia and Achi Baba.

When the Anzac and Helles forces had secured their objectives a converging attack was to be made from Mal Tepe and Achi Baba upon the Turkish position on the Kilid Bahr plateau.

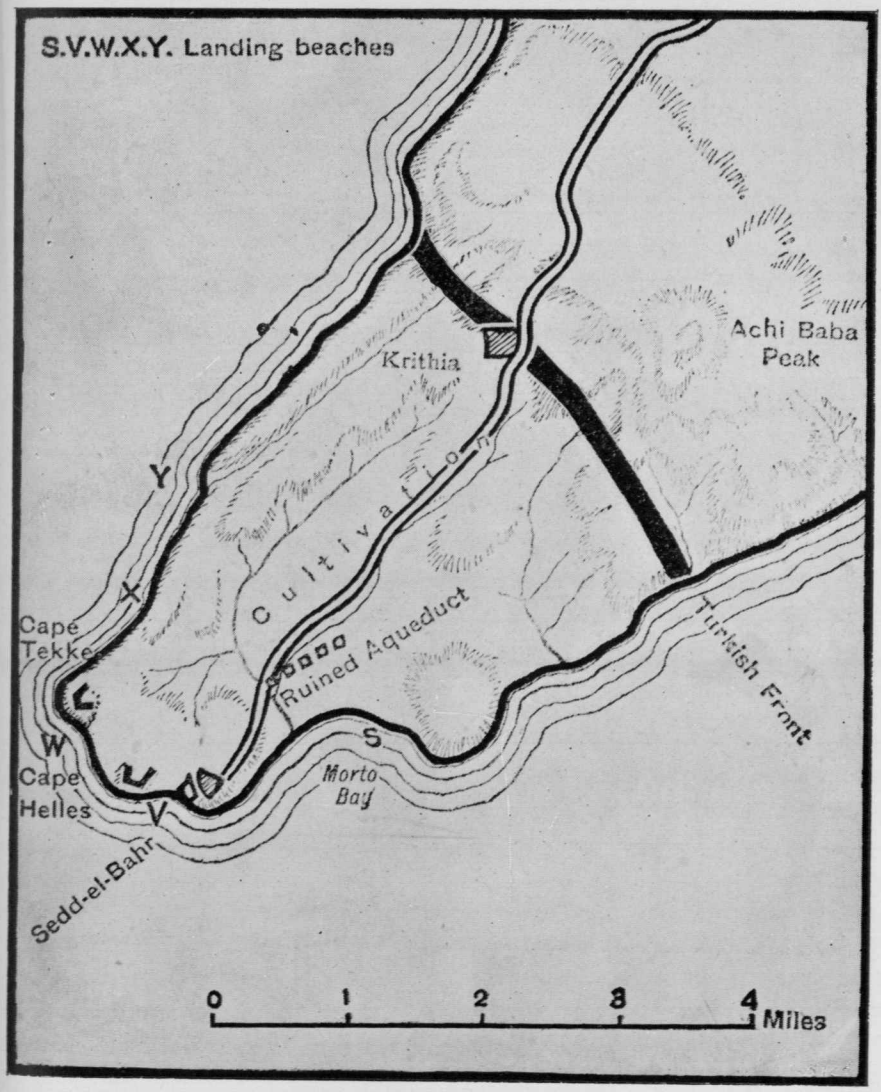


FIG. 7. THE LANDING BEACHES

THE BATTLE OF THE LANDING, APRIL 25, 1915

The Turkish resistance near the shore was too strong at both the Anzac and the Helles landings. The advance inland to Sari Bahr, Mal Tepe, Krithia and Achi Baba did not take place.

At Anzac the landing was somewhat further north than was intended. In nearing the beach the tows crossed one another. This delayed

matters. Battalions got mixed. The troops were only able to occupy positions on or near the shore. Throughout the day the fighting was severe.

At Beach Y the landing was not anticipated by the Turks. It was made without opposition. The covering force was expected to move toward Beach X, there join forces with the troops from Beach X and attack Krithia. The Beach X force moved inland after landing but were held in a position at the head of a gully. The Beach X force did not connect with them. Between 4:00 and 5:00 P. M. the Beach Y force was attacked, forced to retire and re-embark.

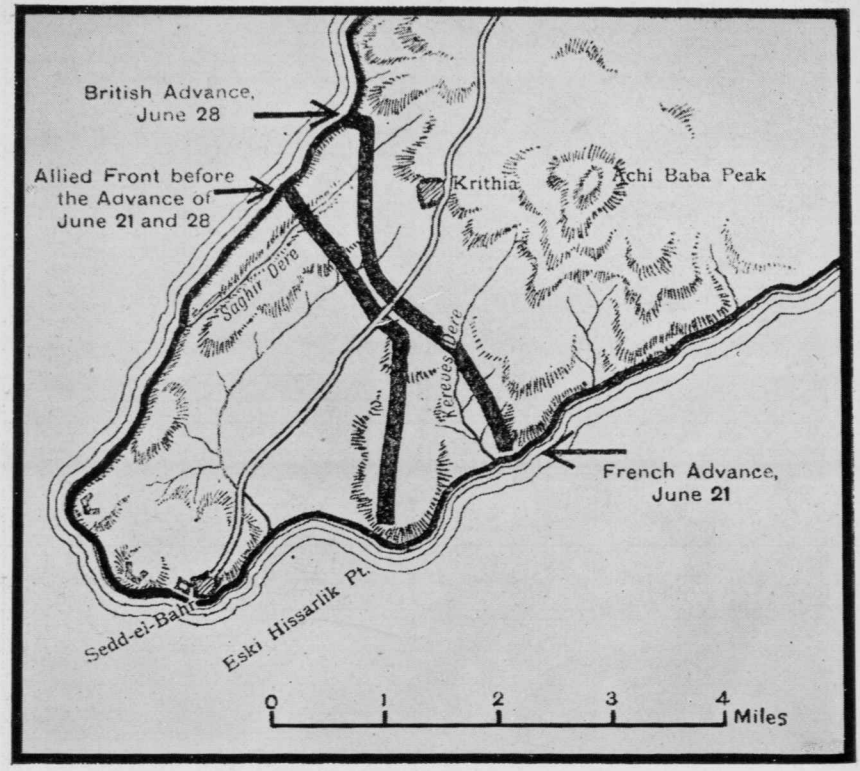


FIG. 8.

At Beach X the troops made good their landing in the face of resistance but with no great loss. They advanced inland but by nightfall they had been pushed back by counter-attacks. They established themselves for half a mile around Beach X and extended southwest connecting with the troops landed at Beach W.

At Beach W the landing force reached shore before the Turks opened fire. This beach was fully protected by enemy works. As the boats reached the beach fire opened and losses were heavy. Other troops were landed a little further north. The fighting all day was severe. At nightfall, although the Turkish counter-attacks continued, the troops retained the ground won but after all were not far from the shore.

At Beach V the defensive arrangements were excellent. A collier, the *River Clyde*, was utilized by the landing force by being run ashore in conjunction with the smaller boats. The troops in the latter were

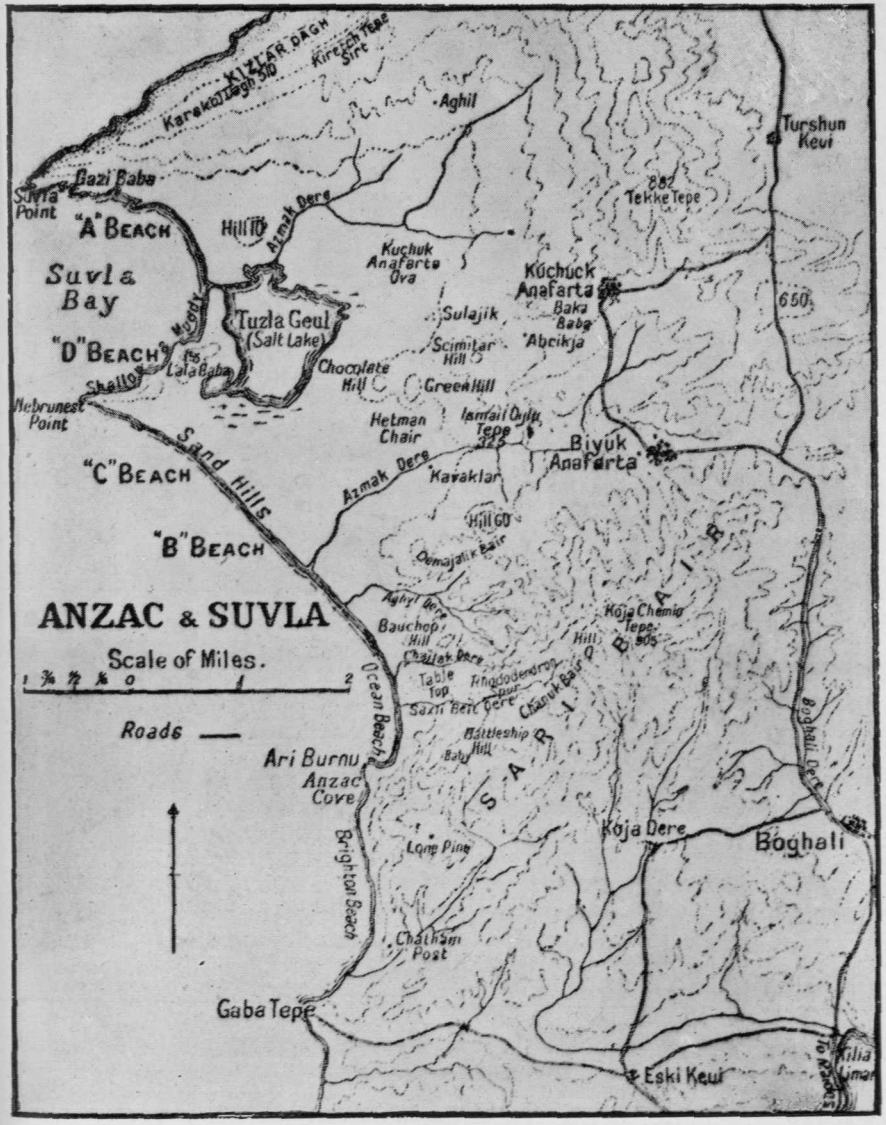


FIG. 9.

almost wiped out of existence. About 400 from the collier—assisted by naval personnel employed in constructing a short floating pier from the collier to the shore—managed to get ashore, but these were unable to accomplish anything. When darkness fell, about a thousand more troops from the collier landed with but slight loss. The shore line was held but the village and old castle near by could not be taken.

At Beach S the landing began at 7:30 A. M. and was resisted by fire as the boats reached the shore. The force captured the main defenses that cover the landing and there dug in. The landing here was greatly aided by fire from the battleships.

The landing at Kum Kale: A French Regiment (6th Colonial) a field battery and half a company of Engineers were landed here mainly for the purpose of preventing effective fire being brought to bear on the landing across the Straits. The force captured the village and intrenched although it had been opposed by a considerable part of the Turkish 3d Division.

The feint toward Enos: This was made by a force made up of transports loaded with part of the Royal Naval Division, one battleship (*Canopus*) and some destroyers. On the 25th of April and during the night 25-26 April this force fired at several points along the coast of the Gulf of Saros. At night flares were lighted on shore at several possible landing places. These drew Turkish fire. This feint was thought to have delayed the sending south of the Turkish divisions at Bulair and the town of Gallipoli throughout the 25th.

RESULTS

" * * As many troops were killed, wounded or captured on this first day of the Gallipoli fighting as the United States sent to Cuba in the first Santiago expedition * * * no less than 15,000 casualties was the price of the effort * * *." (History of the World War—F. H. Simonds, p. 142)

PERIOD APRIL 26 TO THE END OF JULY(*)

On April 26 and during the next few days the effort to get forward was pressed. The remnants of the organizations landed at Helles tried to reach Achi Baba but could not. The Turk held it, Krithia and the plateau by the same name. The road from Sedd-el-Bahr to the plateau and the dominating positions above the Straits was, therefore, blocked.

On April 28 the Helles forces advanced a little. The First French Division in the movement was on the right and suffered severely. The British ranks also sustained heavy casualties.

After the landing on the 25th the Australians got up the first slopes of the hills above Anzac. They there "dug in" but their trenches were commanded by enemy positions on Sari Bair. Frequent attacks were pushed toward the Turks but no considerable progress was made eastward and losses were heavy. Trench warfare followed on all fronts with slight gains of ground only. Throughout this period there was a shortage of artillery and artillery ammunition and other supplies were brought up with difficulty. During May the Helles forces were reinforced by the 29th Indian Brigade, the 42d Territorial Division and three Battalions of the Royal Naval Division.

On May 4 General Hamilton reported that the supply of ammunition was becoming a serious matter. To this Lord Kitchener replied that the supply was not calculated in the basis of a prolonged occupation of the Peninsula and said:

" * * * It is important to push on * * * ."

On May 10 General Hamilton's reports show that the guns of the Navy could not, because of the nature of the terrain, assist the military force as much as had been expected. The Helles positions received

(*) See note by Colonel Hannay, No. 3, p. 519.

enemy fire from the Asiatic shore at all times. About the middle of the same month the difficulties were increased by the arrival of German submarines in the Aegean waters. From then on the help given by the fleet was less as it had to withdraw to more sheltered waters in the vicinity.

War Council and Cabinet Action During this Period

On May 14 the War Council considered the question of a continuation of the operations at the Dardanelles. The effect of the withdrawal upon the Balkan States and upon Russian and British prestige in the East and the military prospects of success were taken into consideration. No final decision was reached other than that the Secretary for War was to ask General Hamilton what force he would require to make sure of success at the Dardanelles. In brief General Hamilton's reply to this was a request for two Army Corps and a liberal supply of artillery ammunition.

Between May 14 and May 17 a political crisis in England resulted in a change in the administration. This delayed the conclusion as to what should be the policy as to the Dardanelles Expedition. No conclusion was arrived at until June 7th. The change in administration also resulted in the change in the name of the War Council. In so far as the Expedition was concerned the Dardanelles Committee thereafter functioned as the War Council had.

On June 7 the Committee reached the conclusion that General Hamilton's force should be reinforced by three Divisions of the New Army with a view to an assault being made in the second week of July. It also concluded to send certain reinforcements to the Navy. On June 9th this conclusion was confirmed by the Cabinet.

At Gallipoli but little was accomplished during May. Trench warfare continued. On June 4th the troops broke through the enemy line but were unable to take advantage of the success or to hold the ground gained due to lack of reserves. This was pointed out to the War Office by General Hamilton. His message was replied to by Lord Kitchener. The reply, in part, was as follows:

"* * * Your difficulties are fully recognized by the Cabinet * * *. We are sending you three divisions of the New Army. The last of the three Divisions ought to reach you not later than the first fortnight in July. While steadily pressing the enemy, there seems no reason for running any premature risks in the meantime. * * *." (Final Report—Dardanelles Commission, Par. 57, p. 26, Part II)

As a matter of fact the divisions mentioned completed their embarkation as follows: The 13th Division on June 23d, the 11th Division on July 7th and the 10th Division on July 14th. Considering the time *en route* and the time for disembarkation, of course, the assault, with these reinforcements, early in July was out of the question.

Continuation of Events at Gallipoli (Period to end of July, 1915)

During May on the days 5th to 8th inclusive the force gained ground in a battle which lasted for three days almost without intermission. The 2d French Division landed at Beach V between these dates. For nearly a month thereafter, operations were confined to minor raids and to trench and sapping work.

On June 21 the French, on the right of the Helles lines, attacked the enemy redoubt in their front and repulsed enemy counter-attacks.

On June 28 another large attack was made by the whole force which gained considerable ground and had some success. An advance of about one mile was made and five lines of enemy trenches were taken. The advances made in the last two attacks mentioned are shown in Figure 8.

On June 29 and 30 a heavy attack was made on the Anzac position but it was repulsed.

During July on the 12th and 13th the Turks delivered a general attack along their whole front but it did not gain much. The rest of July was filled up with minor accomplishments connected with trench warfare.

In the three months that had passed the British losses from illness seriously contributed to weaken the Allied force. The French suffered in like manner. The weather became very hot. " * * The climate was almost as deadly a foe as the Turk * * ." All supplies, including most of the water used, reinforcements, and all movement of ammunition from the advance base had to be landed under the direct observation of the enemy. As a result, of course, enemy fire was an ever present factor.

Other Fronts (Same Period)

During the months of April and May the German-Austrian offensives in Galicia and in Poland made necessary the recall of the Russian force which had been placed in the Odessa Area. In May Libau was captured and on June 3d, Przemysl was retaken by the German-Austrian armies. On June 22d they captured Lemberg and nearly the whole of Galicia was reoccupied. Warsaw was again threatened (captured in August), and in so far as Turkey was concerned with any help that Russia might give the Dardanelles effort it was evident that Turkey had no further cause for fear.

The Russian defeats had made available German-Austrian troops for other operations. British and French negotiations to obtain Greek and Bulgarian support during these months had made some progress but the Russian defeats ended hopes in those directions. No longer threatened from the Black Sea areas Turkey was able to divert several more divisions to the Peninsula.

On the Western Front the second battle of Ypres was fought between April 22 and May 24. In May the French offensive in Artois had not been productive of any great results. During July (and August) there was a lull on the British front and in July the French offensive in the Vosges brought local success only.

During June the Italians crossed the Isonzo but against Turkey no declaration of war had yet been made, as that came on August 21st. Bulgaria was still a vital factor.

In Mesopotamia the Expedition had advanced as intended and by July 28 had defeated the Turks at Kut-el-Amara. The first objective—Baghdad—was only 100 miles away. All was going well.

August, 1915

By the end of July the total casualties were 50,000 not including those of the French who also had heavy losses. The way to the Narrows from Anzac (and Suvla Bay) was blocked by Sari Bair and the Anafarta group of hills. The latter commanded the relatively low shore of Suvla Bay. General Hamilton had received the reinforcements heretofore mentioned and others. They were as follows: three Divisions from the

New Army; the infantry of the territorial divisions and a dismounted division from Egypt's cavalry force. As has been stated, they did not arrive in time to make the assault indicated in the conclusions of the Dardanelles Committee, but it was determined to make an attack on August 6th. This proved to be the last large attempt to defeat the Turk in this area.

Suvla Bay, Anzac and Helles Attack

Several plans were considered. The following was adopted. A force (9th Corps and new troops) to land at Suvla Bay, advance eastward to the Anafarta range. In this there was a twofold object, i.e., to secure a new base for the rest of the operations in the Dardanelles theater and to place a force on the left of the Anzac attack. The two forces then to unite and move upon the Turkish position on the Kilid Bahr Plateau.

The Australians were to attack the Sari Bair ridge, from the Anzac position, (Figure 9). This was to be accomplished by moving out from their position northward along the shore and then by a turn to their right assault Sari Bair along the northwest slopes and gain the heights from which they could command the Straits in so far as observation was concerned. At the same time frontal attacks were to be delivered from Anzac against the Turkish position extending to the northwest from Lone Pine.

The troops at Helles were to push forward toward the Krithia line and divert Turkish reserves from the other two fronts. The first two were timed so as to be night movements. The Helles was to be a day assault on the 6th of August. A small force was to make a feint to the north in the Gulf of Saros.

The Attack. (See Figure 9)

The attack on the 6th by the Helles troops was successful as it had considerable local success and contained a large enemy force in the southern part of the Peninsula.

The Lone Pine plateau was captured by the 1st Australian Division. The other Anzac attacking columns moved according to plan and during the night 6-7 August succeeded in establishing themselves on the hills and spurs of Sari Bair. On the 7th no progress was made but before daylight of the 8th one part of the Anzac attack established itself on the crest of Chanuk Bair. On the 9th other portions of this force reached the crest. All were able to look down upon the Straits. All that was then necessary to a great success was the arrival of the 9th Corps.

The latter took the Turks by surprise, landing without serious opposition at Suvla Bay early the morning of the 7th. It made its way inland. One Division (11th) occupied Lala Baba and Hill 10 and then seized Yilghin Burnu. The other Division (10th) took possession of the Karakol Dagh. All told this was an advance of some two miles from the Bay. Then the whole Corps halted. Throughout both the movements to the north all troops suffered from lack of water as the arrangements for forwarding it had broken down. The 9th Corps remained idle all night the 7th and all day the 8th. At 5:00 P. M., on the 8th, General Hamilton arrived on the scene He urged the Corps Commander to move. The latter claimed the Division Commanders were unwilling to do so as further advance could not be made General Hamilton

finally took direction out of the hands of the Corps Commander and ordered Hammersly of the 11th Division to send a Brigade (32d) to seize Ismail Oglu Tepe, the key to the Anafarta heights, and urged a night attack However General Hamilton allowed himself to be talked out of the latter idea by the General Officers present.

The 32d Brigade did not move until 4:00 A. M. on the 9th. It was then too late to accomplish its task. Enemy reserves had already secured the position. Efforts made on the 10th did not reach Oglu Tepe but were driven off by enemy counter-attacks. By the night of the 10th the 9th Corps was back in the locations reached shortly after it landed.

In the landing of the 9th Corps there was considerable confusion. The troops were new troops acting, in part, in a night movement. The terrain was unknown to them. The lower unit commanders were in doubt as to just what they were to do and as to where they were to go. Many of the battalions and lower units were mixed units before they halted during the initial advance inland. The losses of the Corps did not exceed 1000 and these were almost entirely in three or four of the smaller units.

The troops of Chanuk Bair held on for four days but at the end of that time were defeated by the Turks who brought in a fresh division (8th) to the attack.

Results

The Anzac position had been extended to the north. Demajalik Bair was secured as was the high ground between the Sazli Beit and Chailak Deres which permitted within a few days the joining of the Anzac and Suvla positions. The object of the attack, however, was not accomplished.

The Rest of August

During the rest of the month several offensive operations were undertaken on different dates. On the 21st two Divisions (29th and 11th) made an attack upon Oglu Tepe and had some success but eventually they had to fall back to their original positions. During the month the force in the north was increased to a total of five divisions and the dismounted Cavalry Division. But no progress was made.

September, October and November

The encounters which took place during these months were raids and demonstrations. Five divisions remained in the Helles area and nine were finally the total in the Suvla-Anzac area. During October and November the Expeditionary Force was considerably reduced by its sufferings from constant fire, bad weather and ill health. Marshal von Sanders adopted a policy of passive defense.

Other Fronts (including December)

The lack of action favored the Central Powers. Bulgaria mobilized her forces (under an order dated September 10, 1915) in October as the German-Austrian forces entered Serbia (Oct. 7). Greece asked the Allies to send a force to Salonika to enable her to support Serbia. The Bulgarian action gave the Central Powers a clear road to Constantinople. Both the British and the French promised troops to Greece and the nearest and most available ones were those with the Dardanelles Ex-

pedition. The 1st French and the 10th British Divisions were sent and reached Salonika on October 5th. Other troops *en route* to the Dardanelles were diverted to the same place.

By the middle of November the Austro-German-Bulgarian invasion of Serbia had two-thirds of Serbia in its possession. At the same time, on the Russian front the Germans withdrew from Riga. On the Western Front, the British in September took over considerable additional front (17 miles) and later took part in the Anglo-French offensive, fighting the battle of Loos, after which there was comparative quite on the British front. The French after taking part in the same offensive had encounters in the Champagne up to October 24th but things were relatively quiet on the French front.

In Mesopotamia the British force almost reached Baghdad. On November 22 it fought at Ctesiphon but by December 7 it was back in the vicinity of Kut where it was later forced to surrender.

The Evacuation

On September 26 General Hamilton was called upon by Lord Kitchener to report what troops he could spare for Salonika. On October 11 he was called upon for an estimate of the probable losses which would be entailed if the evacuation was decided upon. To this he replied to the effect that the step mentioned was "unthinkable."

On October 14 the British Government decided to recall General Hamilton and on the 20th General Sir Charles Munro was ordered to take over the command. Upon his later recommendations and upon recommendations contained in a General Staff memorandum, dated November 22, decision was reached by the Committee to cause the evacuation and it so recommended to the Cabinet, which, on December 7th decided upon the evacuation of Suvla and Anzac, but on the advice of Lord Kitchener the Cabinet determined to retain the position of Helles.

In accordance with the foregoing orders were sent to General Munro on December 8th and the evacuation of Suvla and Anzac was proceeded with. Stores, guns, and men were gradually withdrawn and by 5:30 A. M., December 20th the last men were out. There were very few casualties. On the day before, however, a covering attack made by the forces at Helles resulted in 283 casualties.

On the same day, December 20th, General Munro cabled urging the evacuation of Cape Helles. On the 22d the same thing was recommended in a General Staff memorandum. On the 23d the War Committee decided to evacuate and their decision was approved by the Cabinet on December 27th. The records and all authoritative writers agree that the evacuations were successful in every respect. On January 8th the evacuation was completed.

DISCUSSION

With a view to a critical analysis of the whole enterprise, from a command viewpoint, the greater portion of the details relative to the military operations are of necessity omitted in any presentation as brief as this and attention must be focused upon the salient facts concerning the action taken by higher authorities. The short statements of political conditions and correlated military operations inserted in the foregoing were essential to such viewpoint, as they influenced, from

time to time, the judgment of those responsible for this subsidiary operation.

In the narrative "what was done" has been roughly outlined. "The things attempted" may, in a measure, be seen by following the actions taken by the Cabinet and the War Council. These actions must be reviewed separately, however, to analyze the conception and handling of the Expedition.

The first thing attempted was the plan, to be worked out by two officers from the Admiralty and two from the Military Operations Department of the War Office, for the seizure, by "means of a Greek Army," of the Gallipoli Peninsula. In this early idea of Mr. Churchill's some cooperation is indicated as the step was arranged with the Secretary for War. Nevertheless, it was a faulty conception. The "King's Regulations" contemplated that such plans be worked out by the General Staff. Furthermore, as later events prove, it would have been wasted labor in so far as the use of Greek armies was concerned.

The military authorities did not approve of the idea but, in view of the fact that their last Staff study on the same general subject was nearly eight years old, the hint from Mr. Churchill should have resulted in a revision and the preparation of an up to date General Staff study, in cooperation with the Admiralty. In this way a complete presentation of the problem and its solution by experts would have been available for the War Council which, with the Cabinet, was the high command.

Relative to the foregoing it should be remembered that the Cabinet was composed of twenty-two members nearly all of whom were civilians dependent upon experts for advice in military matters. Also, that the ordinary functions of the Cabinet had lapsed in so far as the conduct of the war was concerned and that:

" * * a War Council, with supreme powers, was instituted to take the place of the Committee of Imperial defence * * ." (Dardanelles—First Report of Commission, p. 15)

" * * It was the Council, and not the united Cabinet which finally decided the most important matters and gave effect to its decisions without, necessarily, waiting for any expression of assent or dissent from the Cabinet * * ." (Same source, pp. 5 and 6)

That the Dardanelles were to be kept open had been a policy for years. There should have been plans for action in that area. The lack of an approved staff plan put a great burden on one man after the military operations had been decided upon. In general the War Council and the Cabinet accepted Lord Kitchener's advice without great question. With such a plan at his disposal he would have been just as powerful and his advice would have been more valuable and there would have been less chance of an attempt to accomplish a task with insufficient information and inadequate forces. This view is, in part, sustained by the finding in the First Report of the Dardanelles Commission (page 43), that Lord Kitchener did not sufficiently avail himself of the services of his General Staff.

In this connection, it may be said, therefore, that Lord Kitchener violated the military principle of cooperation. Nor was this the only case where he so acted for we find that, on or about March 12th, when he permitted General Hamilton to leave for the front without all the available information, the same principle was violated. Another case of the same kind occurred when he allowed General Hamilton to labor at Alexandria during an important period without any Administrative Staff.

The initial naval bombardment on November 3d was a clear case of violation of the principle just remarked upon. The War Council was the high command but it did not authorize this bombardment. It was authorized by the Admiralty only. It appears to have been an attempted reconnaissance to determine the hostile strength. It should not have been ordered. The War Council should have been consulted. No great harm was done to the forts and nothing was accomplished, but it served to give the enemy an early hint.

The blockade which followed and which was maintained off the Dardanelles was essential for political reasons and to prevent egress of enemy ships, but the attack by the combined fleet in the attempt to force a passage of the straits was unjustified at the time it was made in view of the fact that the decision had been reached by the high command to utilize military forces which were even then *en route* to cooperate with the Navy. Secrecy was essential and cooperation should have insured secrecy as a great factor in the chances of success. The question as to what should have been done is, of course, far more easy to answer with a full knowledge of later events. In this case, however, the high command, after its decision to use military forces, should have at once notified Admiral Carden to delay the naval attack until the cooperating military forces could be prepared and could reach the scene.

Historical precedents indicated that the fleet had fair prospects of being able to force the passage but that once through, its supply would become a matter of grave concern unless the forts along the Straits could be held by friendly land forces.

As has been shown the whole operation was a growth brought about by lack of plans, changing war requirements of political conditions. At the first of the year the political factors were important. In the past the Russian cooperation had aided the Allied cause and had relieved pressure on the Western Front at a critical time. It would not do to fail to respond to her appeal for aid. She was not a manufacturing country and her artillery ammunition and other war material must come from the outside. The high command was faced with a problem somewhat as follows: Should the military principle of the objective be followed and all efforts be exerted toward the destruction of the enemy's main army, via the Western Front, thereby relieving the pressure on Russia, or should another phase of the same principle be undertaken and a subsidiary operation be entered upon?(*)

The Western Front could not be forced at the time; troops and war material were not available; there was a possibility of holding large bodies of Turkish troops which might otherwise be used; there were some troops in Egypt available for use toward the Constantinople gateway but otherwise these could not be wholly withdrawn from that area; and of even greater importance was the political factor involved in connection with the Balkan States. If they should fall under Teutonic control the road to Turkey would be open to the enemy and the latter's forces would be greatly increased. It was especially essential that the neutrality of Bulgaria be secured.

The problem as solved was patchwork. It was first trifled with by an official of the Navy—Mr. Churchill. At Antwerp in the early days of the war the latter had learned of the effects of the fire of great guns.

(*) See Comment by Major Blyth, No. 1, page 518.

The new super-Dreadnaught *Queen Elizabeth* had eight 15-in. guns. It is believed that this fact had a bearing on the later action in the War Council. It was soon shown that ships' guns could not accomplish the results expected and the subsidiary operation was attempted but with inadequate forces. In part, the attempt accomplished some of the objects hoped for. These accomplishments were due to the fact that the Expedition secured a foothold and held on at Gallipoli. That fact delayed Bulgaria's ultimate hostile action and was a drain upon the Central Powers for months.

Had there been a continuity of plan and adequate forces, the undertaking of a subsidiary operation was the proper procedure. It should have been undertaken early as a surprise. Had that factor been properly considered the forces used would have been sufficient in March, 1915. Decision should have been made accordingly.

It was mentioned in passing that the gradual "drifting" into the big military attack resulted in the Allies' loss of the advantage of surprise. There is nothing to show that the high command cooperated in attempting to obtain that advantage. We first find that the continued partial actions by an ever increasing naval force. Then the great naval attack. That was followed day by day by the bombardment of the forts at the Dardanelles by one or more vessels of the fleet until the arrival of the military forces some four weeks later. The latter action was fundamentally wrong and was a fault chargeable to the high command, for the reasons which follow.

After the naval attack of March 18 the War Council authorized Mr. Churchill to inform Admiral de Robeck that he might continue naval operations. Thus a powerful factor in the probabilities of success was lost. It should have been and could have been retained by a reduction of the fleet outside the Straits and a reverting, on the part of the remainder, to normal blockade functions. Also, by efforts at Alexandria to convince the rest of the world that the preparations there were for a transfer of the troops in Egypt to France.

When the high command appointed General Hamilton it arranged with the French for the unity of the military command which insured cooperation between the French and British forces. This was fundamentally correct. However, during the two months which followed it is shown that the same principle was overlooked in the British forces for General Hamilton was not given control of the garrison in Egypt. In that area were troops which were not required for future use in the area. As a matter of economy they should have been placed at his disposal long before they were. The commander in Egypt in several cases did not cooperate as he should have done. This fundamental error should have been corrected by an Administrative order issued by the high command.

Within the Expeditionary force the unity of command did not result in excessive centralization but because of his wonderful popularity, personality and force Lord Kitchener was the personification of centralized control. Once the military operation had been decided upon the unity of command in all military matters other than those handled by the War Council (later the Dardanelles committee) became highly centralized in the Secretary for War. On the other hand, where matters concerning both military and naval matters came up for consideration there was no unity of command. Fortunately in the Expedition the principle of cooperation was well carried out by General Hamilton and

the British and French naval authorities. It has been stated that Lord Kitchener should have made greater use of his General Staff. Had he done so the faulty loading and dispatch of the transports from British ports would have been avoided. He should have used his staff for such purposes.

Concerning the high command's instructions to General Hamilton (appended hereto) it appears that the principle of simplicity was, with one or two exceptions, adhered to. It was well that this was so as the situation changed rapidly after General Hamilton's arrival at Mudros on March 17. Thereafter orders to him complied with the fundamentals of the principle just mentioned. The high command did not change its determination nor the general trend of its instructions until political conditions and evident failure of the operation caused the evacuation. No repeated changes of policy or orders bothered General Hamilton. Hints as to possible changes from time to time caused considerable correspondence but in the main the principle was adhered to, as it should have been.

Due in general to a lack of available troops it is evident throughout the history of the Dardanelles Expedition that the high command was never able to provide for a concentration of superiority at any critical time although the reliance placed upon the guns of the navy undoubtedly lead to the belief that those and the troops would, together, be capable of establishing superiority in April. Credit for the attempt to comply with the military principle involved may be given but the value of the attempt was lost due to the lack of secrecy of preparations and the failure to take adequate steps for concealing the true intentions of the Expeditionary Force in question.

The high command enters into these operations in other important matters. Its original directive strongly indicates to General Hamilton that an occupation of the Asiatic side by his forces should not be undertaken. This was also a part of the verbal conference with Lord Kitchener before General Hamilton left England. It is one of the exceptions mentioned above. The selection of the Gallipoli Peninsula, from the nature of its terrain and its size restricted the ability to maneuver. It was fundamentally to limit the General by such centralized mandatory limitation which was, as may be noted, taken from the old Staff Study of 1906.

There were certain advantages to be obtained by landing on the Asiatic side somewhere south of Tenedos. There was a better chance for surprise and hence opportunity to move inland far enough to insure the establishment of a bridgehead far enough out to have protected an advance base on the mainland. The terrain was more favorable and "movement" in that direction was possible. The advance would have threatened part of the enemy's communications and would have caused the Turks to draw their mobile artillery from the Straits giving the navy an opportunity for mine sweeping. That might have permitted the passage of the Straits.(*)

It so happened, however, that General Hamilton agreed with the high command. He also does not favor a landing to the north. That possibility will be discussed later. Concerning the Asiatic side, it is doubtful if the high command would have authorized his landing there even if he had recommended it. His instructions should have been left

(*) See Comment by Major Bain, No. 2, p. 518.

open on that score until he had surveyed the situation on the ground. Had he landed there his action should have been approved, as should his recommendation for such action had he made one before landing.

The landing should not have been made on the Asiatic shore for the following reasons: It involved too great a separation from the Navy. It would have made a longer route to the objective and would have required more troops than were ever available. That side of the Straits was dominated by heights on the European side. The mission was first to help the fleet and then to make for Constantinople. The heights on the European side could not have been taken and as long as they were held the fleet could not pass. As will be shown later the plan should have been an attack via Suvla Bay—as a surprise—at about the time of the great naval attack.

"The whole Ottoman State, on the eighteenth day of March, 1915, * * was on the brink of dissolution * * *." (Mogenthau in "The Great Events of the War, by Horne, Vol. III, p. 83. Also, see Enver Pasha's remark previously quoted)

We now come to an odd situation wherein the fate of a force in an active theater of operation, fighting under most trying conditions and sustaining large losses, is left undecided for a period of over three weeks because of a political upheaval at home and the inability of the high command to act. General Hamilton on May 14 was asked what reinforcements were needed to insure success of the undertaking. He had been and was short of artillery ammunition and troops. He replied stating his needs. For 24 days no reply was received as the high command had not reached a decision before the change in the home Government. The matter finally came to the attention of the Dardanelles Committee which had taken the place of the old War Council. The fault was in Governmental organization.

" * * The machinery employed for designing and controlling the higher operations of war was both clumsy and inefficient * * ." (Dardanelles Commission—First Report, Par. 14, p. 5)

But Lord Kitchener was of that machine and had centralized the command in himself as has been stated. From a command viewpoint a decision should have been made by the Secretary for War if action could not be obtained from the War Council of the outgoing Government. The decision and its causes should have been presented to the new Government with request for confirmation and approval of the action taken. Political conditions and situations on other fronts did not at that time justify a withdrawal. The decision should have been made promptly on the same lines as finally arrived at with a view to providing force enough to establish superiority at a then critical point.

The high command's action in withdrawing troops for the Salonika front was due to the situations upon other fronts. It was justified under the political conditions and was a matter of cooperation with military Allies.

One of the best examples of cooperation was the evacuation of the Gallipoli Peninsula, which was ordered by the high command for the same reasons in general as were mentioned above. Security and surprise were adhered to in the greatest detail and were excellently carried out as they should have been. Staff and naval cooperation were equally good. The preparations by General Munro were made in full cooperation with the high command. The difference in the result where there was a definite plan and a good command and staff work marks this phase of the operation for universal favorable comment. It had

been shown that the Dardanelles Expedition could not, with the forces available, accomplish its subsidiary task. Under the principle of economy of forces the troops remaining should have been withdrawn, as they were, for the purpose of placing them where they could participate in main or other important subsidiary operations. The last task of the high command in so far as this Expedition was concerned was accomplished the best of any.

Leaving the high command and considering General Hamilton's problems, the Narrative outlines what he did. He attempted actually two things: (a) To assist the navy; (b) to capture the commanding heights on Gallipoli. There were many minor and more detailed problems which will not be discussed. Under the conditions as General Hamilton found them on March 17 his decision to put back to Alexandria was correct. The military objective of the Allies was on the western front. He was in charge of a subsidiary operation based upon and made necessary by political conditions. He could not afford to risk all at that time with the ill prepared and inadequate forces at his disposal.

His decision not to land to the north toward Enos was correct. He would have been unable to adhere to the principle of security as he would have been attacked from the front, flank and rear. He would have been a long way from his objective and from the coooperation the fleet could render.

His landing attack was faulty. It violated the principle of concentration at the critical time and point. The landings were too many and economy of force ignored. What he should have done is briefly outlined in the following:

Given the same problem and forces it is believed that he could have landed at Suvla Bay. In the light of what almost happened there at a later date with new troops and against greater numbers, it is believed that with the sturdy troops of high morale, fully endowed with the enthusiasm of the offensive he could have effected a partial surprise. In this operation he should have, of course, adhered to the principles which he violated as mentioned. He should have made straight for the dominating high ground that he saw throughout the campaign as his first objective.

His Suvla Bay and related attacks of the 6th of August were well conceived in several respects. There was first of all, however, a violation of the principle of simplicity. This carried clear through to his very orders and to those of his subordinates. During this attack he failed in leadership. He gave the world to understand in his book, as one of his reasons for the selection of his headquarters at that time, that it would be in wire communication with each Corps and but one hour from them should he desire to visit them. He found that things were going wrong with the Suvla attacking force. He was slow in getting there and weak in leadership upon arrival. He gave an order which had it been carried out promptly might have saved the situation, but he did not exert force enough. When the attack was decided upon he should have arranged for the publication and distribution of orders in such form and to such extent that every man of the new troops would have known what was expected of him. When information was received of the slowing up of the Suvla attack he should have reached Suvla within an hour. He should have been more forceful and brought it home to the General Officers present that their security lay in rapidity of movement.

At no time did his force have the ability to maneuver and although the offensive was maintained to a large extent he lost the initiative for any movement of great importance unless assisted by the navy, as in the Suvla affair. As stated, he should have made the original landing at Suvla. He should have gained ground after landing with the greatest speed. Trench warfare would have been avoided. The capture of the heights would have left him the initiative. It was essential that he attain the object of the attack as directly as possible.

In the landing operation and in the Suvla attack he attempted and to some extent in each case obtained partial security by having other operations intended to mislead the enemy. These were only successful in that they delayed the arrival of enemy reserves. It is not believed that they were entered into seriously enough. They should have been actual operations rather than "feints." One, the attack of the Helles troops on August 6 toward Krithia, was properly an application of the principle indicated.

The principle of cooperation, as has been mentioned, was well adhered to nearly all the time in the force under General Hamilton. There was one very marked violation when, at Suvla August 6 to 9, the General Officers failed to interpret their orders intelligently and failed to execute them in accordance with the spirit of General Hamilton's intent. This criticism cannot be applied to lower grades with justice.

" * * The regimental officers and troops in the 11th Division when they set foot on shore had no definite conception of what they were to do, or what they were being called upon to face. * * . (The Dardanelles—Callwell, p. 226)

In the evacuation, the recommendations by General Munro, the cooperation, the secrecy, the surprise, the security and the staff work were excellent. The principles mentioned were adhered to throughout. In leaving Gallipoli there was a plan. Evacuation was effected properly.

PERTINENT EXTRACTS, FROM OTHER PAPERS ON THE SAME SUBJECT, PREPARED BY THE OFFICERS INDICATED BELOW

No. 1. (From a paper prepared by Major James Blyth)

" * * * The correct strategy for the Allies to have employed would have been to pass all available power against the western front, drive through the German lines and relieve the pressure against Russia. The German army was the true enemy or objective, when it was beaten the alliance of the Central Powers would collapse and the Allies could then devote their attention to defeating in detail the smaller powers that had sided with Austria and Germany, thereby regaining possession of any territory that they may have lost as a result of subsidiary operations or minor operations in other fields * * * ."

No. 2. (From a paper prepared by Major Jarvis J. Bain)

" * * * The advantages of landing points on the Peninsula were their proximity to Kilid Bahr, the proper objective of the attack. The most serious disadvantages were the character of the terrain which favored the defender, the lack of suitable beaches, the fact that attackers would be subjected to fire from the Asia side in addition to that of the enemy troops in their front, and greatest of all the intrenchments and obstructions which the Turks had been able to install. Suvla Bay was comparatively lightly held and fortified but was quite a distance from the objective and the approach thereto was very difficult.

The Gaba Tepe location was nearest to the vicinity of Helles. Troops attacking from the west at Gaba Tepe would have the advantage of facing both the fire of land defenders and the artillery from Asia, while those attacking north from Helles in addition to having much farther to go would be enfiladed by fire from Asia at the same time they were receiving fire from local defenders in front.

Operations from landing on the Asia side would have much farther to go and would be on the opposite side of the Strait from the principle objective. They would have the advantage of more favorable landing places, less opposition while actually landing, more opportunity for tactical surprise, more room for maneuver, more favorable terrain, and a chance to threaten the enemy's communications * *."

No. 3. (From a paper prepared by Colonel J. R. R. Hannay)

" * * * During the period following the first attack it became more and more evident to the Allies that a victory of movement could not be expected. The Turks had developed their positions with machine guns and barbed wire until open assault without extensive artillery preparation and protection could not expect to obtain success. It was during this period that the Allies were seriously hampered by a lack of artillery ammunition and the War Council would not approve any material diversion thereof from the Western Front. The British forces were seriously handicapped by a lack of replacements and General Hamilton realized early in May that, even if kept up to strength, the forces at his disposal were inadequate for the task, and he made strong representations to the War Council to the effect that his force must either be withdrawn or maintained in proper strength * * * ."

Conclusions Reached by Other Officers Who Prepared Papers on the Same Subject

Major James Blyth:

" * * * From a military point of view this expedition, viewed as a detachment working to assist the main forces on the Western Front, was not justified as it required at least 400,000 men to neutralize nearly 300,000. The political advantages sought were not gained.

"The main strategic value of the Dardanelles plan lay in its effect upon neutrals.

"Apart from the main operation there are two classes of 'sideshows': (a) a subsidiary operation and (b) a divergent operation. The locality of a subsidiary operation matters nothing provided the operation subserves the main object of the war. The operation must be profitable and have a reasonable chance of success. After the naval bombardment, which gave warning to the Turks, I do not believe the operation had any chance of success.

"A subsidiary operation is a blunder if undertaken with forces that are too weak. This was decidedly the case in the Dardanelles Expedition. Any force used for a subsidiary operation must not seriously weaken the operations in the main battle. The extent to which this did actually happen I do not know but it is certain that the western front was weakened by just that much in men and guns at times when they might have changed the course of events.

"A subsidiary operation is justifiable but a divergent operation is not and the attack upon the Dardanelles by a land army from the start had every vice of a divergent operation. We see then that from whatever angle you look at it the Dardanelles Expedition was a blunder and should never have been made."

Major Jarvis J. Bain:

"1. It is dangerous to allow amateur strategists alone to determine military line of action to be taken in case of serious emergency.

"2. The Dardanelles Expedition should not have been undertaken as a serious effort.

"3. Attempt by naval power alone had negligible chance of success.

"4. Combined attack having been determined upon, it should have been initiated without delay and pursued aggressively.

"5. At the time the initial landing was actually made it was a mistake to land on the Peninsula. The Asia shore offered more promise of success.

"6. In a forced landing executed in daylight it is essential that naval artillery keep down the fire of the defender.

"7. Ordinary ships' boats are not suitable for use by landing parties.

"8. Main effort in landing on the southern end of the Peninsula should have been made at Anzac instead of at Helles, and the 29th Division used for this landing.

"9. The landing and attack at Suvla should have been made at least in part by experienced troops.

"10. The Allied Commander greatly erred in not taking steps to force aggression upon his subordinates at Suvla."

Colonel J. R. R. Hannay:

"In summing up it is believed that the Dardanelles Campaign was brilliantly conceived but faultily carried out from its inception. Too great dispersion of force characterized every effort. Had a feint, as carried out at Bulair, been accompanied with a single subsidiary diversion and holding attack at Helles with a vigorous and determined attack from Gaba Tepe, with practically the entire force, it is believed that Kilid Bahr, dominating the Narrows, would have fallen, either in April or the August offensives. Kilid Bahr was no more than six miles from Gaba Tepe. Such action would have cut off the Turks on the toe of the Peninsula and eventually enabled the fleet to successfully negotiate the Dardanelles.

"During the four months following the August offensive the Dardanelles operated to the benefit of the Central Powers, in that important Entente forces were contained by a Turkish army far removed from home bases and much needed participation on the Western Front, thus presenting a greater drain upon the Allied forces and material than if there employed. The successes of the Central Powers against Russia and Servia, and of the Turks at the Dardanelles, turned the tide of political feeling in the Balkans and Bulgaria entered the war on the side of Germany, thus eliminating the isolation of Turkey, and enabling the shipment of munitions of war to the Ottomans through Bulgaria."

"After this period General Munro foresaw the peril in which the Dardanelles Expedition was placed, with an ever increasing preponderance of artilllery on the side of the Turks, and he wisely counselled immediate evacuation."

APPENDIX I

COPY OF WRITTEN INSTRUCTIONS GIVEN TO SIR IAN HAMILTON, MARCH 13, 1915

1. The Fleet has undertaken to force the passage of the Dardanelles. The employment of military forces on a large scale for land operations, at this juncture, is only contemplated in the event of the fleet failing to get through after every effort has been exhausted.

2. Before any serious undertaking is carried out in the Gallipoli Peninsula all the British military forces detailed for the expedition should be assembled so that their full weight can be thrown in.

3. Having entered on the project of forcing the Straits, there can be no idea of abandoning the scheme. It will require time, patience, and methodical plans of cooperation between the naval and military commanders. The essential point is to avoid a check, which will jeopardize our chances of strategical and political success.

4. This does not preclude the probability of minor operations being engaged upon, to clear areas occupied by the Turks with guns annoying the Fleet, or for the demolition of forts, already silenced by the Fleet. But such minor operations should be as much as possible restricted to the forces necessary to achieve the object in view, and should as far as practicable not entail permanent occupation of positions on the Gallipoli Peninsula.

5. Owing to the lack of any definite information we presume that the Gallipoli Peninsula is held in strength, and that the Kilid Bahr Plateau has been fortified and armed for a determined resistance. In fact we must presuppose that the Turks have taken every measure for the defence of the Plateau, which is the key to the Western Front at the Narrows, until such time as reconnaissance has proved otherwise.

6. Under present conditions it seems undesirable to land any permanent garrison, or hold any lines on the Gallipoli Peninsula. Probably an entrenched force will be required to retain the Turkish forces on the Peninsula and prevent reinforcements arriving at Bulair and this force would naturally be supported on both flanks by gun-fire from the fleet. Troops employed on the minor operations mentioned above (paragraph 4), should be withdrawn as soon as their mission is fulfilled.

7. In order not to reduce forces advancing on Constantinople, the security of the Dardanelles passage, once it has been forced, is a matter for the Fleet, except as in paragraph 6 with regard to Bulair.

"The occupation of the Asiatic side, by military forces, is to be strongly deprecated."

8. When the advance through the sea of Marmora is undertaken, and the Turkish fleet has been destroyed, the opening of the Bosphorus, for the passage of Russian forces, will be proceeded with.

"During this period, the employment of the British and French troops, which will probably have been brought up to the neighborhood of Constantinople, should be conducted with caution.

"As soon as the Russian Corps has joined up with our troops, combined plans of operations against the Turkish army (if it still remains in European Turkey) will be undertaken, with a view to obtaining its defeat or surrender.

"Until this is achieved, landing in the town of Constantinople, which may entail street fighting, should be avoided."

9. As it is impossible now to foretell what action the Turkish military authorities may decide upon, as regards holding their European territories, the plan of operations for the landing of the troops and their employment must be left for subsequent decision.

"It is, however, important that as soon as possible after the arrival of the fleet at Constantinople, all communications from the West to the East across the Bosphorus, including the telegraph cables, should be stopped.

"Assuming that the main portion of the Turkish army is prepared to defend European Turkish territory, it may be necessary to land parties to hold entrenched positions on the East side of the Bosphorus, and thus assist the Fleet in preventing all communication across the Bosphorus."

10. Should the Turkish army have retired to the East side of the Bosphorus, the occupation of Constantinople and the Western territories of Turkey may be proceeded with.

11. As in certain contingencies, it may be important to be able to withdraw our troops from this theatre at an early date, the allied troops working in con-

junction with us should be placed in these positions which need to be garrisoned, and our troops might, with advantage, be employed principally in holding the railway line, until a definite decision is come to as to future operations.

12. You will send all communications to the Secretary of State for War, and keep him fully informed of the operations and your anticipations as to future developments.

(Signed) KITCHENER.

March 13th, 1915.

APPENDIX II

THE FLEET AT THE DARDANNELLES

BRITISH

Name of Ship	When completed	Tons	Guns	
Queen Elizabeth	1915	27,500	8 15-in.	12 6-in.
Inflexible	1908	17,250	8 12-in.	16 4-in.
Agamemnon	1908	16,500	4 12-in.	10 9.2-in.
Lord Nelson	1908	16,500	4 12-in.	10 9.2-in.
Irresistible	1901	15,000	4 12-in.	12 6-in.
Majestic	1895	14,900	4 12-in.	12 6-in.
Prince George	1896	14,900	4 12-in.	12 6-in.
Cornwallis	1904	14,900	4 12-in.	12 6-in.
Vengeance	1901	12,950	4 12-in.	12 6-in.
Albion	1902	12,950	4 12-in.	12 6-in.
Ocean	1900	12,950	4 12-in.	12 6-in.
Canopus	1899	12,950	4 12-in.	12 6-in.
Triumph	1904	11,800	4 10-in.	14 7.5-in.
Swiftsure	1904	11,800	4 10-in.	14 7.5-in.

FRENCH

Suffren	1903	12,520	4 12-in.	10 6.4-in.
Bouvet	1898	12,007	2 12-in.	(2 10.8-in. (8 5.5-in.
Gaulois	1899	11,080	4 12-in.	10 5.5-in.
Charlemagne	1898	11,000	4 12-in.	10 5.5-in.

To these main fighting ships were added four light cruisers: Amethyst
Sapphire
Dublin
Doris.

There were also:

(British)
2 Destroyer Depots.
16 Destroyers.
6 Submarines.
21 Mine-sweeping trawlers.
1 Seaplane ship (6 seaplanes).

(French)
6 Torpedo-boats.
14 Mine-sweepers.

APPENDIX III

APPROXIMATE STRENGTH OF THE FORCES AVAILABLE, MARCH 10, 1915

"14. * * * At a meeting on March 10th, Lord Kitchener announced to the War Council that the 'approximate strength of the forces available against Constantinople' would be as follows:

Naval Division	11,000
Australasian Infantry	30,000
Australasian Mounted Troops	3,500
29th Division	18,000
French Division	18,000
Russian Army Corps	47,600
	128,100

It should be noted that the despatch of the Russian Corps referred to above

was to follow and be contingent upon our obtaining access to Constantinople through the Dardanelles and the Sea of Marmora."

(The Final Report of the Dardanelles Commission, Par. 14, p. 9, Part II)

APPENDIX IV

TOTAL BRITISH LOSSES

	Killed	Wounded	Missing	Total
Officers	1745	3143	353	5241
Enlisted	26455	74962	10901	112318
	28200	78105	11254	117559

(Dardanelles—Capt. H. L. Landers—AWC, number 6368-22)

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Heavy Tractor Artillery in its Relation to Coast Defense

By Major C. Ralph Meyer, C. A. C.

SINCE the close of the war in Europe more attention has been turned to the development of heavy mobile artillery in the United States than ever before. The railroad artillery, still in its infancy, has been developed until it is a very formidable weapon for use against either fixed or moving targets. The use of railroad artillery will not be discussed in this article except as it is casually mentioned. Recent firings by the 51st Artillery at Fort Eustis have demonstrated that the 155-mm G.P.F. is adapted to firing at a moving target and can be fired quite as rapidly as the fixed gun of equal caliber. This article is therefore submitted with a view to encouraging discussion on the points which will be brought out relative to the use of Heavy Tractor Artillery as a Coast Defense weapon.

It will perhaps be best to approach the subject by a consideration of the general characteristics of Heavy Tractor Artillery. These characteristics may be given as follows:

a. Artillery of this class is usually of 6-inch or greater caliber. There is one British 5-inch gun classed as Heavy Artillery.

b. It is of such weight that it must depend upon mechanical means for its transport.

c. It was designed to be fired at a rather low rate of speed at fixed targets.

d. The targets will normally be strong points, concentration points, supply and ammunition dumps in back areas, railroad stations, and it will be used for counter-battery and interdiction fire.

e. Self-propelled artillery of 6-inch and greater caliber should also be considered as Heavy Tractor Artillery.

During and since the war certain types have been developed, the tractor drawn by the French and British, while the self-propelled mount is an American development.

The following types are or have been in use in our service:

Tractor Drawn:

5-inch 60 pdr.	British	Wheeled mount.
155-mm G.P.F.	French	Wheeled mount.
6-inch Mark XIX	British	Wheeled mount.
8-inch Howitzer	British	Wheeled mount.
9.2-inch Howitzer	British	Platform mount.
240-mm Howitzer	French	Platform mount.

The following types have been constructed for experimental purposes:
155-mm G.P.F. with caterpillar adapters to replace gun axle wheels.
8-inch Howitzer with caterpillar adapters to replace gun axle wheels.

Self-propelled types as follows have been built for experimental purposes only:

155-mm G.P.F. on Christie S.P. Mount.
155-mm G.P.F. on Holt S.P. Mount,
155-mm gun Mod. 1920 on Holt S.P. Mount,
8-inch Howitzer Mod. 1920 on Holt S.P. Mount,
240-mm Howitzer on Holt S.P. Mount,
240-mm Howitzer with two units, one power and one gun.

The following types have been developed but not yet issued to the service:

155-mm G.P.F. Mod. 1920	American	Wheeled mount,
8-inch Howitzer Mod. 1920	American	Wheeled mount,

The mount is the same for both of these types permitting a traverse of 60° on the carriage and an elevation of 65°.

The general results of tests so far conducted with self-propelled and tractor-tread mounts will be discussed later.

A discussion of the power and limitations of the tractor drawn types is impossible without the introduction of statistics. Certain items are of extreme importance in the solution of any problem involving this artillery. An artillery commander knowing the mission assigned to him and the various types available for accomplishing this mission must consider them all and select the one which will best suit the conditions. He will have to consider time to reach the positions and to emplace, conditions of the routes of approach and the extent to which he may use these routes for the movement of artillery. These are but a few of the points he must consider. The information given in the following table has been published in various pamphlets or instruction books but it has not been brought together so that the various types can be compared at a glance.

Several of the points covered in the table should be elaborated upon to indicate their value in arriving at a conclusion as to which type should be used for any particular purpose. Certain of these items, too, will at once indicate whether or not a type will be satisfactory as a coast defense weapon.

Number of axles in load. This has considerable bearing on the wear and tear on the tractor. Other things being equal, with two or more loads being hauled by one tractor the pull is greater per ton than with a single load. This is particularly well exemplified in the case of the 8-inch Howitzer with the platform. The platform is carried on a two wheeled vehicle and is hooked to a pintle on the gun axle. There is a great deal of whip and play and the racking effect on the tractor is so great that the 10-ton tractor cannot stand it for any great length of time. Whenever two or more units are hauled by one tractor, the play at the points where the units are connected will rack the tractor. The problem of braking on a down grade will also be more difficult. Greater difficulty is experienced in keeping the vehicles on the road if it is highly crowned or slippery.

Number of tractors per gun. The importance of this item lies in the road space required, the upkeep of the gun and its tractive unit, the supply of petroleum products, and the number of men necessary to operate the tractors needed in the battery. In some cases the number shown in the table is followed by a (?). This is done because the number actually needed is doubtful.

CHARACTERISTICS OF TRACTOR ARTILLERY

	155-mm G.P.F.	8-inch Howitzer Mark VI.	8-inch Howitzer Mark VII	8-inch Howitzer Mk. VIII½	9.2-inch Howitzer Mark I.	9.2-inch Howitzer Mark II.	240-mm Howitzer	
Type of cannon	155-mm G.P.F.	8-inch Howitzer	8-inch Howitzer	8-inch Howitzer	9.2-inch Howitzer	9.2-inch Howitzer	240-mm Howitzer	
Type of carriage	Wheeled split trail	Wheeled solid trail	Wheeled solid trail	Wheeled solid trail	Platform	Platform	Platform	
Number of axles in load	2	3	3	3	6	6	8	
Number of tractors per gun	1	3 per 2 guns	3 per 2	3 per 2	1—?	1—?	4	Based on using 10-ton tractors.
Weight in traveling pounds	29410	28552	29532	31942	33200	42000	57600	
Greatest weight one axle	18000	18092	19092	21502	12600	14800	11745	
Maximum speed on road m.p.h.	3 to 4 with tractor, 15 with truck.	3 to 6	3 to 6	3 to 6	3 to 4	3 to 4	3 to 4	Based on using 10-ton tractors.
Time to emplace	30 min. to 1 hr.	10 min. to 2 hrs.	10 min. to 2 hrs.	10 min. to 2 hrs.	Estimated 6 to 8 hours.	Estimated 6 to 8 hours.	Estimated 4 to 6 hours.	
Time to withdraw	20 min.	10 min. to 45	10 min. to 45	10 min. to 45	Estimated 3 to 5 hrs.	Estimated 3 to 5 hrs.	Estimated 2½ hrs.	
Traverse	60°	8° on carriage 52° on platform			60°	60°	20°	
Accuracy life rounds	10000 MV 1955 f.s.	7800	3000	3000	5000	3000	2000	
Rate of fire. Sustained	120 per hour	75 per hour	75 per hour	75 per hour	Estimated 40 per hour	Estimated 40 per hour	Estimated 40 per hour	
Short burst 15 min.	4 per min.	2 per min.	2 per min.	2 per min.	1 per min.	1 per min.	1 per min.	
Max. range, yds.	17500	10500	12100	12100	10060	13123	18000	
Wt. of full charge,	lbs. 25	10.44	17.5	17.5	14	24	35	
Wt. of projectile	95	200	200	200	290	290	356	
Weight of H.E. in projectile, pounds	16	30	30	30	35	35	50	
Muzzle velocity, full charge	2410 f.s.	1303 f.s.	1500 f.s.	1500 f.s.	1187 f.s.	1503 f.s.	1700 f.s.	
Overall width, in.	105.25	95.8	95.8	95.8	109	109	102	
Road space 1 gun and tractive power	15 yds.	With platform 21 yards. Without platform 15 yards.	With platform 21 yards. Without platform 15 yards.	With platform 21 yards. Without platform 15 yards.	With 1 tractor 25 yards. With 2 tractors 30 yards.	With 1 tractor 25 yards. With 2 tractors 30 yards.	With 4 tractors 56 yards. No interval between loads	
Turning radius	32.8 ft.	Estimated 25 ft.	25 ft.	25 ft.	Estimated 50 ft.	50 ft.	50 ft.	
Fuses	IV. IV.*	II. III. IV. IX.	II. III. IV. IX.	II. III. IV. IX.	II. IV. V. IX.	II. III. V IX	II. III. IV. IX.	

III.—Instantaneous (long fuse).
IV. IV.* (Short fuse) non-delay, short-delay, long-delay.
II.—Used to replace III or IV.

Weight in traveling and greatest weight on one axle. Both of these items are extremely important in considering bridge crossings. These will be the determining factors in deciding whether or not the tractor must be uncoupled from the gun in crossing the bridge, and will also determine the strength of bridge necessary for crossing.

Maximum speed on the roads. This will have a direct bearing on the strategical use of the mount. Some of the types are limited to the speed of a tractor while the 155 G.P.F. can be hauled by an F.W.D. truck at a speed up to 15 miles per hour on good roads. The 8-inch Howitzer may be hauled this way, but for short distances only, at a speed of 6 to 10 m.p.h. and then only over excellent roads.

Time to emplace. The time given in the table is the time actually required to place the gun in firing position. It does not inlclude the reconnaissance, the orientation, the digging of shelter trenches or ammunition pits, nor the running of communication lines. The normal procedure will be to send men ahead of the gun to prepare the position as far as possible and to run lines of communication. The orientation work should be completed to such an extent that the battery commander will have an oriented line somewhere near his position before the guns arrive. The time required to move a battery to a position, emplace it, orient it and have all necessary lines of communication established will vary with each problem. The time required to emplace the gun in the firing position is about all that can be stated beforehand.

Time to withdraw. This is the time required to put the guns in traveling position, withdraw them from the positions occupied and have them ready to move out.

Traverse. This governs the limits of the field of fire. When the directrix of the battery is to be changed it may amount to the occupation of a new position.

Rate of fire. This will have a direct bearing on the type of targets to be assigned as well as the kind of fire and the time to be allowed for the delivery of a certain number of rounds.

Experimental types have been referred to before. The writer has been connected with the test of four of these mounts, namely, the Holt and Christie S.P. mounts for the 155 G.P.F. and the tractor-tread mounts for the 155 G.P.F. and the 8-inch Howitzer.

It is difficult at this stage of the evolution of the S.P. mount to make any prediction as to what may ultimately be expected from these mounts. The Holt mount was so heavy that its use on ordinary country roads was practically impossible. Bridges on such roads were not built to stand such weight (approximately 31 tons.) It was underpowered but was nevertheless capable of going across country fairly well. The power of the motor could be increased but this would cause an increase in the total weight of the mount.

The Christie S.P. mount is in reality a four-wheeled vehicle with a caterpillar tread which could be placed on the wheels or removed at will. Two extra wheels on each side could be raised or lowered and when the tread was in place around the wheels they were lowered. When the mount was run as a four-wheeled vehicle these extra wheels were raised so that they did not touch the ground. The weight of this mount was but 22 tons. However, in securing the decrease in weight the strength of material was sacrificed and the result was that some parts were too weak.

The question of the advantages of the S.P. mount over the tractor drawn mount is on many points a matter of opinion. Some of the advantages claimed for it, such as increased rapidity of fire, and greater stability, cannot be proven. Certainly its use in the United States will be limited until the bridges on ordinary country roads are built much stronger or until the S.P. mount is made much lighter.

It is doubtful if it will ever be found desirable to substitute S.P. mounts entirely for the wheeled mount. The S.P. mount, when perfected, would be an excellent special mission weapon, one which would be held in reserve until needed and then rushed to the position desired and when the mission is completed return to its reserve position. Even in its present stage of development it could be used this way in certain areas where there were no bridges or where the streams to be crossed were fordable.

The 155-mm G.P.F. and 8-inch Howitzer mounts with caterpillar tread adapters to replace the gun wheels were tested by the 51st Artillery at Fort Eustis. The 155 wheeled mount proved much more desirable than the caterpillar adapter mount. When it is realized that the 155 with its rubber tires, spring suspension and bronze wheel bearings can be taken over surfaced roads by an F.W.D. truck at a rate of 10 to 15 miles per hour, it will be readily seen that tremendous sacrifice of mobility is made when the caterpillar adapter is applied, limiting the piece to the speed of a tractor. A full report of the test of this mount was published in the COAST ARTILLERY JOURNAL for December, 1922.

The 8-inch Howitzer with the caterpillar adapter has some advantages over the wheeled mount, but there are disadvantages which almost counterbalance the advantages. It holds the road better but requires a greater drawbar pull; it traverses shell torn areas better but is more difficult to maneuver into position; it weighs less than the wheeled mount with the platform and can be emplaced more quickly but it has but 8° traverse when emplaced, whereas the wheeled mount on the platform has 60°.

Having discussed the various types of Tractor Artillery, the next point is their use in coast defense. This is largely a tactical question and as such may be susceptible of several answers. In order that my solution may be understood it is advisable to state the premises from which I have worked.

Artillery for coast defense may be divided into two classes, the fixed armament of the Coast Defense forts and the mobile artillery which will be used for the defense of landing places which are not guarded by fixed guns.

Can any of the tractor artillery be used to supplement or replace the armament in the fixed defenses? To be satisfactory for such work a gun must have sufficient traverse to cover the entire field of fire, preferably it should have all-round fire, though this is not essential. It must permit of sufficient rapidity of fire to warrant its use in its own caliber; that is, it must be possible to fire it as rapidly as any fixed gun of the same caliber. It should have sufficient range to be used with fixed guns of the same caliber.

With these requirements in mind we may consider the various types and their suitability for the work to be accomplished.

The 155-mm G.P.F. on the wheeled mount has a field of fire of 60°. This could be increased by using prepared positions with a track on which the trails could be moved and locked in position. The fire effect

may also be secured by concentrating more guns to cover a given sector. The range is 17,500 yards. The rate of fire is 4 shots per gun per minute or better. It can be used for either direct or indirect fire. It is evident that the 155 G.P.F. can be used as a rapid fire gun and be as effective as any fixed gun of approximately the same caliber.

The 8-inch Howitzer when emplaced on its platform has a field of fire of 60°. This could be increased by the same methods as suggested for the 155. It is necessary, however, to shift the trail for every eight degrees change in line of fire, a process which would undoubtedly interfere with the smooth serving of the gun. The maximum range of the latest model is 12,100 yards. The rate of fire at best is not more than 2 shots per minute. It would seem that the short range and difficulty in covering a large field of fire would eliminate this type.

The 9.2-inch and 240-mm Howitzers with their limited traverse and slow rate of fire must be considered as not so efficient as fixed mounts of the same or approximately the same caliber. The 9.2-inch Howitzer has a field of fire of 60°, a range of 13,123 yards, and a rate of fire of 1 shot per minute for short bursts. The 240-mm Howitzer has a field of fire of 20°, a range of 18,000 yards and a rate of fire of 1 shot per minute for short bursts. The caliber is such as to place these as well as the 8-inch Howitzer, in the secondary armament class. It is evident that their low rate of fire would render them inefficient in firing against rapidly moving targets which will normally be the targets for the secondary armament. If their use as primary armament is considered it may be readily seen that their small field of fire and comparatively short ranges will greatly impair their efficiency in that class. All could be used of course to fire at certain fixed points in a channel, but this would be a very poor system of defense.

Self-propelled mounts in their present state could not be used since all have a very limited traverse without moving the mount itself. The new model however, it is understood, has provision for traversing the entire mount. If this can be done smoothly it will make this type valuable as a coast defense gun because of its exceptional maneuvering ability. It can be brought to the vicinity of its position by rail and then rely upon its own power for tactical maneuvering.

Everything considered, it appears that for fixed defenses the 155 G.P.F. is the only type of heavy tractor artillery so far issued to the service which can be used successfully. The gun should not be permanently emplaced, thus sacrificing its mobility. If deemed advisable, permanent or semi-permanent emplacements may be prepared but these should be of such character that the guns may be withdrawn with facility. In all training of troops with the 155- G.P.F. in fixed defenses this matter of mobility must never be lost sight of. If it is desired to establish fixed positions this may be done, but other positions should be occupied also and personnel so trained that they can occupy any position efficiently and expeditiously.

Bearing in mind the foregoing and approaching the problem of defending landing places along the coast which are not protected by fixed defenses, we find a different condition.

In this situation we have the three distinct problems of the long range railroad artillery, the tractor artillery, and the light field artillery. There may or may not be two phases to the railroad artillery problem. There will sometimes be two phases to the problem for the tractor and light artillery.

The first phase is the protection of the landing places with a view to rendering the landing impossible, or as costly to the enemy as it can be made. In order to accomplish this the railroad artillery must hold the enemy fleet at such distance from the shore that it cannot silence shore batteries with searching fire. The tractor artillery must keep transports and other unarmored vessels at such distance from the shore that the landing force will be required to travel the greatest possible distance over open water in unprotected boats. The light artillery and the tractor artillery must make every effort to destroy the boats and landing parties as they approach the shore. The point in the operations where these various problems will present themselves will be largely a matter of visibility.

It is believed that there will be occasions when it will be impossible to prevent a determined enemy from making a landing once he has overcome our fleet. This results in the second phase in which the tractor and light artillery must concentrate on points held by the enemy and furnish the artillery supports for infantry attacking to dislodge the enemy from these footholds. This will necessitate withdrawing both types of artillery to the rear where they will occupy new positions or where the problems will be taken up by other guns already emplaced.

We are concerned with the problem of the tractor artillery. Considering the first phase, which type is the most suitable? The discussion of the use of the 155 G.P.F. in fixed defense shows that this type would be ideal for this problem. Due to the rapidity with which it can be withdrawn it could be used until the enemy had actually landed after which it could be moved to prepared positions in the rear and soon be ready to open fire from these new positions. The communications necessary for the firing at the water targets would amount to very little if direct fire were employed and this should be done whenever possible.

The 8-inch Howitzer, firing from its platform, could be used with the G.P.F. In view of the facts that the range of the howitzer is considerably shorter, the rate of fire slower, and traversing to follow a moving target in a wide field of fire much more difficult, it would not be as effective. A better disposition would probably be to place these howitzers in position farther to the rear where they could be used to put down a barrage some distance from the shore and later shift fire to points where landings had been effected. The use of the 9.2-inch and 240-mm Howitzers would be inadvisable for reasons other than their range, rate of fire, and field of fire. Both types require too much time for emplacement as well as for withdrawal.

What has been said about the 8-inch Howitzer in the preceding paragraph, as well as what was said about its use in fixed defenses, applies only to the present model of this weapon. The new model 1920 will be mounted on the same carriage as the 155-mm gun with a traverse on the carriage of 60°. This mounting will eliminate one of the great objections to the present model. In addition it will have a range of 19,000 yards. Being a split trail mount, the time required for loading will be materially reduced, and it seems that it should be possible to fire the piece at the rate of three shots per minute. It could therefore take its place with the 155-mm gun in either fixed or mobile coast defense.

From this it will be seen that the 155-mm G.P.F. is the one type of heavy tractor artillery now in the hands of troops which under any

condition may be used as a coast defense gun for fire at moving targets. The 55th Artillery (C.A.C.) has fired at moving targets in Hawaiian waters. The 51st Artillery has fired at moving targets in the James River. Both have proved that the problem is not difficult. Exact details of the firing by the 55th Artillery are not known by the writer, but the results obtained by the 51st Artillery were all that could be hoped for. The rate of fire varied from 4 to 6 shots per gun per minute and the guns were fired even more rapidly by indirect fire than by direct fire. However, the latter method is undoubtedly more desirable and the one which should normally be used. Reports of these firings were published in the COAST ARTILLERY JOURNAL in January and February, 1923, and these articles clearly show the methods used.

The entire problem of mobile coast defense can be advanced immeasurably by work which can be done in peace time. We are in the very earliest stages of this work now. The problems of fire direction and control, of observation and adjustment of fire, are all in a stage of development. The experience of the Coast Artillery in the fixed defenses is available, it is true, but much original work must be carried out before the best system for mobile coast defense can be determined.

There is another phase of the preparatory work which can be begun at once and which is of such importance that it should not be put off. This consists of the necessary reconnaissance and study for the selection of possible gun positions, observation posts, etc., for each possible landing place along the coast. To have its full value this work must be done thoroughly and must be accurate when completed. The preliminary study should decide where the main concentration points for artillery are to be situated along the coast. The extent of cooperation for the various Corps areas along the coast should be stated. Corps Area commanders should then detail boards to carry out the details of the problems in their own areas.

These boards should consist of men who are experts in their own branch. The mere fact that an officer has had a little experience with R.R. or tractor artillery is not sufficient. He should have had enough experience to enable him to arrive at the best possible solution in each case. An officer of the General Staff should be a member of the board. Since it would be his duty to solve the general problem for each landing place, the importance in the selection of the officer for this position cannot be too greatly stressed. In addition certain officers who are experts in orientation work and communications should be detailed.

A board such as this should, as a result of the study of the general plan of defense, proceed to the landing places at which attempts at landing may be anticipated. The General Staff officer should study each landing place as an individual problem as well as in its relation to the rest of the coast defense. He should then prescribe the number of batteries, the general location of positions to be occupied, the points which an enemy landing force would endeavor to secure, the probable direction of withdrawal of our artillery and any other information which could be given the officers charged with the remainder of the work. These officers should then proceed to select all possible gun positions, observation posts, possible aiming points, registration points, routes of entry and exit and ammunition supply for the guns. If new roads will be required these should be indicated, stating what work would have to be done. The reconnaissance should be very carefully made and all pertinent information recorded. The coordinates of all positions should

then be determined, gun positions, O.P.'s, aiming points, strong points, which the enemy would endeavor to secure. An oriented line should be permanently marked near each battery position; the length and azimuth of various possible base lines determined. the best routes for all lines of communication should be found, the amount of wire necessary and an estimate made as to the time required for its installation.

Upon completion of all this work the entire plan should be drawn up, maps prepared giving all the data, and a complete statement made giving all information not otherwise embodied in maps and plans.

The following tentative composition of a board for this purpose is submitted as a suggestion:

One officer of the General Staff
Two officers of R.R. Artillery
Two officers of Tractor Artillery (C.A.C.)
Two officers of Light Field Artillery
Two officers of Infantry
One officer of Signal Corps with experience on communications for artillery
One officer of Engineers
One Master Sergeant, topographer
One Master Sergeant, sergeant-major
Two Master Sergeants, orienteurs.

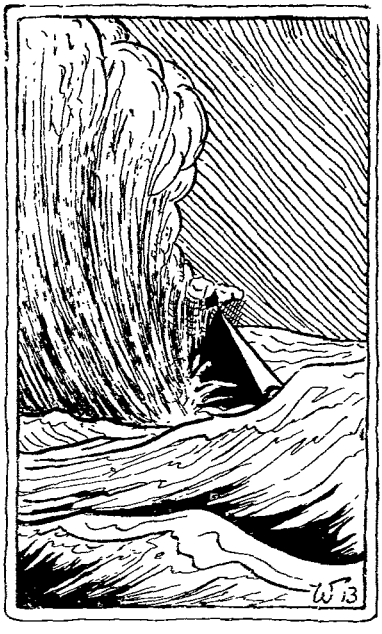
This is undoubtedly a very ambitious project. It will require much time and labor. However, the fact that it is ambitious and will require time and labor is a certain indication of its value, for if the same work must be crowded into the few hours allowed on the approach of an enemy the work cannot be done as well. Furthermore, when war is declared and this work is necessary the men now available will have to be used somewhere else, and the men who will be called upon to do the work will undoubtedly lack the experience necessary to do it as well as it can be done now. The problem is one which cannot be dismissed or acted upon perfunctorily by passing it on to Coast Defense Commanders for action. It is so important and comprehensive that it must be handled as the big project it really is.

One of the great advantages which will be derived from carrying this plan out will be to reduce materially the time required to put the artillery into action. At present six hours are allowed as the time necessary for putting a G.P.F. battery into action. This includes reconnaissance, orientation, running lines of communication, and emplacement. If all reconnaissance and much of the orientation is done beforehand this time can be reduced to such an extent that the gun can be treated almost as light artillery. Using it for direct fire the communication lines will be few and short and could in many cases be installed by an advance party while the guns are being brought up and emplaced.

Battalion and battery commanders will readily appreciate the value of this preliminary work if they can visualize being given a defense problem and with it maps and data showing all that has been outlined here.

All that has been said about mobile coast defense is dependent upon one thing, namely, that the enemy overcomes our fleet by destroying it or bottling it up. As long as our fixed defenses are equipped with proper armament and if we are given sufficient personnel the Navy will

have a safe refuge if needed. Direct attacks by an enemy fleet on our fortified harbors will be improbable. Until our Navy is destroyed or is held immobile the landing operations will proceed with difficulty. We as Coast Artillerymen will be called upon to furnish the protection of submarine and other naval bases, not only from the sea but from the air as well. We therefore have a very important position in the protection of our coast before landing is attempted. From what has been said in this article I believe it will be seen that our function in preventing landings if our Navy is destroyed is of very great importance. Therefore, when we are called on to act in coast defense our problems of fire control and direction, observation, and adjustment will all be similar and it is well for all of us to realize it. Our success in accomplishing our entire mission will be dependent upon the extent to which we realize this and study for the solution.



Observation Grill for Antiaircraft Artillery

By Captain Aaron Bradshaw, Jr., C. A. C.

THE Observation Grill, Model 1917 M-1, has been issued to the Regular and National Guard Antiaircraft units as part of their fire control equipment. As there is no descriptive matter issued with this equipment, there have resulted numerous requests for some information regarding its purpose, operation and theory.

This device is not used in the preparation of fire but, as its name implies, in the observation of prepared fire. It serves as a means for checking the accuracy of the preparation for fire by giving the errors in altitude. In order to prevent the recurrence of these errors in altitude in immediate subsequent firings, these errors are applied as a percentage correction to the altitude as follows:

Angular Travel Method (Double Sight): Either on Base Line Index of altimeter or on the Altitude Scale of Range Indicator.

Angular Travel Method (R. A. or Mechanical Corrector): Either on Base Line Index of altimeter or on Altitude Index on lower scale of face of the R. A. Corrector.

Linear Speed Method: As before on altimeter or on altitude arm of Range Computer.

The observation grill, Model 1917 MI, is an instrument for determining the errors in altitude between the bursts and the target. This device when set up comprises two instruments, one of which is erected at each end of a base line. The two parts of this instrument are generally known as the "Home" and "Distant" station instruments, sometimes called "primary" and "secondary" station instruments. The instruments at each station are exactly similar. The primary station is generally situated at or near the B. C. Station and the secondary station is about 3,000 yards distant. In order to convert the readings of the two stations into errors in altitude, a circular slide rule is employed and this slide rule operator takes post at the "Home" or Primary station.

DESCRIPTION OF THE GRILL

As shown in Figure 1 and 2, the grill proper consists of a horizontal rectangular frame which carries many threads stretched across in one direction called "Threads of Grill" with a single thread stretched across it in the other direction marked "Base Thread." This horizontal frame or grill proper is mounted on a metal column which rests upon a tripod mounting. At a fixed distance below the grill proper is a rotatable collar which supports an adjustable rod, along which is placed the right temple of the observer, thus assuring that the eye is kept at the right height. As shown there is also an azimuth scale for orienting each instrument.

OPERATION OF THE GRILL

Each instrument is levelled and so oriented that the Base Thread is in a vertical plane containing the base line, thus causing the "Threads

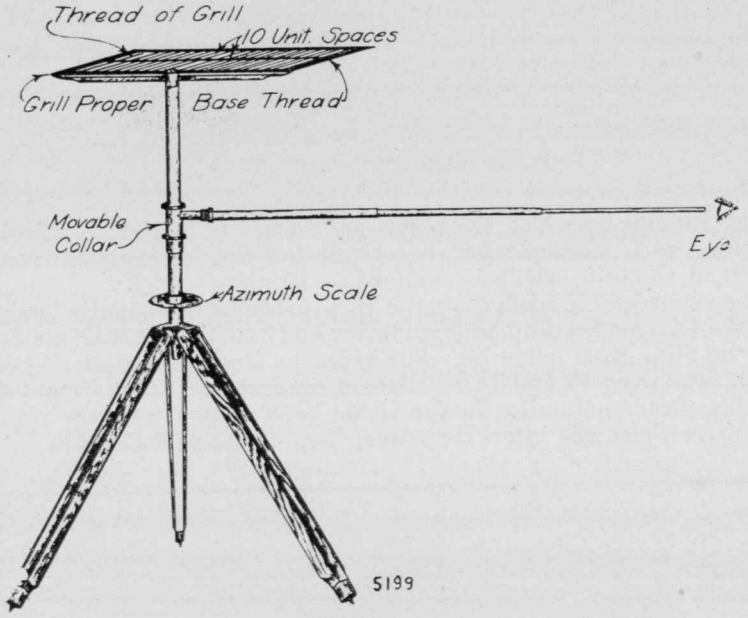


FIG. 1.

FIG. 2.

of the Grill" to be perpendicular to the base line. Each observer takes position with his eyes as shown in Figures 1 and 2, or at any position along the adjustable rod, and moves around so that he can see the

airplane as it passes along the base thread. At each burst each observer looks at the grill and sees how many threads separate the burst from the airplane. Each observer records as "short" the bursts which are on the side toward the other observer, and as "over" the bursts which are on the opposite side.

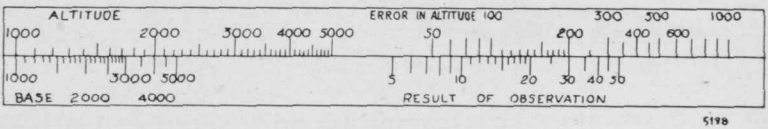


FIG. 3.

The amount by which the bursts are "over" or "short" is calculated by taking as a standard for the calculation the interval between the threads of the grill, which is assumed as 10 units.

The observer (or reader) at the B. C. Station receives the estimate from the Distant Station, adds it algebraically to his own and announces it to the Slide Rule operator. For example, if Distant Post observer's reading was over 40 and B. C. Station observer's reading was "short 10," the officer conducting the fire would know that the bursts are over 30 or three times the interval between two of the grill threads.

FIG. 4.

OPERATION OF THE SLIDE RULE

Referring to Figures 3 and 4, we see that this slide rule is a device for converting the results of observation into errors in altitude. Fig. 3 shows *in development* the two scales wrapped around the superimposed cylinders, as shown in Fig. 4.

The altitude of the target is set above the length of the Base Line (marked BASE) and above the algebraic sum of the readings of the two stations (marked Result of Observation) is read the Error in Altitude. For example, for an altitude of 2,000 yards and a base line of 4020 yards, for a result of observations of 30 (Over 40, Short 10), we have an error in altitude of 200 yards.

MANNING DETAILS

B. C. Station, One Observer
One Slide Rule Operator
Distant Station, One Observer.

The observers are in telephone communication with each other, and should be provided with headsets. If headsets are not available an additional man is needed at each station for a telephone operator. The Slide Rule operator is the Chief of Detail.

THEORY OF THE GRILL

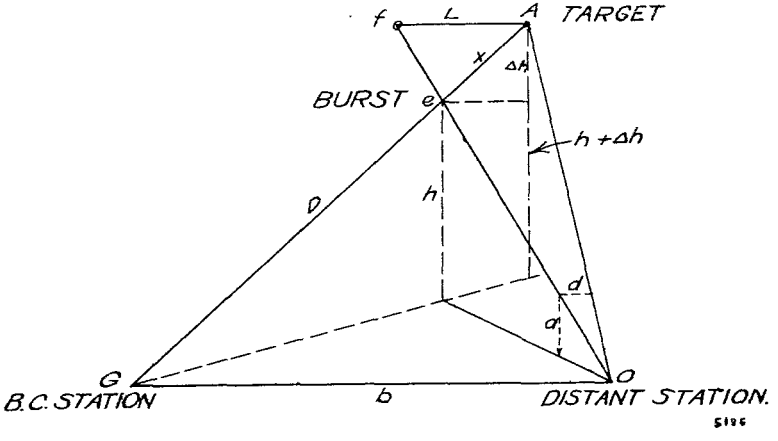


FIG. 5.

THEORY OF THE GRILL

Referring to Figure 5, consider a special case where the burst occurs on the line from the B. C. Station to the target, at a point one thread or 10 units to left of A as viewed from the Distant Station. This burst as seen from O will be projected on the horizontal plane containing A at a point f at a distance L from A.

From similar triangles:

$$\frac{L}{d} = \frac{h + \triangle h}{a} \text{ or } \frac{L}{d} = \frac{h}{a} \text{ approximately}$$

in the triangles efA and eGO

$$\frac{X}{D} = \frac{L}{b} \quad \text{Similar triangles.}$$

$$\text{But} \quad \frac{X}{D} = \frac{\triangle h}{h}$$

$$\text{Since} \quad L = \frac{hd}{a}$$

$$\text{Then} \quad \frac{L}{b} = \frac{hd}{ab}$$

$$\therefore \frac{\triangle h}{h} = \frac{L}{b} = \frac{h}{a} \times \frac{d}{b}$$

If "a" is a constant, then for any particular target at a constant altitude $\frac{h^2}{a}$ is a constant; b is a constant therefore since

$$\triangle h = \frac{h^2}{a} \times \frac{d}{b} \text{ we have}$$

$\triangle h$ is proportional to d or the reading from the distant station in this particular case.

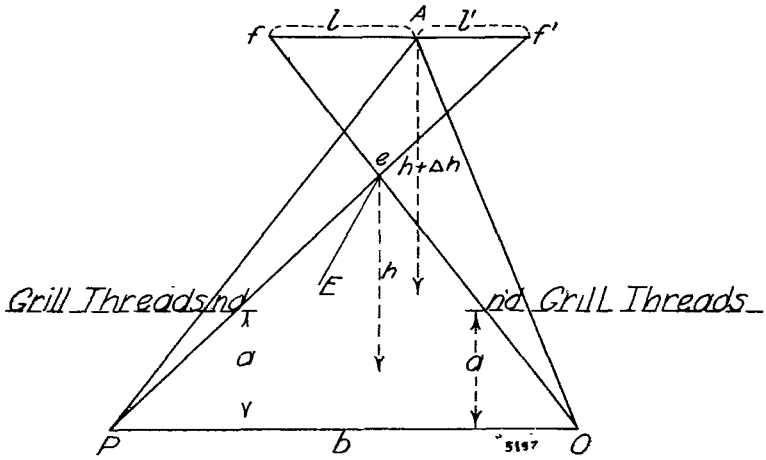


FIG. 6.

FOR GENERAL CASE

Refer to Figure 6. Draw through E a horizontal line perpendicular to the base line PO. It meets the plane PAO at a point e, which has the same altitude as E. Suppose that the point e is a visible point, at which one may look by the usual process of conjugate threads. Let n and n′ be the number of threads reported by P and O respectively: then (n + n′)d (d being the interval between the knots) is the measure of ff′ = l + l′ on the scale $\frac{h}{a}$, that is to say $l + l' = \frac{h}{a} \times d\ (n + n')$; ($\triangle h$ in relation to h is neglected)

But the similarity of the triangle eff′ and ePO gives

$$\frac{\triangle h}{h} = \frac{l + l'}{b}$$

$$\text{Therefor } \triangle h = (n + n') \times \frac{dh^2}{a \times b}$$

That is to say $\triangle h$ is measured by (n + n′), the scale of the measure being constant a if is proportional to h^2, and variable but easily determined if a is constant as it is in the present type of instrument Model 1917, MI.

The separation of the threads of the grill will be calculated by the formula

$$d = \frac{ab}{h^2} \times \triangle h$$

The circular slide rule when operated in the manner described above under the heading "OPERATION OF THE SLIDE RULE" solves logarithmically the basic formula

$$\triangle h = (n + n') \times \frac{dh^2}{a \times b} \qquad (1)$$

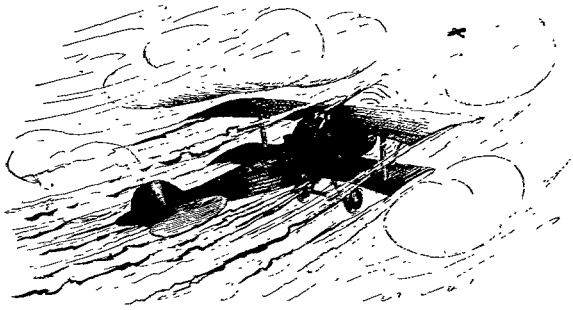
where $\triangle h$ = error in altitude
n = reading from Home Station
n' = reading from Distant Station
d = distance between conjugate threads
h = altitude
a = height of grill above eye = constant
b = length of base line

Formula (1) can be written in the form

$$\log \triangle h = 2 \log h - \log b + \log (n + n') + \log K \qquad (2)$$

where $K = \frac{d}{a}$ = constant for this instrument.

Thus we see that if we write the fundamental formula (1) in the form (2) above or in similar form in terms of logarithms we can easily construct a slide rule to perform the simple operations indicated for each case.



A Universal Panoramic Sight

By 1st Lieutenant F. W. Gerhard, Jr., C. A. C.

WHILE working up a new plotting system or rather set of fire control equipment for railway artillery at Fort Eustis, Virginia, one of the difficulties with which we were confronted was that of converting azimuths obtained from the plotting board into deflections so they could be used with the panoramic sight. The new Cloke Plotting Board was being used and as this board does not lend itself to the conversion of azimuths into deflections on the board itself, as does the Whistler Hearn Plotting Board, by merely graduating the gun arm azimuth circle accordingly, it became a question of either constructing an azimuth-deflection conversion device for each gun with the resulting increase in the possibilities for both personnel and matériel errors and in this case four guns were to be fired on separate data, or to devise some other means. The latter method was chosen. Major Fulton Q. C. Gardner, Coast Artillery Corps, and I then devised a modification of the panoramic sight as described below which not only permitted the setting of azimuths on the sight but also resulted in several other advantages in the orientation and use of the sight. The modified sight has advantages commending its use for all artillery, fixed as well as mobile. The modification was made without difficulty by the Ordnance machinists at this post.

DESCRIPTION

The sight used was the regular Panoramic Sight, Model 1917, for Railway Artillery, modified as follows: The German silver azimuth circle, reading from 0 to 360 degrees from left to right as seen through the azimuth index window, was removed and replaced by one graduated in the opposite direction, permitting the use of azimuths instead of deflections in setting the sight. The new azimuth circle was not fastened to the azimuth worm wheel but was left free to be rotated about the wheel so that it could be set at any desired position. The azimuth worm wheel was threaded below the azimuth circle, which was made narrower than the circle removed, to allow space for threads, in order to take a collar by means of which the azimuth circle could be securely clamped to the wheel. In order to provide more friction between the azimuth circle and the worm wheel than between the azimuth circle and the threaded collar (to prevent rotation of the azimuth circle when the collar is being tightened in adjusting the sight) the upper edge of the azimuth circle was beveled and the shoulder on the azimuth worm, against which the azimuth circle rested, was undercut. A series of small radial holes was drilled in both the azimuth circle and the threaded collar to take a small teat wrench or pin to provide a means of clamping the azimuth circle to the azimuth worm wheel when adjusting and orienting the sight, the azimuth index window being removed for this

purpose. The new azimuth circle was turned out of brass and as there was no engraving machine available it was necessary to print the numbers by hand. To facilitate this and also to make the numbers stand out more plainly a narrow band of white enamel was painted around the azimuth circle and the numbers printed with drawing ink on this band. It is thus seen that the modification consisted in replacing the fixed azimuth circle with one free to be rotated about the rotating head of the sight and so graduated as to permit numbers representing azimuths to be used with the sight in pointing the gun; also in providing a means of clamping this movable azimuth circle to the rotating head after the sight had been adjusted and oriented.

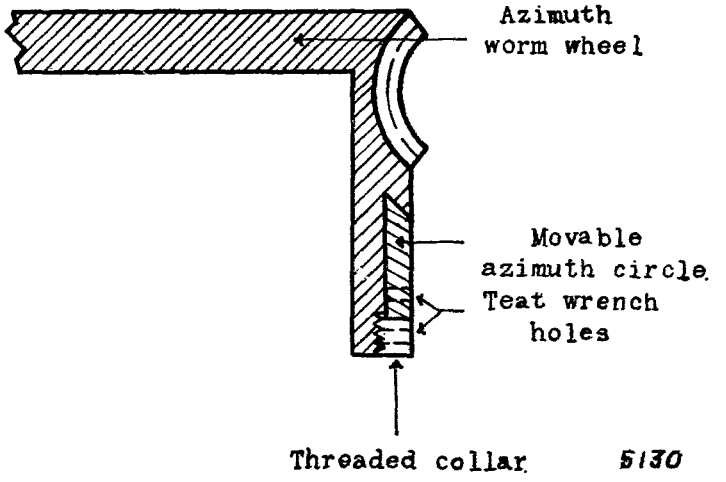


FIG. 1. CROSS SECTION OF AZIMUTH WORM WHEEL SHOWING MODIFICATION

ORIENTATION AND ADJUSTMENT

(1) In general, to orient the sight, (a) bore sight the gun on some distant object of which the azimuth from the gun position is accurately known, (b) without moving the gun, turn the sight on an aiming rule which has been set up in any convenient position (the azimuth from the the gun to the aiming rule not being required), (c) make the lines of sight of the gun and aiming rule sights coincide, (d) adjust the azimuth circle and deflection index so that the gun sight reads the azimuth of the point on which the gun is bore sighted. In case the distant point of known azimuth is to be used as an aiming point it is then of course only necessary to bore sight on this point and adjust the sight so as to read the azimuth of this point from the gun when the sight is turned on the point.

(2) If the gun is so located that a distant object of known azimuth can not be seen, run a transit traverse to a point near a gun. Having oriented the transit over the point, traverse and elevate or depress the gun until it is possible to look down the bore of the gun through the transit and bisect the muzzle and vent with the vertical cross wire of the transit. This orients the gun at the back azimuth of the transit. Then proceed as in (1) above.

(3) Due to the fact that it is not possible to see over the top of the gun through the sight, the condition will frequently arise when the aiming rule, placed in the most favorable position for covering the field of fire, can not be seen through the sight when the gun is pointed at the distant point of known azimuth. In this case traverse the gun 180 degrees as read on the gun azimuth circle. The gun is then pointing in a direction differing by 180 degrees from the azimuth of the known point. Then proceed as in (1) above.

(4) In detail, the orientation and adjustment of the gun sight is as follows: At the position selected for the aiming rule, which must be such that the middle of the rule can be seen through the gun sight when the gun is pointed at the middle of the field of fire, drive the two aiming rule stakes firmly into the ground on a line approximately perpendicular to the line Gun-Aiming Rule. To these two stakes attach, and after leveling approximately, rigidly clamp the horizontal bar. The aiming rule sight is clamped to the movable bracket fitted to this bar. Orient the gun by bore sighting on the point of known azimuth or on an oriented transit. Remove the azimuth index window of the gun sight and make the azimuth scale free to rotate about the azimuth worm wheel by unscrewing hte clamping collar. Then lay the gun sight on the aiming rule sight, which has been placed at such a position on the horizontal bar that, as the gun is traversed through the field of fire, the proper azimuth being set off on the gun sight, the line of sight of the gun sight will not fall off the horizontal bar. This precaution is necessary due to the fact that the gun sight is given a lateral motion as the gun is traversed, the sight travelling in a circle about the pintle center of the gun. The aiming rule sight should be laid on the gun sight. Without allowing the rotating head of the gun sight to turn, rotate the azimuth circle about the azimuth worm wheel until the azimuth of the known point appears in the center of the window as closely as can be estimated by the eye, and then clamp the azimuth circle to the azimuth worm wheel by tightening the clamping collar. Verify this setting by replacing the azimuth index window to insure that this azimuth comes within the limits of the lateral adjustment of the window. With the azimuth micrometer at zero, cause the deflection index to read the hundredth of degree of the azimuth of the known point by loosening the locking screw and rotating the deflection index. Then clamp the deflection index by tightening the locking screw. Now turn the azimuth worm knob, allowing the rotating head to turn, until the deflection index reads zero. The azimuth circle should then read the corresponding whole degree and if necessary re-adjust the azimuth index window to make it do so. With all adjustable parts of the gun sights clamped, set off the exact azimuth of the known point. The line of sight should then fall exactly on the aiming rule sight but may not do so owing to the fact that the gun sight may have moved slightly in making the foregoing adjustment. If this has happened, correct it by sliding the aiming rule sight along the horizontal bar until it is bisected by the line of sight of the gun sight, At the same time rotate the aiming rule sight so that its line of sight bisects the gun sight. The lines of sight of the two instruments thus being made coincident, the reading of the aiming rule sight should be recorded. Under no circumstances should the reading of the aiming rule sight be changed after once being oriented, the sight being moved laterally along the horizontal bar to keep the lines of sight of the two instruments coin-

cident as the gun is traversed. It must be remembered that the sights and brackets must be firmly clamped in place and bubbles leveled at all times. The orientation of the modified panoramic sight having been made as described above, it is used in the usual manner. To assist in keeping the lines of sight of the two instruments coincident with each other, black and white targets were made and fastened to the rotating heads of the instruments.

ADVANTAGES

A careful check was made on the Modified Panoramic Sight after being used at a service practice and none of the adjustable parts were found to have slipped. Actual tests by service practice showed the modified sight to be a success and to have many advantages over the sight as issued. In the plotting car it eliminated the use of an azimuth-deflection conversion device and operator for each gun. In this particular problem four would have been required, thereby greatly increasing the possibilities of personnel errors. Furthermore the use of the modified sight makes it possible to graduate all degree scales for the plotting board, azimuth correction board, wind component indicator, azimuth board and slip stick for adjustment of fire in azimuth, in fact all scales having to do with angles, once and for all with no necessity of regraduating for a new situation, no matter where the aiming rules or aiming points may be and whether it is desired to point the guns in deflection using a panoramic sight or in azimuth using an azimuth circle. This is not possible using the sight as issued. At the guns a minimum of surveying is necessary. Usually none is required as it is possible to determine the azimuth of the point to be used in bore sighting and orienting the sight by means of coordinates. Using the sight as issued it is necessary to bore sight, adjust the zero of the sight and by a transit traverse accurately determine the azimuth of the aiming rule. Moreover after the gun is in place it is very difficult to determine accurately the azimuth of the aiming rule making it practically necessary to move the gun in case it becomes necessary to select a new location for the aiming rule due to a shift in the field of fire. Using the modified sight it is only necessary to bore sight and orient the panoramic sight, which operation corresponds to, and is done almost as readily as, the adjustment of the zero of the sight. No transit traverse is necessary to determine the azimuth of the aiming rule. It can be located anywhere and at any time just so long as its location permits covering the field of fire. If for any reason it becomes advisable or necessary at any time to locate the aiming rule in another position this can be done very readily and simply. When using a single aiming point for more than one gun the need of any parallax correction is eliminated.

A Pistol Rack for National Guard Armories

By Captain William J. Smith, C. A. C.,
Commanding Battery G, 213th Artillery, A.A., Reading, Pa.

THE two photographs and drawing herewith show the details of construction and the use of a Pistol and Revolver Rack which was designed and manufactured for the use of Battery G, 213th Artillery, Antiaircraft. The information concerning this Pistol Rack is being furnished to the Coast ARTILLERY JOURNAL in response to the request of the Editor, in the hope that the suggestion may be of some use to other National Guard organizations.

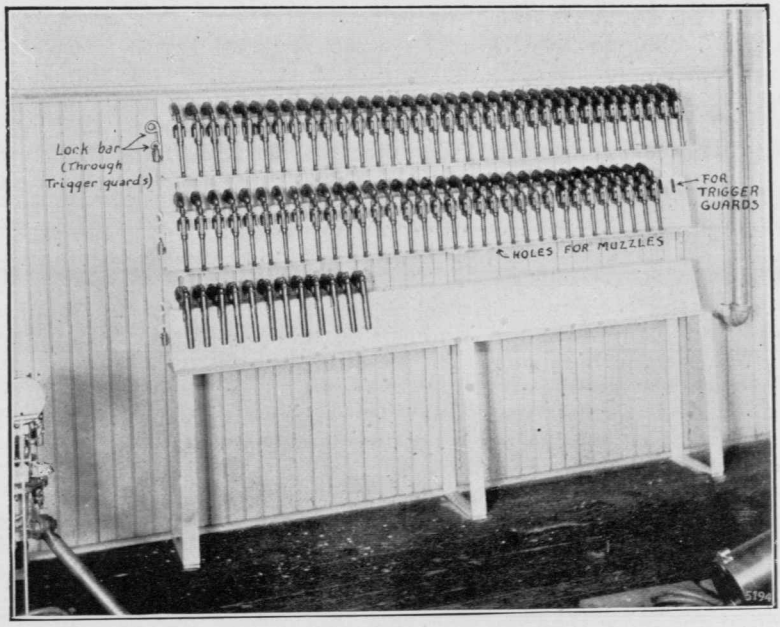


FIG. 1.

This Rack was designed with a view to protecting pistols and revolvers from theft, and as well to facilitate the frequent inspection and checking by the responsible officer. Pistol Racks have heretofore been unavailable for National Guard issue, but the importance of the safeguarding and care of these small arms is so apparent that the design and use of some form of secure pistol rack seemed absolutely necessary.

Briefly, the device consists of one or more steel shelves with perforations to fit the muzzle guards of the revolvers or pistols as the case may be. This particular organization is temporarily equipped with

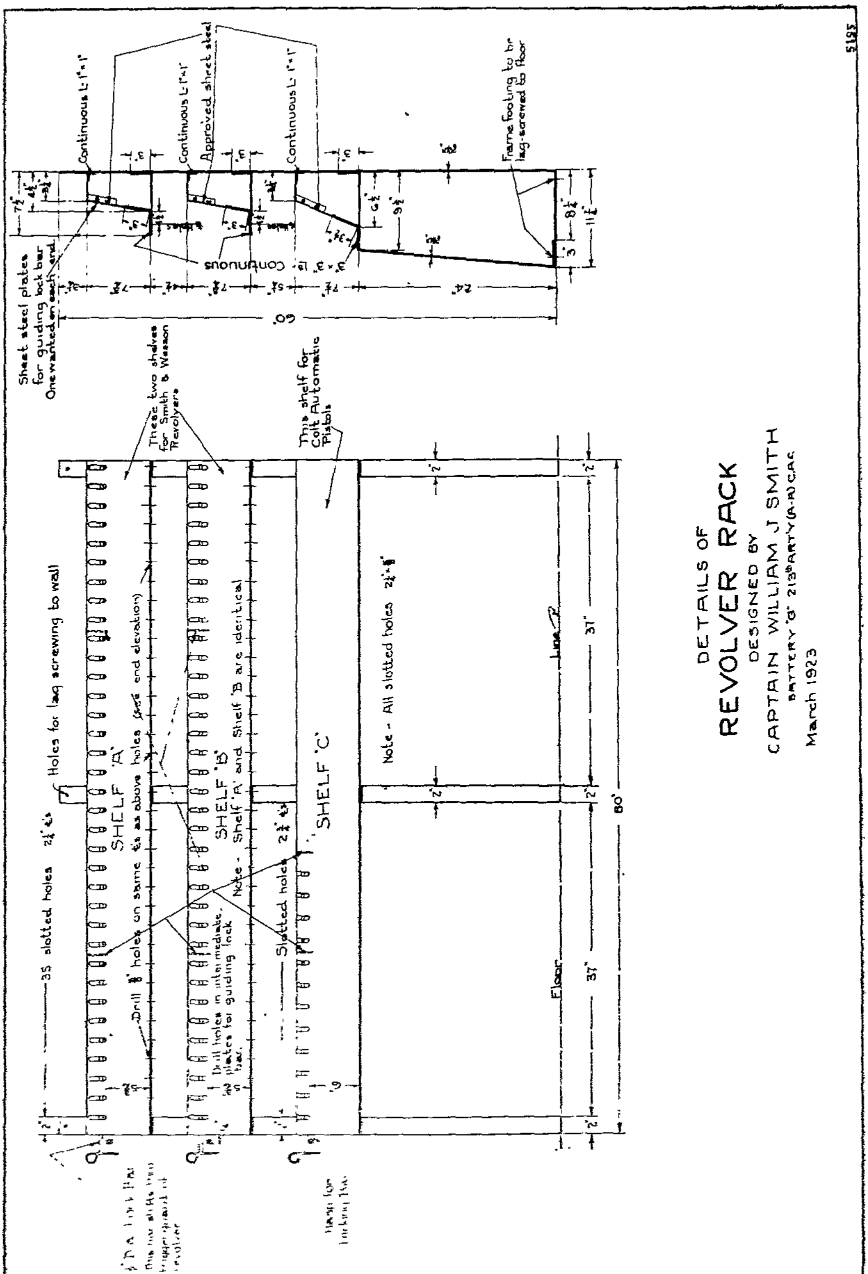

DETAILS OF
REVOLVER RACK
DESIGNED BY
CAPTAIN WILLIAM J SMITH
BATTERY 'G' 213th ART'Y (A-A) C.A.C.
March 1923
SHELF 'A'
SHELF 'B'
SHELF 'C'
Note - Shelf 'A' and Shelf 'B' are identical
Note - All slotted holes 2¼" × ⅝"
35 slotted holes 2¼" c's
Holes for lag screwing to wall
These two shelves for Smith & Wesson Revolvers
This shelf for Colt Automatic Pistols
Sheet steel plates for guiding lock bar One wanted on each end
Continuous L 1" × 1"
Approved sheet steel
Frame footing to be lag-screwed to floor
Floor
37"
80"
60"
24"

FIG. 3.

both. From the detailed drawing herewith a suitable modification could easily be made by any organization which had only pistols or only revolvers. When once placed in the rack, the pistols are locked by passing through the trigger guards a one-half inch steel rod, which is then locked in position. The rod can not be reached by a hack saw and if considered necessary, an extension of each shelf over the lock end would prevent a similar attack on the locks themselves. It should be noted that the length of the rack must be such that a space equivalent to the length of the rack will be available in order to remove the locking rods.

FIG. 2.

The photograph of the store room in which this Rack is installed indicates the generally "ship shape" condition of the room, which it may be proper to state, has received, together with the Rack itself, the warm praise of the Federal Inspector.

Coast Forts in Colonial New Hampshire

By Major Robert Arthur, C. A. C.

THE territory now under the jurisdiction of the State of New Hampshire was originally included in the grant made by King James I. to the Plymouth Company in 1606. The noblemen, knights and gentlemen who were interested in the country of North Virginia found that their patent did not adequately secure them from intrusion and they therefore obtained from the king a second grant or patent enlarging and confirming their privileges. Under the new arrangement was established a corporation known as "The Council Established at Plymouth, in the County of Devon, for the Planting, Ruling and Governing of New-England, in America." Upon this patent is founded all grants of territory made in New Hampshire.

In 1621, Captain John Mason, Secretary of the Council and former Governor of Newfoundland, procured from the Council a grant of all the land between the Naumkeag (Salem) River and the Merrimac River and extending from the sea coast to a line connecting the headwaters of the two rivers,—a district which was named Mariana. The following year, Mason and Sir Fernando Gorges, President of the Council, were given a grant of all the land between the Merrimac and the Sagadahock Rivers and extending back to the St. Lawrence and the Great Lakes. This area was known as Laconia.

Gorges and Mason organized "The Company of Laconia" and attempted the establishment of a colony on the Piscataqua River. In the spring of 1623 they sent two detachments, fully equipped for permanent settlement, to their new territory. These were in charge of David Thompson and the Hilton brothers. The first detachment landed at the mouth of the river, at a place they called Little Harbor, and put up salt-works and a house which was subsequently known as Mason Hall. Not satisfied with his location, Thompson moved, the following spring, to an island in Massachusetts Bay.

The Hiltons went eight miles further upstream and landed at a place called by the Indians Winnichnhannat but which they named Northam (Dover). Settlement in New Hampshire progressed from this beginning very slowly but comparatively peacefully, for the Indians were neither particularly warlike nor antagonistic towards the white settlers. In fact, they had suffered so severely in recent wars with the Tarratines of Maine, in a civil war to determine the succession to the leadership of the confederacy after the Tarratine war, and in the plague of 1615-17 following their civil war, that they were inclined to welcome the white men as allies against their fierce enemies to the north and to the south west. Portsmouth was settled in 1631, Exeter in 1638, and Hampton in 1639.

In 1629, some of the planters on Massachusetts Bay desired to establish a settlement on the Piscataqua and considered, as had the

Pilgrims at Plymouth, that a deed from the Indian owners was more valid than a grant from European authorities. So they called a meeting of the Sagamores who might be interested and obtained from Passaconaway of the Penacooks, Runnaawitt of the Pentuckets, Wahangnonawitt of the Squamscots, and Rowls of the Newichwannocks a deed in which they express a desire "to have the English inhabit amongst us as they are amongst our countrymen in the Massachusetts Bay; by which means we hope in time to be strengthened against our enemy, the Tarrateens; and accordingly, with the universal consent of their subjects, for what they deemed "a competent valuation in goods already received in coats, shirts and kettles, and also for the considerations aforesaid," they sold "unto John Wheelwright of the Massachusetts Bay late of England, a minister of the gospel, Augustine Story [Storer], Thomas Wite [Wight], William Wentworth and Thomas Levet [Leavit] * * * all that part of the main land bounded by the river of Piscattaqua and the river of Meremak, that is to say; to begin at Nuchawanack falls in Piscattaqua river aforesaid, and so down said river to the sea, and so alongst the sea shore to Merramack river, and so up along said river to the falls at Pantuckit aforesaid, and from said Pantucket falls upon a north-west line twenty English miles into the woods and from thence to run upon a streight line north-east and south-west till meet with the main rivers that runs down to Pantuckett falls and Nuchawanack falls; * * * together with all islands within said bounds, also the Isles of Shoals so called by the English."

This same year Mason procured from the Plymouth Council a new patent, embracing all of Wheelwright's purchase, from the Merrimac to the Piscataqua and extending sixty miles inland from the headwaters of those rivers. This territory he called New Hampshire.

The several patents to Mason, the purchase by Wheelwright, and patents issued in 1630 to the west country adventurers and the London adventurers paved the way to an interesting contest over the proprietorship of New Hampshire and caused several upheavals in the political fortunes of that part of New England, but they did not materially retard or hinder the growth and development of that promising territory. The proprietors were careful to look out for the interests of their holdings and accordingly sent over to the lower plantation, in 1631, a number of cannon which they directed their agents to mount advantageously. A survey of available sites indicated Great Island as the most suitable situation for a fort; and in consequence the guns were mounted on the north-eastern point of the island and ground was selected "about a bow-shot back from the water-side to an high rock, on which it was intended in time; to build the principal fort."

The very short extent of the coast of New Hampshire consists mainly of a sandy beach with several coves, but with only a single harbor suitable for ships. This is in the mouth of the Piscataqua River, in the middle of which lies Great Island. To the north and east is the main channel facing Kittery; on the other side is shoal water separating the island from Little Harbor. Nowhere else did New Hampshire require protection on its coast line, and for many years it was felt that protection was not required even here.

In 1664 disputes over the several limits of jurisdiction in New England led the king to send a commission consisting of Colonel Richard Nichols, Sir Robert Carre, George Carteret, and Samuel Maverick, "to visit the several colonies of New-England; to examine and determine

all complaints and appeals in matters civil, military and criminal; to provide for the peace and security of the country, according to their good and sound direction, and to such instructions as they should receive from the king, and to certify him of their proceedings." As might have been expected, the commission was not at all pleasing to the colonists and the commissioners were received with marked coolness, particularly in Massachusetts.

In 1666, while at Piscataqua, the commissioners received notice that it was the desire of the king to have the harbors of New England fortified. They immediately issued warrants to the four towns of New Hampshire, calling a meeting to receive the king's orders, but Boston received notice of the warrants and at once dispatched two officers to the Piscataqua region to forbid the meeting and to require the towns to disobey all orders received from the commissioners. At the same time, however, the Governor ordered the appointment of a committee to determine a suitable site for fortifications.

The committee chose "the neck of land on the eastward of the Great Island, where a small fort had been built,"—a fort which had been erected in about 1665 at the expense of Dover and Portsmouth. The General Court, approving the report of the committee, received in 1669, ordered the site to be "sequestered for the use of the Fort planted there, taking in a great Rock, & from thence all the easterly part of the said Island." George Waldron submitted a claim to the condemned site, but the court of associates rejected the claim and confirmed the appropriation. The fort had been built before the sequestration, and the customs and imposts on imported goods were applied to the maintenance and upkeep of the fort.

In May, 1667, the General Court at Boston, in answer to "an humble petition of the inhabitants of the two townes of Dover & Portsmouth on Piscataqua River," granted them a tract of land above Dover, six miles square, "which may be an enlargement to our inhabitants, & an inabling them to carry on & perfecting of the sayd fortifications" for "defence on Piscataqua River's mouth."

In May, 1673, the General Court ordered "that all the souldyers dwelling on the great island at Piscataqua, with the soldjers in Kittery from Spruce Creek eastward" should be discharged and reenrolled as a "distinct foot company & to belong to the fortification upon—great Island aforesaid." "Mr. Richard Cutts shallbe captain & comander in chiefe of the said Fort & the foot company now established, Elias Styleman to be the leiftenant & Joakim Harvey to be ensigne." Cutts was succeeded, upon his death in 1676, by Styleman.

The following description of the fort was written in 1682.

"There is at the Great Island in Portsmouth, at the harbour's mouth, a fort well enough situated, but for the present too weak and insufficient for the defence of the place; the guns being eleven in number are small, none exceeding a sacre (six-pounder) nor above twenty one hundred weight, and the people too poor to make defence suitable to the occasion that may happen to the fort."

"There are five guns more lying at the upper part of Portsmouth, purchased by private persons, for their security against the Indians in the late war with them, and whereof the owners may dispose at their pleasure."

From the building of the first fort until the Revolutionary War, the fort on Great Island was constantly falling into decay and being occa-

sionally repaired or rebuilt. Governor after governor year after year pleaded for money with which to repair the fort and, except in time of war, money was not as a rule forthcoming. In 1692, the Council at Portsmouth ordered that the "Fort-house upon Great Island" be forthwith repaired and carriages erected for the guns.

The name Fort William and Mary had been given to the fort on Great Island and was used in all official correspondence and records, but the work was better known to the people as the Castle, particularly in later years. As it was the sole fort in New Hampshire, there could be no confusion in the adoption of such a title.

In 1694, the Council, sitting at New Castle, found that "watching and warding at Fort Wm. & Mary" was burdensome to the town of New Castle, and ordered "six men impressed for their Maj'ties service in watching and warding at fort Wm. & Mary."

In 1697, it seems that the fort itself was not considered sufficient in the defence of the colony, for, while "we have now put the King's Fort on Great Island into the best posture of defence we are able," it was ordered "that the soldiers now at the Fort, be employed * * * about making a convenient breastwork at Jno. de'Greeks [John Amazeen, called the Greek] point [of] the Great Island to prevent the landing of the Enemy passing Little Harbor." The anticipated invasion not developing, John de Greek's battery quickly passed into history.

In 1699, Colonel William Romer appeared in New Hampshire, having been sent to "view the fort" on the Piscataqua, and to "take the plans" and make an estimate of the cost of a "good substantiall" fort at that place. The Governor had recommended to the Council the erection of such a fort on Great Island and later gave his assurance that he would endeavor to have the king pay the cost of construction. The success of his endeavors being quite doubtful, the Council felt "that the fortifying of Piscataqua River doth as much concern the Massachusetts as y^{s} Province, whose interest on that side of the River is of much more value than ours on this" and was disinclined to assume the responsibility of ordering the fort built.

Colonel Romer's preliminary estimate called for the expenditure of eight thousand two hundred four pounds one shilling four pence but he revised his figures to his final estimate of six thousand one hundred five pounds fourteen shillings eight pence for the cost of materials and labor. Even this figure staggered the Council and that body replied that even in their greatest difficulties in time of war, when their lives and property were in most imminent danger, they had never been able to raise one thousand pounds in a year; that they had been impoverished by a long war; that they were even then struggling under a heavy debt and were engaged in an expensive controversy with a "pretended proprietor;" that they had expended more "blood and money" to secure his majesty's interest and dominion in New England than the intrinsic value of their estates; that the fortification of the mouth of the river concerned Massachusetts fully as much as New Hampshire; but that they would submit to whatever the Governor considered them capable of doing.

It was not long after this that the construction of the fort was undertaken. In 1703, so we are told, "there are but two soldjers belonging" at Fort William and Mary, but in 1704 the Council ordered "to impress" thirty-six laborers and twelve carpenters for ten days "to be sent down * * * to labor and work, eight working days" under "Honorable *Wolfgang*

Wm. Romer, Esq., her Majestys Chief Engineer." These were to be followed by an equal number of laborers and carpenters, and they in their turn by others until the work at hand could be completed.

In 1706 the Council ordered that the two flankers fronting toward the land be fortified with platforms. Later in the summer of the same year, the garrison was reduced to six men.

An appropriation of seven hundred pounds was made in 1739 for the purpose of repairing the fort but by 1742 the fort had again materially deteriorated. Its condition at that time is indicated by the following "Memorandum of Sundry stores" then at Fort William and Mary. Among other items, the inventory includes "12 field P^es, 9 of which without the Fort on the Neck, the Carriages much Defective & useless,—the other 3 in the Fort in the same condition.

"9 [7?] Large Guns on the south East Platform from 24 lb. to 32 lb. pounders, Carriages unfit for service.

"4 on the south east Platform by the Flagg Staff 32 lbs. The carriages unfit for service.

"2 Do. on the north East Platform about 32 lbs carriages rotten.

"3 Do. on the North West Platform of 32 lb carriages rotten.

"9 smaller on the same Platform eaten with rust & unfit for service.

"2 small guns without carriages.

"2 one of which is on each side of the gate—carriages rotten."

At about this same time, "his Excellency Benning Wentworth, Esq., Captain General & Commander in Chief of his Majestys Province of New Hampshire," reported that "The Walls, Barracks, Flankers & Storehouses in said Garrison, except the gateway & Northeast corner require rebuilding from the foundation," for which purpose twenty-five hundred pounds were made available in 1745.

Nothing further occurs in the record on the defenses of New Hampshire until the Revolutionary War, when Fort William and Mary was replaced by earthworks at the Narrows, near Portsmouth, called Forts Washington and Sullivan. Batteries had appeared at New Castle in 1757 but they were not long kept up.

The closing scene at Fort William and Mary was laid in 1774, when the supplies stored there were seized by the inhabitants of the Colony. In October of that year, the king decided to stop the private exportation of arms and ammunition to the American colonies. When news of the embargo reached New Hampshire, the people determined to take over the ordnance and stores of the fort. Sir John Wentworth, who was governor at the time, has left us, in a letter to the Earl of Dartmouth, a description of the seizure.

"On Tuesday the 13th instant [December, 1774], in the afternoon, one Paul Revere arrived with letters from some of the leaders in Boston to Mr. Samuel Cutts, merchant, of this town. Reports were soon circulated that the Fort at Rhode Island had been dismantled and the Gunpowder and other military stores removed up to Providence. * * * It was also falsely given out that Troops were embarking at Boston to come and take possession of William and Mary Castle in this harbour. These rumors soon raised an alarm in the town; and although I did not expect that the people would be so audacious as to make any attack on the castle yet I sent orders to the captain at the fort to be upon his guard.

"On Wednesday news was brought to me that a drum was beating about the town to collect the populace together in order to go and take

away the Gunpowder and dismantle the Fort. I immediately sent the Chief Justice of the Province to warn them from engaging in such an attempt. He went to them where they were collected in the centre of the town near the townhouse, explained to them the nature of the offence they proposed to commit, told them it was not short of Rebellion and intreated them to desist from it and to disperse. But all to no purpose. They went to the island and, being joined by the inhabitants of the towns of Newcastle and Rye, formed in a body of about four hundred men and the Castle being in too weak a condition for defence * * * they forced their entrance in spite of Captain Cochrane who defended it as long as he could; but having only the assistance of five men their numbers overpowered him. After they entered the Fort they seized upon the captain and triumphantly gave three huzzas and hauled down the King's colours. They then put the captain and men under confinement, broke open the Gunpowder magazine and carried off about 100 barrels of Gunpowder but discharged the Captain and men from their confinement before their departure.

"On Thursday, the 15th, * * * instead of dispersing, the people went to the Castle in the night headed by Mr. Sullivan and took away sixteen pieces of cannon, about sixty muskets and other military stores and brought them to the out Borders of the town.

"On Friday morning, the 16th, Mr. Folsom, the other delegate, came to town that morning with a great number of armed men who remained in Town as a guard till the flow of the tide in the evening when the cannon were sent in Gondolas up the river into the country and they all dispersed without having done any personal injury to any body in the town.

It was rumored that the colonists intended to pay still another visit to the Castle for the purpose of dismantling the fort and destroying the remaining heavy cannon, but any such intention was effectively quelled by the arrival from Boston of two armed vessels, the *Canceaux* and the *Scarborough*, with a force of one hundred marines.

In the summer of 1775, the Governor decided it prudent to take refuge at Fort William and Mary. With his arrival the entire garrison consisted of Governor Wentworth, his brother-in-law, Benning, Captain Cochran, three servants, and six enlisted men. In August it became necessary for the *Scarborough* to make a trip to Boston for replenishment of its supplies. Unwilling to remain at the Castle deprived of his sole real protection, the Governor took passage on the *Scarborough* for himself and his family. Within half an hour of his departure, a party of Americans repaired to Great Island and demolished all that remained of the once important but now undefended Fort William and Mary.

Chief Executives of New Hampshire.	Assumed office
President John Cutts	Jan. 21, 1680
Richard Waldron	May 8, 1682
Lieutenant Governor Edward Cranfield	Oct. 4, 1682
Walter Barefoot	May .., 1685
President Joseph Dudley	May 25, 1686
Governor Sir Edmund Andros	Dec. 20, 1686
Lieutenant Governor John Usher	Aug. 13, 1692
Lieutenant Governor William Partridge	Dec. 14, 1697
Governor Samuel Allen	Sep. 15, 1698
Governor Lord Bellonmot	Jul. 31, 1699

Governor Joseph Dudley	Jul.	13, 1702
Lieutenant Governor John Usher	Oct.	22, 1703
Governor Eliseus Burgess	Resigned.	
Lieutenant Governor Samuel Vaughan	Oct.	13, 1715
Governor Samuel Shute	Oct.	17, 1716
Lieutenant Governor John Wentworth	Dec.	7, 1717
Governor William Burnet	Nov.	2, 1728
Governor Jonathan Belcher	Aug.	25, 1730
Lieutenant Governor David Dunbar	Jun.	24, 1731
Governor Benning Wentworth	Dec.	13, 1741
Lieutenant Governor John Temple	Jan.	19, 1762
Governor John Wentworth	Jun.	13, 1767

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EDITORIAL

Short Talks for use in Training

CAPTAIN Ralph E. MacLeod, C. A. C., Mass. N. G., has offered a suggestion which is unanimously supported by all the officers of the Massachusetts Coast Artillery National Guard, and which is here presented for the consideration of all Coast Artillery readers of the JOURNAL.

In his experience as Commanding Officer of the 323rd Co. Mass. C. A. N. G., Captain MacLeod has found that a carefully prepared, crisp, fifteen minute talk along historical or descriptive lines is a valuable stimulant to the interest of his men as a preliminary to the weekly class in gunnery. National Guard officers well appreciate the importance of stimulating the *interest* of their men in the subjects of instruction. As an illustration of his method, Captain MacLeod has sent to the JOURNAL the draft of a short talk on the history of Artillery Matériel. In this talk are outlined the development of explosives from the invention of black powder by the Chinese, down to the present time, with observations on the characteristics and methods of manufacture of the different orders of modern explosives; the development of cannon; and the design and manufacture of projectiles. The subject is covered in such a way as to introduce it as an interesting challenge to the soldier just stepping inside the Coast Artillery threshold. The preparation of such talks as this, involves a real drain on the already overburdened energy of the Battery Commander.

Explicitly, then, the suggestion initiated by Captain MacLeod, is just this, 1st, that all officers who may have occasion to prepare short talks such as the one indicated, send them in to the JOURNAL, 2nd, that any officers who would be glad to have such material to use in training their organizations say so to the JOURNAL, whereupon, 3rd, the JOURNAL will devote the space necessary to pass along the desired material for use by Coast Artillery officers everywhere—as we like to say—from Maine to Manila.

The scope of this effort may be as wide as you wish. Probably the first sort of thing to suggest itself will be the historical talk—answering the *why* of—the Army, the Coast Artillery, the mortar, the G.P.F., the plotting board, the uniform, the salute, the sabre, and whatnot. Incidentally, do *you* know why the present model of officer's sabre is as is? The story may or may not be true, but it is interesting either way.

If training can be supported by the urge of curiosity, the result will be both more satisfactory and more agreeable than when items of instruction have to be driven in by main strength. In one respect your soldier man is not unlike Silas Bender, an old-time New England hired man, who was understood to be very fond of baked beans. One noon, after a session at the pump and roller towel, he entered the kitchen, and

guided by a savory smell, headed for the bean-pot on the kitchen stove, where the noon meal was being kept hot. This particular bean-pot had a metal contraption to keep the cover on. As Silas loosened it preparatory to pouring out the beans, the generated pressure blew in his face the porcelain cover, a cloud of scalding steam, and a discharge of red hot beans. The back-fire of profanity prompted another hired man to observe, "Silas, I thought you liked beans!" Whereupon Silas—"Consarn it! I may like beans, but durned if I want them *driv* into me!"

Just so with military training. As Captain MacLeod says, "When they are interested we get results. With the many diversified, outside attractions we must make our instruction such that they want it; that they will give up a dance or a party rather than miss the weekly class of gunnery." Is this a scheme worth exploiting, in which the JOURNAL can help? If it is, you say the word!

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"Step on the Self-Commencer"

There is a well known Coast Artillery officer who drives a car in much the same determined way that he drove a division during the War. Upon being complimented concerning the quiet powerful performance of a new car, he casually observed, "Oh, yes, it will do very well. It gives no trouble at all. In fact it is like a good military outfit, all you need to do is to step on the self-commencer, and off she goes, and keeps going."

All of which implies that if original design, constituent materials and current supply are satisfactory, you need never look under the hood—of a car or a company. If this were true, there would certainly be fewer garages. With regard to military organization it is certainly not true that even the finest body of men could be assembled under the most perfectly designed administrative scheme, and continue to perform under pressure without friction or breakdown; if the commander refused to apply daily the oil can of tact and failed to watch for and make adjustments with the wrench of persuasion and the hammer of authority.

The ideal of design and workmanship is the machine which will never break down. In a military machine, which in spite of the Pacifist, is really not much of a machine after all, the material called upon to resist wear is not steel, nor even human flesh, but the human spirit. Less than all other things can the human spirit be given a permanent temper of hardness and strength. The spirit that today may defy fire and steel, tomorrow will melt before the breath of an idle rumor.

Is there then no practicable standard of dependability for a military organization, no prescribable period during which it should run alone after the commander has stepped on "the self-commencer"? Assuredly yes, and it is the function of discipline to strengthen the reactions which will tend to hold an organization steady, while it is the function of training to eliminate functional weakness by fitting and confirming every man in his especial task. Applied specifically to the Coast Artillery, the reasonable standard should be the requirement that any battery should hoe its own row through one action, without stimulus or interference from outside, in the way of reorganization, replacement, exhortation or discipline. When a car is clipping the miles along the road is no time to tinker under the hood. So with a battery, the time for higher officers, or the battery commander himself, to tinker with its

training, equipment, methods of fire, or discipline, is *before* target practice or action. During action the necessary rule will be "Hands Off!" If the same rule prevails during target practice, everyone will know exactly how far we have gone on the road to battle efficiency. You would not expect to leave a battery alone during a whole war, but if it measures up to the reasonable standard, every one in a battery, from the Captain down, should expect the battery to function *as is* from "Commence Firing!" to "Cease Firing, Target Destroyed!"

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General Pershing Indorses Boy Scout Movement

The JOURNAL has received from Major Frank Moorman, General Staff, a copy of the following letter recently written by General Pershing, in which is expressed the Chief of Staff's approval of participation by Army personnel in the work of the Boy Scouts of America. The letter is here published for the information of the Cosst Artillery readers of the JOURNAL.

WAR DEPARTMENT
Office of the Chief of Staff
Washington April 15, 1923.

Mr. James E. West, Chief Scout Executive,
Boy Scouts of America, New York City.

My Dear Mr. West:—

I have received a copy of a resolution recently adopted by the National Council, Boy Scouts of America, in which the hope is expressed that Army and Navy men may take a greater interest in the organization. You ask my cooperation in bringing this to the attention of the Army with a view to encouraging active participation by a greater number of Army men.

The Scout program being non-military in character, it is true, as suggested in the resolution, that some Army officers have hesitated to take active part in scouting, fearing it might create misunderstanding, but I am sure, from the information you have presented to me, that making known this resolution, expressing the earnest desire of the leaders of the Boy Scout Movement for a greater degree of cooperation, will serve to remove this misunderstanding.

After carefully reviewing the activities of the Boy Scouts of America, their program, objectives, leadership and actual accomplishments, I do not hesitate to say that I should be very glad to see members of the Army everywhere take such active part in scouting as official duties and local conditions permit.

That the Boy Scout Movement has already recruited a group of over 130,000 men giving volunteer service in character building and citizenship training, and that over 2,000,000 boys of America have been helped by this program is a remarkable accomplishment. I feel that the work is one with which any soldier should be proud to be associated.

Such association would be of benefit in many ways. The leadership of boys develops qualities which aid in the leadership of men, and active scout service would give valuable experience to many of our officers which they might not otherwise get in time of peace. Moreover, the responsibility of setting an example to boys who have adopted a standard as high as that expressed in the Scout oath and law must react on the leader in a manner entirely to his benefit and to that of those with whom he associates.

Having kept in close touch with the work of the Boy Scouts, I thoroughly approve of its object for the good it does the boy, and further, I approve of it as a soldier for the good it does to those who may be called upon to serve as our future defenders, and finally, as an American citizen I approve of it for the training it gives in preparing the boy to be a worthy citizen of his country.

I feel that it is a distinct recognition of the high qualifications of Army men to be asked to participate in a movement which has accomplished so much for the youth of the land and which has so much of promise for the future.

The Secretary of War, with whom I have discussed the matter, joins me in hoping you may find many Army men who will appreciate and take advantage of this opportunity to become useful workers in a great undertaking.

Very sincerely yours,
(Sgd) JOHN J. PERSHING.

COAST ARTILLERY BOARD NOTES

"Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the corps or of the service at large. These communications, with models or drawings of devices proposed may be *sent direct* to the Coast Artillery Board, Fort Monroe, Virginia, and will receive careful consideration."—

JOURNAL OF U. S. ARTILLERY, June, 1922.

Work of the Board for the Month of April, 1923

A. New projects initiated during April, 1923.

1. Project No. 103.—Range Board Chart for Model 1914 Mortars. The chart for the Model 1914 Mortar Range Board is being modified for the new 12-inch mortar Range table for aliquot part charges. It will be recalled that this board permits the application of a percentage correction in changing zones.

2. Project No. 104.—Charts for 1909 Range Board, 6-inch, 90 lb., H. E. Shell have been constructed and are now available for distribution.

3. Project No. 105.—Range Correction Chart for the 12-inch Batignolles Railway Mount. A provisional chart with height of site curves for this mount firing the 900 lb. projectile has been constructed.

4. Project No. 106.—Fuse Setter Mountings for Antiaircraft Matériel. A device constructed by the Ordnance Department to be mounted on antiaircraft guns to expedite and facilitate fuze settings. During a test by the 61st Artillery Battalion (Antiaircraft) certain defects were noted and objections became manifest. The construction of a new device designed to overcome these defects and objections has been recommended.

5. Project No. 107.—Gas Mask Telephone Transmitter. A gas mask fitted with a telephone transmitter has been received for test in comparison with the Navy type gas mask with transmitter. The test will be conducted on receipt of the latter device.

6. The following Training Regulations have been received for study:
   435-161, *Identification of Aircraft*, Project No. 108.
   435-331, Tactical Employment of A. A. Searchlights, Project No. 109.
   435-30, Tactical Employment of A. A. Artillery, Project No. 110.

7. Project No. 111.—Fire Control Telephone system for Fixed and Mobile Coast Artillery, initiated by the Coast Artillery Board for the purpose of obtaining more efficient telephone communications in the present F. C. installation, and to provide standard installations for large caliber long range fixed armament and for mobile Coast Artillery.

8. Project No. 112.—Experimental Meteorological Equipment for A. A. Units. Past experience has shown that in a high wind antiaircraft fire is always much less effective than in a light wind, and in general that the accuracy of antiaircraft fire is adversely affected by lack of accurate meteorological data. To remedy this condition it was proposed to equip antiaircraft units with meteorological instruments in order to secure more frequent and accurate correction data for

wind and atmosphere effects, and especially to determine the ballistic wind effect in the vicinity of a battery firing. The Coast Artillery Board recommended that the necessary meteorological equipment be furnished the 62nd Artillery (Anti-aircraft) for use and test in connection with target practices to be held during the current season; the 61st Artillery Battalion (A.A.) to use data furnished by the meteorological station at Fort Monroe. Firings should be conducted using data secured by use of complete set of meteorological equipment, and also using only data obtained from the meteorological equipment ordinarily issued to an anti-aircraft battalion. Results obtained from firing under both conditions can then be compared and serve as a basis for further recommendation.

9. Project No. 113.—Drill Cartridges for Antiaircraft Armament. The Coast Artillery Board has recommended the supply of drill cartridges with dummy fuze for antiaircraft armament. Regarding design and suitability of several dummy fixed drill cartridges the Board submitted the following:

a. The weight of the drill cartridge, dummy fuzed for all antiaircraft guns should be as near as practicable that of the service round in order to afford practice in loading at high angles as well as fuze setting.

b. The drill cartridges used with the 3-inch 15 pounder guns, Models 1902 and 1898 can be used for drill with the 3-inch antiaircraft gun, Model 1918. These cartridges would be satisfactory if equipped with dummy fuzes.

c. The drill cartridge of the 75-mm field gun, Model 1916, can be used with the 75-mm A. A. gun, Model 1916. This cartridge has a dummy fuze and functions satisfactorily with the A. A. fuze setter.

d. The 3-inch 15 pounder drill cartridge, Model 1903 gun, can be used with the 3-inch A. A. Gun, Model 1917, and would be satisfactory if equipped with a dummy fuze.

10. Project No. 114.—Preparation and Adjustment of Fire, Guns and Mortars, against moving targets. The Board is making a study of the prescribed methods of adjustment of fire against moving targets with a view to recommending a single method of adjustment of fire most suitable for the probable conditions of an action between shore armament and armament afloat, with the necessary modifications to meet special conditions.

11. Project No. 115.—A copy of notes on "Cooperation with Coast Defenses" intended for inclusion in Training Regulations 205-5, (Air Service) was submitted to the Board for comment. References used in compilation of these notes were the text "Observation," Air Service Tactical School; "Joint Army and Navy Action in Coast Defense"; and the "Report of the Joint Board on Coast Artillery—Air Service Training Exercises."

These notes had to do with the objects of aerial observation, in cooperation with Coast Defenses which were stated as being:

(1) Locate and report upon the nature, strength, and activities of enemy forces approaching or operating off the coast.

(2) Reduce the possibility of surprise raids on seacoast defenses or unknown landings on unprotected beaches.

(3) Furnish shore batteries with the information necessary for opening fire at extreme ranges.

(4) Furnish shore batteries with accurate information as to the fall of shots and effectiveness of fire.

The use of airplanes and airships was prescribed for patrol and reconnaissance work, pars. (1) and (2) above, airplanes and captive balloons for tracking and spotting, pars. (3) and (4) above. For shorter ranges, up to 15,000 yards and when visibility permits, the use of balloons was prescribed, airplanes to be used for both tracking and spotting at the longer ranges or when for any reason the target may be invisible from shore.

The use of two way radio telegraph was prescribed for use between airplanes and shore stations. The Coast Defense radio stations recommended for installation are described under Project No. 118. Without continuous two way radio telegraph communication between airplane and battery, observation of fire from airplanes will be of little value. Radio telephone, the dropping of messages, and visual signalling by ground panels were given as emergency methods of communication, but they are considered to be of little or no value.

The methods prescribed for tracking a target, and spotting, by airplanes are substantially as described in the article "Position Finding by Airplane" by Captain G. W. Ricker, C. A. C., appearing in the January 1923 issue of the COAST ARTILLERY JOURNAL.

12. Project No. 116.—Fire Control System for National Guard. The Coast Artillery Board has been called on to recommend an improvised fire control system, applicable to a mobile 155-mm G.P.F. coast defense battery, setting forth all of the apparatus and matériel required in such detail as to admit of the preparation of requisitions. This matter is being considered by the Board in connection with Project No. 75, "Fire Control Equipment and Installation for 155-mm Guns."

13. Project No. 117.—Fire Control Methods for Mortars. The Board is studying the standard fire control method for mortars with a view to developing a method by which mortars may be laid continuously or approximately so, in order that the delay of 1 minute occasioned by a "relay" may be reduced to not exceeding ten seconds, and so that the rate of fire of mortar batteries will be limited only by the time required for the operations of loading and laying.

14. Project No. 118.—Radio Equipment for Coast Defenses.

a. The question of radio stations for coast defenses was considered in the report of the Joint Board on Coast Artillery—Air Service Training Exercises, October-November 1922. The matter is also taken up from the Air Service point of view in Training Regulations 205-5 (Observation, Air Service), Subsection, "Cooperation with Coast Defenses."

The Coast Artillery Board is in agreement generally with the recommendations made in both of the above mentioned papers in regard to radio stations, each of which contains rather complete and similar studies in this connection.

Each case should be considered on its merits but as a general guide the stations enumerated in the following paragraph should be considered as standard.

b. Radio Equipment—

(1) There should be in each modern Coast Defense the following radio stations permanently installed:—

(*a*) One COAST DEFENSE RADIO STATION for general communication as a part of the Signal Corps Radio Net. 700 to 1100 meters, power output 500 watts or more according to distance to adjoining Coast Defenses, army posts, and Signal Corps net station. Buzzer and telephone and C. W. telegraph, antenna approximately 150 ft. by 500 ft.; steel towers; buzzer range 100 miles.

(*b*) One COAST PATROL RADIO STATION to serve in peace time as a tug control station and in war time for communication with Navy and Air Service patrols to the seaward. Wave lengths to suit that of naval craft and aircraft; approximately 300 to 900 meters. Power output 500 watts; buzzer, telephone and C. W. telegraph; antenna approximately 65 ft. by 125 ft.; wood poles; buzzer range 50 miles.

(*c*) FIRE CONTROL RADIO STATIONS in or adjoining the plotting room of each major caliber battery of range greater than 20,000 yards, for communication with observing planes. Power output 300 watts, wave lengths to suit aircraft, 300 to 600 recommended. Antenna approximately 60 ft. by 60 ft.; buzzer, telephone and C. W. telegraph; buzzer range 35 miles.

(2) To avoid identifying land marks it would be desirable to reduce the dimensions of the antennae and correspondingly increase the power output of the radio stations to compensate for this reduction.

(3) As airplane observation is more expensive than terrestrial observation and not as reliable at the shorter ranges, it is advisable to limit the use at the shorter ranges and take full advantage of aerial observation at the longer ranges (Ranges greater than 15,000 yards.)

c. Radio Personnel—

(1) It is recommended that there be provided in the manning table for each coast defense a minimum of one chief radio mechanic for the entire coast defense, and one radio operator and one land telephone operator for each radio station within the coast defense.

(2) A special course for chief radio mechanics should be instituted at the Coast Artillery School.

d. Discussion of Recommendations—

(1) The range of the "Coast Defense Radio" station obviously should not be less than that of the "Coast Patrol Station" as in case of emergency or when there was little danger of attack it would probably be required to perform the functions of that station.

(2) The power output specified for the coast patrol and fire control stations is large compared with commercial standards but is necessary for the following reasons:—

(*a*) The rated output will rarely be obtained in buzzer modulation as a modulator tube rarely contributes its full share of the power.

(*b*) It is not in general practicable to use full voltage and full power adjustment simultaneously on tube sets as power tubes are erratic in behavior and short lived when held up to rated load.

(*c*) To be of any use these stations must be positively reliable in operation even when working through considerable interference.

(3) The power output rating can be reduced to one-half that given above if single tubes with either direct current supply chopper modulated or preferably high frequency (500 cycle) plate supply are used. This is believed to be preferable from the viewpoint of reliability and efficiency of radio telegraph communication, and it is thought probable that a sufficient number of radio telegraph operators would be procurable in the outbreak of hostilities to enable these stations to be manned. However as long as airplanes are equipped for radio telephone communication coast artillery ground stations should be equipped correspondingly with this emergency system. When telephone is provided for, provision for C. W. does not introduce any complication.

15. Project No. 119.—Proposed New Model Antiaircraft Searchlight (General Electric). Referred to the Board by the Chief of Coast Artillery. It relates to a portable high intensity searchlight designed by the General Electric Company to fit the Cadillac unit.

In this light the vertical axis has been tilted 45 degrees. The object of this design is to obtain comparatively slow and easy traversing when following a target in the neighborhood of the zenith.

It is also proposed to reduce the diameter of the light to 48-inches and mount the lamps in a barrel type projector with a glass front door which will afford protection against inclement weather conditions.

16. Project No. 120.—Ammunition for Antiaircraft Guns to serve as targets. The Board recommended previously that ammunition which would give a burst of distinctive color should be issued to antiaircraft units, these bursts to serve as targets for rounds fired immediately after. The Ordnance Department recommended that to accomplish this purpose a round of H. E. shell which would give

a dark colored burst might be used advantageously as a target for succeeding rounds of shrapnel. This procedure will be tried out and if satisfactory will be adopted. It would be a comparatively simple matter to provide special ammunition with burst of distinctive color but it is considered highly desirable to restrict as much as possible the number of types of special ammunition.

17. Project No. 121.—Antiaircraft Targets. This project originated in connection with recommendations for A. A. matériel previously submitted. (See Par. 3-d, Coast Artillery Board Notes, April 1923 COAST ARTILLERY JOURNAL.) The Board will consider suitable balloons for use as targets for A. A. units, including clusters of small cheap balloons instead of the larger sizes previously recommended.

B. Projects previously submitted on which work has been accomplished.

1. Project No. 82.—.50 Caliber Machine Gun, Water and Air Cooled. The Coast Artillery Board favors the adoption of the .50 caliber watercooled machine gun for antiaircraft work. It was found that the overheating of the air-cooled gun was a serious disadvantage. It decreased the efficiency of the gun and the accuracy life of the barrel. Several defects were noted in the water-cooled gun as constructed which are susceptible of correction; the weapon when filled with water and with ammunition box attached was overweighted forward; more rugged construction of several small parts is necessary to secure proper functioning of the gun.

One of the problems incident to the adoption of the .50 caliber machine gun is the design and construction of a sight which will permit the delivery of effective fire on moving aerial targets. The tactical requirements of such a sight are as follows:

a. It should be simple in design and operation, capable of successful manipulation by a man of average intelligence.

b. It should be of rugged construction to withstand the rough treatment incident to field service conditions.

c. It should require a minimum amount of adjusting before firing.

d. It should require a minimum amount of mental effort on the part of the gunner, (i.e., calculation of speeds, ranges, etc.), to direct the gun fire toward the target.

e. It should compensate *automatically* for as many variable sighting elements as possible, (i.e., drift of bullet, jump of gun, speed, range, and altitude of target. effect of high angle fire on trajectory.)

f. It should be capable of being used, in an emergency, as an infantry sight against ground targets.

g. It should allow the gunner freedom of both his hands, so as to enable him to maneuver the gun freely about the tripod.

The design of a sight to fulfil the above requirements will be undertaken. The study of the development of such a sight is urged upon officers and men throughout the Corps. Any design submitted to the Coast Artillery Board will receive recognition and consideration.

The tripod designed for this gun proved satisfactory. Service ammunition functioned satisfactorily but the tracer ammunition was not effective.

The ammunition supply system should be improved. Reloading the web belts at present furnished does not seem practicable and it was suggested that belts of paper or other cheap fabric be used and thrown away when emptied.

2. Project No. 97.—Range Correction Charts for 12-inch Mortars. Completed. Charts are available for distribution.

3. Project No. 99.—Range Correction Charts for 8-inch Railway Mount firing H. E. Shell. Completed. Charts available for distribution.

4. The following Training Regulations have been reviewed:

No. 435-97, Hqtrs. Detch. and Combt. Train, Separate Bn, A. A. Arty.—Project No. 100.

No. 435-98, Separate Btn. A. A. Arty.—Project No. 101.

5. Project No. 102.—Brocq Corrector and R. A. Corrector for A. A. Artillery. The Board recommended as follows in regard to the construction and issuing of these instruments.

a. A limited number of Brocq Correctors for 3-inch Antiaircraft Guns, Model 1916, on trailer mounts should be continued in service with Regular Army antiaircraft units. One set per battery and one spare per battalion should be sufficient. Only the R. A. Corrector should be issued to National Guard organizations.

b. It is not advisable to replace the Brocq Corrector with the R. A. Corrector until a greater number of comparative tests have been held demonstrating the superiority of the R. A. Corrector. With this in view one R. A. Corrector should be issued each regular army antiaircraft unit, and instructions given to compare the Brocq and the R. A. throughout the drill season and render detailed reports as to which is more desirable.

c. Present indications are that the R. A. Corrector is more satisfactory than the Brocq. However, the apparent superiority of the R. A. is not sufficiently pronounced to justify discarding the Brocq without the additional information to be gained by the procedure recommended in paragraphs *a* and *b*.

The Chief of Coast Artillery has taken the necessary steps to put the above recommendations into effect.

C. The Coast Artillery Board has been informed that hereafter the policy in regard to barrage balloons as a part of A. A. defense shall be that the Air Service shall be charged with their development and A. A. Artillery units with their operation.

Employment of Heavy Artillery—Problem No. 11—A Solution

1st Requirement:

In general there are two choices of route for this Bn, one west of WILLOUGHBY RUN and the other east of WILLOUGHBY RUN resulting from crossing the RUN immediately at KATALYSINE SPRING. Due to the requirement that all heavy artillery is to be east of WILLOUGHBY RUN by 3:00 PM, the possible routes west of the RUN may be ruled out of consideration, especially as the only suitable crossing of the RUN is at TRASTLE'S (345.8-744.1). Furthermore, many possible routes west of WILLOUGHBY RUN are over excessively hilly roads, much of which will be within range and observation of the hostile artillery and subject to the road congestion to be expected from the retirement of our forces all along the front. Consequently Maj A definitely decides to take the road direct to GETTYSBURG skirting GETTYSBURG by the western and southern peripheral streets. After clearing GETTYSBURG the Bn is practically limited to the TANEYTOWN ROAD due to the reservation of the BALTIMORE TURNPIKE for Infantry troops and trains. The only question then remaining is where to turn off the TANEYTOWN ROAD. The selection of roads leading east at RJ545 and RJ515 may be dismissed as they would require the Bn to pass through the front of the new position of the III Corps; they involve complicated routes and chances of going astray and unnecessarily traversing difficult grades.

The route leaving TANEYTOWN ROAD at RJ450 via CR491—KING—RJ598—RJ588 is nearly a mile shorter than the route via BARLOW—J. SMITH—RJ529, but the latter has the advantage of easier grades, fewer sharp turns and less chances of error in following the route, besides having the advantage of being further from the new Corps front line and consequently less likely to be choked with traffic.

Therefore, Maj A decides on a route as follows, direct to western edge of GETTYSBURG—TANEYTOWN ROAD—BARLOW—J. SMITH—RJ529—CONOVER FARM.

2nd Requirement:

In view of the fact that nearly all the motor transportation is at the Rear Echelon and that the road between the Btry positions and the Rear Echelon is open and exposed to hostile aerial observation Maj A decides to call up to the Btry position only enough trucks of the Comb Tn to load the ammunition now at the Btry position and the tractors to take out the guns. He immediately assembles the members of his Staff and the Btry Comdrs in the Bn CP near the

Btry positions and issues the following verbal order, with a caution to the Adj to transmit to the Bn Supply Officer, the Med Officer and other officers at the Rear Echelon the portions which require their action:

"The counter-attacks of the enemy on our front have been unsuccessful. However, the hostile 2d Army has crossed the SUSQUEHANNA and is now near YORK. In the meantime our 3d Army has arrived at WESTMINSTER, and orders have been received from the III Corps to withdraw to a line of principal resistance LITTLES RUN—TWO TAVERNS—ASH GROVE S H—TOLLGATE pursuant to the orders of 1st Army, as part of a strategic refusal of our right wing to make contact with our 3d Army, the withdrawal to be completed by 6:00 AM 12 May, except for the 8th Div which covers the withdrawal of the Corps.

"The 1st Bn 701st Arty withdraws to a new position in the vicinity of CONOVER FARM (357.1—739.9), center of field of fire BONNEAUVILLE.

"Route of march for both light and heavy columns, direct to western edge of GETTYSBURG—TANEYTOWN ROAD—BARLOW—J. SMITH—RJ529—CONOVER FARM.

"The CO Bn Comb Tn will immediately ascertain from Btry Comdrs the number of rounds of ammunition remaining at Btry positions, sending immediately to Btry positions enough trucks of Bn Comb Tn to load this ammunition. Bn Exec will immediately have tractors sent to Btry positions. Btry A and B March Order, heavy column clears WILLOUGHBY RUN at bridge east of SPRING HOTEL 1:00 PM in order—Btry A, Btry B, proceed direct over designated route to new positions in command Bn Exec.

"As soon as March Order has been executed, wire and camouflage material salvaged, all members of both Btrys not required with heavy column march on foot to Rear Echelon and embuss. The light column will be formed in order—Bn Hdqrs, Btry A, Btry B, Bn Comb Tn, Bn Sect Serv Btry, Ord Det, Med Det; will clear eastern exit GETTYSBURG not later than 2:00 PM under command Cpt B (Senior Btry Comdr). When the light column overtakes the heavy column it will pass it at the first opportunity and proceed by designated route to new positions reporting to me there.

"The Surgeon will evacuate sick and wounded now with Bn direct to TANEYTOWN via TANEYTOWN ROAD.

"I will proceed with first party and third party (less Surgeon) for reconnaissance of route and new position and will leave guides at necessary CR's and RJ's Present CP closes 12:00 noon, new CP opens at CONOVER FARM on my arrival there."

Maj A then proceeds by automobile with the first and third parties as indicated over the route, dropping guides from among the Scouts and Agents at CR570, RJ545, RJ515, RJ469, RJ450, RJ432, RJ375w, BARLOW, J. SMITH, RJ543, RJ588. Upon arrival at CONOVER FARM, Maj A decides to put A Btry in the orchard just north of CONOVER FARM and B Btry in the woods north of the Road halfway between CONOVER FARM and RJ588, Bn CP at TRUSTLE, Bn and Btry CP's on Hill 606, Rear Echelon in woods west of Hill 547 (353.6—737.5) (on TANEYTOWN sheet).

In compliance with his orders to prepare the position for defense, Maj A decides that this purpose will best be accomplished by entrenching machine gun positions near RJ661 and in the woods to the south, and on the eastern slope of Hill 606, also northwest of RJ598. If time permits, he plans to obtain barbed wire, covering each of these positions in the direction of the front, preparing barricades to be put across the road west of RJ661 and at FAULK's with a belt of wire north of the Btry positions.

Employment of Heavy Artillery—Problem No. 12

References:

Maps, Gettysburg General, 1-inch, and 3-inch, Hunterstown, New Oxford, Gettysburg, Bonneauville, Taneytown and Kingsdale Sheets.

General Situation:

In continuation of Problems 2, 4, 6, 8, and 10.

The fighting on 7-8 May drove the Reds back to the line (SUGAR LOAF HILL—CARR HILL—SEVEN STARS—TABLE ROCK—HEIDLERSBURG.) On the 9th the Blue Forces sustained a heavy repulse, but no ground was lost.

On 9 May our Air Service reported the enemy crossing the SUSQUEHANNA at WRIGHTSVILLE and MT. WOLF in great force. On 11 May the Blue Cavalry covering the right flank of the Army reported that they were withdrawing from YORK on HANOVER JUNCTION before superior hostile forces estimated as at least three corps.

Special Situation (Blue):

The 1st Bn 901st Art was still at GRANITE HILL where it had been since 7 May. During the fighting of the 9th it had fired at long range on hostile front line positions. Due to the condition of the railroad west of GRANITE HILL it had been unable to make any further advance.

F.O. No. 10, GpC, Army Artillery was received at Bn Hq at 10:00 AM 11 May. Those portions concerning the 1st Bn 901st Art read as follows:

* * * * *

"The 2d Red Army has crossed the SUSQUEHANNA and is now in the vicinity of YORK confronted by our cavalry. Our 3d Army has arrived at WESTMINSTER. The 1st and 2d Blue Armies, pursuant to the plans of GHQ, will adjust their lines by refusing their right, in order to make contact with our 3d Army at WESTMINSTER.

* * * * *

"The zone of principal resistance of the 1st Army is along LITTLES RUN—TWO TAVERNS—ASH GROVE SH—TOLLGATE—LITTLESTOWN—MT PLEASANT SH - - - - .

* * * * *

"All units of GP C A A will withdraw at once to sidings at KEYMAR (off map), 7000 yards SW of TANEYTOWN. Locomotives for this movement will be furnished by the Engineers, who will control trains on main line. No further railroad equipment is available.

* * * * *

"The 1st Bn 901st Art will move all its R R equipment under its own power to NEW OXFORD yards, to arrive 3:00 PM, and make up train ready to leave NEW OXFORD at 5:00 PM 11 May, when Engineers will furnish locomotive by arrangement of Gp C AA. Motor transport will leave GRANITE HILL STA at 4:00 PM 11 May as a single convoy, via BONNEAUVILLE—WHITEHALL—PLEASANT HILL SH—TOLLGATE—LITTLESTOWN—OAKGROVE SH—WASHINGTON SH—TANEYTOWN—CRABSTER for KEYMAR.

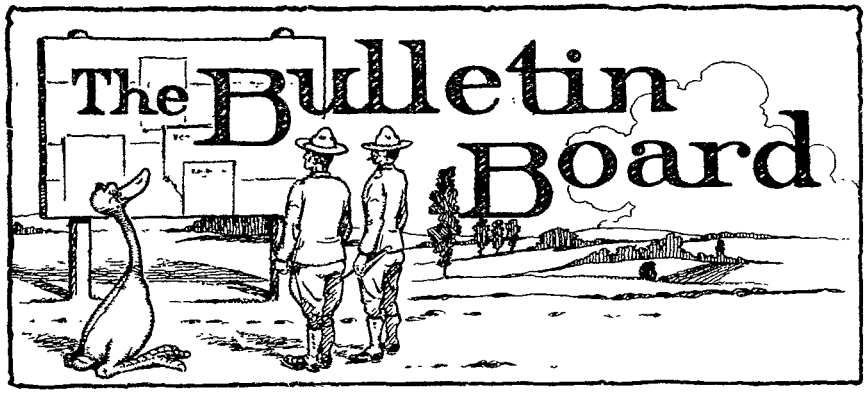
* * * * *

"Group CP closes at BERLIN JUNCTION at 8:00 PM 11 May and opens same hour at KEYMAR, at P.O. Each unit will send an officer in advance of its arrival for assignment of trackage and camp site."

* * * * * .

Requirement:

Maj A's arrangements and orders for the move from his present position to KEYMAR, with especial attention to make-up of train, command of train and convoy, salvage of ammunition, wire and camouflage matériel.



The Tank Appears

The National Guard of Rhode Island is to have an official newspaper, called "The Tank." Volume I, No. I, dated April 30 has just made its appearance as a five column, twelve page paper. It is being sponsored by the 348th Company, Coast Artillery Rhode Island National Guard, under the Editorship of the company commander, Captain Earl C. Webster. The publication office is at 335 Westminster Street, Providence, Rhode Island. As it is to be distributed gratuitously, it is assumed that the expense of publication is to be borne by the local advertisements, of which the first issue contains a goodly number.

Tanks are noisy things and it is hoped that this one will live up to its name in making little Rhode Island sit up and take notice of its own National Guard.

National Convention, M. O. W. W.

The Military Order of the World War will hold its National Convention in Washington on October 4, 5 and 6 next. Headquarters will be established in The New Willard Hotel. Included in the program is to be a military banquet and ball to be given during the evening of October 5.

Rhode Island Coast Artillery Holds Exhibition

On the evening on Monday, May 21, the Coast Artillery Corps of the Rhode Island National Guard tendered to Governor William S. Flynn, a Review and Exhibition Drill, including Coast Artillery Drills and simulated practice, with special exhibitions by the different organizations, including Signal Drill, Manual of Arms, Bayonet Drill, Infantry Drill, Guard Mount and Escort of the Color, and a Litter Drill by the Medical Detachment. followed by a review to the Governor and Presentation of War Streamers and the 1922 Artillery Trophies. The Trophy for Gun Companies was won by the 347th Company, Captain H. V. Allen commanding, while the Trophy for Mortar Companies was won by the 345th Company, Captain G. S. Anderson, commanding. The occasion was enlivened by music furnished by the Rhode Island Coast Artillery Corps Band, Master Sgt. T. B. Gall, Leader.

The Coast Artillery at the University of Washington

An interesting report and a series of newspaper clippings have reached the JOURNAL, which feature the successful conclusion of this year's instruction in the Coast Artillery R. O. T. C. Unit at the University of Washington.

The policy of the Chief of Coast Artillery to conclude the year's scholastic work with a week-end encampment was carried out with such a marked degree of success that the students were not only given an understanding of the whys and wherefores of the routine life of an army post, but they were also given a delightful outing under novel circumstances for most of them.

One hundred and ninety-five students, thirty-three of whom were of the Air Service Unit, boarded the Army Mine Planter J. Franklin Bell and sailed for Fort Casey where they were immediately housed in barrack buildings which had been vacated by Regular troops. The bedding, mess equipment and the necessary cooks and assistants were provided by the Fort Commander with the exception of a small detail of Kitchen Police which was provided by the unit itself. The unit attended the regular routine formations of the garrison including reveille and retreat under arms. Sunday morning was devoted to turning in property, settling of mess accounts, and recreation of various kinds, including a baseball game between the Unit and the Fort Casey Teams.

The cadet officers and noncommissioned officers of the unit were required to assume the full responsibility of their offices. A remarkable spirit of cooperation and enthusiasm was evinced by all concerned and the trip was conducted in such an efficient manner by the cadet officers as to receive commendation from the Fort authorities.

Major W. D. Frazer, C. A. C., in making his official report of the week-end encampment states that the results of the trip were very noticeable. "The military environment was most conducive to a thorough instruction in Coast Artillery work and a great deal more was accomplished under these conditions than could be hoped for in any other way. The application of theoretical instruction received throughout the year was especially valuable and should be continued. * * * The total expense of the encampment for each student was $2.10."

New Jersey Association of Reserve Officers

The First Annual Convention of the New Jersey Association, Reserve Officers Association of the United States, was held in the Assembly Chamber of the New Jersey State house at Trenton on Saturday, May 19, delegates being present from fourteen local units in different parts of the state. Colonel W. A. Starrett of Madison presided, the principal speakers being Colonel John R. Delafield and Major J. H. M. Dudley.

The following officers were elected for the current year: President, Lt. Col, Carroll Badeau, 1st Vice President, Lt. Col. James Barnes, 2nd Vice President. Col. Philander Betts, 3rd Vice President, Major Bartram Woodruff.

BOOK REVIEWS

THE MILITARY ART

L'Artillerie Nouvelle. By L. Thouvenin, Captain of Artillery. Charles-Lavauzelle and Co. Paris. 1921. 4" x 7½". 315 pages. 300 sketches. Price, 6 francs.

The first part of this book, devoted to munitions, takes up in detail the powder charges, projectiles and fuses used in the French artillery service and provides

an excellent discussion with sketches of the types of fuses to produce various results. Part two, devoted to Artillery Fire, is of considerable interest as it presents in a remarkably lucid way the influence of dispersion on methods of adjustment. With reference to the ballistic preparation for fire and its relation to the conduct of fire the author states that the war of 1914-1918 proved that the tendency is toward less and less adjustment and more and more careful ballistic preparation. He believes that the time is near at hand when the determination of "the exact trajectory of the moment" will result in there being no need for the adjustment of fire. It is interesting to note that our present methods of adjustment are identical with those of the French. The third part deals with the details of design of the present types of French artillery matériel.

While this book presents little with reference to Gunnery which is not available to the American artillery officer in English its treatment is so lucid and so well arranged that it may be read with considerable profit.

L'Art Militaire dans l'Antiquité Chinoise. Une Doctrine de Guerre bi-millénaire. Taken from the translation of P. Amiot (1772). By Lieutenant Colonel E. Cholet. Charles-Lavauzelle et Cie. Paris. 1922. 5½" x 9". Paper. Price 6 francs.

Under the title *Military Art in Chinese Antiquity*, Lieutenant Colonel Cholet gives to that part of the public which is curious to go deeply into the sources of things, a certain number of maxims attributed to three Chinese generals who, many centuries before the Christian era, had by their great deeds and their writings attained a celebrity whose brilliance seems to have persisted even to our times among the military men of the former Celestial Empire.

The author has taken upon himself the task of demonstrating—as paradoxical as it may appear—how for many thousands of years back across the ages runs the origin and the application of certain general principles to which contemporary military science has ever adhered, and quite properly so. It is the comparison of these maxims of modern military geniuses with those of the Chinese generals which comprises in part the originality of the present work, which might have as an inscription the old aphorism that there is nothing new under the sun, of which one finds confirmation in so many of the branches of human knowledge.

Comment Finit La Guerre. By General Mangin. Plon-Nourrit et Cie. 8 Rue Garanciere. Paris. 1920. 5" x 7½". 330 pages, 11 maps. Paper. Price, 10 francs.

The author states in his prefatory remarks that it is still too early to write the complete and final history of the great war, but that it is proper for those in a position to know the conditions of morale and other important conditions at various times in the war to lay them before the public before they are lost. These, as well as the memoirs, personal notes, etc., are necessary as an addition to the official records of the war in order for the final historian to obtain a complete and accurate analysis of the entire situation at all times.

It is very easy to remark that the long war finally came to a very abrupt ending just after the final victors had suffered a long series of almost overwhelming defeats, and this brings up the question of whether or not it would have been possible for the Allies to have ended the war at a very much earlier period by proper concerted action. This book is written in an attempt to answer this question. It covers in a general way the events leading up to, during and immediately after the Battle of the Marne in 1914; the general preparations by both sides for the 1916 offensive, the course of the great offensives and counter-attacks of that year; the preparations for the 1917 offensive and its outcome; and finally the 1918 offensives by both the Germans and the Allies, and the consequent Armis-

tice. This book also covers briefly the general causes of the victory, its results, the new French Army, and the final or present relations of the Allies with one another, as well as the subject of the reparations and the New Europe.

The Marne Miracle. By Colonel W. K. Naylor. U. S. Infantry Assoc. Washington. 1923. 5¼" x 7¾". 193 pp. Price, $1.50.

Colonel Naylor, already well known to American military students as the author of "Principles of Strategy," and as an authority on military history, has prepared a concise critical analysis of the operations of the German Armies and the Allies opposed to them on the Western Front from August, 1914, to the conclusion of the retreat to the Aisne on September 10-12. A careful examination of Colonel Naylor's analysis of this first campaign on the Western Front does not fully convince one as to his preference expressed in the preface for terming the operations "The Miracle of the Marne."

In conclusive fashion, the author establishes the reasons for the outcome of the battle; in the incapacity and weakness of character of Von Moltke, in very definite faults in the German system of high command, in a lack of a strategical reserve, in a surprisingly inadequate system of liaison, communications and intelligence, and finally in a specific defect in the military character of Von Bülow, the Commander of the German Second Army. In the face of these combined conditions which were not matched by an equal number of unfortunate faults and mistakes on the part of the Allies, it seems clear that the outcome of the German effort was the logical result of all the conditions, which Colonel Naylor has so clearly set forth, and that it need not be assigned to the category of miracles. It is unfortunate that in numerous instances the author has resorted to expressions sufficiently awkward to leave doubt as to his exact meaning, and that the punctuation, spelling and proof reading were not more carefully scrutinized. Nevertheless, these strictures are minor in character, and hardly detract from the unquestioned value of the book, which is undoubtedly the most useful manual for the examination of the Marne campaign of any of the books which have so far appeared.

Memoires de Russie. By Jules Legras. Payot and Co. Paris. 1921. 5½" x 9". 449 pages.

This book presents, in diary form, the experiences of a French officer, detailed in the early part of 1916 to spread pro-French propaganda among the Russians. Later he was commissioned in the Russian army and saw service with it until the Revolution and the conclusion of peace between the Bolsheviks and the Germans.

The book is written with great minuteness of detail; so much so as to lose the interest of the reader at times. The author concludes, however, with an interesting study of the personnel and customs of the Russian army before the revolution.

Mon Rapport sur la Bataille de la Marne. By von Bülow. Translated into French by Captain Jacques Netter. Payot, Paris. 1920. 4¾" x 7½". 188 pp. Paper. 4 maps. Price, 6 francs.

This is an absorbingly interesting account of the events leading up to the turning point of the great World War, from the point of view of the commanding general of the center of the German right wing in the first Teuton onrush. From right to left, this wing consisted of the 1st Army (von Kluck), 2d Army (von Bülow) and 3d Army (von Hausen).

The German plan was that the right wing should turn the French left, while

the line prolonged east by the German 4th, 5th, 6th and 7th Armies would crush the French center and by a combined enveloping attack throw the French Army back in confusion on the Swiss frontier.

No better admission of Teuton over-confidence at this time can be found. Press dispatches in Germany announced the fall of Belgian forts, when in reality they were held for days thereafter by their gallant defenders. The Anglo-French force was considered routed beyond rallying, which is advanced in part as an argument for the careless exposure of the German right flank; a costly blunder that lost the fruits of a brilliant campaign.

Von Bülow explains the latter with the admission that Mavnoury's 6th French Army in the defenses of Paris was a total surprise to the German High Command until Sept. 7th. His odium falls on von Kluck for first crowding across the front of his advance, causing no little confusion and delay to the 2d Army, and then for rushing ahead of the line formed by the 2d and 3d Armies through Chateau-Thierry.

To the student of tactics this book will appeal because it contains detailed dispositions of units to include the division in advance, attack, retirement and on the defense. The casual reader will enjoy the historical narrative style of the translator, as well as many interesting sidelights on this great campaign. German orders covering Reims and its cathedral, and von Ludendorff and von Hutier first seen in subordinate rôles, strike the readers' attention because of their later influence on the war.

An appendix and four maps are very useful in coordinating the movements of the units of the German right wing until Sept. 10th, when von Kluck was subordinated to the command of von Bülow.

Note Di Guerra. By General Luigi Capello, Italian Army. Fratelli Treves, Milan. 1920. In two volumes. Volume I. 6¼" x 9½". 348 pp.

This book of war notes is not intended by the author as a history of the great war. It was intended rather to satisfy the desire of the people to know something of the hidden facts of the Sombre tragedy.

In its narrative part the book is but a transcript of the war notes made under the impression of the events, and the comments and observations of the moment inspired directly by the facts, by the orders given or received and by the effect produced on the front by public opinion.

The author frankly states that the book is intended as a criticism, but a constructive criticism, supported by a strong faith in the destinies of Italy. By indicating the errors made he hopes the nation will learn to avoid their recurrence in the future.

In the first four chapters the author touches on the lack of preparation for the war. He particularly criticises the feeble Italian diplomacy; the absence of a practical and definite program due chiefly to a lack of organizing spirit; the unpreparedness in a material way,—shortage of artillery, no trench weapons, no hand grenades, no means for destroying wire entanglements; the unpreparedness in a professional way,—reliance on map maneuvers, ignorance of the tactical employment of machine guns and often of the manual of the piece, the infantry weakened by constant detachments for the service of other arms, officers of highest rank often unfitted for work in the field by reason of long continued employment in administrative work in peace time.

The remaining six chapters deal with the plan of the war, the beginning of operations, the halt, the military action in the Summer of 1915, the Autumn offensive of 1915, the winter inactivity, the military action in the Spring of 1916, the Austrian Offensive in the Trentino and the battle of Gorizia.

Throughout the whole book there runs a vein of criticism which, though in-

terspersed with many military details of undoubted historical value, is apt to prove very annoying to the non-Italian reader.

An appendix supplies data for comparing the Italian and Austria-Hungarian armies at the time of Italy's entry into the war.

Post-War Ordnance. By Major LeRoy Hodges, State Ordnance Officer, Virginia National Guard. Richmond, Virginia. 1923. 6″ x 9″. 113 pp. Paper, Price, $1.50; Cloth, price, $2.00.

In this concise volume Major Hodges has prepared a manual, primarily for the instruction of the officers of the Virginia National Guard, covering the post-war organization of the Ordnance Department and the post-war development of Ordnance matériel and methods of manufacture, which is not only admirably adapted to its original purpose, but which should prove an almost indispensable handbook on the subject for reference by all officers of the Regular Army, the National Guard and the Organized Reserves. There is no other book which approaches it in up-to-dateness or in completeness of concise description of the weapons and accessories which have been developed by the Ordnance Department since the War. The first two chapters are devoted respectively to a brief exposition of the present organization of the Army of the United States and of the mission and organization of the Ordnance Department itself. Following these two chapters are six chapters devoted to the new artillery from the smallest types of field weapons through the whole range of antiaircraft matériel up to and including the new 16-inch coast defense gun, with descriptions of the projectiles, explosives and fuses used therewith. An important chapter is devoted to machine guns with another to the development of machine guns and cannon for aircraft. Chapter eleven is concerned with the post-war development of small arms and pyrotechnics, including the self-loading rifle, the Browning automatic rifle, the centrifugal gun and the development of small arms ammunition. The final chapter is devoted to new automotive equipment from the Light Infantry Power Carts through the whole range of trucks and tractors to self-propelled gun carriages and the new models of tanks.

The value of the book as a reference and text is much enhanced by the frequent use of excellent illustrations and by the addition of a very complete index. The book has been approved by the Chief of Ordnance and has been heartily indorsed by every officer who has had the opportunity of giving it a critical examination. Standing at the present time alone in its field, Post-War Ordnance will prove a valuable addition to the library of any officer.

Sir Douglas Haig's Command. By G. A. B. Dewar and Lieut. Colonel J. H. Boraston. Houghton Mifflin Co. 1923. 5¾″ x 9″. Volume I, 415 pp., 7 Maps. Price, $5.00. Volume II, 373 pp., 7 Maps. $5.00.

Whether written at the instance of Field Marshal Haig, or prompted by the loyalty of the authors, this work constitutes a very elaborate piece of special pleading for the full recognition and favorable judgment of history as to the wisdom and skill displayed by Marshal Haig in the conduct of his command of the British Expeditionary Forces in France from December, 1915, until after the Armistice in 1918. Unquestionably, the detailed and extensive account of all the British operations on the Western Front during this period adds an invaluable source to the student of World War history. Like any other piece of historical writing which is such a distinct effort at special pleading, its use as historical reference should be made with due regard for the points of view to be obtained from other accounts of the operations and decisions described.

In commenting on this work it may first of all be said that the chapters written by Colonel Boraston are distinctly superior to those written by Mr. Dewar. Colonel

Boraston has written the chapters giving the actual accounts of all the battles and operations in which the British Army was involved, while Mr. Dewar has handled the chapters devoted to the exposition of Sir Douglas Haig's decisions, his point of view, and his proper share of credit for Allied strategy. Mr. Dewar has distinctly marred not only the readability of his work, but as well, its conciseness, by his excessive repetition and by the display of an almost petty and certainly acrimonious attitude toward other individuals than the hero of his tale. However, he brings to the fore certain specific claims in such definite terms that they demand full consideration and appraisal in the light of all evidence which may subsequently be brought to bear. Among these claims which he sets forth as distinctively pertaining to the leadership of Sir Douglas Haig are the following:

The recognition by Marshal Haig of the inescapable necessity of the "wearing-out phase" in the conduct of the War in order to weaken German fighting resources to the extent that a final victory in the field should become possible; the illogical and unjust subordination by the British Government of Haig to General Nivelle in the early part of 1917, and that nevertheless in the outcome of the Nivelle fiasco, Haig stood alone in loyally supporting Nivelle's effort, and that Haig saved the situation thereafter in 1917 by the Battle of Arras, the Flanders Offensive and the Battle of Cambrai; that the accomplishment of unity of command after the German attack in March, 1918, by the appointment of General Foch resulted not in spite of Haig but as the direct result of his insistent demand, in order that Petain should be prevented from retiring on Paris and separating the British and French forces; and finally, that the distinctive strategy which marked the Allied advance to victory beginning July 18, 1918, was not the conception of Foch, but was directly due to the ideas and insistence of Marshal Haig. All these issues have been definitely launched, and it must be admitted that the book goes far to making out a strong case for the support of each of these contentions. At the very least, we may conclude that during and since the War Marshal Haig has fallen far short of the loyalty and recognition which should have been afforded him by his own government and by the British public.

Nevertheless, an attempt at impartial appraisal of the argument of the authors leaves one here and there with the feeling that they attempt to prove too much. Two definite instances may be cited. In the discussion of the Battle of Cambrai the ultimate failure of the Battle is recognized and in part ascribed to the fact that a part of the cavalry and necessary reserves were too far away on the day of the battle. That being the case, some one must necessarily have been responsible for this real fault in the plan, but the responsibility is not fixed, and it is fair to assume that the responsibility lay with the British G.H.Q., who must have carefully visé̊d the detailed plans for the operation before approval. Again, in the discussion of the German Attack beginning March 21, 1918, the authors make it clear that British G.H.Q. predicted that the German thrust would take place near the junction of the British and French forces, and fully recognized their weakness at this part of the British position. Yet in view of these facts the explanation for the failure to strengthen this critical part of the British Front, even at the expense of dangerous weakening of the line in Flanders, is not wholly convincing.

A particularly interesting chapter is Chapter XI of Volume II, written by Lieutenant General Sir Alexander H. Gordon, giving an account of the German Attack on the Aisne in May, 1918, in which the tired British IX Corps played so difficult a part. In this as well as in many other chapters, the criticism of French generalship and the fighting qualities of French troops are commented on in terms which are to say the least, far from complimentary.

Whether justified or not, the frequently recurring comments on the share

of America and the fighting of American troops, can not fail to be irritating to American readers. Some of these comments seem distinctly petty and in some cases are certainly gratuitous and uncalled for. An instance is the footnote in the account of the combined Belgian and British attack in the latter part of 1918, which quite pointlessly suggests an invidious comparison between the conduct of the troops in this operation and the handling of the American share of the battle in the Meuse-Argonne.

Nevertheless, after all the strictures which have been noted or which may suggest themselves to the unbiased student who approaches this work, it may safely be predicted that the book will stand as one of the most necessary and valuable references for the subsequent study of the operations of the World War.

Sous-Marins, Torpilles et Mines, (Submarines, Torpedoes and Mines). By A. Laubeuf and H. Stroh. J.-B. Baillière et Cie. Paris. France. 1923. 6″ x 9″. 810 pp. 343 figures. 10 diagrams. Paper. Price, 66 francs.

This book contains all that the authors could find available on the subject of submarine warfare, including submarine boats, torpedoes and mines. It is intended as an authoritative work on the subject, and published as a part of an encyclopaedic library of applied mechanical science. As a reference book it is excellent, but could be improved were it indexed more in detail.

After tracing the history of the submarine boat, the theories and general principles of its construction are taken up. These include discussions of the Diesel engine, electric drives and submergence equipment. Auxiliary equipment, such as ventilators, air compressors, radio, periscopes, etc., as applied to the submarine, are also discussed in detail.

Part two of the book is devoted to torpedoes and mines. This is of particular interest as it contains in comprehensive and yet concise form all the developments of the World War in which this armament played so vital a part.

The book is an interesting addition to the library of any military or naval student.

Modern Permanent Fortifications. (Essai sur la Fortification Permanente Moderne). By Col. Lévêque. Berger-Levrault, Publishers. Paris. 1923. 5½″ x 9.″ 80 pp. Paper. Price, 3½ francs, net.

The new French frontiers have raised the question of their fortification. A careful study of the problem by Col. Lévêque has resulted in this treatise containing his recommendations.

The gist of the discussion is summed up in the preface by Gen. Debeney when he recommends the "quartier" of Col. Lévêque on the grounds that it is a modern application of the established principles of Vauban. After an intensive study of the permanent fortifications of the Belgians, French, Russians and Germans, and their rôle in the World War, this new defensive system is evolved, whereby strong-points are arranged in groups of five, (en quinconce—on the four corners of a square and at its center), and in mutually supporting distance determined by the range of the armament installed. This "quartier" is a battalion command utilizing all modern arms, and each is in itself a complete fighting unit. Whereas the first consideration of Vauban was the protection of personnel and armament, that of Col. Lévêque is effective fire power. Both agree upon defense in depth and an active defensive barrier, based upon the assumption that the first line of real resistance will also be the battlefield of the war. Both strategical and tactical considerations will govern the selection of the place fortified, and its fortification must be such as to furnish the maximum fire-power in all directions and be incapable of investment by the enemy.

This study is of immediate importance to all European nations who have new frontiers to defend as a result of the World War. In view of the influence of permanent fortifications in determining the battle lines of the World War, it is agreed that they will play as equally an important rôle in future wars. The problem, therefore, is their modernization to utilize all the latest adjuncts to warfare.

Whether Col. Lévêque's recommendations are adopted or not, this study is of interest to all military leaders, both from the standpoint of attack and defense.

Joffre. By Mermeix. Librarie Ollendorff, Paris. 1919. 4½" x 7½". 370 pp. Paper. Price, 7 francs.

The French High Command experienced two great crises during the World War. The first marked the change from Joffre to Nivelle, and the second, from Nivelle to Petain. A third crisis may be admitted, the demand for a unified inter-Allied command, which brought Foch to power. This book is one of a series of three, each dealing respectively with the three epochs named above.

A great English writer has said that the history of a nation is written in the biographies of its great men. This work is such a history, for it undertakes to elucidate many of the personal complications that embarrassed France at a time when she was fighting for her very existence. The Joffre-Gallieni and Joffre-Sarrail disputes, investigations by General Castelnau at Verdun and M. Roques, Minister of War, at Salonica, political disputes in the French Senate and Chamber which brought Millerand, Briand, Viviani and others to the defense of the military leaders of the war, and in general, a dissatisfaction with the conduct of the war and the efforts of various political factions to place their candidates in posts of high command, form the theme of the book.

Especially in the Annex does the book contain many interesting sidelights on the effect of political pressure at home on the military dispositions during the first two years of the war. It is a book of equal interest to the military as well as political student.

The French Plan of Campaign—(Le Plan de Campagne Francais et le Premier Mois de la Guerre). By General Lanrezac. Payot. Paris. 1921. 4¾"x 7½". Paper. 284 pp. 4 maps. Price, 7½ francs, net.

General Lanrezac contributes this document to the history of the World War to cover in detail the actions of the Fifth French Army during the period of his command, Aug. 2—Sept. 3, 1914.

This army, it will be recalled, occupied the sector from Mezieres to Verdun, and contained some 300,000 men, 110,000 horses and 21,000 vehicles. A chronology of events during this period is as follows:

Aug. 2–12—Concentrations along the Meuse between Mezieres and Verdun.
13—1st Army Corps sent to Dinant.
15—Battle of Dinant.
16–21—Fifth Army shifts to lower Sambre and deploys along the line, Namur-Charleroi.
21–23—Battle of Charleroi.
24–27—Retreat from the Sambre to the Oise.
28–30—Battle of Guise.
Aug. 30–Sept. 3—Retreat from the Oise to the Marne and relief of Gen. Lanrezac.—Gen. Franchet d'Espérey, formerly commanding III A. C. in command.

The book commences with a study of the French Plan of Campaign ("Directive No. 1"), and closes with an explanation of the reason why General Lanrezac

was relieved by Marshal Joffre for alleged indecision and failure to carry out the plans of the General Staff. In rebuttal, Gen. Lanrezac closes his argument with citations from German authors who give him credit for saving his army from total destruction by his timely decisions.

Due to its limited scope the work will appeal principally to those interested in a minute close-up of the war.

My Command in the East—(Mon Commandement en Orient). By Gen. Sarrail. Ernest Flammarion, Publisher. Paris. 1920. 4½" x 7½". Paper. 424 pp. 2 maps. Price, 7¾ francs.

General Sarrail was the Commander-in-Chief of the French and Allied forces sent to the Balkans to aid Serbia, and, if possible, bring Greece into the war on the Allied side. The twenty seven months period of his command, (Sept., 1915–Dec., 1917), was the subject of much controversy in military and political circles. At a time when the Allies were sorely pressed for men and munitions on the Western Front, it is not strange that they turned covetous eyes upon the 300,000 men at Salonica. Especially during the periods of inaction there, did censure fall upon this army from those factions in France not in sympathy with the project.

General Sarrail attempts in this book to explain the circumstances which guided him in his decisions, and treats the subject with great candor. Speaking of his allies, he says: The British desired to leave Constantine upon the throne and abandon the campaign; the Italians wanted Albania only and their further cooperation was uncertain; the Greeks wished to establish a political party in power, and selfishly sought the maximum of gains with a minimum of effort to them, were intriguing and not dependable; and even a strong French faction opposed him because he did not belong to the G.H.Q. "ring."

In a measure, the book is an exposé of alleged intrigues which robbed his expedition of the victorious results expected of it. His final success in forcing the collapse of Bulgaria is, therefore, even more remarkable, considering his hazards.

Aside from the political controversy, the book holds interest for the student of major tactics and strategy. General Sarrail explains with painstaking care the general and special situations, his plan to conform to them, and the creation of his expeditionary force to carry his decisions into effect. All are agreed that the undertaking was a hazardous and delicate operation requiring great strategy and unlimited diplomacy.

In the annexes are to be found practically all correspondence of importance bearing upon the campaign. These documents, together with the explanations of the Commander-in-Chief of the expedition, give the book value as an historical document covering this theatre of the World War.

Handbook of Ballistics.—Volume I. Exterior Ballistics. By Dr. C. Cranz and Captain K. Becker. Translated from the second German edition. H. M. Stationery Office. London, Eng. 1921. 6" x 10." 483 pp. Price, 30s 9d.

To students of ballistics a book by Dr. Cranz is an event of importance, since his studies in this science have largely become doctrine. What a treat it must be then to the student whose equipment of foreign languages is meagre, to be presented with an English translation of so important a work.

The book begins with the subject of the motion of a projectile in a vacuum and in addition to the usual topics under this head, Chapter I contains a section on the trajectory in a vacuum taking into account the decrease of gravity with the altitude and the convergence of vertical lines owing to the curvature of the earth. Chapter II is devoted to the resistance of the air, the four subdivisions being,—air resistance to an elongated shell on the assumption that its axis lies

in the direction of motion of the centre of gravity; on the influence of the skew position of the shell on the direction of motion of the centre of gravity; calculations relating to the shape of the shell head; and the density of the air. Besides fairly complete chapters on the approximate solution of the differential equations, and an investigation of modern methods of calculation, there is a chapter on the high angle trajectory, and the method of swinging this trajectory, also one on the employment of experimental results for the construction of range tables. Lateral deviations of a shell; lateral deviations due to the rotation of the shell; and accidental deviations, are each treated in a separate chapter. There is also a chapter on the explosive effects of shells, or as it is more familiarly known, ballistics of penetration.

Cranz's Ballistics is too widely known both in its original and revised edition to require any further comment. Suffice it to say that the publication of it in English by H.M. Stationery Office fulfills a long felt want. The text is one of conspicuous merit.

TECHNOLOGY

Mars. By William H. Pickering. The Gorham Press. Boston, Mass. 1922. 5½" x 8¼". 172 pp. Ill. Cloth. Price, $2.50.

This little book, coming at a time when the daily press is stirring up the public interest in Mars and the possibility of inter-communication with Mars, contains a fund of information on a subject which is dealt with in the abstract by most of us.

Mars is to many persons the most interesting body in the heavens, chiefly because we have been led to believe that it is inhabited, and our imagination runs riot in an effort to devise bodies and modes of living for the Martians which we liken to our own through our ignorance of any other.

Professor Pickering offers this volume as the results of his lifelong study of the planet. This "Collection of Papers" which constitutes the book itself, is arranged logically for sequence and dates of discoveries, but for a general review, they may be regarded in two groups; "What we know about Mars" and "What we surmise about Mars." Within these two groups, such interesting subjects as the seas of Mars, its canals, seasons, snows, marshes, and the possibility of the earth's communicating with Mars are all discussed in a pleasing and convincing manner. Many halftones from telescopic photographs are used to emphasize the opinions and suppositions of the author.

Practical Advanced Navigation. By Charles H. Cugle. E. P. Dutton and Co. New York. 1922. 6" x 9¼". 53 pp. Price, $3.00.

As its title indicates, this book contains simple rules and problems in the practical higher branches of navigation. What would otherwise appear complex, the subjects considered are given with rules that the ordinary sea-going man can understand, thus making them as simple as any other problem in navigation.

The subjects covered are "Deviation by Star, Planet, and Moon," "Construction of a Mercator Chart," "Great Circle Sailing," "Double Chronometer Method of Determining Ship's Position (commonly known as Johnson's Method, but in this volume worked entirely from Bowditch)". "Tangent Method of Determining Ship's Position by Summer Lines," "Marcq St. Hilaire Method," "Chartlets with the Marcq St. Hilaire and Summer problems plotted on same."

The books used in working the problems are "Bowditch's American Practical Navigator," "1922 American Nautical Almanac," "American Azimuth Table H. O. No. 71," "Azimuths of Celestial Bodies H. O. No. 120."

The Great Circle Courses are worked out complete for a Trans-Atlantic voyage.

Mr. Cugle who wrote, "Simple Rules and Problems in Navigation," has the facility, born of his experience as a teacher and his twenty years as a navigator, of putting these rules of navigation into readable form. He has contented himself with giving these rules in as plain language as possible without attempting to go into theory.

Navigation. U. S. Naval Institution, Annapolis, Md. 1922. 6″ x 9″. 508 pp. Ill. Cloth. Price, $5.65.

This is a new book compiled under the direction of the Head of the Department of Navigation, U. S. N. A., and has been adopted as a textbook for midshipmen and contains chapters on: General definitions, Books and Instruments, The Compass, Piloting, The Sailings, Dead Reckoning, The Chronometer, Time, Nautical Almanac, The Sextant, Bowditch Tables, Latitude, Azimuth, Longitude, Days Work at Sea, The Tides, Identification of Heavenly Bodies, Tactical Handling of Aerial Navigation, together with Abbreviations, Greek Letters, Standards of Accuracy and Extracts from the 1922 Nautical Almanac. This is a splendidly prepared and arranged text, and is of special value to the Artilleryman in view of the present trend of Artillery fire at invisible targets, where the greater the understanding of navigation by the Battery Commander, the better equipped will he be to fire his Battery.

Practical Radio. By Henry Smith Williams. 2d ed. Funk and Wagnalls Co. New York. 1923. 5″ x 7½″. 413 pp. Price, $1.75.

Dr. Williams is author of an imposing list of books on science, and has the happy faculty of presenting obscure scientific facts and theories in such simple language and illustrating them by such simple analogies that the reader soon feels that they are "not half so bad as they have been painted." His chapter on "The restless electron and the radio hook-up" is almost a classic on the internal happenings in the vacuum tube. The mysteries which are so puzzling to the average amateur are presented in the clearest possible way.

Many excellent circuit diagrams are given of sets used in commercial and amateur practice, with full analyses and descriptions. Some unusual but related subjects are covered, such as radio on trains, transmission of pictures by radio, radio control of distant apparatus, etc.

In the more elementary portion of the work the description of each of the several devices used in radio is accompanied by an excellent illustration, and by its appropriate symbol, which will prove of great assistance to the novice.

A very comprehensive index adds to the value of the book as a reference work which may well be kept constantly near the hand of the radio bug, be he beginner or more advanced.

Radio Telephony for Amateurs. By Stuart Ballantine. 2d ed. D. McKay Co. Philadelphia. 1923. 6″ x 8½″. 296 pp. Price, $2.00.

The author, formerly Expert Radio Aid, U. S. Navy, and now Electrician, Radio Frequency Laboratories, Inc., states in his preface "Since 1908 I have longed for the appearance of a certain type of radio book . . . from the pen of an amateur . . . chockful of practical information . . Such a book has never appeared, nor ever shall, for we all have our own ideas as to what it would be like."

However we can safely state that the author has, in a great measure, achieved his object. The book presents clearly and definitely the steps that the average amateur could most easily follow in gaining a basic knowledge of radio and in

constructing a simple receiving set, and, as one reads further it gradually adds sketch, description and theory of more complicated types of apparatus.

The diagrams are clear, and some bring in details of unusual and novel construction. Each "hook-up" is accompanied by a statement of the values of the constants of the component parts of the sets, so that the handy man can reproduce the set experimentally or for more permanent use.

Steam Turbines. By William J. Goudie. Longmans, Green and Co. New York. 1922. 5½" x 8¾". 804 pp. Price, $10.00.

Professor Goudie presents a revised edition of his text-book on "Steam Turbines" which he first published in 1916. His aim was to suit the requirements of engineering students, and engineers who have to deal with the design or operation of steam turbines.

In order to bring the book up to date the author felt compelled to re-write it. Although the general scheme of the first edition has been followed, the number of chapters had to be increased from sixteen to eighteen on account of the new matter introduced.

A large number of worked examples has been added throughout the text, the data in most cases selected in conformity with practical requirements.

Among recent engineering books it will be hard to find a text in which the nomogram or alignment chart for the solution of equations, is more extensively used. Take the case of Callendar's equations. By laying a straight edge across the given pressure on the scale AB of the appropriate nomogram, and the given temperature on the scale CD, the total heat is read where this straight edge cuts the scale EF. Only those who have spent many a weary hour solving one of these equations "long hand" can fully appreciate the value of this mathematical device.

Technical and Scientific German. By E. V. Greenfield. D. C. Heath and Co. New York. 1922. 5" x 7½". 505 pp.

Professor Greenfield's selection of articles of a generally scientific nature is so persuasive in fashion that one wishes that more German science readers would have the tendency not to try to teach the elements of science, but rather to create in the student the desire and conscious ability to read with both pleasure and profit, German books and magazines of a scientific nature.

In the introduction the author impresses the student with the importance of having a thorough knowledge of the participial construction and of word composition, both of which modes of expression because of their conciseness, make an especial appeal to the scientific mind and are made use of constantly.

This reader was first published in 1916 but because of requests that subject-matter be added that would be of more direct interest and benefit to students of electrical and mechanical engineering, the author amplified the original text by adding sections devoted exclusively to these sciences.

Etudés Elémentaires de Météorologie Pratique. By Albert Baldit. Gauthier-Villars. Paris. 1920. 6½" x 10". 428 pp.

This is a new edition, revised and enlarged, of a valuable text on the elements of practical meteorology. It is of especial interest to the artillery and air services for it is largely the result of experience in military meteorology.

Prior to 1914 no army of any nation was equipped to measure atmospheric conditions aloft, particularly the upper winds. But in the few short years which have elapsed development of this science has been so rapid that M. Baldit has found it necessary to revise his text originally published in 1921. That the unusual attention lately given this old science has been fully justified is now generally

acknowledged not only in the military but in the commercial world as well. Books on meteorology have appeared from time to time but these have been concerned mainly with theoretical considerations. This book deals not only with atmospheric conditions at the surface and aloft, but with the methods of measuring these conditions in the field.

Tables Centesimales pour le Trace' des Courbes. By J. Bouchard, Ingenieur Civil. Gauthier-Villars et Cie. Paris, France. 1922. 5″ x 10″. 200 pp. Paper. 15 francs.

This is a handy table of trigonometric functions for use by civil engineers in staking out curves for railroads, roads, canals, etc. The unit of the table is the *grade*, a French unit of circular measure; (1° = 1 grade 11′ 11″, or 1 centigrade = 32″.4). It could find practical application in staking out epis when it is desired to use the *grade* instead of the degree.

Heat. By W. J. H. Calvert. Longmans, Green and Co. New York. 1922. 5″ x 7½″. 336 pp. Illustrated. Price, $1.80.

This book is divided into two parts. The first part is intended to cover the ground of a general school education. Several chapters have a supplement in small type, which can be omitted by beginners without disturbing the continuity of the treatment. The second part, also in the same smaller type, is intended for those specializing in heat as a main subject. It brings the work up to university standard.

The author did not intend that his work should be "Science made easy" for his experience with most beginners has been that they are prepared to make serious effort if they are satisfied that their efforts lead to a reasonable end. He emphasizes the practical application and at the same time keeps the attention fixed upon the underlying principles, not shirking reasonable difficulties.

A First Course in Nomography. By S. Brodetsky. The Open Court Pub. Co. Chicago. 1920. 5½″ x 8¾″. 135 pp.

Here we have a valuable little volume, hardly more than a booklet, which is meant for the average engineer as well as the artilleryman. This is the kind of work we imagine one would select if he were anxious to learn the elements of nomography. It is written for the average reader so it is practically bare of anything obstruse, be it statement or formula.

The author has handled his material admirably, starting with the simple combination of scales for addition, and building his theory gradually until he has reached that form of alignment chart called the nomogram—this special device for graphical calculations which was brought to its present state of development by Professor D'Ocagne.

The method of treatment is based mainly on experience gained by the author in making nomograms for various technological departments in the University of Leeds. It is intended for the student who wishes to learn the theory of nomography and its practical use. The little volume is one of "Bell's Mathematical Series, Advanced Section."

History and Economics

Economic Imperialism. By Professor Achille Viallate. The Macmillan Company. New York. 1923. 5½″ x 8″. 173 pp. Price, $2.00.

This is one of the series of publications of the Williams College Institute of Politics, and represents a series of lectures given in Williams College in 1921 by Professor Viallate of the Ecole Libre des Sciences Politiques, Paris. The lectures

present a recognizably French viewpoint of the economic development of the World which began with the inventions of the 19th century, and the impacts and reactions of this development on political and international relations.

The author shows that first England, then Germany, and finally the United States aspired to an economic imperialism, the essence of which consisted in the industrial development of a home country, coupled with the employment of the generated capital of the process in the exploitation of less developed areas, from which, through agriculture and mining, were received the raw materials required in industry.

Prior to the War there had begun to be awakened the appreciation that the time was approaching when economic internationalism would have to supplant economic imperialism. This tendency was interrupted by the World War. Two important chapters are devoted to an examination of the economic solidarity maintained during the War, and the frightfully unparalleled economic situation which has resulted because of the War. Finally, Professor Viallate insists on the necessity for governments to recognize that political method must take cognizance of economic requirements, and he questions whether the world will be wise enough to renounce economic imperialism for economic internationalism. Taken together the lectures afford the material for rationalizing the outlook over the present situation. Being a scientist rather than a philosopher, Professor Viallate indulges neither in pessimism nor optimism and has no panacea to offer.

A History of California: The Spanish Period. By Charles E. Chapman. The Macmillan Co. New York. 1921. 5¾" x 8½". 527 pp. 3 Ill. 3 Maps. Price, $4.00.

A History of California: The American Period. By Robert G. Cleland. The Macmillan Co. New York. 1922. 5¾" x 8½". 512 pp. Price, $4.00.

We can well forgive much that has been said and written about California—altho at times it has been saturated with enthusiasm that one could wish more finely tempered by intelligence—for many reasons, but particularly because California has a romantic story to tell. The modest Easterner gladly overlooks these lapses into overenthusiasm because of the warmth and friendliness of spirit which characterizes the breezy and confident Westerner.

To Fray Junipere's legendary fame is due much of "that remarkable interest in local history which has been characteristic of the citizens of the Golden State." It is only about 150 years since this "enthusiastic, battling, almost quarrelsome, fearless, keen-witted, fervidly devout, unselfish, single-minded missionary," reared the rafters of the white man's first home on the shores of Alta California. It is only right and proper that this brown-robed adventurer should stand "as the symbol, in the minds of Californians, of the days when their state belonged to Spain."

With such material the authors of the two works here considered, after years of research and investigation, have brought to full fruition, plans which they have matured during years of study. For although these studies are popular history, they are authoritative, and are meant for the student, and the library as well as for the general public.

Dr. Cleland's book complements the work of Dr. Chapman, the general plan of the two books having been agreed upon as far back as 1914. Although there is a slight overlapping in the opening chapters of Dr. Cleland's book, each volume covers a separate field. "Yet" says Dr. Cleland in his preface, "the keynote of the two volumes is essentially the same, namely, that California history is vastly more significant because of its national and international aspects than for any local interest it may possess."

The three objects of the author of the American period, namely,—"to make his

book conform to the canons of sound scholarship; to escape a provincial and localized point of view; and to avoid being classed with those 'who write for nothing so irrelevant as a reader,' " fully characterize these delightful volumes, in which the authors so skilfully set the times in precisely their own perspective.

The United States. By William H. Hudson and Irwin S. Guernsey. Frederick A. Stokes Co. New York. 6″ x 9″. 632 pp. 52 Ill. 23 Maps. Price, $5.00.

This history of the United States from the discovery of the American continent to the end of the World War was undertaken by the late professor William H. Hudson of Stanford University, as a companion volume to his "History of France," but at the time of his death he had only finished the sections up to and including the administration of John Adams. The completion of the work was intrusted to Mr. Guernsey of DeWitt Clinton High School, author of "A Reference History of the War."

The plan adopted by the publishers for the "Great Nation Series" has been followed in this volume. The aim of this series, "to present history in such a way that the reader will understand the underlying soul of each country discussed," comes as near to being attained as is probably possible.

The work is divided into six books (bound in one volume) as follows: "The American Colonies to 1763," "The Revolution and the Early Republic to 1815," "National versus Sectional Interests: 1816-40," "The Slavery Question: 1840-54," "Division and Re-Union: 1854-65," and "Political, Economic, and Social History Since the Civil War: 1865-1920."

The omission of the usual mass of dull statistics and dates in favor of more vital questions, shows a masterly handling of material. The result is a worth while history of the United States in which dry facts are humanized into a rich study of human life. The make-up of the book is worthy of note, particularly for the many full page illustrations.

Miscellaneous

Automobile Blue Book, Volumes 1 and 3. Automobile Blue Books, Inc., Chicago. 1923. 9¼″ x 5½″. Vol. 1: 802 pp. Vol. 3: 830 pp. Flexible fabrikoid binding. Price, $3.00 per volume.

All that was said in the April issue regarding Volume two of this guide applies with equal weight to the two new volumes, which have just been issued. Volume one, entitled New York and New England, includes the states of New York, Connecticut, Massachusetts, Vermont, New Hampshire, Maine, Provinces of Quebec and Ontario, and the Maritime Provinces of Canada. Volume three, the Middle Western volume, covers Michigan, Ohio, Indiana, Kentucky, Illinois, Wisconsin, Minnesota, Iowa and Missouri.

Both volumes contain large folded maps, showing all available routes in the territory covered by the volume, excellent articles on "Getting ready for your tour," road maps of all cities and towns with historical descriptions, and "Points of Interest" along the routes. At the end of each volume are also found full page maps of the Highway systems of the different states, condensed motor laws, Canadian Customs regulations, and Ferry and Steamship schedules in connection with itineraries and ports mentioned in that volume.

A very complete index in each volume lists every place name with its location on the general map, and gives the number of every route which passes thru it.

With these Blue Books, one can start on the longest tour with the same feeling of security that one would have if following a driver who knew every inch of the road, every stopping place, detour and hotel.

American Individualism. By Herbert Hoover. Doubleday, Page and Company. New York. 4¾" x 7¼". 72 pp. Price, $1.00.

When we come to read a doctrinal essay by Mr. Hoover we recall that he has been chiefly associated in the public mind in two particulars. One, as the principal figure and administrator of measures of relief for the millions of destitute and suffering people of Europe. The other relates to the information he has given us from time to time in regard to the business and psychological situation on that continent. In both of these particulars Mr. Hoover attained the confidence and admiration of the American people to the highest degree. The problems arising from those conditions continue and must long continue to be absolutely vital to the prosperity and happiness of all classes of our people and of all mankind. In the light of this undeniable truth, Mr. Hoover's present essay is, I hope, only preparation to more direct efforts on his part toward the settlement of the broader questions which confront us.

Viewed in this light, Mr. Hoover's essay is especially gratifying. It is a plain and candid statement of the fundamentals of our institutions, as viewed by a business man, and as they should be viewed by every citizen, rich or poor. The domestic difficulties which exist are shown to be not of a kind or degree to make it necessary to delay attention to external matters which vitally affect our internal prosperity and happiness, both present, and, from this age on, extending to the unlimited future. It is an essay of assurance and hope, from a man who is not only a great business man, but also an enlightened citizen. It is in large measure from such men that our wisest and best counsel is to be expected at this time; and it is to be hoped that Mr. Hoover has not said his last word.

Motor Campcraft. By F. E. Brimmer, M. A. The Macmillan Co. New York. 1923. 4¾" x 7". 224 pp. Ill. Price, $1.75.

The Auto Blue Book has always seemed to be the one book which carried with it the "lure of the open road," but this volume is a fitting companion. It goes so thoroughly into the details of auto camping trips that one feels that, given means of transportation, a guide book, and this volume, one could attempt almost any trip and reach the destination physically and financially the better for the journey. The book covers exact details of various outfits from the "Chuck a blanket and a few sandwiches into the tonneau, and step on the gas" to the specially built "camping car body" which includes double spring beds, ice box, hot and cold running water, bath tub, to which may be added phonograph, typewriter table, radio set, shaving stand and sewing table.

Very good and clear suggestions are given on the selection of tentage, tools and accessories worth taking, clothing to be worn and packed, different patterns of cooking and heating stoves, illumination for camps, and portable furniture. We learn that one can purchase a "table and chairs combination" of steel and canvas which fold together into small space, and sleeping cots having the same accommodating features.

There are excellent chapters on Cooking-Eating Outfits, Simple Camp Recipes, Where to Make Camp, and Highways of Our Nation. When one reads over this book and notes the multitude of appliances designed especially for the auto-tourist, it can hardly be believed that, as the author states "the first motor trip across the United States was made only twenty years ago," the trip from West to East being made in a single-cylinder nine-horsepower car.

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