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The French 5th Army from August 10, to September 15, 1914

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UPON the completion of their concentrations both France and Germany planned to push an offensive into enemy territory.

Due to this fact the campaign of 1914 opened with three great mass encounters between the Germans and the allied armies:

The first in Lorraine, in which the 1st and 2nd French Armies were engaged with the VI and VII German armies.

The second in the Ardennes, in which the 3rd and 4th French Armies were engaged with the IV and V German Armies.

The third on the Sambre and Meuse, in which the French 5th Army, the British Expeditionary Force and one Belgian Division (the 4th) were engaged with the German I, II, and III Armies.

It is with this last encounter and with the operations leading up to it and immediately following that the French 5th Army is particularly concerned.

The main feature of the German plan was to be the wheel of a mass of attack of five armies, I to V, on a front Brussels—Metz, pivoting on the fortified area Metz—Thionville. The inner flank of the wheel was to be covered by the VI and VII Armies in Lorraine and Alsace respectively.

The French plan was as follows:

1st and 2nd Armies, each of 5 corps, to operate between the Moselle and the Rhine.

5th Army (5 Corps), and the Cavalry Corps, to operate to the north of the line of the Moselle.

3rd Army (3 corps), to furnish liaison between the right and left groups above.

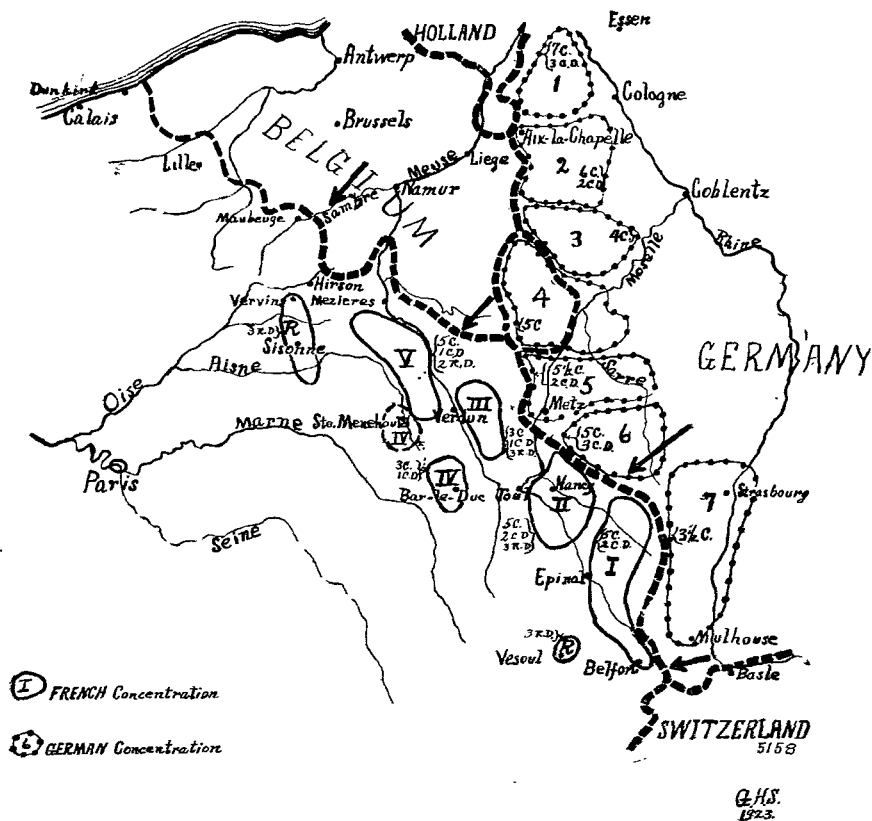
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4th Army (3 corps), in reserve position in the second line ready to attack either north or south of the 3rd Army.

Two groups, (3 divisions each), behind the wings of the general line and to be under orders of the commander-in-chief.

Such other forces as may later become available, African and Alpine, to be disposed as circumstances dictate.

In accordance with this plan the 1st and 2nd French Armies advanced from the front Pont a Mousson—St. Dié, August 13th, and encountered



the German VI and VII Armies, which, on August 20th, counter-attacked from the east and south, with the result that the 1st and 2nd French Armies withdrew to the line Verdun—Nancy—Belfort.

Having information of the German masses coming through Belgium via Liège and vicinity, the French High Command assumed that the German center must be weak if the right and left were strong and attacked with the 3rd and 4th Armies into Belgium Luxemburg. This attack commenced on August 21st but by the afternoon of August 22d was definitely stopped by the IV and V German Armies.

The 5th Army in accordance with this general plan was to concentrate under cover of the Meuse between Verdun (exclusive) and Mezieres. It consisted of the 1st, 2d, 3d, 10th and 11th Corps; the 4th Division of Cavalry, and 2 reserve divisions, the 52d and 60th.

Sordet's Cavalry Corps was provisionally attached to it.

Army headquarters were at Rethel; the Cavalry Division and the 2d Corps (less Mangin's Brigade) covered the concentration in the Marville Corridor to the east of Stenay.

The strength of the Army was 160,000 rifles, 8000 sabers, 800 guns, with a ration strength of 300,000.

Of Mangin's Brigade one regiment was at Sedan and one at Givet.

The 5th Army was to operate north of the line Verdun—Metz in conjunction with Sordet's Cavalry Corps.

The concentration commenced on August 3 and was completed August 11.

G.H.Q. issued on August 8th General Instructions No. 1. According to these instructions the 2d Corps passed from the 5th to the 4th Army and the Zone of the 5th Army was moved to the north so that when it advanced it was to cross the Meuse between Mouzon and Mezieres.

This change was made with the belief still held that the German attack at Liège was a demonstration and not an advance in force of a great flanking group.

This belief therefore imposed on the 5th Army a rôle of strategic waiting until such time as under the new plan this army and the 4th Army on its right could be redispensed to accord with it.

On August 5 Sordet's cavalry corps had passed to the control of G.H.Q. and was moved forward from Sedan on Neufchateau to protect this part of Luxemburg and to reconnoiter toward Luxemburg and Montmedy. It was ordered on August 8 to cover the front of the 5th Army.

On August 11th and 12th minor engagements occurred between the 2d Corps and advance guard detachments of the Germans.

On August 12th Lanrezac, fearing for his left, secured permission from G.H.Q. to move his 1st Corps from Mezieres to Dinant. This movement was executed on August 13th.

On August 13th French G.H.Q. issued instructions to the 3rd, 4th and 5th Armies and to Sordet's Cavalry and at the same time it issued orders for the attack by the 1st and 2nd Armies in Lorraine previously mentioned. So much of these instructions as apply to the 5th Army and Sordet follow:

"The 5th Army, now concentrated between Auberton and Vouziers, will hold the heads of its main body 8 or 10 kilometers behind the Meuse. It will not counter-attack until the enemy has engaged part of his forces on the left bank. * * * Below Mezieres and up to Givet the crossings of the Meuse will be energetically defended and destroyed if necessary.

"The 1st Corps will cover the left of the 5th Army and will lend support to Sordet's Cavalry Corps.

"Sordet's Cavalry will hold itself on the left of the 5th Army and carry out its original mission but will not cross to the left bank of the Meuse if it can remain on the right.

"Should the enemy be found to be distant, all measures will be taken from August 15 to permit the 4th and 5th Armies to push rapidly on the front Beauraing—Gedinne—Paliseul—Fay-des-Veneurs—Cuignono (5th Army) and Tetaigne—Margut—Quincy (4th Army)."

Fearing the German advance through Belgium would strike his left and rear, General Lanrezac was greatly perturbed by these orders.

On August 14, thoroughly convinced of the seriousness of the threat, he endeavored to induce the French G.H.Q. to modify its orders. G.H.Q. at first refused but later, on August 15, authorized him to prepare 2 Corps besides the 1st, now around Dinant, for a movement more to the north to meet what it termed a *possible* German advance from that direction.

However, no actual movement north of these corps was to be made without further orders from G.H.Q.

On this same day, August 15, at 1 P.M. several German battalions, supported by several batteries, attacked at Dinant and secured a foothold on the left bank of the Meuse. They were driven back by the 1st Corps under d'Esperey and the bridge retained intact.

At 7 P.M. of August 15, Lanrezac received orders by phone to move two of his corps to the north.

The written orders received about midnight August 15/16 read as follows:

"1. The enemy seems to be making his principal effort on his right to the north of Givet. He has another group of forces which appear to march toward the front Sedan—Montmedy—Damvillers.

"2. The 5th Army, leaving its right corps, the 11th, and its reserve divisions, the 52d and 60th, for the defense of the Meuse, and placing the 4th Cavalry Division at the disposal of the 4th Army, will move the rest of its troops to the region of Philippeville or Marienbourg to act with the English and Belgians against the Northern German group. Sordet's Cavalry Corps and the G.D.R. at Vervins pass to the 5th Army.

"The 4th Army to which are attached the 4th Cavalry Division, the 11th Corps, and the 52d and 60th Reserve Divisions, will establish itself faced to the northeast so that it can debouch from the front Sedan—Montmedy in the general direction of Neufchateau."

The movement of the 5th Army from August 16 to August 20 to the designated locations was made without incident save that demonstrations by the Germans occurred along the Meuse from Namur to Givet and some German patrols appeared on the Sambre in front of Namur.

The Cavalry Corps (Sordet) had moved August 15 to the west of Dinant and, greatly fatigued, received on August 16th from G.H.Q. orders to push to the north of the Sambre to operate in liaison with the Belgian Army. Its movement actually commenced August 17. French

G.H.Q. was much irritated that Sordet did not move sooner as it felt the necessity of liaison with the Belgians in order to prevent their withdrawal.

On August 20th in the evening the allied situation to the west of the Meuse was as follows:

5th Army.

Hdqs. Signy-le-Petit.

1st Corps, Hdqs. Anthee. Main body west of Dinant with advance posts on the Meuse from Revin to Namur and on the Sambre from Namur to Floreffe inclusive.

51st Division near Rocroi marching on Dinant which it was to reach August 22.

10th Corps, Hdqs. Florennes. Main body in the zone Fosse—Philippeville, advance posts on the Sambre from Auvélais to Tamines inclusive.

3rd Corps, Hdqs. Walcourt. Main body in the zone Gerpinnes—Journioux—Gourdinnes. Advance posts on the Sambre from Roselies to Marchiennes au Pont.

Sordet's Cavalry Corps, behind the Charleroi—Brussels Canal, its advance posts guarding the crossing from Gosselies to Seneffe.

18th Corps, detrainment completed August 20, echeloned with its head at Baumont, in march on Thuin, which it was to reach noon of the 21st.

Reserve divisions, Valabregue, still in Hirson—Vervins Area, waiting to move to the northeast of Maubeuge as soon as the English and 18th Corps have made the way free.

French cavalry detachments are in contact with German Cavalry, those of the 1st, 3d, and 10th Corps to the north of the Sambre, those of Sordet on the line Charleroi—Nivelles.

The English Army has finished detraining in the zone Landrecies—Cambrai and will reach the front Conde sur Escant—Mons—Binche on the 22d.

The Belgian main army was retreating to Antwerp. Namur was invested on the north and seemed fated to fall soon. The Belgian commander, Michel, requested Joffre to send reinforcements. Joffre ordered a reserve division sent but Lanrezac found this impossible. For political reasons however 4 battalions are sent.

The general idea of French G.H.Q. with reference to the operations of the 5th French Army and the British was that the movement was to pivot on Namur and swing to the northeast across the Sambre, the British moving from the area of Mons in the general direction of Nivelles. It was expected that the British army would strike the flank of the German advance.

The situation of the I, II and III German Armies on August 20th, was as follows:

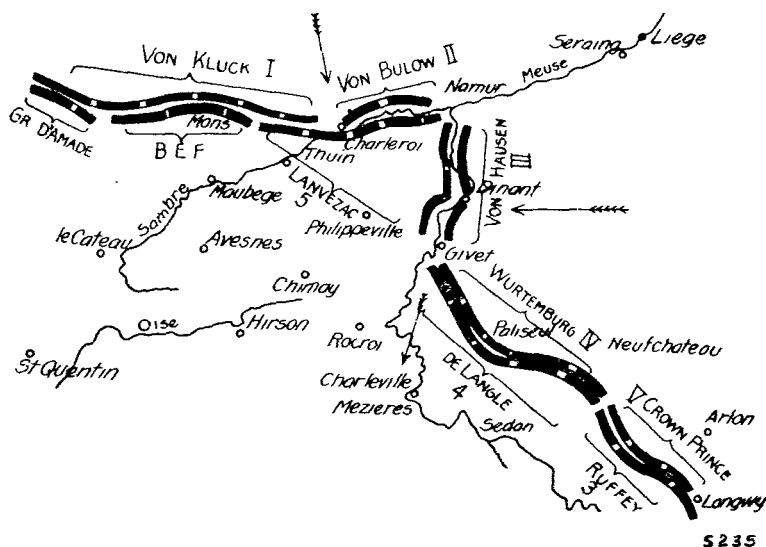
The I and II Armies, the I on the outer flank, crossed on the morning of August 20 the line Brussels—Namur and began to wheel south-westward toward France. The II Cavalry Corps covered the outer flank and the I Cavalry Corps was at the disposal of the II Army.

The III Army, marching westward through the Northern Ardennes toward the Meuse, was east of the line Spontin—Ciney by the 20th.

The German High Command was aware of the presence of the French on the Sambre and the Meuse but the French strength was underestimated.

The German operation orders issued on August 20, for the approaching encounter were as follows:

"The offensive about to take place against the enemy west of Namur must be carried out in conjunction with the attack of the III Army

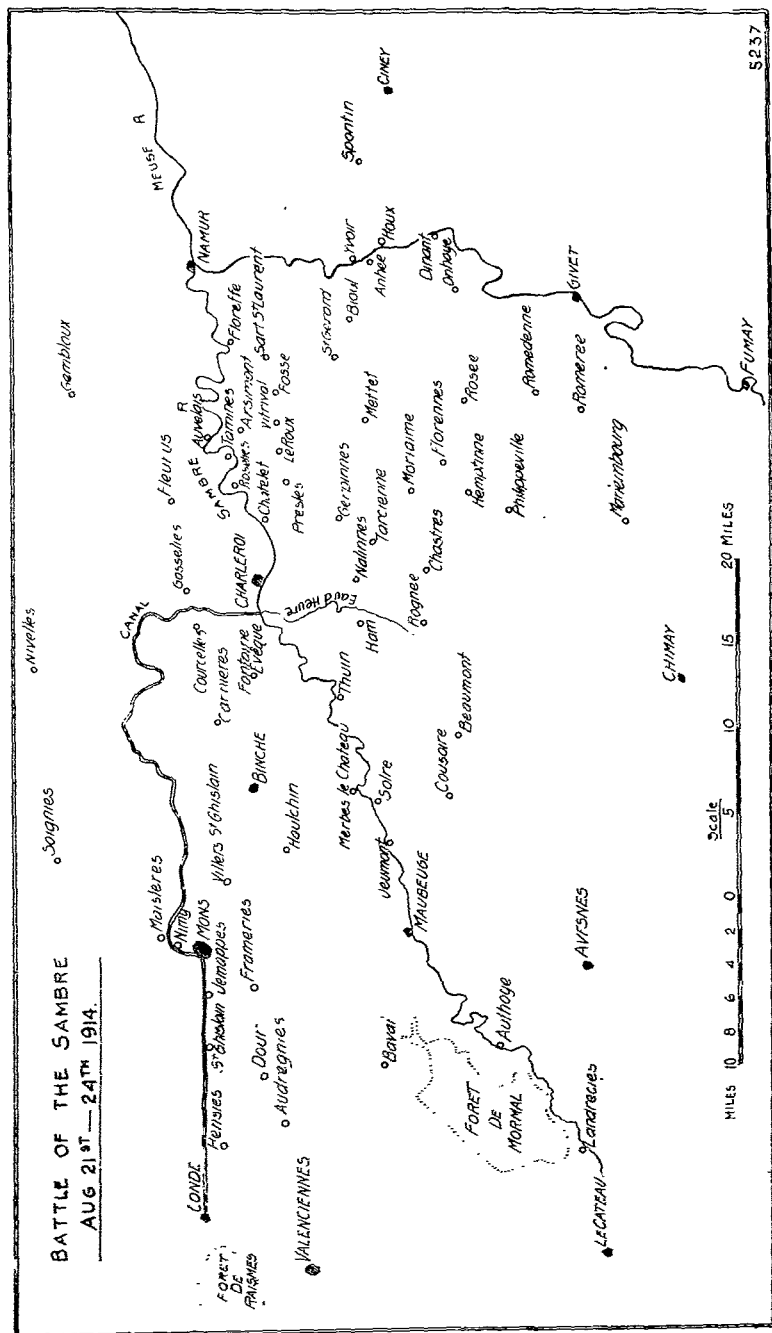


MAP NO. 2

against the line of the Meuse between Namur and Givet; the details are left to the Army commanders concerned to arrange among themselves."

In consequence of the above, von Bülow, commanding the I and II Armies and the senior of the three Army commanders, assumed the command of the operations, though the III Army was never placed under his command.

On August 21st the French 5th Army was closing up on its advance guards. No troops were to advance into the Valley of the Sambre except small detachments at the river crossings. The bridges were left intact.



On the afternoon of the 21st the advance guards of the II German Army finding only small detachments guarding the Sambre crossings pushed across the river at Auvelais, Tamines, Roselies and Charleroi, and established bridgeheads on the southern bank. Sordet was forced back from the front Nivelles—Gosselies to the high ground about Courcelles and Carnieres, west of Charleroi.

On the morning of August 22d three German Corps crossed the river and, notwithstanding fierce but uncoordinated counter-attacks, launched by parts of the 3d and 10th French Corps, were able to gain ground to the south.

On the early morning of the 22d, the 3d and 10th Corps had executed without army authority counter-attacks against the small bridge-heads established by the Germans in the valley of the Sambre on the south bank on the preceding afternoon. These were repulsed and the French driven back to the high ground south of the Sambre.

At nightfall August 22 the French line was as follows:

10th Corps, Fosse—Vitrival—Le Roux. 3rd Corps, Gerpennes—Tarcinnes—Vallinnes. On the right of the 10th Corps, the 1st Corps was in the area Sart—St. Laurent—the Meuse, with the 51st Division guarding the Meuse crossings from Yvoir southward to Dinant and Givet. On the left of the 3rd Corps the 18th Corps held the line Ham-sur-Heure—Thuin. Sordet was south of the Sambre about Cousolre. Behind him were Valabregue's 2 reserve divisions. This was in general the line prescribed by the Army for the night of August 20th.

Believing the Sambre to be strongly held by the French, von Bülow ordered the II Army to "close up to a line Binche—Fontaine L'Eveque—north bank of the Sambre on the 22d ready to cross the morning of the 23d, when it would cooperate with the III Army and assist it to cross the Meuse."

During the night of the 21, 22d he received information that led him to believe he was opposed by three French Cavalry Corps and a weak force of infantry. Accordingly he abandoned the idea of the combined attack of the three armies and at 12.45 P.M. the 22d, ordered a general advance. "The Second Army will reach the line Binche—Mettet (some ten miles south of the Sambre) today." He requested the III Army to advance at the same time with its right on Mettet. This advance did not push beyond that of the 3 Corps made in the morning.

On August 23 at daybreak the II German Army opened a heavy bombardment to which the French were unable to reply effectively due to lack of heavy guns. The German Guards Corps drove the 10th Corps south of Mettet; the German 10th Corps forced the 3d Corps back to the vicinity of Walcourt; and the German 10th Reserve Corps drove the 10th Corps to the line Thuin—Merbes—Le Chateau.

During the morning of August 23d the 1st Corps had started an attack against the left flank of the II German Army from the vicinity

of St. Laurent and St. Gerard. This caused the division on the German left flank to halt and face it. However, just at this time, 1 P.M., word was received that the Germans had crossed the Meuse southwest of Onhaye, 8 miles to his rear, and that the 51st Division, left to guard the Meuse, was retiring.

This caused the corps commander, d'Esperey, at once to move the main body of his corps toward Anbee and Dinant, to support the 51st Division. This line was reached at nightfall, but the German detachment did not attempt to advance beyond Onhaye that night.

This German advance was by the III Army, von Hausen's, which in the early morning of August 23d attacked the Meuse crossings, 57 batteries and two corps being engaged in the attack.

On August 22d and 23d, the British Army, which had arrived on the left on the 21st, had been attacked by the German I Army on the line Binche—Mons—Conde, but had held its position. The offensive of the French 3rd and 4th Armies, which had started on August 21st, had been stopped at once by the German IV and V Armies. The French 4th Army, which was along the Semoy River, on the right of the French 5th Army, had its left near Givet.

By evening of the 23d reports of the operations on its flanks showed the 5th Army Headquarters, at Chimay, that the Army's situation was critical.

Furthermore Lanrezac was now aware of the following facts:

1st, the 4th French Army was in retreat southward;

2nd, the III German Army was now free to devote its whole attention to forcing the Meuse in his rear and had already effected a lodgment on the west bank;

3rd, while the British Army had arrived on his left the evening before, it refused to attack northeast as he requested due to the pressure the I German Army was bringing to bear on it. Shortly thereafter the presence of this Army, heretofore not suspected, was discovered;

4th, Namur had fallen.

It was now apparent to Lanrezac that, instead of pushing an offensive across the Sambre, as directed by G.H.Q., he must retreat if he was to save his Army.

In consequence he decided in the evening of the 23d to order the withdrawal of his army on his own initiative.

The retreat began the night of August 23, 24 and at the close of the 24th the 5th Army was south of the line Givet—Philippeville—Beaumont—Maubeuge.

During the morning of August 24th, the British, on the left, withdrew and by nightfall were on a line east and west of Bavai, practically in prolongation of the French left, although a gap of some 12 miles existed between the 18th Corps and the British.

Sordet's cavalry was on its way to cover the British left. Von

Bülow had ordered, on the 24th, a general attack of the I, II, and III German Armies but this attack found little to meet it.

The French Army withdrew toward the Meuse with its left near Mezieres. On the evening of the 25th, the 9th Corps of the 4th Army was given the mission of connecting the 4th and 5th Armies. It performed this mission until August 29 when the III German Army pushed between it and the 5th Army.

The 4th Army held its left near Mezieres until the 29th when it fell back to the line Buzancy—Rethel, and crossed the Aisne on the 30th.

The 3rd Army fell back on Verdun and held it. Thus the left flank and center armies pivoted on Verdun.

During this period the 1st and 2nd Armies successfully held the Germans in the east.

August 25 by evening the 5th Army had reached the line Avesnes—Chimay, having been engaged during the day, fighting Bülow's advance guards, as well as fighting von Hausen on the right.

At 10 P.M. August 25th General Joffre issued the following order for a general retirement, "The proposed offensive movement having been found impracticable, further operations will be arranged so as to reconstitute on our left massed troops, who will be able to regain the offensive, consisting of combined forces of the Fourth and Fifth Armies, in conjunction with the British Army and the new forces taken from the Eastern Region, while the other armies will hold the enemy as long as necessary. The movements of these armies will be covered by rear guards left on the ground with entrenchments, so placed as to make the best use of all obstacles and to stop by short and violent counter-attacks the progress of the enemy. Artillery will constitute the principal element in these counter-attacks." It further provided that the British should retire to the line Bray-sur-Somme—Ham, the 5th Army to Vernand—Moy—La Fère—Laon—Craonne, the 4th Army to the middle Aisne, the 3rd Army to the Argonne—Verdun line. From this situation the offensive was to be resumed.

August 26th, the 5th Army continued its retreat, moving, however, more to the southwest on account of the pressure of von Hausen. Two French reserve divisions went to the assistance of the British right corps on this date.

On the afternoon of August 27th the 5th Army was crossing the Oise and by evening it was across.

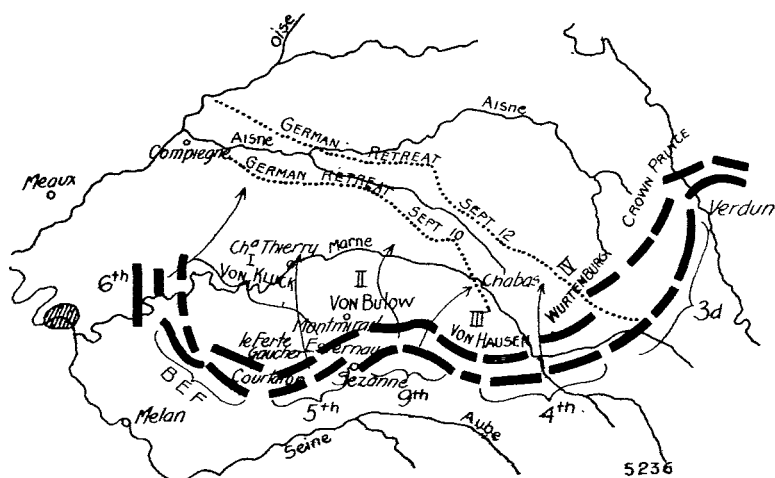
On August 27 Joffre ordered the 5th Army to attack toward St. Quentin, to relieve the pressure on the British, who were at this time to Lanrezac's left rear and who reached the line Noyon and La Fere on the 28th.

The 1st, 10th, 3d, and 18th Corps from right to left lay between Aubenton and Guise, with covering detachments on the right and left.

To make the attack ordered, it was necessary to transfer the strength to the left. To secure this, orders were issued for movements to take place August 28th. The 3d and 18th Corps from the right were to take post along the Oise between Origny, St. Benoite, and Moy, and attack toward St. Quentin. The 1st Corps was to move to Sains and form the army reserve. The 10th Corps was to take post along the Oise east of Guise. The British 1st Corps was to cooperate.

In the evening the II German army was on the line Wassigny—Etreux—Laschelle—LaCapelle.

On the 28th Lanrezac moved his corps into position behind the Oise while von Bülow ordered two corps on his left to cross the Oise. This order would bring the German left upon Lanrezac's right in his attack against St. Quentin.



MAP No. 4

Lanrezac commenced crossing the Oise to attack at daybreak the 29th. At 9 A.M., his 10th Corps was attacked from the north. This required the main body of the Army to fight faced to the north, and St. Quentin was masked by the left Corps. The French drove the Germans back across the Oise. On Lanrezac's left, however, his left corps were driven across the Oise. Isolated on both flanks, on the evening of the 30th, the 5th Army withdrew pursuant to orders from G.H.Q. and by the 31st was disposed in a great semicircle around Laon.

This attack released the British from German pressure. By the 3d of September Lanrezac had crossed the Aisne and the Marne and in the afternoon was replaced by d'Esperey.

On September 4th the 5th Army crossed to the south of the Grand Morin, to the southwest of Crecy, having broken off contact with the enemy.

September 5th the 5th Army extended from Courtacon on the left to the region Esternay—Sezanne on the right. The 9th Army was on its right, the British Army on its left. Attached to it was Conneau's Cavalry Corps.

On September 6th the 5th Army, in conjunction with the British and the 6th French Army, attacked north from its position of September 5th. The 2nd Cavalry Corps furnished contact with the British.

On the 7th the 5th Army pushed forward rapidly some 6 miles to the line Le Ferte Gaucher—Trefols and rendered signal service to the 9th Army on its right, which, being violently attacked, had called for assistance.

On the 8th the 5th Army crossed the Petit Morin at Montmirail, and on the 9th crossed the Marne at Chateau-Thierry, the 5th Army again coming to the assistance of the 9th Army.

On the 10th the pursuit by the 5th Army was conducted by Conneau's Cavalry Corps which by evening was on the north bank of the Ourcq holding the line Oulchy-le-Chateau—Fere-en-Tardenois and in contact with the British.

In conjunction with the 6th and British Armies the 5th Army took up the pursuit of the German right wing which continued to the Aisne which was reached September 14th.

On the following day the Battle of the Aisne began.

COMMENTS

The outstanding figure in the operations west of the Meuse up to September 3d was Lanrezac. In April 1914 he became the commander *designate* of the French 5th Army and, having studied the probable development of a German offensive against France from that viewpoint, he considered even then that his 5th Army on the left of the line would be exposed to the weight of a decisive German attack through Southern Belgium. The French General Staff thought otherwise and thus early the difference of opinion between them became pronounced. It was accentuated also by the fact that Lanrezac was an exponent of the defensive-offensive while the French General Staff advocated the adoption of an immediate and continued offensive.

Lanrezac did not fail to make his views known and on July 31st, forwarded to Joffre a letter in which he drew his attention to the probability of a German advance through Belgium. Throughout his service in command of the 5th Army he was continually at variance with French G.H.Q. Between the 7th and 10th of August he sent his Chief of Staff to G.H.Q. at Vitry, again calling attention to the necessity of giving consideration to the guarding of the Meuse toward Namur.

He was informed that responsibility for stopping a flanking attack on his left did not devolve upon him. Continuing his efforts, he was on August 12th permitted to send his 1st Corps to Dinant and after

continued representations was directed on August 15th to move his Army to the lower Sambre. However great Lanrezac's foresight may have been, he had created between himself and G.H.Q. a feeling which made full and willing cooperation difficult. He had difficulty with Marshal French the first day he met him, August 17th, and his attitude, as was also that of Marshal French, precluded full cooperation between them. Based solely on his own story it is believed that inability to cooperate was Lanrezac's main fault.

It will be noted that twice during the battle of the Marne we find d'Esperey cooperating and assisting the 9th Army on his right, while Lanrezac's efforts in this direction were limited to sending two divisions to the assistance of the British right on August 26th. While the battle of Guise served to relieve the British right, it was made by Joffre's order and brought forth the usual protest from Lanrezac. There was lack of cooperation between the units of the 5th Army on the Sambre.

Had there been unity of command in the allied forces west of the Meuse, better results could have been accomplished. Certainly under such an arrangement the British would not have been left exposed on both flanks for twelve hours without knowledge of the withdrawal of the 5th Army and Haig could have been used to assist Lanrezac's left at the battle of Guise. Moreover, the 4th Belgian division would have been available for use on the 5th Army's right instead of disappearing as a military factor in the retreat from the Sambre.

Naturally the political factors involved rendered this impossible at the time. It has been said there were three commanders at the Battle of the Sambre, King Albert, General Joffre, and Marshal French. The name of Marshal French might have been replaced by Lord Kitchener as French was continually complaining of the control Lord Kitchener exercised from England.

Marshal French's announced intention of withdrawing on his base after the retreat might have been carried out had not Lord Kitchener intervened. No such movement by Marshal French would even have been considered had a single commander controlled the forces west of the Meuse.

Sordet was for such a short time under Lanrezac's command that consideration of his movements does not come within the scope of this paper; but had he been continually under Lanrezac's command, his wild and useless rides would have been avoided and he could have been used to gain much needed information north of the Sambre and west of the Meuse.

Lanrezac advanced to the Sambre under orders to cross it and take the offensive to the north. Had he pushed across the Sambre on the 21st as he could have done with part of his force it is believed that the result might have been disastrous to the French. However, exponent of the defensive-offensive as he was, he failed to take proper precautions

to see that proper defensive positions were taken up and prepared on the heights south of the Sambre. Although he states that he ordered entrenchments constructed, it is the duty of a commander to see that his orders are carried out as well as to issue them. It was particularly necessary in this case as he was, according to his own statements, aware of the predilection of many of his officers for the offensive with a consequent disregard for defensive measures. Altogether he seems to have failed to have any defensive plan for the 22d, at least none that he communicated to his corps commanders.

The action of d'Esperey, commanding the 1st Corps, in stopping his counter attack on August 23d against the German left about Sart St. Laurent and going to the assistance of the 51st Division, about Orhay, has been criticised by some.

In spite of the fact that the Germans went no further than Orhay on the night of the 23d, it is believed that immediate and adequate measures were necessary to meet this threat some eight miles to the right rear of the 5th Army. Had von Hausen's III Army effected a crossing on the 23d in force and moved west without opposition other than then existed, the results might well have been so tremendous that there would have been no battle of the Marne. However, had Lanrezac provided a reserve and properly placed it, the necessity for the 1st Corps taking over this duty would have been obviated.

Before and during the battle of the Sambre the Germans, the 5th Army and French G.H.Q., were all sadly lacking in information as to the strength and movements of the opposing forces.

Neither Lanrezac nor von Bülow knew the strength of the other, while the presence of von Hausen and von Kluck when revealed came as a surprise to French G.H.Q. and, in so far as von Kluck was concerned, to Lanrezac. Moreover Lanrezac was ignorant of the strength of von Hausen. Such lack of information resulted in a failure to provide the security essential to the intelligent handling of the opposing armies.

In the retreat from the Sambre the 5th Army was well led by Lanrezac and crossed the Aisne in such shape as to render a good account of itself at the Battle of the Marne. Lanrezac was criticised by G.H.Q. for being pessimistic and hesitant. Under the circumstances there was little on which he could base optimism. That he was hesitant may perhaps have been the case due to his innate feeling that conditions called for a defensive role while G.H.Q. was forcing on him an offensive one. It is believed that, had he been permitted to move to the Sambre some days earlier than he did, there would have been less reason to accuse him of hesitancy. All in all he appears to have rendered France a great service on the flank of the French armies and a less far seeing commander might well have caused irreparable disaster to French arms.

At the battle of Guise he was ordered to attack west when he was echeloned to the northeast. While bitterly complaining about the

order he executed an able maneuver and all but succeeded in carrying out his attack as ordered and planned.

Again he denounced the French high command and on September 3d was relieved of command of the 5th Army which was taken over by General d'Esperey.

French G.H.Q. planned its original deployment apparently on the assumption that the front would extend from the Rhine to Belgian Luxemburg inclusive as a maximum, and that the enemy would not cross the Meuse below its junction with the Sambre, that is, north of Namur. Obsessed with this idea G.H.Q. clung to it, even though on August 4th Liège was attacked and Belgian neutrality was violated. To risk drawing Great Britain into the conflict on the side of France merely to stage a demonstration is inconceivable even for German mentality. Yet this is the idea that French G.H.Q. persisted in, as evidenced by the General Instructions No. 1 of August 8.

In fact this idea persisted until August 15th when Lanrezac was permitted to begin his march toward the Sambre.

Lanrezac objected to the initial deployment as ordered by G.H.Q. and of course to their idea of the Lorraine and Ardennes offensives. He suggested that the armies in Alsace and Lorraine be reduced to 6 or 7 Corps to act defensively while staging offensive demonstrations; that the 3rd and 5th Armies be concentrated on the front Verdun—Mezieres, first to take the defensive and later to stage an offensive against Thionville and to the north; that Valebregue's reserve divisions be placed at the southern exits of the forests between Mezieres and Maubeuge; that Sordet's Cavalry extend from the Lower Meuse two marches below Givet to Maubeuge; that the 4th Army (4 corps) have 1 corps at Maubeuge with Sordet's Cavalry, and the other 3 Corps echeloned to the left around Rozoy-sur-Serre, so that they could in three marches either join the left of the 5th army on the Meuse or reach Maubeuge; that two corps, constitute a general reserve to be established behind the center in the zone Bar-le-Duc—Chalons—Briennes, ready for rail movement wherever needed; that the English Army concentrate eventually around Valenciennes; and that the fortified regions Lille—Maubeuge serve as points of support for a field army.

If we accept this plan we still render ourselves liable to be outflanked by the German advance as actually executed, particularly if the English do not come up in time.

Furthermore it leaves Belgium to the mercy of the enemy without any effort to protect it. The question arises as to what disposition should have been made of the 5th Army that would permit of the effective protection of Belgium or at least the major portion of it.

On August 4th Belgium called on France for help. At this time it was practicable to have moved Sordet's Corps immediately north to the assistance of the Belgian Army, had the significance of the attack been

realized by French G.H.Q. The 4th Army could have been diverted at this time and moved by rail to assist the Belgians in creating a defensive line based on Namur on the right and Antwerp on the left, passing through Wavre and thence along the Dyle. The Germans did not reach this line until August 18th as it was, and two weeks would have been available to make the required dispositions. The 5th Army under this plan would have been required to extend its front greatly and take over the line of the Meuse practically from Verdun to Namur. However, much of this line is readily defended, thanks to the character of the Meuse Valley and subsequent displacements from the 1st and 2nd Armies as well as the African divisions and the English would have served to strengthen it against German attacks. A general reserve in the area Mons—Maubeuge would have permitted prompt reinforcement both north and south of Namur. As a matter of fact the line Verdun—Mezieres—Namur—Antwerp is little if any longer than the line Verdun—Mezieres—Namur—Conde, and with proper foresight could have been much more strongly held than was that line at the time of the battle of the Sambre. The Belgian Army would have been available, and it is to be hoped that all troops north of Verdun would have been placed under one commander.

German mobilization antedated that of the French by 48 hours. Throughout the first stages of the War, French G.H.Q. failed to realize that "Germany, as attacker, had the initiative; she could determine the form of battle and make her enemy conform to her will." Furthermore, G.H.Q. failed to recognize that modern weapons increased the relative strength of the defensive, even though they decreased the value of fixed fortifications as such.

Had the 5th Army been placed as above suggested and the corresponding changes made as recommended, it is believed that the war could have been kept out of France, the initiative eventually regained and the war materially shortened.

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Camp Pontanezen and its Billeting System

By Major Harold E. Small, C.A.C.



CONDITIONS that existed in Camp Pontanezen (which were well advertised in the American Press while the camp was in its first stages of construction), can best be understood after a consideration of the climatic peculiarities which had to be overcome in building that great camp. In that particular part of France it begins to rain about November first and continues to rain every day until about April fifteenth. From about December first to about April first it rains all day and during this period the sun is almost never seen. The soil is a soft loam which does not require much moisture to be turned to a sticky mud. With all of the precipitation of December, thousands of troops in a congested space waiting for a transport and meantime tramping over the ground without sidewalks to walk on, it is easy to see that in a very short time the mud at Pontanezen became intolerable. As the work of construction of the camp did not commence until the Armistice, and as the troops began to arrive at the same time as the construction began, living conditions in the camp were very bad the first two or three months. This could not be avoided. Surely the Commanding General of the American Expeditionary Forces would not have been justified in diverting supplies from the front, in those last days before the Armistice, for the construction of a camp at Brest. Nor could the cargo space that was needed for the materials to build the camp be spared when the fight was at its height. After the work on the camp began it was hurried at top speed; all the troops in the camp worked day and night to make the camp better for those who came after them. At the time that the author arrived at Camp Pontanezen, about February 20, 1919, tremendous progress had been made. Practically all the temporary barracks had been completed, about four thousand of the five thousand five hundred tents had been erected, at least three thousand of these were floored, there were plank sidewalks along all of the main roads and all around the troop kitchens, and duckboard sidewalks had been made for all of the inner parts where it was necessary for a man to go. (It was just at this time that the newspaper publicity in the United States began. Much that was published was absolutely false and a good deal more was greatly exaggerated.) To be sure we still had mud with us and it was easy to get into, if one wanted

to, but by this time it had become unnecessary. I occasionally found photographers in the camp hunting out its worst spots (places where no one ever went) and taking pictures of them—I presume for publication. On one occasion I was told of a photographer who took a picture of some men at work draining a swamp so as to show how the men had to wade in mud! These men were all equipped with hip boots. By the middle of April the construction of the camp had progressed so far that the living conditions became such as to make the camp the best that the American Army had ever had. French and British officers who visited Brest considered this camp as a model. It was at about this time that the Congressional Committee visited the camp to investigate the "horrible conditions that existed at Brest." The only adverse comment made by the committee during their inspection (if the comment can be considered as adverse), was that they were afraid the men who passed through Brest were babied too much. They expressed the opinion that the living conditions were then excellent and the camp one that could well be copied by those in the United States.

The Billeting Department of Camp Pontanezen passed through six more or less distinct stages of organization from the time of my arrival at the camp (about February 20, 1919), until the time that the last of the camp was turned over to the French Military authorities on December 31, 1919. At the time of my arrival at the camp it was divided for billeting purposes into about nine "sections." The billeting head of each of these sections was a lieutenant or captain who had a small detachment at the section billeting station, and who operated the billeting system of that section under the supervision of the Camp Billeting Officer, who was located in the Main Billeting Office at the entrance of the camp. In the latter office was done all of the administrative work for the Billeting Department as well as the assignment of troops to billeting sections for billets and to troop kitchens for mess. The entire personnel of the department consisted of about fifteen officers and about two hundred men, the latter all special duty men from the 319th Engineers, the 8th Infantry, and the 5th Machine Gun Battalion, U.S.M.C. Nearly one half of these men were on duty at the Main Billeting Station as guides, runners, switchboard operators, clerks, etc.

On March 1, 1919, the Camp Commander, Brig. Gen. Smedley D. Butler, U.S.M.C., reorganized the camp into seventeen billeting areas, designated as Area A, and Areas 1 to 16. Each of these areas was a more or less complete unit having its own billeting station for the details of billeting and minor construction (operated

under the Main Billeting Office), its own troop kitchen, welfare hut for recreation, wash-houses, inspector, sanitary officer, and billeting space for about 5,000 men. Areas A and 1 to 10 were areas in which the billets were temporary barracks of the frame and corrugated iron type, and Nos. 11 to 16 were tented areas (under ordinary circumstances, six men were billeted in each tent). Bunks in the barrack areas were of the familiar 4 man standee type, and in the tents steel cots and hospital beds were used. By the first of May about 5500 tents had been erected, floored, and "strongbacked" (that is, the tents were fastened to a framework of two by four lumber so constructed that the walls of the tent were vertical and they would just reach to the floor). All of the tents that were used after March 1, 1919, were floored and strongbacked. The hospital area with a patient capacity of about 3500 beds was included in Area A, and the venereal camp was a separate area called the Segregation Camp. Neither the hospital nor the Segregation Camp were used for billeting under the Billeting Department until about November 1, when a part of the hospital area was used. The total capacity of the camp was somewhat over 95,000 when the camp was fully built, and it covered a space about one and three fourths miles long by one and a quarter miles wide.

About April 1, 1919, the Billeting Areas were separated from the supervision of the Camp Billeting Officer and placed under the Commandant of Billeting Areas in order that the work of construction in the Billeting Areas (being done under the supervision of the Billeting Department) might be hurried. The Camp Billeting Officer continued to perform the duties of assigning troops to the billeting areas for billets and to the kitchens for mess, of guiding the troops from the train to the Billeting Area to which they were assigned and from the camp to the docks, and of keeping all records pertaining to the Billeting Department.

On June 15, 1919, the offices of the Camp Billeting Officer and the Commandant of Billeting Areas were combined under the Commandant of Billeting Areas.

About August 1, 1919, the number of troops passing through the camp decreased to such an extent that work was begun to turn over the camp, an Area at a time, to the French Liquidation Commission. The tented portion of the camp was turned over first and the Americans gradually withdrew toward the walled area of the old French camp, which was the only portion that the Americans occupied on December 1, 1919.

September 15, 1919, the Billeting and Camp Engineer Departments were combined into the Utilities Department under the Billeting Officer.

PERSONNEL

In April, 1919, the table of organization for the Billeting Department provided for a Lieutenant Colonel, Billeting Officer, and the following personnel for the Main Billeting Office: 3 majors as heads of departments of the Main Billeting Office, about 5 captains and 6 lieutenants as assistants, 1 regimental sergeant major (chief clerk), 3 battalion sergeant majors, about 20 sergeants, 20 corporals and 10 privates. Each Billeting Area was allowed 1 major as Area Commandant, 1 captain as assistant and 3 lieutenants (of whom 1 was to be Area Supply Officer), 1 Battalion Sergeant Major, 5 sergeants, 9 corporals and 9 privates. The personnel for the Main Billeting Office included the guides stations at the railroad station and at the exit to the camp for troops enroute to the docks. All of this personnel was to be recruited for the Army Service Corps from the troops passing through the camp enroute for the United States. Men so transferred to the Army Service Corps became part of the Pontanezen Embarkation Detachment. They performed no drills or duty with the detachment, which was only an organization containing all of the Army Service Corps men on special duty in the camp and having an authorized strength of about 1200 men of all grades from regimental sergeant major down to private. The table of organization for the Billeting Department was never filled, and indeed it was found that the authorized strength was more than that necessary to properly perform the duties of the department. The morale of the Billeting personnel was at all times very high, due, no doubt, largely to the special privileges allowed these men when they were not actually on duty. Their quarters were as a rule better than most of the quarters for the officers, as they were allowed to use for the improvement of their quarters any material that they found during their spare time off duty. In cases where they showed special aptitude for the work these men were given promotion far in advance of what they would have been entitled to in the line of the Army.

The officers and men were often required to work 24 hours at a stretch in order that the necessary work might be completed and the required improvements made, as well as to see that all troops arriving were promptly billeted and cared for properly, whether they arrived in the middle of the night or during the day.

The personnel of a department such as that at Brest should always be capable of replacement on short notice with the exception of a very small nucleus to train the new personnel. Except for a nucleus of about 75% of the officers and 10% of the men, the Billeting Personnel of Camp Pontanezen was changed, on one occasion, three times in one month. The changes were necessary on account of the fact that the organizations from which the men were detailed on special duty were ordered out of the camp. (Only a small minority of the personnel was from the Army Service Corps until the last month or two of the camp). The 8th Infantry was ordered to the American Forces in Germany; the 5th Machine Gun Battalion, 11th and 13th Regiments, U.S.M.C., to the United States and the Overseas Replacement troops to replace emergency men in the regular divisions in Germany. About September 1, 1919, all of the emergency personnel was relieved from further duty for return to the United States. After this time there was a steady decrease in personnel as fast as the conditions would permit. By December 1 the personnel had been reduced to one officer and eight men.

The maximum strength of the Billeting Personnel was about 65 officers and 275 men. Of the officers about 50 were lieutenants, 3 were majors and the remainder were captains. As stated above, the table was too large for a camp operated as Camp Pontanezen was. Probably 75% of the enlisted and 60% of the officer personnel would suffice for a similar camp as concentrated as Camp Pontanezen was.

FUNCTIONS OF THE BILLETING PERSONNEL OF CAMP PONTANEZEN

The term Billeting Department, when applied to the Billeting Department at Camp Pontanezen, is more or less misleading as to the functions performed by that department. It acted as a general guide and information bureau for all troops and welfare personnel of the camp, particularly transient troops. Non-commissioned officer guides met all of the troop trains as they arrived in the Kermoor Track station in Brest (the station into which all of the American troop trains were switched on arriving in Brest), and immediately obtained from the train commander a list showing the organizations on the train and the approximate strengths of each. These lists were turned over to one of the other N.C.O's at the station to be telephoned to the Main Billeting Office of the camp, and the troops were conducted to the mess hall located across from the station where they were served a hot meal by the kitchen and mess division of the camp regardless of the hour of arrival. The ap-

proximate hour of arrival was always known by telegraph from the Railway Transport Officers at Rennes and at St. Briec, and the meal was prepared in advance. As soon as the troops had finished the meal they were conducted to the camp by the N.C.O. guide. Meanwhile, the information received from the train commander when the train arrived had been phoned to the camp and the Main Billeting Office (which was located at the entrance of the camp) had prepared billeting slips from its list of vacant billets (received once a day, or oftener if necessary, from the Area Billeting stations), and had notified the Area billeting station that the troops would arrive, the approximate hour of their arrival, and the number to be billeted. The Main Billeting Office also notified the Camp Inspector's Office, the Camp Adjutant, the Camp Detail Office, and other offices desiring the information, that the troops were enroute; and again when the troops arrived at the entrance to the camp, notified the same offices. At the same time that an assignment to billets was made the troops were assigned to one of the troop kitchens for mess. Assignment to troop kitchens was made through the Main Billeting Office in order that the loads on the various kitchens might be kept as nearly equal as possible. The distance from the railroad station to the camp was about five miles and practically all of it was up-hill, so that about two hours was necessary to make the march, and this allowed plenty of time for all of the details to be arranged for the proper reception of the troops.

As soon as the column arrived at the Main Billeting Office a new guide met the column and the commanding officer of the unit was presented with a copy of the camp orders and regulations. The guide from the railroad station returned to his post for further duty there. The new guide conducted the troops to the Billeting station of the Area to which they were assigned for billets. At the latter station they were met by the Billeting personnel of the Area. The officers were detached by the Area Commandant while the enlisted personnel of the station put the men of the transient organization into their billets. Meanwhile, the Area Commandant explained to the officers of the organization where the men would find water for washing and drinking, the guard that must be established, the police regulations for the area, and the requirement of the Camp Commander that all organization commanders should sign for and draw from the Area Billeting Officer *at once* two blankets and one bedsack per man whether the men wanted them or not. Organization commanders were also informed that one suit of denim clothing could be drawn for each man for fatigue if desired, that tables for company offices were available for issue at the billeting station,

that fuel and candles, (in cases where there were no electric lights), could be drawn daily at the station; and that police tools must be drawn. The Billeting personnel told them of the location of the recreation buildings of the area, the athletic fields, the camp library and other points of interest in the camp; and explained that the billeting station and personnel were bureaus of information. The commanding officers were furnished with rough maps of the camp, and given the necessary instructions for arrangements for the mess of the organization. In general, the instructions for the arrangements for the mess were, that a mess officer must be appointed for the organization who would confer with the kitchen officer to secure the necessary details as to the kitchen police to be furnished, (up to 7% could be called for by the kitchen officer if necessary), the time that troops were to arrive for the mess, synchronization of watches, etc. Kitchen police details were for twenty-four hours and must be kept filled at all times. By the time that these things had been explained the men had been billeted and were back to draw their blankets, bedsacks, denim and tools for police. Organizations were required to draw the two blankets for the men because it was found that in some cases the officers were so absorbed in getting through the camp that they would not permit the men to draw blankets, because of the extra bother to the officer and the small time that it would take to turn them in when the unit left the camp. If desired, the men could draw more than the two blankets. All equipment of any kind that was drawn from the Billeting Department by the transient troops had to be turned in before they left the camp and after they had received their orders to march to the docks to embark. Ordinarily, there was not a delay of over two minutes at any place between the time that the troops arrived at the entrance to the camp and the time that they were actually in their billets, it being the desire of the camp authorities to keep the men moving until they had gotten into their billets and removed their packs. It generally took an average of about forty-five minutes for a train load of one thousand men to arrive in their billets and receive their blankets and bedsacks. Delays were promptly investigated and remedial measures taken to prevent recurrences. All blankets, bedsacks, denim, etc., turned in by transient troops was sterilized at the delousing plant before being re-issued to other troops. Fatigue details ordered through the Camp Detail Office from the transient troops at such times as they were not needed for physical, vermin or equipment inspection, or for bathing or delousing, worked under the supervision of the commissioned and enlisted personnel of the several billeting stations daily. They hauled blankets to and from

the delouser, did police work of ground not in the immediate vicinity of the troop billets, drained and ditched, built duckboard sidewalks, erected tents in the tented areas, floored and strongbacked tents, installed iron beds and mattresses in the tents, dug latrines and constructed latrine buildings. Besides these duties, they worked at swamp drainage, landscape gardening around the billeting station and area, painting of all of the buildings, drawing of supplies and turning in for salvage those worn out, hauling of lumber including sections of tent floors and duckboard sidewalks that had been assembled in the Engineer saw-mills, all minor construction and repair, etc. All of this work was done under the direct supervision and direction of the Billeting officers and men. In cases where material was not available for the work to be done it was generally taken from the Camp Engineer's Department. Among other jobs performed by the department was the erection, flooring, strongbacking, and ditching of about 5500 tents and the joining of all of these tents and all of the barracks buildings of the camp with the main roads by a plenty of duckboard sidewalk, and the ditching of all of this sidewalk so that no men would have to walk in mud. Over 400 buildings were painted in ten days just before the arrival of the Congressional Military Committee. Generally the theft of property from one job for use in construction in another was overlooked and at most only an admonition to discontinue the practice was all that could be expected if caught. Everyone was after results and if the means of securing those results were not too flagrant a violation of orders no questions were asked.

All billets of troops were inspected daily for police by the Area Commandant and a member of the Camp Inspector's Department. They were again inspected just before the unit left the camp and after they had made their final police. For this inspection the Area Commandant was accompanied by the Commanding Officer of the unit. After the inspection, if the result was satisfactory to the Area Commandant, the Commanding Officer of the troops was required to sign a certificate in the following general form: "I certify that the billets occupied by this organization have been thoroughly policed and that all property belonging to the billeting department has been turned in, that no property has been removed or destroyed, and that an inspection has been made for all books belonging to the American Library Association and that all books so found have been returned to the camp library or to the Area Billeting Station." (Books so turned in to the Area Billeting Stations were returned to the Camp Library.) All salvage articles found at the last minute were turned in to the Billeting Station to be delivered by the Billet-

ing Department to the Camp Salvage Officer. If the Police of the Area was satisfactory to the Area Commandant he issued a "clearance" to the commanding officer of the unit and furnished him with a guide to the Embarkation guides office, where an Embarkation guide was picked up to conduct the troops to the docks. In some cases the troops left the areas without making the final inspections of police, and in cases where this was too flagrant they were ordered back from the docks by telephone before the unit was permitted to embark and required to make the necessary police, and to settle the property responsibility to the satisfaction of the Area Commandant.

It was necessary to use guides to conduct the troops to and from the camp by particular routes on account of the large numbers of men arriving and leaving daily. Ordinarily from 4000 to 6000 men arrived daily and departures in a single day sometimes totalled over 20,000 and were often over 10,000. It can readily be seen that unless different routes were used and proper routes rigidly followed, all traffic from the port to the camp would have been practically impossible. The camp was largely supplied by motor transport so that this would have created an intolerable condition. Some idea of the congestion of roads and walks within the camp can be obtained when in addition to the movements outlined above it is remembered that the ordinary camp population was from 60,000 to 70,000 and that on at least three occasions the population reached over 90,000 (all in a space of $13\frac{1}{4}$ miles by $11\frac{1}{2}$ miles) and that all of these men must use roads to go to meals three times a day and to their work, inspections, etc. Practically no military police or traffic regulation men were used because they were little needed, and men were not kept on jobs where their services were little needed.

The Billeting Department kept accurate records of the camp population, issued daily bulletins of all troops in camp, strengths of the units, their location, the kitchens they messed at, records of the loads carried by the different kitchens, time of arrival and departure of units, etc.

Criticisms were invited from all of the organization commanders when they left the camp and any adverse criticisms were immediately investigated by the Camp Billeting Officer or Commandant of Billeting Areas and the necessary action taken to prevent a recurrence of the incidents causing such criticism; or if the case warranted it, it was turned over to the Camp Inspector's Department for a more thorough investigation. Suggestions that were of value were immediately adopted throughout the department.

Each Billeting Station conducted a small sales commissary

selling tobacco, candy, and fruit and toilet articles for the convenience of the troops located in the Area. A baseball diamond was made in all areas in which there was the necessary space for it and there were about twenty tennis courts constructed by the Billeting Department and operated by it, the equipment for the courts for use of the transient troops being furnished the billeting department by the various welfare organizations. Welfare buildings and the grounds around them were kept policed by the Billeting Department, and where it was possible any assistance desired by the welfare workers was given.

During the last few months of the operation of the camp, a great deal of extra work was experienced in co-operating with the Pontanezen Casual Depot in the billeting of the individual casual officers and men, then re-billeting them when they had had their records inspected and were put into "forming companies," with a third assignment to billets for each man when he was placed into a "formed company," and possibly a fourth assignment if that company had to move to make room for other formed companies. In addition to this the Billeting Department kept accurate check of the location of each officer, the fact that each officer and man reported promptly for an inspection of records and for inspection for vermin and venereal disease, that they received their orders at the proper time, and strange as it may seem *that they were actually present to move to the docks for embarkation.*

When I was assigned as Commandant of Billeting Areas by General Butler I was told by him that it was the duty of my department to get anything that transient troops asked for, to assist them in every way possible, and to make their stay in Camp Pontanezen as pleasant as possible. With his approval, the department also assumed the duty of doing any work belonging to another department which could be done under the supervision of the Billeting Department and which was not promptly done by the proper department. As a rule the particular department was not generally consulted and often did not know that the work needed to be done. The motto of the Billeting Department could always be stated in the word "Co-operation."

All of the changes for the better, new duties assumed, variations in the routine, etc., in the Billeting Department were not the work of one day or of one specific period, but improvement was constantly going on until the camp closed. Errors were corrected as they were found and new ideas and methods adopted as they presented themselves.

The Angular Travel Method of Position Finding

By Captain A. M. Jackson, C. A. C.



HIS method of position finding is based on the assumption that during the predicting interval and the time of flight the angular velocity of a target as observed from a given point is constant. This assumption is of course slightly erroneous in all cases except where the target is travelling toward or away from the observer or at a constant speed on the arc of a circle of which the observer is the center. However, for small intervals of time, i. e., less than one minute, the angular velocity of a marine target as observed from a given point is, for all practical purposes, constant.

The determination of the setforward point on the prediction board or on the plotting board is at best a tedious and time-consuming operation, requiring great rapidity of operation with attending inaccuracy. Further, the data determined by employing the prediction board lags behind the actual conditions, so that with a target proceeding along a sinuous or zig-zag course, the prediction board setforward points will always be one step behind the target. It is not known whether prediction boards have been developed to such general extent that they can be operated on the basis of a 30 second predicting interval, but it has been the experience of the writer that a one minute predicting interval is the shortest that can be used and still allow the gun section sufficient time to properly apply the data to the gun. With the probability of marine targets capable of rapidly changing direction during an engagement wherein the volume of fire with more or less approximate data will be the determining factor, it is thought that the methods of predicting now in vogue would be incapable of meeting the requirements.

The angular travel method of position finding places the burden of predicting the setforward point where it rightly belongs—on those who are in the best position to calculate it—the observers. If the base-end observers can determine, even approximately, what the azimuth of the target will be at the instant of impact, as viewed from their stations, then the intersection of these azimuths on the plotting board will be the setforward point. There remains only to apply the ballistic corrections to the range and azimuth of that point and transmit the same to the emplacement. It has been found that observers can do this, and do it accurately.

With this method, when a given target is assigned to the base-end stations the observer determines accurately the azimuth of the target on the third stroke of the next bell (time 1). This azimuth is called to the plotting room in the usual manner by the reader and during the time interval the plotter has determined the range to the target from the battery and has called back to the readers the time of flight for that range. On time 2 the observer again stops his instrument and the angular travel during the last time interval (30 seconds) is noted. On a special slide-rule this value is set opposite the time of flight as received from the plotting room during the last time interval and from the index on the slide-rule is noted the angular travel during the time of flight plus the predicting interval. This angular value is then set off by the pointer on the splash scale of the instrument in such a manner that when the target is followed by traversing the instrument so that the pointer is always on the target, the vertical cross-hair will always be directed at the setforward point.

Inasmuch as the instrument is oriented on the vertical cross-wire the azimuth index will at any instant indicate the azimuth of the setforward point from that station. Hence on time 3 or at any succeeding time or instant the instrument can be stopped and the azimuth of the setforward point can be read to the plotting room. The gun can then be fired 30 seconds later. In this method the reader has, in addition to his regular duties, the task of determining this displacement of the pointer from the vertical wire. This displacement will vary with the angular velocity and with the time of flight. The time of flight is called from the plotting room every time it changes one second. The angular velocity is checked after each time interval bell by noting the azimuth difference of the last two predictions. This is recorded by the reader in the usual manner. For purposes of analysis the reader records on the same sheet the angular displacement of the pointer from the vertical wire so that this value can be added to or subtracted from the setforward azimuth to determine the actual azimuth on the time interval bell. It has been found practicable to train observers and readers in the application of this method in three drill periods. It is to be noted however that the application of this method is limited by the present construction of matériel. For instance the W. and S. azimuth instrument, Model 1910, has a splash scale that reads only 1.25° on either side of the vertical wire, so that a target travelling at a high angular velocity would have a greater displacement during the predicting interval plus the time of flight than would be possible to set on the instrument as it is now constructed. Should this system have suf-

ficient merit to warrant its general adoption it is believed that the instrument could be modified to take care of greater displacements of the pointer.

With a target proceeding along an irregular course the observer, after some training, knows when the target changes its course, and knows it *at the time*, and knowing it, he can readjust the position of the movable pointer so as to indicate a greater or lesser angular velocity and hence he can make a reasonably close prediction while the target is changing its course or speed.

The range section for a major caliber battery under this system would consist of two observers, two readers, and a plotting room detail of five men. This system possesses an advantage over the prediction board system if only in the matter of personnel. The duties of the plotting room detail are as follows:

Plotter: Determines the intersection of the primary and secondary arms on the plotting board and calls the range to the setforward point to the Pratt Range Board operator or to the operator of the percentage correction slide-rule in case the latter system is used.

Indicates the time of flight to the arm-setters every time it changes one second. In calculating the time of flight he uses the corrected range.

No. 1. After the plotter has called off the range and is still holding the gun-arm stationary No. 1 notes the azimuth indicated on the gun-arm azimuth scale, sets it on a special slide-rule that applies the ballistic correction and calls the corrected azimuth over the telephone to the azimuth-setter at the gun.

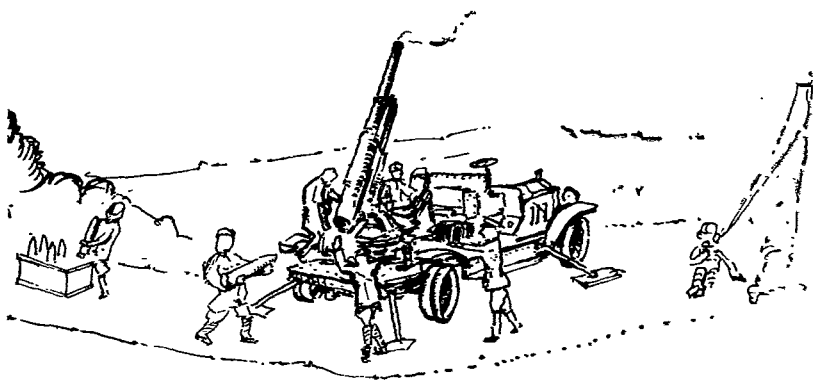
No. 2: Sets the primary arm on the plotting board in the usual manner and transmits the time of flight to his reader every time it is indicated by the plotter.

No. 3: Sets the secondary arm. Duties identical to those of No. 2.

No. 4: Operates the Pratt Range Board or the percentage range correction slide-rule. Notes the range called by the plotter, applies the ballistic correction to it and calls the corrected range to the gun.

This method of position finding was employed during annual target practice at Battery Kingman (12" Model 1895 Mk. I Bar-bette carriage, model 1917) at Fort Hancock, New Jersey on September 10th, 1923. The results attained were excellent. A course of setforward points was traced on the plotting board at ranges from 13,000 to 9000 yards. The course was as smooth as the best

courses of plotted points under the normal system of position finding. The setforward point was located at an average of 5 seconds after the bell. The range and azimuth data were received at the emplacement at an average of 14 seconds after the bell, allowing 16 seconds for the setting and verifying of the data. As a safety measure the Battery Commander was bridged on the azimuth telephone line so that he overheard the transmission and repetition of azimuth data between the plotting room and the emplacement. An analysis of the practice shows that the target was, except in only one case, exactly on the setforward point at the instant of impact. In that one excepted case the towing tug had allowed the target to drift sideways with the current during a halt on account of interference and consequently an error of 50 yards in range and $.10^{\circ}$ in direction occurred. On the second leg of the practice four shots were fired in six minutes, the greatest range section error being 20 yards. A greater rate of fire could perhaps have been attained had the gun been elevated and depressed electrically.



Is Chemical Warfare More Inhuman Than Gunfire?

(Reprinted from *The Military Surgeon* for October, 1923)

By Lieutenant Colonel Albert P. Francine, Med. O.R.C., U.S.A.



HERE are appearing from time to time articles or editorials in the press against the use of poison gas in warfare, based on the assumption that this is more deadly and inhuman than other methods. While not wishing to go on record as defending any branch of warfare, directed as they all are to the killing or maiming of human beings, yet this point of view calls for comment.

1. Because it reflects admirably the opinion of the vast majority of people, who visualize large groups of men struggling in torment, gasping and choking, and dying in acute agony. This is a very incorrect picture and therefore unfair and dangerous, as all untruth is unfair and dangerous.

2. Because it is based on an erroneous, though natural conception, but failure to recognize the essential features, of chemical warfare as it developed and existed in the last summer of the war when it was most effectively and vigorously pushed.

3. Because it fosters a propaganda of unpreparedness, in an inevitable branch of offensive and defensive warfare of the future, and is therefore un-American and unwittingly unpatriotic.

I can speak the more convincingly perhaps because I am not a professional soldier nor professional propagandist of any kind, except for better health and welfare, and speak from first-hand practical experience in the hospital and in the field. As Consultant in Gas to the IV U. S. Army Corps from July, 1918, till after the armistice, six weeks of which was spent as Resident Physician-in-Chief to the great gas hospital at Toul, I had every opportunity to see and learn, and must have been wanting in observation and understanding if I did not see and learn.

Let me, at the outset, invite special attention to official figures of the Report of the Surgeon General for 1920. They say figures can be made to tell any story, and I think they can, but it is hard to get but one story from the official fact that of the total battle

casualties from all causes during the war among U. S. troops, more than one-quarter were due to gas alone; and that of these, less than 2 per cent died; while of those injured by gunfire, high explosives and similar methods, more than 24 per cent died! Thus gas was twelve times a better risk than bullets and high explosives. More striking still, these latter were responsible for twenty-five times as many blinded as gas. Out of over 70,000 gas casualties, there were just twenty-nine men blinded in one or both eyes!

One cannot estimate suffering in terms of percentages, and anyone's conclusions, though earnestly arrived at, may be wrong. The public formed its opinion on gas, once and for all, in the shock of those early accounts of the chlorine cloud-gas attacks on the British on the western front, and the Russians on the eastern front, on troops surprised and defenseless. These vivid pictures were made before gas defense had been developed, and were indeed cruel, ghastly and inhuman.

This use of gas was indefensible on the score of honor, because Germany was a signatory twice to The Hague Convention outlawing the use of poison gas in warfare; on the score of humanity, because of the frightful trail of suffering and death. It was, from the German point of view, a most successful strategic military surprise. Had the Germans been able at the time of Ypres to use gas in the amounts, manner, and kind developed by the spring of 1918, they would have quickly won the war. No human power, nothing could have stopped them.

But under the urge of self-preservation or annihilation, defense was quickly organized against this deadly weapon. The gas mask, at first a flimsy thing, sprang into being, soon to be perfected; and gas discipline was established for all troops. Germany had long been prepared to strike with gas, and she had struck a terrible, surprising blow, but it had fallen short. The so-called asphyxiant gases, like chlorine and phosgene, acting through the respiratory tract, soon lost much of their efficiency as battle gases due to gas defense. All forms of gas which have to be inspired unfiltered for their effects are innocuous against the gas mask.

It should be noted that the different gases attack primarily certain functions or systems of the body; thus the lungs, like phosgene and chlorine; the eyes, tear gas; the nose and pharynx, sneezing gas. There we have a very pertinent feature of the development of the science of chemical warfare and the effort at protection against it. This should not be lost sight of in thinking of possible gases of the future; they must permeate the mask as at present or in the future constituted, or they must act on some unprotected surface of the

body. It is well not to let our imagination run wild in weird tales or dreams of gases that will kill or maim armies by the wholesale. The answer is gas defense. In reference to unprotected civil populations it is absolutely essential that chemical warfare should not be used against cities or towns, since with gas, as it already exists, these could be wiped out over night.

Meanwhile, cloud effects depending on the strength and direction of the wind, as for instance the liberation of gas from batteries of the Livens projector camouflaged in No Man's Land, became too uncertain and too inefficient against the improvement in the mask. The Germans made the next great step forward in using gas in shells. Thus any given area or terrain could be reached with accuracy and with any combination of gases.

The only unprotected surface of the human body remained the skin. The Germans next called upon their research chemists to discover, and their great dye and chemical works to produce in quantity, a gas that would strike man where he was unprotected, and there appeared the greatest of all battle gases, mustard gas, or yellow-cross—not nearly as deadly as phosgene or chlorine, but many times more effective in producing casualties. Phosgene and chlorine are only effective in such high concentration, hence, in such restricted area and are disseminated in the air so quickly as not to be compared to mustard against protected troops. It must be clear to everyone that you could not chloroform or etherize a man in the open unless you held him down and shut out the air. The same applies largely to all gases, even the deadly and instantaneous hydrocyanic acid and carbon monoxide, a good whiff or two of which in high concentration will kill. But you have to reckon with the dissemination by the air, and they cannot be used effectively as battle gases. Further, it is plain that strategically it is vastly more important to put 2,000 men permanently out of the lines than to kill 15 or 20 men outright. This is exactly what mustard did. To understand chemical warfare at the peak of its efficiency, one must understand mustard gas and its effects.

It is not what the public would consider a gas at all, as it is a heavy oil thrown in shell. Great extent of terrain can thus be contaminated for long periods of time, as long as ten days or two weeks, particularly in damp, wet, low-lying fields or woods. It volatilizes with difficulty and only under warm sunshine, when it is detectable by odor. Troops going into such areas or bivouacking there are burned, that is, gassed. It is usually not inhaled at all, or very slightly. The action is escharotic like ivy poisoning, if you will, and burns take some time to appear, often twenty-four hours.

Superficial burns heal in a few days; deep-seated burns take a long time but are not very painful. It is simply an acid burn. So that all but the most severe cases who have inhaled the gas, recover in due course, with no permanent damage done. It leaves few, if any, pathological after-effects. It does not even give rise to activity in latent or so-called healed tuberculous lesions, as some for a while thought.

So when I think of the hundreds of men littered in the great gas hospital every night or so, and the overflow had to be cared for in adjacent hospitals, I do not picture men who were coughing, choking or gasping for breath, for they were not; but of men cold and exhausted from exposure and want of sleep, quiet, or occasionally laughing, fellows burned more or less seriously about the eyes and body. Casualties all right, but not suffering like torn men, and not to be permanently disabled or even scarred. Approximately 90 per cent of the cases in the hospital were suffering from mustard gas, and 80 per cent of these were not seriously gassed. In only 20 per cent was the condition severe enough to confine the men to bed for more than forty-eight hours. The death rate in the hospital was 1.98 per cent, and nearly all deaths were from mustard gas. This percentage again goes to show that the mortality and effects of gas, where gas defense had become well-developed, have been, as was to be expected, greatly exaggerated in the minds of laymen, doctors, and soldiers themselves, who did not study it closely, and among large groups.

Casualties from gas have a direct relation to the gas discipline in an organization. This should be clearly and definitely understood. It was not at all exceptional in two companies, side by side, exposed to the same straffing with gas, to find three-quarters of the men in one company gassed, and not a single case in the other company. In one instance a battery commander kept his men in respirators for eight hours without a casualty, while a neighboring battery, careless in wearing the mask, or taking it off too soon, were all gassed. Gas discipline had to be continually and strictly kept up. The men often do not like to wear the mask, grew careless about adjusting it properly, or took it off too soon, careless even of gas itself. The Germans encouraged this neglect by repeated abortive attacks with non-toxic gases. An organization which had been in a position a good while would be shelled with tear or sneezing gas, with intentional ineffectiveness. Then suddenly they would be drenched with the real thing. Or the men of a new organization, relieving an old one, would sometimes be told by their comrades not to worry about gas. They made light of it. With the idea of

taking advantage of developing carelessness, for the Germans knew the moment a change in the line was effected, the enemy would follow the above tactics, lightly shelling outlying areas, kid them along, so to speak, and then suddenly let them have it—result, hundreds of casualties.

In all villages back of the lines, jammed with troops in support, and at all cross-roads, Klaxon automobile horns were set up. They were sounded at the beginning of a gas attack, and every one was under orders to quickly adjust his mask, carried always (at the front) on the chest in the so-called alert position. Men did not always do it if not under the eye of their officers, and there would be scattered casualties.

Brig. Gen. Amos A. Fries, Chief of the Chemical Warfare Service, has dealt with this subject in a masterly and interesting way, as has Col. H. L. Gilchrist, and Col. James Robb Church and others. I mention them because professional soldiers are accused of a partisan view about chemical warfare. But they know and their opinions should be listened to.

CONCLUSIONS

1. The terrible impression people have of gas arises from its early, tragic, inhuman and indefensible use against troops, surprised and defenseless before this untried but potent offensive weapon.

2. People generally, including even soldiers, have a much distorted mental picture of its effects, and begin by thinking of it as of the nature of deadly fumes. This is only true within limitations. The effects of gassing are, in the majority of cases, superficial eye and body burns. Gas of any kind seldom kills outright in the field. It temporarily disables.

3. Mustard gas is the most effective of all battle gases in being the greatest casualty producer, and hence was by far the most widely used. It is not usually inhaled. It is a burn.

4. The percentage of deaths from gas and of permanent disability (blindness) was both absolute and relatively extremely low.

5. Chemical warfare put more men out of action with less hurt to the individual than any other branch of the service.

6. Following the perfection of methods of defense against it, it became many times less inhuman than shot and shell.

7. Anyone who saw closely the use and effect of gas would far rather be exposed to a gas attack than take a chance with a half-inch of red-hot flying steel.

8. It put over 70,000 of our men out of the war with usually slight and temporary injuries who otherwise would have continued to be exposed to the damaging effects, severity, and cruelty of gun fire. To this extent gas may be looked upon as having protected this particular group.

9. So far as mere savagery and brutality goes, gas is refinement in warfare. It is, in this relation, as much an advance over gunpowder as the latter was over the broadsword, battle axe and pike.

10. It would appear incapable of leaving serious and lasting pathological after-effects. This view is endorsed by American, French, British and other authorities.

11. Under no circumstances let us delude ourselves with the vain hope that chemical warfare will not be an important factor in future wars. The pact, or agreement of any men or group of men or nations, cannot and will not stop it. This is a propaganda of unpreparedness.

12. Let attacks on civil population of cities and towns be outlawed, if possible, that civilization may endure. This may appeal to the self-preservation even of barbarians. Fear of retaliation is a convincing factor in war. Retaliation is a necessary evil.

13. All things considered, the intensive study and research in chemical warfare seem to have well fixed its possibilities, unless what appear chemical and physical impossibilities are to be overcome. However, let us not hesitate to admit ignorance and suspend judgment.

14. A nation with a flourishing dye industry has at hand a weapon that can be turned instantly to warfare purposes. One cannot demobilize that. Let the United States foster this that it may be prepared, and certainly not allow a monopoly in the hands of any other country.

15. I yield to no one in my intensity of feeling against war. But that chemical warfare as it developed both in effectiveness and use was more inhuman than other methods of warfare, will not be admitted by anyone who knows.

The Concealment of Railway Gun Positions

By Lieut. Colonel Aymar Embury, II, E. O. R. C.

OME time ago the *New York Times* published two pictures of the positions of the German gun which fired on Paris, which were interesting to the writer because of the excellent camouflage employed by the Germans. This gun was apparently in position for about six months, was never located, and fired at frequent intervals during the entire period. I have no information on the position other than that given by the photographs, but the general type of the camouflage employed is similar to that of the gun position captured by the 4th Division near Bezu le Guéry, north of Chateau-Thierry, which I was able to inspect before the end of July, 1918, and certain observations may be of interest to officers of the Coast Artillery.

The position at Bezu le Guéry required a considerable amount of construction which must have been done very rapidly since the Germans only entered the salient at the end of May, and presumably this gun fired on Meaux about the first of July, so that the position could not have taken over three to four weeks to construct, although an excavation at least eight feet deep and sixty feet in diameter was made, the bottom filled with concrete, and on this a circular steel turntable about fifty feet in diameter and six feet in height installed. The position was not shown on the French maps as a gun position at all. Some activity had been noticed by the Allied Intelligence Section and dotted lines indicating trails into the woods were shown. The Germans had selected a location for this gun, near the Chateau Thierry—Soissons railroad track about one hundred feet distant from a little piece of woods at the west. Here a spur track was constructed into the woods and an ammunition switch and three large concrete dugouts, two of which were apparently used for ammunition and one for the personnel of the gun crew, were installed. Naturally a position of this importance required very careful concealment if it were to continue to be effective, and the methods employed were of extreme interest to me as an officer of the Camouflage Section.

In the first place; (see Figure 1) the entire space between the line A—A of an open field was covered with small pieces of cut brush; presumably this space was originally one of those small square fields so common in France, and the intention of the German officer responsible for the work, was to create a surface which would be uniform over the excavated portion of the track and the rest of the field. This he did by mowing the space and scattering brush very thickly. This brush would necessarily be removed when railroad carriages were moved along the track, but ordinarily the entire surface was kept covered.

In order to lay the track through the woods, it was necessary to cut down a considerable number of trees. These trees were cut off as close to the ground as possible; were saved by the Germans

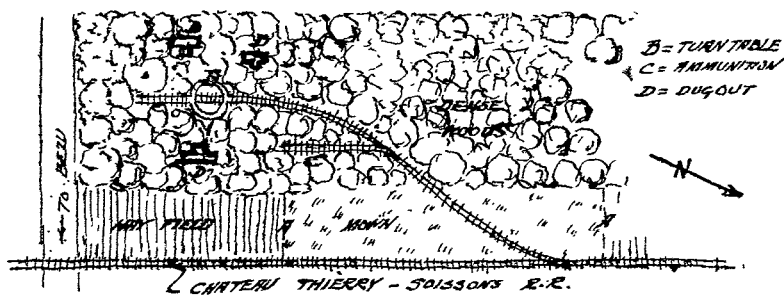


FIG. 1

and were replaced in empty shell cases or square wooden boxes sunk into the ground, either between the ties or as close to the track as was possible. (See Figure 3.) The foliage in these trees naturally dropped off and the Germans had in some cases replaced this foliage with strips of dyed cloth tied to the branches; in other cases fresh brush was cut and tied in the trees. Most of these trees were small—from four inches to six inches at the butt, but immediately in front of the gun position was a tree measuring about ten inches at the butt and thirty feet high. This presented a somewhat different problem. The tree was big enough to act as a screen for most of the gun platform and was probably large enough to show in photographs as a single spot. This particular tree then was sawed off about ten feet above the ground; two upright stakes were erected about eight inches apart and the tree was fastened to a pivot connecting the top of these stakes; the bottom being counter weighted so that the tree could be let down when the gun was fired and re-erected by poles and pulleys, as we see linemen put up telegraph poles, when the gun was not in action. Around the dugouts, trees

were actually transplanted after the dugouts were built; these dugouts were of reinforced concrete over wood frames and covered with three to four feet of earth on top of the concrete. Directly above the dugouts new trees were planted. Most of these had died by the time I saw the position, and a certain amount of the other concealment had disappeared owing to the hasty manner in which the position had been abandoned, but the whole position compelled the utmost admiration for the patience, skill and imagination displayed by the officer in charge of its construction.

The photograph of the Paris gun shows the position under ac-

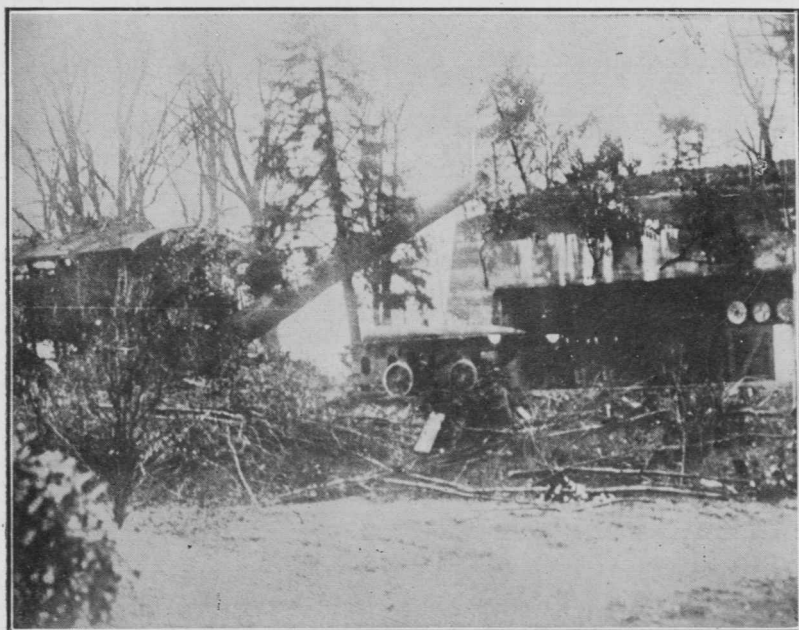


FIG. 2. CAMOUFLAGED GERMAN GUN POSITION
Photo from Wide World Photos.

tual operating conditions and again a very skillful piece of camouflage appears to have been done. In the first place, the general photographic color of the terrain was simulated by leaving a considerable amount of cut shrubbery and trees on the ground over the earth fill. In the second place, the great concrete structure built to protect ammunition was camouflaged by trees set in its top and twigs and brush scattered over the entire surface. There were apparently sufficient trees on the site when construction began to create a rough broken texture in air photographs and under these conditions, concealment is not difficult providing sufficient pains are

taken when the position is constructed and the upkeep of the position is carefully watched. It may be stated here that the Germans were uniformly more careful in keeping up their battery positions than were the Allies. A number of German battery positions examined after the Chateau Thierry and St. Mihiel attacks show that these positions were located at some little distance away from the co-ordinates given on our maps, although these positions were often in open fields, indicating that extreme care must have been taken to avoid making trails. It was almost habitual with the Germans to mow any field in which they moved guns and to cover with branches



FIG. 3. APPROACH TO 380-MM GUN POSITION SHOWING REMOVABLE TREES

any openings cut in woods. A useful thing to remember is that while branches scattered on the ground will cover trails pretty well, that if they are elevated on wire above the height of a man, they are much more effective against photographs and do not need constant attention when people pass along.

In concealing heavy gun positions it must be realized that such a position cannot be successfully hidden except in rough country, that is, in country where the photographic color is irregular; that the means of concealment must approximate the photographic color displaced, and that continuous upkeep is necessary.

Training Communication Details

By 2nd Lieutenant J. E. Harriman, Coast Artillery Corps



WITH the increasing complexity of the modern command and administrative systems of units of any size, an increasing importance is being attached to that agency essential to both, known as liaison. Liaison within a unit, with neighboring units and with higher command is an absolute requisite to efficient teamplay, which is indispensable in obtaining the highest possible efficiency in battle or maneuvers.

Liaison is established by various agencies of communication which are authorized for and exist in all units. The personnel by means of which these agencies of communication function is obtained largely from the communication details of the units of a command. It is then to the proper training of the communication details that we must look if efficient liaison is to be accomplished through the proper functioning of the agencies of communication. Perhaps in some cases too little attention has been paid to the detailed training of those individuals intrusted with this important work. The following paragraphs deal directly with the training of the communication detail of the Headquarters Detachment and Combat Train of a separate battalion of Antiaircraft Artillery and it is believed that the methods suggested will prove helpful in training the communication detail of any unit.

Of the various agencies of communication existing within a separate battalion of Antiaircraft Artillery, the telephone is of primary importance. For this reason it is necessary that a highly efficient personnel be available for the installation and maintenance of telephone lines, for the operation of the battalion switchboard and for the operation of all telephones in use by the battalion. Men must be selected for the communication detail who are capable: first, of speaking distinctly and without impediment of speech, in a moderate tone of voice; second, of writing and understanding English readily; and third, of understanding a certain amount of technical instruction which will enable them to make minor repairs and adjustments to telephones, switchboards and lines. This detail is no place for a "dud" and any man, whose reliability is doubtful, even though he may fill the three requisites given above, should not be selected. It is usually advisable to have several men additional

to the number authorized for the detail go through the first phase of the training outlined below, with the idea in view of selecting those who show the greatest adaptability for this work.

Let us start then with a hypothetical group of men who fulfill the requisites given above, but who have had no experience in the use of the field telephone or the transmission of field messages. Let each man be provided with a pencil and pad (field message books may be used) and seated at a table at one end of a room. The instructor then explains the form in which a field message should be recorded and places a message recorded in the proper form on the blackboard, if one is available, or on a large sheet of paper placed in such a position that it is easily visible from where the class is seated. The instructor then places himself about fifteen feet from where the class is seated and repeats a message in an ordinary tone of voice, grouping his utterances into groups of two or three words and pausing slightly between each group, allowing sufficient time at each pause to enable one to write down what he has just said. Each member of the class is required to write down the message as it is repeated by the instructor, placing it in the proper form as he records it. Several such messages are repeated by the instructor and recorded in the proper forms by each member of the class. This drill is continued until the class shows ability at recording these messages, which in all respects resemble those they will receive later over the telephone.

Each member of the class is then taught to connect up and use the field telephone. To accomplish the best results, the instructor should show each man individually how to make the connections and use the telephone for the transmission of messages. The men should be cautioned at this point to speak directly into the transmitter and use an *ordinary tone of voice* in talking. The tendency of men without experience in telephone work is to shout. If this tendency is found to exist in the class it must be overcome by requiring the men to use even a *lower* tone of voice than usual in talking. If the Type E.E. 5 field telephone is used, members of the class must be cautioned repeatedly to press in on the thumb switch when talking, as this operation is apt to be forgotten by members of the class until they have had considerable experience. Of course it is necessary to press in on this switch before one can talk, and if this is forgotten by the new operator, he is apt to become discouraged and lose interest because of his inability to get results with his phone. The elementary nomenclature and general principles of the telephone should be explained at this point, but care must be taken to make the explanations as non-technical as possible.

The next step is to group the class into pairs. Each pair is given a length of field wire and each man a field telephone. If two adjoining rooms are available, the first man of each pair is instructed to remain in the first room and connect his phone to one end of the length of wire which has been furnished his pair. The other man of the pair is instructed to lay the wire into the adjoining room and connect his phone to the other end of the wire. When the connections are completed the members of each pair practice talking to each other, using the phones they have just connected and the line they have just laid. The instructor should correct any difficulties encountered by any pair in getting and maintaining telephone communication. This exercise should be continued until all members of the class are thoroughly familiar with the use of the telephone, and are able to talk over the telephone with facility.

The class should next be divided into groups of four, numbered from one to four. Numbers one and three are operators and should each be furnished with a field telephone and each group with a length of wire. These men connect their telephones as explained in the preceding paragraph. Numbers two and four are recorders and are each furnished with a pad and pencil. Numbers one and two work together at one end of the line, and numbers three and four work together at the other end of the line. The instructor furnishes a type message to number two of each group. Number two repeats the message, phrase by phrase, to number one, who has obtained communication with number three at the other end of the line, and transmits the message phrase by phrase, just as he receives it from number two, to number three. Number three repeats each phrase as he receives it over the line, and as he repeats the message in this manner, number four records it in the proper form. If number three should misunderstand anything sent by number one, number one should correct him as he hears number three repeat the phrase to number four. Should number three fail to understand any phrase he should call through his phone "repeat," and number one should repeat the last phrase only. A number of messages are sent in this manner, the instructor giving messages to number four for transmission as well as to number two. The numbers of each group should alternate during the drill as operators and as recorders.

The messages transmitted should be type messages similar to those which members of the detail will be required to transmit under service conditions. They should contain all the technical phraseology which might be encountered in service messages, in

order that the class may become familiar with the use of all such expressions.

The operation and connections of the monocord switchboard should next be explained to the class, and each member in turn should be allowed to actually make the connections at the switchboard.

The class is then divided into groups of ten and each group subdivided into pairs. Each pair consists of an operator and a recorder and is furnished with a field telephone, length of wire, a pad, and a pencil. One pair of the group is furnished a monocord switchboard and if available a switchboard operator's head set in place of the field telephone furnished the other pairs. A miniature field telephone system is installed, each of the pairs connecting their length of wire to the monocord switchboard and the other end of their length of wire to their field telephone, and the pair assigned to the switchboard installing it and connecting its head set or field telephone. If possible the lengths of wire should be run to different rooms in barracks, so that the messages sent by one pair can not be overheard by the others, except in the normal transmission of the messages over the telephone.

Each pair consists of an operator and a recorder. For the first few minutes they should alternate in calling other pairs through the switchboard. As soon as the class is familiar with this procedure, each pair should be assigned a battery designation, except one which is designated as headquarters. Messages similar to those used in the employment of the battalion are now furnished each of the "batteries" and "headquarters" for transmission to each other. These messages are transmitted and recorded in the proper form as described in the preceding paragraphs. All messages received by any pair should be collected by the instructor and compared with the original message given for transmission. As the group becomes better trained, the instructor may merely assign messages to "headquarters" for transmission to the "batteries" and allow the "batteries" to make their own replies, reports, etc., in compliance with the messages from "headquarters." Drills of this nature should be continued indefinitely, as they give the detail training in duties exactly similar to those required in field problems and maneuvers.

Selected members of the class should now be given instruction in telephone and switchboard troubles, repairs and tests to complete the course.

EDITORIAL

The Marne Campaign

 F it is true, as Napoleon said, that the only way to perfect oneself in the art of war is to study and restudy the campaigns of the great leaders, then no better campaign can be selected today for this purpose than that one which led up to and culminated in the Battle of the Marne—for in this campaign not only did situations arise which afforded the leaders of both sides many opportunities to comply with or violate the eight recognized fundamental principles of war, but in addition it was a campaign of open warfare, in which each side had engaged immense masses of troops equipped with the most modern arms and equipment and led by soldiers who had been thoroughly trained in the art of war. It was the opening campaign of a great war in which the very existence of nations was at stake. The troops were fresh and enthusiastic and the ranks filled. It was no haphazard campaign. Its details had been worked out by Germany as early as 1906, and since that time her officers and men trained with this particular campaign in mind. From the viewpoint of the military student it is an ideal situation.

Journal readers have been most fortunate during the past four months in having had presented for their consideration and study the following articles which appeared in the September, October, November, and the present issue of the Journal:

Action of the I, II, and III German Armies from August 15 to September 15, 1914. By Major E. C. McNeil, J.A.G.D.

Critical Analysis of Operations of Third, Fourth and Fifth French Armies and British Army from August 15 to September 15, 1914. By Col. W. P. Chamberlain, M.C.

The French Fifth Army from August 10 to September 15, 1914. By Colonel H. B. Crosby, Cavalry.

The Conduct and Handling of Von Kluck's Army from August 10 to September 15, 1914. By Major A. W. Lane, Infantry.

These articles are by officers of recognized ability. They were prepared while the authors were students at the Army War College and under conditions which permitted concentrated thought and ample opportunity for research. An officer undertaking for the first time a study of this campaign will, by a careful consideration of these articles, have constructed such a mental frame-work of what actually occurred that it can easily be built upon by further study and finally a complete picture of this campaign be firmly fixed in the student's mind.

It is safe to say that more pages have already been written of this campaign than of any other campaign in the World's history. Authors of books on strategy, tactics, logistics, and the employment of the separate arms already turn constantly to this campaign for illustrations. That this practice will be continued more and more as its details are better understood goes without saying. The officer who has a clear understanding of the Marne Campaign; of the troops engaged and the terrain covered; of the considerations governing the various moves; and of the results of violations of, or compliance with, the principles of war; has laid the foundation for the accurate analysis of military campaigns.



Peace Thru Preparedness

In the wise exercise of government, as much consideration should be given to the preservation of our country as to its upbuilding. Let us labor unceasingly for peace throughout the world, let us seek in every proper way to promote liberty and happiness, let us assure to our people for all time the full enjoyment of the liberties our forefathers bequeathed us. But let us be adequately prepared to defend these liberties against aggression.—Warren G. Harding.

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 October, 1923

A. NEW PROJECTS INITIATED DURING THE MONTH OF OCTOBER

Project No. 173.—This is a spotting device constructed on the principle of the nomographic charts described on pages 157 to 172, of the August, 1923, issue of the COAST ARTILLERY JOURNAL. It was devised by Major A. R. Rockwood, C.A.C., and was tested in the Coast Defenses of Puget Sound during 1923. A description written by Lieutenant Edward Supple, C.A.C., was submitted to the Coast Artillery Board by Captain Nyal D. Adams, C.A.C., at the request of a member of the board.

Project No. 174, Test of Range Correction Computer, Deflection Correction Computer and Wind Component Indicator for 8-inch Howitzer.—The correction devices are designed to give the information to mobile batteries that is given by the Pratt board and the deflection boards to fixed batteries. A compact wind component indicator is constructed on one side of the deflection correction computer.

The devices were made up by the Ordnance Department in metal. Their general design is described and portrayed under Project No. 122, Range Corrector for 155-mm. guns, in the Coast Artillery Board notes July, 1923 issue of the COAST ARTILLERY JOURNAL.

The Coast Artillery Board submitted comments on the devices as actually constructed, approving them in general but suggesting some improvements in the way they are made up. These devices were forwarded to Fort Bragg, N. C., for further test by the Field Artillery Board. Their adoption for use by 8-inch Howitzers was recommended and the use of similar devices for other mobile Coast Artillery units will be recommended.

Project No. 176, Test of Zeiss 4-meter Stereoscopic Antiaircraft Range Finder.—This instrument is of late type and design and will be tested in comparison with a Goerz 4-meter Coincidence Range Finder for antiaircraft work and with 30, 15 and 9 foot coincidence range finders for use on fixed targets and targets moving on water. This test is under way. The Zeiss instrument shows considerable promise.

Project No. 177, Sound Ranging Switchboard.—This switchboard has been installed at Fort Eustis for use by the Sound Ranging Company there and is specially designed to meet the requirements of this particular work.

Project No. 178, Description and Sketch of Cloke Plotting Board For Incorporation in Training Regulations 435-220.—Description and sketch of Cloke board for incorporation in Training Regulations is being prepared.

Project No. 179, Angular Travel Method of Position Finding.—This method was devised by Captain A. M. Jackson, C.A.C., and referred to the Board for study and test.

With this method, when a given target is assigned to the base-end stations the observer determines accurately the azimuth of the target on the third stroke of the next bell (time 1). This azimuth is called to the plotting room in the usual manner by the reader and during the time interval the plotter has determined the range to the target from the battery and has called back to the reader the time of flight for that range. At time 2, the observer again stops his instrument and the angular travel during the last time interval, (30 seconds), is noted. On a special slide rule this value is set opposite the time of flight as received from the plotting room during the last time interval and from the index on the slide rule is noted the angular travel during the time of flight plus the predicting interval. This angular value is then set off by the pointer on the splash scale of the instrument in such a manner that when the target is followed by traversing the instrument so that the pointer is always on the target, the vertical cross hair will always be directed at the set forward point.

Inasmuch as the instrument is oriented on the vertical cross wire the azimuth index will at any instant indicate the azimuth of the set forward point from that station. Hence on time 3, or at any succeeding time or instant the instrument can be stopped and the azimuth of the set forward point can be read to the plotting room.

A more complete description of this method with discussion of its advantages and disadvantages and recommendations as to its adoption will be published after a study and test have been completed.

Project No. 180, A Study of Firing Tables for 8-inch Howitzer, Mark VII, VIII and VIII½, Firing H. E. Shell Mark I.—The Board submitted comments on these tables as prepared by the Ordnance Department with a view to getting them in final form for printing.

Project No. 181, Automatic Fire Control Instruments For Antiaircraft Artillery.—This project involves a study and consideration of the Morse automatic antiaircraft fire control instruments in comparison with other automatic and electrical instruments developed to secure similar results.

Project No. 182, Caissons for Mobile Antiaircraft Artillery.—Initiated by the Coast Artillery Board to insure a quickly available supply of ammunition to antiaircraft guns when called on to go into action on the road.

B. PROJECTS AND STUDIES COMPLETED DURING OCTOBER, 1923

Project No. 151, Subcaliber Guns for Tractor Artillery.—It was customary during the late war to use 75-mm. guns during subcaliber training in land firing methods for heavy artillery organizations. The practice is still in use by the field artillery and is doubtless satisfactory training for land firing. It is not a satisfactory method for training tractor artillery organizations whose mission includes firing at naval targets. Due to the short time that such targets may be expected to expose themselves to our fire and to their rapid maneuvering ability, a more highly organized fire control system is required for effective fire upon these targets than is needed in land firing. Satisfactory training in the use of a fire control system for firing at naval targets involves the maneuvering of the particular cannon to which an organization is assigned, that is, the pro-

cess of determining the course, speed and position of naval target, applying the necessary corrections and then pointing the guns at a future point on the target's course preferably should be a complete operation during training. It is for this

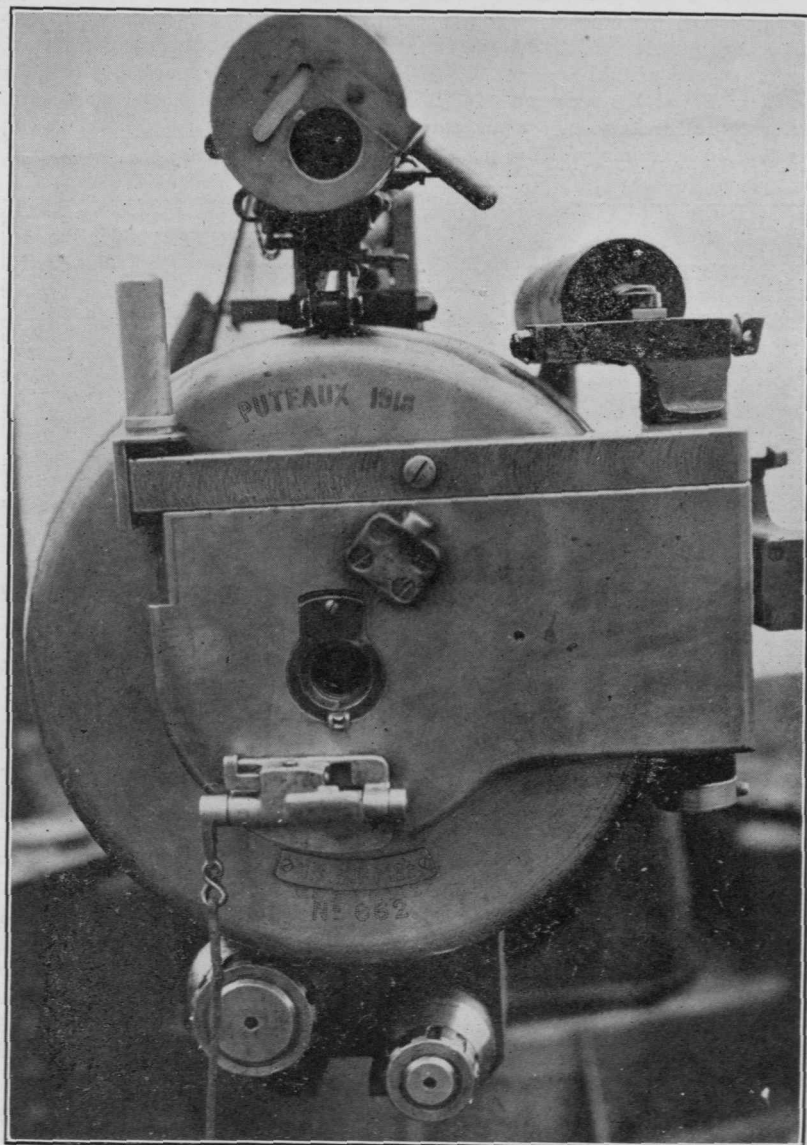


FIG. 1

reason coupled with the economy of such a course that the coast artillery has followed for subcaliber purposes, the practice of adapting small guns to the larger cannon assigned to the corps.

For tractor artillery whose mission includes seacoast firing, a satisfactory means for subcaliber training has been developed by the 51st Artillery, C.A.C., at Fort Eustis. This regiment is assigned to 155-mm. guns and uses in subcaliber training a 37-mm. gun mounted on the breech of the 155-mm. gun. A shield of iron or steel plate is interposed between the muzzle of the 37-mm. gun and the gunner to protect the latter from the blast. The materiel required for mounting the subcaliber tube is shown in sufficient detail in figures 1 and 2. The Coast Artillery Board has seen this equipment in use several times and considers it eminently satisfactory for the purpose designed. It can be used with satisfactory results also in training for fire upon land targets.

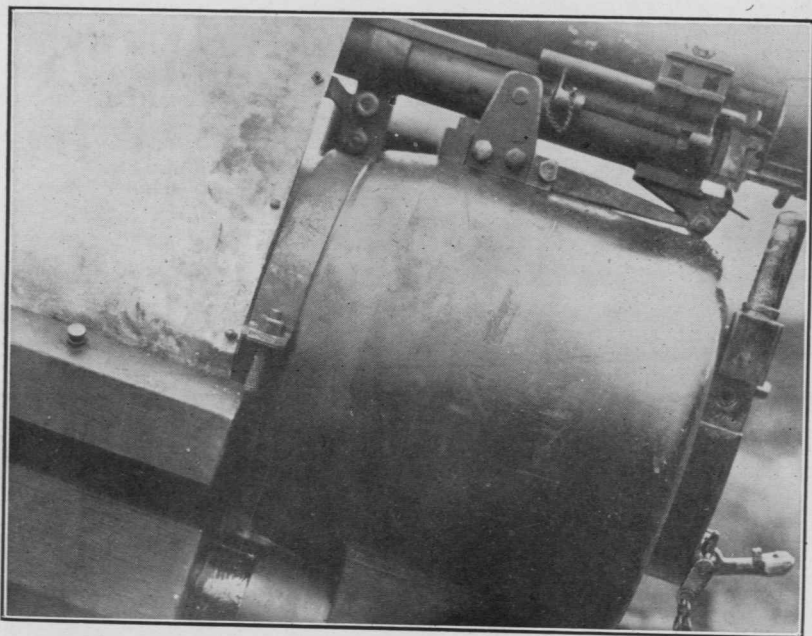


FIG. 2

On the basis of weight, portability and relative economy compared with 75-mm. gun, as well as the necessity for equipping all tractor organizations of coast artillery with a satisfactory means for training for fire on naval targets as well as land targets, the Coast Artillery Board believes that ten (10) 37-mm. guns completely equipped for subcaliber work as indicated in figures 1 and 2, should be supplied to each tractor artillery regiment of coast artillery, (except anti-aircraft), and included in the regimental tables of equipment for such organizations.

Project Nos. 170, Range Correction Board, Model "E," 1923, and 152, Range Correction Board, Model of 1921.—1. The Range Correction Board, Model "E," 1923, is a modification of the Pratt Range Board, Model 1905. The modification consists chiefly of the addition of two rollers to the Pratt Range Board. One roller is mounted at the top of the board, the other at the bottom. Upon the rollers is wound paper supporting charts of various curves of ballistic effects. The modification is designed to care for the

zoning of coast artillery cannon, and specifically for the 12-inch mortar and 16-inch howitzer. By means of a correction scale and a pointer therefor which can be mounted upon or detached from the standard correction ruler, either corrected ranges or range corrections in yards may be obtained. Two such boards have been received and tested by the Coast Artillery Board. They have not been reported upon previously.

2. The Range Correction Board Model of 1921, is a box containing four (4) pairs of drums upon each pair of which is wound a chart of one or more of the curves of ballistic effects. There is a pointer for each set of curves. By means of a system of gears turned by crank handles at the left side of the board these pointers are driven across the face of the charts by individual spiral worms. The gears are interconnected and the motion of each pointer is transmitted to a total correction pointer which is thus driven by a spiral worm across a range tape and correction scale therefor, at the top of the board. At the right side of the board crank handles and interconnected gearing are used to turn the roller charts and to engage, (or disconnect), their motion with that of the range tape.

This board was tested under Coast Artillery Board Project No. 43, and report was published in the Coast Artillery Board Notes of the February, 1923, COAST ARTILLERY JOURNAL.

3. Comparative cost data are contained in an indorsement from the Office of the Chief of Ordnance to the Chief of Coast Artillery under date of June 26th; 1922, upon File 0.0. 413.68/2936. This indorsement is understood to contain the following:

* * * * * * * * *

"The estimated cost of manufacture of Range Correction Board Model 1921 in lots of five (5) is \$2300, each. The estimated cost of altering five (5) Pratt Range Boards for 16-inch gun and howitzer work is \$800. The estimated cost of manufacturing Pratt Range Boards is \$320, each, in lots of five (5)."

* * * * * * * * *

4. With the development of improved methods for measuring meteorological conditions above the surface of the earth, it is desirable to provide suitable range correction devices to mortars, howitzers and long range cannon. The Pratt range boards of older design do not lend themselves to zoning because, (a) Charts for various projectiles can not be changed readily, (b) At ranges above 13,000 yards adjacent sets of curves intersect due to the splay in the curves, and, (c) The inclusion in the already crowded charts of the curves necessary to correct for the ballistic effects of rotation of the earth, temperature elasticity and variations in the weights of projectiles from standard, would produce confusion.

5. Both of the types of range correction board reported on herein can be altered to meet the conditions imposed in paragraph 4, above. It should be noted however that each is designed at present for use as follows:

(1) To obtain corrected ranges, in which the actual range to each set forward point is corrected on the board.

(2) To obtain a range correction in yards, which is to be determined periodically and applied to the true range.

Neither of these processes is satisfactory. The first results in a hurried operation of the board with the introduction of numerous personnel errors. The second is unsound because it results in the application of a flat correction to ranges which change rapidly in action.

6. It is desirable that a range correction be obtained from the board by

careful, deliberate and periodic operation of the board, and, in order to minimize personnel errors, that this range correction be in such units that it may be applied to rapidly changing ranges so as to vary directly proportionate to the range variations. Such a correction is afforded by the use of curves of ballistic effects which are plotted as percentages of the ranges. A discussion of the use of percentage corrections is contained in the report on Coast Artillery Board Project No. 114, Preparation and Adjustment of Fire against Naval targets. This report was published on page 143, of the July, 1923, COAST ARTILLERY JOURNAL.

7. Percentage curves can be plotted on the charts of the Range Correction Board Model of 1921, and, by the substitution of a logarithmic range tape and a logarithmic spiral worm for driving the total correction pointer, a satisfactory range correction can be obtained; but, this board is inordinately expensive if an equally satisfactory, cheaper board can be obtained.

3. The Range Correction Board Model "E," 1923, can be made entirely satisfactory at less than half the cost of the 1921 board. In the test conducted by the Coast Artillery Board a horizontal scale of 1-inch equal 2 percent for the curves on the charts was used. The board was operated in the usual manner and the gross percentage of range correction was read on the correction scale mounted on the correction ruler. A paper scale of numbering from zero to plus and minus 10 percent was pasted over the old indices to the graduations on the correction scale.

For purpose of the test curves of the ballistic effects of rotation of the earth, temperature elasticity and variations in the weights of projectiles from standard were included in the charts, and were drawn across the right (and left) edges of the curves of velocity and atmosphere. The slope of these curves and the fact that they were colored rendered negligible the confusion usually caused by the overlapping of adjacent sets of curves. It is believed that no troublesome overlapping of curves will exist on charts of percentage curves for the 1923 range board.

9. Three more markers should be added to the marking strip at the top of the Range Correction Board Model "E," 1923, for use with the curves for rotation, elasticity and weight of projectile.

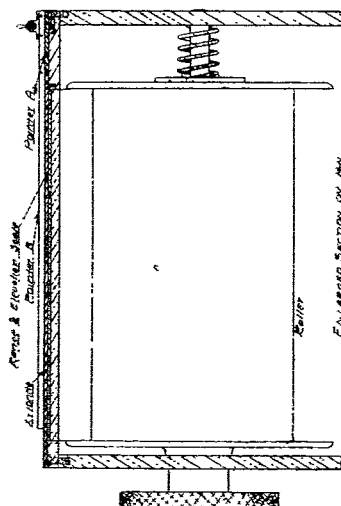
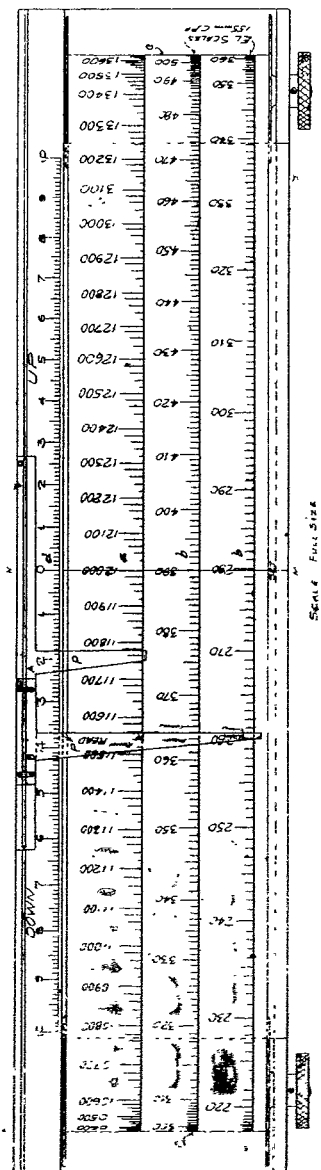
Additional traveling pointers for the correction ruler probably would be convenient. It should be noted in this regard that but one traveling pointer is absolutely required for the operation of any Pratt Range Board. The three additional pointers which are now standard for the correction ruler are conveniences chiefly, although they may decrease the chances for personnel errors and increase the speed of operation of the board to some extent.

It does not appear that any modification of the correction ruler, other than numbering as percentage indices on a scale of 1-inch equal four (4) percent to the graduations on the correction scale is needed, provided, a supply of these correction rulers is on hand at Frankford Arsenal, or, is to be obtained from obsolete batteries.

When new correction rulers are made the gear ratio should be changed to 1 to 1. The only graduations needed on new rulers are those on the correction scale. These should permit readings to one tenth of one percent on a scale of 1-inch equal two (2) percent, or twenty (20) graduations to the inch.

10. A satisfactory means for applying a percentage of range correction as obtained from a range correction board, is a percentage corrector constructed on the principal of a slide rule. Figure No. 3 is a schematic drawing of such a device.

FIG. 3

COAST ARTILLERY BOARD
PORT HURON, MI

PERCENTAGE CORRECTOR

DESIGNED BY	DATE	FILE NO.
J.F.	SEP 8 1923	C 52

ENLARGED SECTION ON THE
LEFT HAND SIDE

At (a) is shown a logarithmic scale of ranges. On the same tape at (b) are the corresponding elevations. The tape (a) (b) is wound upon the rollers (c) by means of which the graduations on the tape are moved past the zero of the correction scale (d). The graduations on (d) are a logarithmic scale of percentages from 90 to 110 percent. The numbering to these graduations is shown as up (or down) zero to 10 percent. The scales are constructed at a setting of the zero of the correction scale opposite 10,000 yards on the range tape. Opposite 9,000 yards on the range tape (a) the graduation "Down 10" on the correction scale (d) is drawn and corresponds to 90 percent of the range. Opposite 11,000 yards on the range tape the graduation "Up 10" on the correction scale (d) is drawn and corresponds to 110 percent of the range. The intermediate lines on the correction scale (d) are at 91 to 109 percent of the range inclusive, they correspond to ranges 9100 yards to 10,900 yards inclusive and represent the logarithms of 91 to 109. The scale (d) is immovable and is attached to the top of the board. At the rear of the scale (d) are two guides for the movable pointers p and p' .

The pointer p extends across the range scale, the pointer p' is marked "Read" and extends across the scale of ranges and the scale of elevations. The slide for the pointer p carries the slide for pointer p' .

11. A process for determining and applying range corrections is as follows:

a. The Range Correction Board Model "E," 1923, as described in paragraph 8 above, is used and operated in the usual manner for operating Pratt Range Boards. The total percentage of the range correction, based upon a predetermined range to the trial shot point or target, is read on the correction scale of the correction ruler.

b. This correction (as percentage up or down) is called to the operator of the percentage corrector who moves pointer p and p' of Figure 3 to the percentage required. At this stage of the process, the setting of pointers p and p' is identical.

c. The plotter calls out the range to the registration point or set forward point depending on whether trial shots or ranging shots are to be fired as described in the report on Coast Artillery Board Project No. 114, Preparation and Adjustment of Fire against Naval Targets. If range prediction boards are being used the operator of the prediction board calls out the uncorrected range to the set forward point.

d. The operator of the percentage corrector moves the range tape until the range just called is at the zero of his correction scale (d). He then calls out the reading indicated by his "read" pointer (p'). This reading will be as indicated on the elevation scale (b) for all cannon which are laid in elevation by a quadrant. For cannon which use a range drum the reading called out will be read from the "read" pointer (p') on the range scale (a).

e. When a correction based upon observation of fire at the registration point or the target is to be introduced, the amount of this correction in yards up or down is called to the operator of the percentage corrector who moves "read" pointer (p') until the required number of yards is indicated between the pointer (p) and "read" pointer (p') on the range scale (a) of the range elevation tape. A pair of dividers might be used to facilitate this setting and to avoid mental arithmetic on the part of the operator.

f. The operator of the percentage corrector then calls the total percentage indicated by the setting of his "read" pointer (p') to the operator of the range correction board who unclamps the traveling pointer to the velocity

curves and moves this pointer by turning the knurled nut on the correction ruler until the total percentage set on the range correction board agrees with the total percentage set upon the percentage corrector. He then clamps the traveling pointer to the velocity curves, notes the new velocity obtained and moves the marker at the top of the range correction board to the new velocity curve.

g. The corrected range or elevation to be sent to the gun for each shot is obtained by the operator of the percentage corrector. He moves his range elevation tape until the uncorrected range is at the zero of his correction scale and then calls out the range or elevation indicated by the position of his "read" pointer (*p'*).

h. The range correction board is operated periodically whenever meteorological conditions have changed, the target has changed location considerably, or, corrections based upon observation of fire are to be introduced as velocity corrections.

CONCLUSIONS:

1. The Range Correction Board Model of 1921 can be modified into an acceptable range correction board. Due to the heavy cost of production, disadvantages and large number of modifications required as indicated in the report on Coast Artillery Board Project No. 43, and the resultant non-uniformity in materiel and training methods, this board is not as satisfactory as the 1923 board. It should not be adopted as standard and no further experimentation should be done at this time on this type of board.

2. The Range Correction Board Model "E," 1923, is a satisfactory range correction board. The cost of production is not considered excessive. Should such action eventually become desirable, all of the Pratt Range Boards now in service may be modified into this type of board at a cost of less than \$200 per board. Pratt Range Boards can be withdrawn from obsolete batteries, modified, and then issued to non-obsolete batteries requiring such a device, or, the parts required for modifying Pratt Range Boards can, and probably should be, shipped from Arsenals and assembled locally. Because this board is a modification of a standard piece of apparatus with which the corps at large has long been familiar, this type of board can be introduced with a minimum change in training methods. Pending the development eventually of a satisfactory mechanical computing device along the lines of the Ford instruments, the range correction board Model 1923 is a satisfactory device for all fixed and railway coast artillery mortars, howitzers and long range guns and should be adopted as standard for issue to these units.

3. *a.* Whenever existing Pratt Range Boards and correction rulers therefore are to be converted into the 1923 type of board no further modification of the board appears necessary, except the issue of additional markers and traveling pointers, and a change in the numbering on the correction scale to a basis of 1-inch equal four ($\frac{1}{4}$) percent.

b. Whenever new correction rulers must be made, the gear ratio for driving the traveling pointers should be reduced from 1:2 to 1:1. The only graduation which need appear on the ruler are those on the correction scale. These should be in 20 graduations to the inch and numbered to permit at least reading of one-tenth of one percent on a scale of 1-inch equal two (2) percent.

4. *a.* As indicated in paragraph 6, of the above discussion, and in Report on Coast Artillery Board Project No. 114, Preparation and Adjustment of Fire against Naval Targets, percentage of the range corrections should become standard Coast Artillery usage for the correction of fire at naval targets and the

charts of all range correction boards should be altered to a percentage basis.

b. Because corrections for the effects of rotation of the earth temperature elasticity, and, variations in the weights of projectiles from standard, are of sufficient magnitude to warrant their inclusion in range tables and computations by the battery commander before beginning fire, the curves for these effects (as percentage of range variations) should be incorporated in the charts of all range correction boards. A reference to this inclusion is contained in paragraph 8.

c. The method for obtaining and applying range corrections should be substantially as described in paragraph 11 above.

5. a. A percentage corrector as described in paragraph 10 above and as shown in Figure No. 3, is a necessary and desirable adjunct to the use of range correction boards. A method for using this board is given in paragraph 11 above.

b. It is believed that the device shown should not be adopted as standard for manufacture and issue at present. It can be made locally by the officers concerned with its application and it is probable that many improvements will be suggested. These suggestions will be the basis for the adoption of a standard device for manufacture and issue.

RECOMMENDATIONS:

1. That no further development of the Range Correction Board Model 1921 be undertaken for the present.

2. In conformance with paragraph 3 *a* and *b* of the above conclusions that the Range Correction Board Model "E," 1923, be adopted as standard.

3. That the charts for all Pratt Range Boards, and Range Correction Boards of the recommended standard, be constructed on a percentage of the range basis to a scale of 1-inch equal two (2) percent and, that the curves of the ballistic effects of rotation of the earth, temperature elasticity and variations in the weights of projectiles from standard, be included in all such charts.

4. That a correction scale for a chart scale of 1-inch equal two (2) percent (with index), additional markers and traveling pointers, together with instructions for mounting same be furnished to all batteries using a Pratt Range Board for guns which are not zoned.

5. That along the vertical margins of the charts for all range correction boards be shown such range table data as to time of flight, penetration, slope of fall, probable error, etc., as may be included without unduly crowding the chart.

6. That Range Correction Board Model "E," 1923, modified in conformance with paragraph 3 *a* and *b* of the above conclusions be issued to each 12-inch mortar battery of fixed and railway artillery, and in general, that each battery of fixed or railway artillery which varies either the weight of projectile or the weight of powder charge in obtaining desired ranges by curved, high angle or direct fire be equipped with this type of range correction board, with charts therefor as indicated above.

* 7. That in case of approval by the Chief of Coast Artillery, the general sense of this report and a full description of the percentage corrector shown in Figure No. 3, be published to the corps as a Coast Artillery Memorandum for the target year 1924.

Project No. 160, Test of Deviation Board (Unkles) Model 1918.—

Referring to the method for bilateral observation of fire given on pages 207 to 211, Part IV, Heavy Artillery Materiel Coast Artillery Corps, the Coast Artillery Board concludes that due to the amount of preliminary data which must be obtained, the number of operations required after a splash occurs and the

time consumed in carrying out these operations in order to obtain the deviation, the device is not as suitable for use in correcting fire on naval targets as any one of a number of devices now being used throughout the corps. It is believed impracticable to modify this board so that it will meet the requirements of a satisfactory spotting device for coast artillery usage.

While there is, as yet, no standard spotting device for coast artillery cannon, a spotting device which will be satisfactory for use in fire on naval targets can be used by coast artillery organizations employed in land warfare also.

The board is not without merit as a device to be used in land warfare, but in view of the above criticism it is not believed to be satisfactory as a standard device for issue to either fixed or mobile artillery.

RECOMMENDATIONS:

1. That the Unkles Deviation Board Model 1918 be not adopted as standard for manufacture and issue to any coast artillery organization.

2. It is understood that officers at the coast defenses to which these boards have been issued are of the belief that a test of the boards during service practice is required. The Coast Artillery Board believes that such a test may jeopardize the successful completion of some practices and recommends the distribution of a circular letter from the Office of the Chief of Coast Artillery correcting the impression that such a test of the board is either mandatory or desirable.

Project No. 161, Modification of the 1918 Azimuth Instrument For Use as A Spotting Instrument.—The Artillery Board considers as satisfactory for temporary use in spotting, instruments now available such as azimuth instruments, Models 1910 and 1918. Practically all fire control stations of recent construction are so designed as to permit the installation of two instruments, an observation instrument and a spotting instrument. The Chief of Coast Artillery has announced as a matter of policy that the 1910 azimuth instrument is to be installed as a spotting instrument until a more satisfactory type is available.

Project No. 167, Firing Tables For 14-inch Gun, Model, 1910, On Disappearing Carriage, Model 1907, And The 14-inch Gun, Model 1909, Mounted on 14-inch Gun Turret, Both Firing The 1560 lb. Projectile, and

Project No. 168, Firing Tables For 12-inch Seacoast Gun, Model 1895, Firing 900 lb. Projectile.—These firing tables were studied by the Board and certain minor changes were recommended before tables were finally printed.

Project No. 171, Radio Equipment For Vessels Used By Coast Artillery.—1. Radio communication is either by telephone or telegraph. Telegraph communication is either continuous wave (C.W.), or some form of modulated or interrupted continuous wave (I.C.W.).

2. It is impossible to state exactly the range of communication of a radio set of a given power. The range varies with the location of the transmitting and receiving stations, the construction of the antenna, the season of the year and temporary atmospheric conditions.

3. The following table shows the approximate reliable daytime range of transmitting sets in summer, over land, when installed in good location with a good antenna. Thus this table shows the range to be expected when conditions under human control are as good as can reasonably be expected, and things not under human control are the worst that will be encountered for any extended period:

TABLE I—RANGE OF RADIO SETS

Transmitter output (†)	5-Watts	50-Watts	250-Watts
Radiophone range (*)	4 miles	20 miles	50 miles
I. C. W. range (*)	8 miles	40 miles	100 miles
C. W. range (*)	12 miles	60 miles	150 miles

(†). The above table is based on actual output of the transmitter. For telegraph the actual power used is approximately seven times the transmitter output, (or antenna input), and for telephone about fourteen times the transmitter output.

(*). Over water increase ranges 50 percent. Ground to airplane reduce ranges 50 percent. In winter increase ranges 100 percent or more. At night increase ranges 100 percent or more. Under freak conditions the range may be a hundred times as great as that shown.

4. It will be noted that the transmitter output rating of the sets listed in paragraph 3 above proceeds by large jumps. The reason for this lies in the fact that the standard tube ratings are 5, 50, and 250 watts. Hence, unless tubes are to be operated in parallel, radio sets run in a series of 5, 50 and 250 watts tube output rating.

The sets listed above are the simplest sets of each type. The Signal corps is believed to have developed a line of sets, (each arranged for C.W., I.C.W., and radiophone), of the master oscillator type such that three tubes are required per set. While this system is necessary for aircraft on account of the variation of the fundamental wave length of aircraft antennae due to rapid movement and turning, it is not certain that its advantages outweigh the disadvantages of the extra complication and extra power consumption in the case of radio equipment installed on land or on board ship. None of these new Signal Corps sets have ever been submitted to the Coast Artillery Board for test.

5. The following comparative characteristics of radio sets and methods should be considered when making a selection of the type of set:

a. Construction: Telegraph sets have from 1/3 to 1/2 as many parts as radiophone sets.

b. Operation: Radiophone sets are about three times more difficult to maintain in adjustment than telegraph sets.

c. Training of Operators: Radiophone operators can be trained in about two months. Telegraph operators require about six months training.

d. Range: For the same power input telegraph sets give a range of communication at least six times as great as that of radiophone sets. For instance a 50 watt telegraph set requires a power input of 275 watts and has a C.W. range of 60 miles. A 250 watt radiophone set requires a power input of 1900 watts and has a reliable range of 50 miles.

e. Power consumption: In addition to requiring about six times as much power input per mile of transmission as radio telegraph sets, radiophone sets require full plate power during the entire time of sending, resulting in a total kilowatt-hour consumption about 10 to 12 times as great as for telegraph sets.

f. Interference: About four times as many telegraph sets can be operated simultaneously as telephone sets, or the same number of sets may be spaced twice as closely, or with constant spacing telegraph sets may have about four times the power output of phone sets, without causing interference.

g. Tuning: Telegraph signals may be tuned in about twice as quickly as radiophone signals.

h. Speed of transmission: If messages are to be copied radio telegraph will average as fast as radiophone. If messages are not to be copied radiophone messages may be sent about four times as fast as telegraph.

i. It is to be expected that in any serious war time operation the need for communications will be so great that every possible channel of radio communication will have to be utilized, which means that telegraph, which furnishes the greatest number of channels, will be the preferred system.

6. It is thus seen that radio telegraph is, in almost every respect, preferable to radiophone, except that longer training of the operators is required and communication is limited to trained operators. In general radio telegraph operators, in case of war, can be trained in less time than is required for training of combat units, and since there is no excuse for lack of training in units organized in peace time, this objection loses some of its weight.

The great length of time required for training operators is however a very serious disadvantage of radiotelegraph as compared with radiophone.

The other objection, namely, that communication must always pass through operators, is not so serious as it appears, since as a practical matter, in the present state of development of radio, this practically always will be the case, even if communication is by radiophone.

However, if telegraph is necessary under war conditions, it would be foolish to accustom ourselves to radiophone in peace time.

The use of radio telegraph with Coast Artillery towing vessels would assure training in this means of communication.

EQUIPMENT FOR COAST ARTILLERY VESSELS

7. *Vessels used by the Coast Artillery are:*

- a.* Mine Planters.
- b.* Cable Ships.
- c.* Harbor Vessels.
- d.* Launches.
- e.* Distribution Box Boats.

8. *Mine Planters and Cable Ships:*

- a.* Present equipment: Spark sets of 1 to 1½ k.w. rating.

Range: The spark sets are rated at 100 miles range. When the spark gaps are in good condition and the set is in adjustment this range is obtainable.

The chief objection to these sets is the large amount of interference caused by them. Even when the Coast Artillery Mine Planters are on the allotted Coast Artillery wave length of 1100 meters with ½ power the local Navy radio stations continually order the Mine Planters to stop sending.

b. Power available: These vessels generally speaking carry two d.c. turbo-generators each of about 6 k.w. capacity. The generating equipment was designed to furnish power for lighting, electric hoists, and radio.

c. Radio requirements: As these are seagoing (coastwise) vessels a reliable radio communication range of 200 miles is very desirable.

These vessels are used also frequently for towing targets. For this purpose a range of 30 miles is necessary.

d. Suitable radio equipment: For target practice purposes a 50 watt output set, either radiophone or telegraph, would be sufficient.

For seagoing purposes a 250 watt output telegraph set would be most satisfactory. A 250 watt output radiophone set would consume too much power.

The following table shows the characteristics of these sets:

	Range Phone	Range Telegraph	Input
50 watt Radiophone	30 miles	60-100 miles	550 watts.
50 watt Telegraph	-----	75-100 miles	275 watts.
250 watt Telegraph	-----	190-225 miles	950 watts.

Either of the telegraph sets could be obtained very cheaply by modifying the present spark set, using 500 cycle plate supply. In the 250 watt size this could be a great saving. Any standard modern receiver rated from 200 to 3000 meters will be satisfactory.

9. *Harbor vessels.*

a. Present equipment: A large number of these boats have been equipped with $\frac{1}{4}$ k.w. spark set. This set is now entirely obsolete.

b. Power available: All of these boats are lighted by electricity and they carry a generator for this purpose and for the operation of a small search-light. Several of these boats are known to have generators of 5 k.w. capacity. As noted above 250 watts has in the past been spared for radio purposes.

c. Radio requirements: Radio is necessary for use when towing targets. A reliable communication range of 30 miles is sufficient.

d. Suitable radio equipment: A set of 50 watts output, either telegraph or radiophone, would have sufficient range. The 50 watt telephone set would probably consume too much power for use on some of the smaller boats. In this case a 5 watt telephone set could be used.

The characteristics of the above sets aboard ship, are given below:

	Range Phone	Range Telegraph	Input
5 watt Radiophone	6 miles	12-18 miles	50 watts.
50 watt Telegraph	-----	70-90 miles	275 watts.
50 watt Radiophone	30 miles	60-90 miles	550 watts.

The present spark transmitter could be cheaply modified to furnish the 50 watt telegraph transmitter, using 500 cycle plate supply.

An entirely new receiver will however, be necessary in any case as the one now furnished is entirely obsolete. Any standard modern receiver rated from 200 to 3000 meters will be satisfactory.

10. *Launches and D. B. Boats:*

a. Present radio equipment: None.

b. Power available: None.

c. Radio requirements: These boats require radio communication when towing targets for subcaliber practice, and occasionally for other special purposes. The need for radio is not sufficient to warrant the assignment of a radio set to each such boat. A portable telegraph set consisting of a combined receiver and transmitter with a reliable over water range of about $2\frac{1}{2}$ miles would be suitable. Such telegraph sets can be made to weigh, complete with all accessories, less than 20 lbs.

If radiophone communication is desired a 5 watt set would be suitable. The approximate characteristics of these sets are shown below, when used on board ship.

	Range Phone	Range Telegraph	Weight
1 watt Telegraph	-----	2½ miles	20 lbs.
5 watt Radiophone	6 miles	12-18 miles	120 lbs.

RECOMMENDATIONS:

1. *Method of Communication:*

It is recommended that radio telegraph be adopted as the standard means of communication with Coast Artillery vessels and that these vessels be not equipped with radiophone.

2. *Mine Planters and Cable Ships:*

a. If the recommendation in paragraph 1 be approved, it is recommended that mine planters and cable ships be furnished single tube telegraph transmitters of 250 watts output, to be procured by conversion of the present spark sets.

b. If radiophone communication is decided to be advisable, it is recommended that these vessels each be equipped with a two tube, 50 watt output set, (i.e. the set to have a 50 watt oscillator and a 50 watt modulator tube), arranged for radiophone, C.W., and I.C.W., or a similar three tube master oscillator set.

c. Filament supply for transmitters on these vessels should be furnished by separate dynamotor.

d. Provision should be made for transmitting wave lengths of approximately 300, 450, 600, 900 and 1100 in the case of these vessels.

e. These vessels should be furnished a modern receiver with a wave length variation from 200 to 3000 meters.

3. *Harbor vessels:*

a. If the recommendation of paragraph 1 be approved, it is recommended that harbor vessels be equipped with single tube telegraph transmitters of 50 watt output to be either entirely new sets or to be procured by conversion of the present ¼ k.w. spark sets. In either case a small 110 volt—12 volt-dynamotor separate from the plate current dynamotor should be furnished to supply filament current.

b. If radiophone communication is decided to be advisable, it is recommended that a two tube 50 watt output set, (50 watts oscillator and 50 watts modulator), be furnished for the vessels with large generators, and that a two tube 5 watt output set, (5 watt oscillator and 5 watt modulator), or a similar three tube master oscillator set be furnished for the vessels with small generators.

c. Transmitting wavelengths of approximately 250, 300, 450, and 600 meters should be provided for in the case of these vessels.

d. These vessels should be equipped with a modern receiver with a wave length variation from 200 to 3000 meters. The receiver should be capable of being operated from dry cells.

4. *Launches and D. B. Boats:*

a. These boats should not be permanently equipped with radio sets, but portable sets should be furnished Coast Defenses for use on them, or elsewhere, according to the special needs of each coast defense.

If telegraph communication is decided upon, combination transmitter-receivers of about 1 watt power output and twenty or thirty pounds weight should be furnished.

If radiophone communication is decided upon, a radiophone set of 5 watt output, (two 5 watt transmitting tubes), should be furnished. In this case the set should be similar to the present set S.C.R. 67, but lighter in weight and with a modern receiving circuit, and arranged for both phone and telegraph.

The wave length of these transmitters should be adjustable and a wave length of 250 meters, or above, should be obtainable when the set is used in a D. B. Boat or a launch.

The receiver should be capable of receiving wave lengths from 200 to 1200 meters.

5. The Signal Corps Radiophone Set S.C.R. 67, should be modified for regenerative reception by the addition of a variometer, and for a buzzer modulated and C.W., transmission by the addition of a buzzer and telegraph key. If the parts are supplied these modifications can be made locally. The total cost of such modification will only be a few dollars.

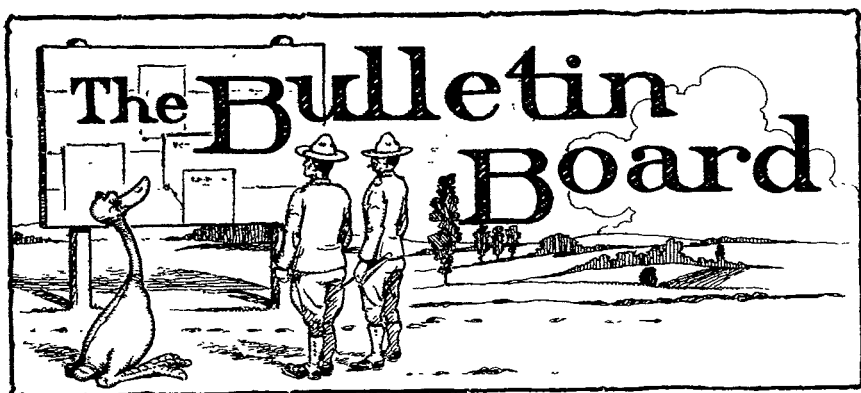
This set should then be used on harbor vessels, launches and D.B. boats, pending the issue of the sets recommended above.

6. Each Coast Defense Commander should be required to submit data and recommendations concerning each vessel under his jurisdiction to enable the Signal Corps to carry out the above recommendations when and as approved by the Chief of Coast Artillery.

Mission of the Unorganized Reserves

To provide a trained, organized, and balanced force which may be readily expanded and developed into an adequate war component of the Army of the United States to meet any major emergency requiring the use of troops in excess of those of the Regular Army and the National Guard.

The Organized Reserves as the third component of the Army of the United States, constitutes purely a war force and can be employed only in the event of a National Emergency declared by Congress.



Annual Encampment of the 197th Artillery (A A)

For several important reasons the fifteen days field training of the 197th Artillery (AA) was changed from Camp Alexander Hamilton, Long Island, to Fort Constitution, N. H. The first and most important reason was the fact that the three hundredth anniversary of the settlement of New Hampshire was to be celebrated during the week of August 20th at both Portsmouth and Dover, and the participation of the Regiment was earnestly requested. A second consideration was the time lost in traveling to Long Island, which, by rail, would take two days each way, and would mean sleeping in day coaches one night both going and returning. The Regiment made camp on August 18th and settled down under canvas and in the cantonment barracks on the new reservation at Fort Constitution. Headquarters Battery was detached and occupied the cantonment barracks at Fort Stark.

On August 20th the Regiment was convoyed to Portsmouth for the parade. In addition to the 197th Artillery (AA) the other services were represented by the Regimental Band with a picked Battalion from the 5th U.S. Infantry, the Portsmouth Navy Yard Band and a composite Battalion of "Bluejackets" and Marines. Thursday, August 23rd, the 1st (Gun) Battalion and a provisional Machine Gun Battery convoyed to Dover, N. H., about 16 miles from camp, for the parade and celebration. The 5th Infantry again held the right of the line, the bands of both units drawing the greatest applause.

Friday and Saturday, August 24th and 25th, the camp was inspected by Brigadier General Mark L. Hersey, District Commander, First Coast Artillery District, accompanied by Major Avery J. French, C.A.C. No special review was held as the General was more interested in the actual training. The Governor and Staff reviewed the Regiment on the Golf Links of the Hotel Wentworth on Wednesday, August 29. The Regiment passed in review before a large crowd, the new Regimental standards and the battery guidons adding color to the occasion.

The first week's training was devoted to preparation for service practice, service practice beginning on Monday of the second week. The Gun Battalion was greatly handicapped by the lack of fire control instruments thus retarding

the practice considerably as but one complete set of instruments could be had for the camp. The machine gun batteries fared little better, having but seven A.A. tripods for use of the four batteries; all however were completely equipped with infantry mounts for use on the 1000-inch range. The progress made by the Regiment was marked in spite of the lack of equipment and instructors. In addition to Lieut. Colonel Grieg, Jr., Captain Ben B. Blair, Sergeants Philip Hill and William J. Moulton, assigned to the regiment as instructors and sergeants-instructor, Captain James C. Bates and Sergeant Samuel M. Reeder, 211th A.A. Battalion, "1st Corps Cadets" were also assigned for temporary duty during the training period. Lieutenants W. R. Ellis and Paul A. Harris, C.A.C. and four enlisted men of the 62nd Artillery, A.A. joined the staff of instructors on Monday of the second week. Another innovation this year was the incorporation of the 3rd component of the Army in the training, five Reserve officers being attached to the Regiment for instruction and training. Those attached were: Captain Frank A. Hovey, Lieutenants James Biggar, Aaron I. Bless, Walker W. Daly and Stanley N. Juthe, all of the 501st Artillery, A.A.

Taken as a whole the camp was the most successful of any held by New Hampshire troops. It is certain that the field training period of 1924 will find the Regiment in better condition than ever. The band under Warrant Officer Ralph Holt especially contributed to the success of the camp and to the appearance of the Regiment in the Portsmouth and Dover parades and to the ceremonies held each evening on the golf links of the Hotel Wentworth.



The R. I. Coast Artillery at Fort H. G. Wright

During their recent camp held in August at Fort H. G. Wright, N. Y., the Coast Artillery Corps of the Rhode Island National Guard employed aerial observation in their target practice. Arrangements were made to secure a plane and observers from Mitchell Field. The two aviators were 1st Lieut. Clyde V. Finter, A.S., and 1st Lieut. Irwin S. Amberg, A.S., and they were assisted by 1st Lieut. Augustus L. Newman, C.A.C., R.I.N.G., who served as an artillery observer in the Argonne, as an officer of the 90th Aero Squadron. Excellent results were obtained with the plane, which checked well with such terrestrial observation as was practicable. The latest method of transmitting observations was secured from Fort Monroe, and furnished in provisional form to each officer. The regiment is commanded by Colonel Cyril L. D. Wells, C.A.C., R.I. N.G., and finished its practice promptly so that several days were left for preparing the required records and reports. Captain Sam W. Anderson, C.A.C., U.S.A., was on duty as assistant instructor.

A Filipino with the Coast Artillery Spirit

Through the courtesy of Captain Bryan L. Milburn, C.A.C., the JOURNAL is able to present the following interesting letter:

Binalonan, Oang, P. I.

Nov. 16, 1922.

The Coast Artillery Corps,
Corregidor Islands,
Manila, P. I.

Dear Sir:

I wish to enlist my body in that body of soldiers, with all my heart and thought.

Now it is the time for you to call me as the newspaper stated.

It is stated that you get 1,600 Filipinos, now I will be one of them.

Try my ability, if you know Albert Lyod, I will try to follow him also, as Joan of Arc again she save the city of Orleans now I will save the Phillippines also. "I will die for my right."

My motto is: "There is no victory without struggle." That's all.

Earnestly yours,

DIONISIO VIDAL.



Wearing of the Uniform by Reserve Officers

Published by Request of the Adjutant General of the Army

The policy of the War Department, as will be seen from revised Army Regulations 600-40, is to encourage Reserve Officers to wear their uniforms on all occasions where military dress is proper and in good taste. The revised regulations cover all the functions where a Reserve Officer should appear in uniform and specifically those cases where a Reserve Officer is also a member of the Regular Army or the National Guard.

That part of these regulations relating to the wearing of uniforms by Reserve Officers is quoted, the changes from the original regulations being printed in italics.

EXTRACT

22. OFFICERS RESERVE CORPS.—a. Except as otherwise prescribed, a reserve officer on active duty will wear the uniform, including insignia, prescribed for officers of the Regular Army.

b. (1) Reserve officers *not members of the Regular Army or National Guard*, not on active duty and within the United States or its possessions, may wear the uniform on occasions of military ceremony, *at social functions of a*

military character, at informal gatherings of the same character, and when engaged in the military instruction of a cadet corps or similar organization, or when responsible for the military discipline at an educational institution. Such reserve officers may also wear the uniform when attached to an organization for target practice, when visiting a military station for participation in military drills or exercises, or when assembled for the purpose of instruction.

(2) Reserve officers not on active duty, and outside the United States or its possessions will not, except when granted authority, wear the uniform. Such officers, on occasions of military ceremony or other military functions, may, upon reporting to the nearest military attache and having their status accredited, be granted authority to appear in uniform.

(3) Field clerks, warrant officers, and enlisted men of the *Regular Army who hold commissions in the Officers' Reserve Corps may wear the uniform of their grade in the Officers' Reserve Corps as follows:*

(a) *When undergoing voluntary training designated for reserve officers which they have been authorized to take by their department or corps area commanders, and in going to and returning from this training.*

(b) *When attending meetings or functions of associations formed for military purposes whose membership is composed largely or entirely of officers of the army of the United States or former members of the service.*

The uniform of the reserve grade will not be worn by field clerks, warrant officers and enlisted men of the Regular Army in an office of the military establishment or at places where they would come into contact with troops of the Regular Army, or of the National Guard when called into Federal service, except when the wearer is on active duty as a Reserve Officer or as is otherwise authorized in this paragraph.

(4) *The rules stated above will apply also to Warrant Officers and enlisted men of the National Guard holding reserve commissions and not on active duty as Reserve Officers, when the National Guard is called into the service of the United States; but when the National Guard is acting as a State force these individuals may wear the uniform of their reserve rank as prescribed in b (1) above when not actually on duty with the National Guard, except at places where, or on occasions when, the wearer would come into contact with other members of uniformed troops of the National Guard of his State.*

c. Members of the Officers' Reserve Corps will provide themselves with field uniforms with insignia of the branch in which commissioned, for use when ordered to active duty. Other than clothing, everything needed by such officers will be issued to them when on active duty, except such articles as they may have previously purchased from the War Department.

35. GENERAL PROVISIONS.—c. (As changed by C I, AR. 600-40). Reserve officers and officers of the National Guard in Federal Service, will wear the same insignia as officers of the Regular Army.



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<i>F-12</i>	Revue Militaire Generale	<i>US-23</i>	Field Artillery Journal
<i>I-3</i>	Rivista de Artiglieria e Genio	<i>US-30</i>	Infantry Journal
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BOOK REVIEWS

Military History of the World War. By Colonel C. R. Howland, Infantry, U.S. Army. The General Service Schools Press, Fort Leavenworth, Kansas. 1923. 5 $\frac{7}{8}$ " x 8 $\frac{7}{8}$ ". Price, \$3.00.

This latest history of the World War is by an officer who has made a thorough study of the subject and in his research has consulted many sources, two hundred and twenty being listed in the bibliography. With so many sources of information available the facts as presented may be considered as accurate and as giving a true outline of the operations of the war.

The narrative covers in an interesting and logically arranged manner the operations in every theatre of the war. The point of view is that of high command and consequently the minor details are not covered except in the case of the operations of some American units. For each major operation there is a statement of the situation and the plans of operation of the opposing forces. This is followed by a narrative of events as they occurred in carrying out the plans of operation. Then comes a statement showing wherein the fundamental principles of war were complied with or violated and the author's conclusions as to the results of adherence to or violation of these principles.

The maps, which are in a separate volume, are numerous, with all unnecessary details omitted. The operations which are outlined thereon can thus be readily followed. The American participation in the World War is naturally emphasized; and the important results of its efforts, and their distinctly American characteristics, are clearly and interestingly presented. One might say that it glorifies the work of the United States forces.

For a student of military history it gives an authoritative outline of every major operation of the World War which affords a basis for study of the application of the fundamental principles of war. For a detailed study of any operation it thoroughly orients the student, who can then more intelligently take up the minor details of the operations. For the average reader it is an interesting and accurate narrative of events conveniently arranged. It gives a very clear picture of the World War.

The Decisive Battles of Modern Times. By Lieutenant Colonel F. E. Whitton. Houghton Mifflin Company, New York. 6" x 9". 254 pp. 7 maps. Cloth. Price, \$3.50.

Colonel Whitton, the author of "The Marne Campaign," "A History of Poland," etc., has attempted to extend the field of Sir Edward Creasy's "The Fifteen Decisive Battles of the World," by an examination of the decisive battles in all the major wars which have occurred since Creasy's book was written. As a result of his examination, Colonel Whitton has selected the Battles of Vicksburg, the Battle of Konnigratz, Mars-la-Tour, Tsushima and The Marne, as being respectively the preeminently decisive battles of the American Civil War, the Austro-German War, The Franco-German War, the Russo-Japanese War and the World War.

His selection of these battles for discussion and criticism will hardly be challenged, excepting possibly in the case of the Battle of Vicksburg. While the siege and capture of Vicksburg have been fully recognized by American students as being of great importance in breaking down the resistance of the Southern Confederacy, yet it has been so customary to look upon the Battle of Gettysburg as the "turning point" of the Civil War, that the author's emphasis on the major importance of the Vicksburg Campaign is encountered with somewhat of a preliminary shock. Nevertheless, a careful consideration of Colonel Whitton's argument of the case will at least go far in carrying conviction that Vicksburg is entitled to an equal place with Gettysburg, even if one can not travel the whole road with Colonel Whitton in yielding the position of primary importance to the battle which he has selected.

In treatment, all the campaigns discussed are set in their proper perspective as to the prior and underlying political, geographic and strategic conditions which led up to the battle and which rendered its outcome so significant, in a manner at once scholarly and interesting. It is perhaps fair to say that in the treatment of each of these battles the author has displayed the point of view of a historian and strategist rather than that of a tactician. This is not to say that the essential details in the development of the several tactical situations are neglected, but nevertheless the specific contribution of the book to the military student is strategic rather than tactical.

An especial value attaches to this work by reason of the literary skill as a result of which the author has succeeded in presenting in a small compass a graphic and complete picture of each of the entire wars, including its causes and

antecedent political and military background, leaving the reader with a clear comprehension of the reason why the battles discussed proved to be the decisive operation in the several wars.

Although published by Houghton Mifflin Company in America, the book was printed in England, which is practically equivalent to saying that it is altogether excellent in typographical make-up and accuracy. Furthermore, another characteristic excellence of military works produced in England appears in the series of seven excellent maps which are used to illustrate the five battles described.

"The Decisive Battles of Modern Times," is perhaps particularly to be recommended to the officer who seeks an introduction to the study of any of the five wars which are represented in the contents of this work.

America. A Family Matter. By Charles W. Gould. Charles Scribner's Sons. New York. 1923. 6" x 8". 182 pp. Cloth. Price, \$3.00.

Mr. Gould attacks the immigration laws of this country from the purely scientific angle, basing his opinions on obvious conclusions to be drawn from historical facts.

The book opens with the following quotation "A mongrel people never attain real prosperity." Under the heading of "Opinions of Scientists" we read the rather well known facts about the value of the pure strain in both man and beast, and the ill effect of cross breeding, or thoughtless breeding, that is, breeding with a complete disregard for defects and bad traits which we should strive to eliminate.

Historical facts which have to do with the rise and fall of civilization, beginning with the early Egyptians of 3500 years before Christ, the decrees they issued in an attempt to keep their blood untainted, and their ultimate decay through the introduction of bad or inferior blood are told to establish the claims of the author.

Through period after period and dynasty after dynasty, the reader is conducted over the critical points of history, being continually reminded that the homely phrase of "blood will tell," is more truth than fiction.

The author's concluding paragraph is the keynote of the whole book. ". . . . Repeal our naturalization laws deafen our ears to the clamor of demagogues Already the plunderers, availing themselves of the importation of cheap labor, without thought of replanting, have recklessly swept away great forests, wantonly careless of provision for those who come after them Already they have brought in hordes of witless, so that now millions of voters are mental children Repeal our immigration laws; bar out the feeble-minded, the vicious, and the debased; secure our children and our children's children in their legitimate birthright."

Mr. Gould has prepared a powerful argument which should be of vital interest to every American.

Industrial America in the World War. By Grosvenor B. Clarkson. Houghton Mifflin Co. New York. 6¼" x 9¼". 573 pp. Price, \$6.00.

In the words of Rebecca West, "Criticism must break down when it comes to masterpieces." The professional *man-at-arms* "can only put out a tremulous finger to touch the marvelous shining crystal, and be silent with wonder." "One

sits and looks up," while Mr. Clarkson unfolds this untold tale of the war, "The Strategy Behind the Line, 1917-18." The soldier soon becomes lost in the maze of figures, not even wondering why copper could be sold to the War Department for about 16 cents a pound and only shortly after be worth double that figure. But when the author in his summing-up asserts that all plans for industrial mobilization against war should be placed in the hands of qualified civilian experts and not in the hands of the military, adding that, "*no one who witnessed the spectacle of an American War Department, magnificent as were its achievements on the purely military side, thrust unprepared into a great modern conflict, going down for the third time in an uncharted sea of industrial-military problems, could come to any other conclusion.*" the soldier feels that here he might venture an opinion. Since his role is to re-establish peace by force of arms, where the citizens or their "representatives" have brought about war, might it not be possible for him as well to try and learn to become a navigator of uncharted seas? Since war in the words of Clausewitz, "is a political instrument, a continuation of political commerce," perhaps it might be worth his while. So he turns to his companions with a new light in his eyes, but finds them gone. He has forgotten that most of them have been thrust back. Where? He picks up his books and studies awhile, and now and then he dreams awhile of the probable outcome of the Ruhr War. Will the French and Belgian soldiers succeed in navigating that uncharted sea?

Radio for Everybody. By Austin C. Lescarbours. Scientific American Publishing Company. New York. 1922. $5\frac{1}{4}'' \times 7\frac{3}{4}''$. 334 pp. Cloth binding. Price, \$1.50.

The author has made good use of that peculiar talent of explaining complicated and involved processes in simple language which is so well exemplified in the Scientific American. He states in his preface that he has written the book on the very table on which he has his radio set, and that he has been inspired by actual contact with the new art, and by the hundreds and thousands of inquiries which have found their way to the editorial rooms of the publication. This has given him a very solid base on which to build, and he has indeed builded well.

The book covers Elements, Radio-phone broadcasting, Receiving equipment and its operation, Amplifying, the Radio-telegraph, Transmitting, Unusual use of radio, Application of radio to every-day business, How to construct radio receiving sets, and The radio-telephone of today and tomorrow. This last chapter is not, as might be expected, a prophecy of what we may expect, so much as a description of the combination of land lines with radio telephone links, such as the Avalon-Los Angeles system on California, where radio is used to "hook-up" the telephone system on the island of Avalon with the telephone central of Los Angeles, across some thirty miles of water.

The chapter on the construction of home-made sets is very clear and understandable, diagrams are well drawn and clearly marked, and the half-tones used thruout the book are interesting and instructive. The book is not only an excellent aid to the amateur, but will be found well worthy of a place in the library of the more advanced student of this fascinating art.

A Study of American Intelligence. By Carl C. Brigham. Princeton University Press. Princeton, N. J. 1922. $6'' \times 9''$. 210 pp. Price, \$3.50.

Perhaps the most important recent contribution to the subject of immigra-

tion is this collection of facts concerning race deterioration. This study which embodies neither theories nor opinions, but cold facts, leads to the conclusion that the average intelligence of our immigrants is declining. It is based on a careful interpretation by trained psychologists of the results of the United States Army mental tests.

The man-in-the-street wonders what answer the fruitman, who "inspired" the writer of that crazy song, "Yes, we have no bananas today," would make to the question; "If 4 is more than 2, then cross out the number 3 unless 3 is more than 5, in which case draw a line under the number 4." The apparent simplicity of the materials used in mental tests has led many to make up lists, but needless to say they are worth nothing. No one but the psychologist appreciates the amount of time, labor, and training necessary for the development and standardization of the simplest of these tests. Those in a position to know do not claim that these psychological measurements have reached the ultimate, but they assure us that they will be enormously improved in the near future. Their hope is that they will soon be able to measure emotional and moral characteristics.

Dr. Brigham's work is not light nor easy reading, being made up largely of charts and tabulations, but it is a notable contribution to sociology.

Better Letters. The Academy Press. Wyoming, N. Y. 1920. $4\frac{1}{2}" \times 6\frac{3}{4}"$. 114 pp. Cloth. Price, \$1.00.

In view of General Pershing's order of April 12, 1923, relative to faulty army English, this little book is of special value to service men. "Better Letters" really lives up to its title. It gives the essentials in a concise attractive form and acts as a stimulus in striving for better letters.

The book contains a very valuable collection of ideas on the subjects of phraseology, punctuation, abbreviations, misused words, vulgarisms, synonyms and pronouns. Its pocket size and carefully planned type style, enhance its value.

Les Captifs Delivres. By Henry Bordeaux. Plou-Nourrit et Cie. $4\frac{3}{4}" \times 7\frac{1}{2}"$. 327 pp. 3 maps. Price 6 francs.

A book of personal reminiscences and anecdotes of the stirring action during the retaking, by the French, in October and November, 1916, of the forts of Vaux and Douaumont near Verdun. The author brings out particularly the intense sentiment of the French for Verdun and its forts which enabled them during the entire war to make a defense there unparalleled perhaps in all history.

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