

The
FIELD ARTILLERY
Journal



IN THIS ISSUE:

Lessons from the Maneuvers

DECEMBER, 1941

From Berryman in
Washington Star,
1918.



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IN FIELD ARTILLERY
HISTORY!

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Foreword by Major General Danford, Chief of Field Artillery

THE FIELD ARTILLERY JOURNAL

1624 H STREET, N. W., WASHINGTON, D. C.

The Ideal Christmas Gift

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The Field Artillery Journal

A Publication for the Field Artillery of the Army of the United States

DECEMBER, 1941—Vol. 31, No. 12

THIS ISSUE features lessons from the maneuvers, and the JOURNAL has joined the hecklers in heaving a few rocks at the participants. But we want to make it perfectly clear that we are aware that much fine work was done, that great improvement has been shown, and that all in all the praise bestowed by high commanders and by the press has been well merited. Recent notes from the Chief's Office (published in the JOURNAL) giving a few criticisms on the maneuvers have brought favorable response and have shown that units and individuals can take it and like it. Hence we have been emboldened to go into the subject more fully.

HOWEVER, there is no need to get too long a face over it. A distinguished foreign officer who was at the maneuvers told the editor that the criticisms we direct at ourselves are too severe if we compare ourselves to foreign armies. Many of the so-called mistakes would not occur in combat. In maneuvers the average American has an understandable aversion to hiding under the leaves, like a covey of young quail, everytime a plane flies over. But if he actually were being shot at he would not be so brash. The American's sense of humor does not permit him to perform in rehearsal with the same deadly seriousness as some of his European contemporaries. But he learns quickly.

IN ACCORDANCE with our prior promise we are presenting with this issue a bonus consisting of a tinted photograph suitable for framing. There will be a series of these inserted in forthcoming issues.

AGAIN WE URGE that readers save their back numbers of the JOURNAL. In years to come, a complete set of the magazine covering the period of the present war will be a rich source of historical and professional data. The photos which we are now producing will in themselves be worth the price of the periodical. Many of them are flown across the south Atlantic, thence up the coast of South America, and reach this country in a remarkably short time after the events illustrated. To those who are not subscribers, we can only repeat, "If you want the JOURNAL, you had better enroll; we don't know where you will get back numbers—they are collectors' items already."

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A MESSAGE FROM THE CHIEF OF FIELD ARTILLERY



As the holiday season again approaches, we look back upon a year of activity such as has not been seen in our Army since 1918. The particularly difficult period of reorganization and expansion lies behind us; perfection of our individual abilities and skills, and the perfection of our units as teams, lies ahead. We would not be human if we failed to take the keenest interest in what the New Year holds in store for us.

As field artillerymen, and as soldiers in the United States Army, it is our business to face the uncertainties of the coming year as though war for us at an early date was an absolute certainty. It is only by such a view of the situation that we are made to realize how precious is the time available to us for essential instruction and training.

Sergeant, as Chief of Section, are all of your men skilled in setting the sights and laying the gun? Are all of your men proficient in all of the duties of all of the cannoners? Do they all know the mechanism of the gun and how to keep it clean, free of rust, and lubricated, and do you see that they keep it that way? Do all of the men of your section know how to drive the truck that pulls your gun, and do you see that they all know how to "groom," and water and gas, and lubricate that truck, and keep it in such condition as to make it, in depreciation and maintenance, the least possible expense to the American taxpayer? Do you keep your men smart, and clean, and proud of themselves in their punctilious observance of their military courtesies?

Lieutenant, do you assemble your sergeants and corporals and teach them, and coach them, in their many and varied duties, and in the knowledge that they must have?

Captain, are you by any chance permitting your men to idle away their time when it is your business to see that they are kept busy on progressive instruction? If so, you have not yet mastered your job, and time is very short. Remember that you will have no morale troubles if you follow the tried and reliable Army rule "feed them well, treat them squarely, and work them hard." Do you or your officers by any chance hobnob with your men, as, for instance, mix with them for cards or dice, or for an occasional beer? If so, you have a rotten outfit and it will get worse, not better, until you learn that trying to be a "good fellow" in any such way does not win the respect, confidence, or affection of your men.

Colonel, do you sit up nights, if necessary, planning comprehensive, well balanced, and thorough schedules of training, and do you meet with the officers frequently and regularly to doctriate them with your standards, and to help them and coach them in getting interesting and instructive training down to their men? If so, and if you carefully supervise their work; if you are fair and kind and just and exacting in your relations with all of your officers and men, you have assured yourself the privilege and the honor of commanding a superb organization of American soldiers.

May the holiday season be a most happy one, and may the New Year bring frequent and repeated satisfaction over duties loyally, enthusiastically, and efficiently performed, is the wish extended at this time to all personnel of the Field Artillery of the Army of the United States.

ROBERT M. DANFORD,
Major General, U. S. Army,
Chief of Field Artillery.

Editor's foreword: This issue of the Journal features reports—both official and unofficial—on the Louisiana maneuvers. The general tone is critical; although praise was due in numerous instances, this magazine can fill no useful function in lauding units or individuals. That can be (and doubtless has been) done more authoritatively by commanders concerned. However, we do not toss brickbats for the pleasure of it. Our army is undergoing a phase of searching self-analysis which is both wholesome and timely. Far better that we expose our own faults now than have the enemy do it for us later.

A "battle." Troops are waiting for umpires to decide who won.



LOUISIANA HAYRIDE

By Garrett Underhill

Photographs from "Life," by Ralph Morse

A journalist casts a sharply critical eye at the maneuvers, and tells us many things which may be helpful.

The joint Louisiana maneuvers of the Second and Third Armies this year were thoroughly covered by the Fourth Estate. Uniformed and assigned to either Red or Blue armies in a combatant status, reporters attached themselves to military units, and were thus for the first time brought into interested and intimate contact with combat intelligence, reconnaissance, patrolling, and local security.

The conduct of units engaged in such work did not bear out the reputation Americans have as frontiersmen, hunters and scouts. In view of this outdoor tradition and the past months of small unit training, their execution of local security was particularly disappointing.

Along improved roads where heavy traffic moved there was no organization to prevent vehicles and personnel from running right through friendly outposts and into the hands of the enemy. Such ridiculous sights as a ½-ton weapons carrier with a caliber .50 machine gun attacking (at 30

mph) two parked scout cars and a light tank has no place in modern war. Neither has the spectacle of two Blue wire trucks traveling at such a clip that they were unable to stop before passing through a Blue rifle company and a Red reconnaissance platoon. However, there were innumerable instances where the situation had so changed as to absolve the lost vehicles and personnel of much blame for running into enemy lines.

A striking case in point concerns a problem wherein Blue cavalry had penetrated behind the Red right flank to a town called Zwolle, thus getting astride a north-south concrete road and separating Red Army HQ and some railheads from the main Red effort in the south. Red cavalry and armored formations south of Zwolle about-faced and went north to push the Blues out of the town. They parked half-tracks 1½ miles south of Zwolle on the concrete highway and swung to the right



After getting hopelessly intermixed with Red Cavalry at Zwolle, and after turning around to attack the center of town, Red tanks here meet a colored brigade moving up to reinforce the cavalry attack.

to attack along a parallel road. Meanwhile a Blue cavalry patrol worked in among the half-tracks and forced them back.

Subsequently, in the course of an hour, the Red half-tracks were passed by a northbound Red 6×6, various Red motorcyclists, a division artillery commander and party, a forward artillery observer, jeeps and miscellaneous other personnel. Some vehicles were even unaware that Zwolle's occupation had blocked the main road to Army HQ and Shreveport. All went through Red outposts without the slightest warning from the half-tracks, and were taken captive almost to a man.

Such indifference as these half-tracks displayed was common. No small number of officers and men outside of corps and division CP's had a shocking lack of knowledge about the location of the enemy in their immediate front, and were equally and blandly ignorant as well as careless as to what friendly units in the immediate vicinity were doing.

A Red tank company

commander in a certain village was questioned. No, he didn't know where the Blues were. His mission was to defend the village against attacks from the south and east, and he supposed the enemy to be directly to the south. (There was at least a battalion of his own division some

seven miles to the south.) He had no information concerning the antitank units in the village—neither as to their unit or as to their purpose. (They were mechanized cavalry whose mission was to defend the town against attack from the south and east—a little matter on which they and the tanks might well have gotten together.) He didn't know where the remainder of his regiment was, but when told that X Company was on the defensive to the east, he surmised that they might be protecting the regimental train. But he couldn't be sure.

MP's knew *nothing*. While men were posted to guide personnel of their own units when occupying a position, they were of little additional



Mired tanks surprised by Blue infantrymen, the first of whom is seen approaching in the foreground. Note the utter lack of local security on the part of the Reds.

and. A typical conversation between an artilleryman and such a guide ran as follows:

"Third Cavalry Brigade this way." "Did any artillery go with it?" "I can't say, sir." "Did any guns at all go down this road?" "I really don't know, sir." "Did any artillery of any description go through this road junction at any time during the past two hours?" "I'm sure I couldn't say, sir."

In the Zwolle engagement already mentioned, a Red medium tank battalion commander was ordered to deliver an attack to clear out the town. His attack began to roll, and found Red cavalry in full possession of the quarter he first entered. It was therefore decided to support the cavalry in storming a final center of resistance in a cemetery. In so doing, the tanks became so hopelessly intermixed with cavalry reserves that forward progress became impossible. The tanks

turned, in hopes of getting in a blow on the center of town, got mixed up in other armored columns already there, and before the battalion could be reorganized the war was over.

At least a partial excuse for the commander of the tank battalion seemed to lie in the absence of good general information, to no small extent due to the lack of adequate radio equipment.

There is no excuse for the type of mentality displayed by the tank company commander. Later this captain lost three tanks to the Blues. *With no guards out*, no guns manned or dismounted, these mired tanks were caught flat-footed by less than a squad of crack Blue infantrymen.

The actions of these Blues—Westerners and cagey Indians of a Guard division—were in striking contrast to the sloppy work of many other soldiers. After taking the Captain's tanks—along with a wrecker, a reporter and two radio announcers—they scored again on the regiment to which he belonged. Light tanks were sent down to clear the Blues out. They worked around a bend in the road with only a gesture at reconnaissance. Here they ran smack into a cleverly emplaced Blue .50 caliber antitank gun. A Blue lieutenant concealed in the grass on the high bank would observe each tank as it worked around the bend. By hand signals he would indicate to his gun squad the time to commence dragging their piece out of hiding in the woods, the path to take through the long grass, and



Blue infantry has out-bluffed this half-track platoon, scared them to they are making this terrible mistake of running directly across the road to mount their car in background. The Blues have a light machine gun with their forward platoon, and will get them all. Presently the half-track itself will come out to flee, and be nicked by the .50 caliber also with the advance point. With jeeps, 6x6's, etc., this Red force has about twelve times the fire power of the Blue Platoon, and has greater strength in rifles alone—for they have armored infantry with them.

the location of the forward tank. They would let the surprised tank have it, and crawl back into cover to await the next. In this manner two tanks were called out. All umpires agreed that in war a minimum of four would have been lost by blundering into this single gun and its handful of protecting riflemen.

In the course of the same afternoon, these Westerners accounted for a total of 3 half-tracks, 6 tanks and a horde of other vehicles and personnel. This feat was accomplished with a Blue loss of two .50 caliber antitank guns and a scattering of assessed casualties. The evident reason for success: headwork on the part of the officers, NCO's and men of the rifle companies which successively led the advance. Their skill (and ability to bluff) was such that it was never necessary for the leading platoon to call on the support platoons of their company.

By no means uncommon, this kind of work was often duplicated by units whose scouting and patrolling ability enabled them to maneuver or frighten out of position more powerful organizations whose ignorance, indifference and lack of skill left them open to such action.

While training alone is the remedy for most faults of inability, one wonders about devising some schemes to cure at least the outpost and information problem. The duties of MP's might be expanded to include the posting of guards along important roads rendered dangerous by



Typical machine gun emplacement for maneuvers—right out in the open. Incidentally, the position on the gun of the ammunition chest is not favored by the Infantry School. It is fixed to tripod only for AA use.

enemy action. In accordance with the natural limitations imposed by military activity and terrain (and not merely by military organization by corps and divisions) an intelligence network might be arranged so that, at key points, it would be possible to find out what was going on and where other units were.

Under present conditions, the vertical routing of intelligence puts such a lag on distribution that



A Blue Douglas attack bomber strafes assembled Red tanks and other vehicles without getting more than passing attention. This is the tank battalion assembling to "attack" Zwolle.

organizations operating on the same road and contiguous to a reporting unit will normally get those reports as forwarded by rear echelons far too late. Brigade and division S-2's were usually aware of the general situation, but were poor on knowledge of road conditions and on the immediate battle intelligence required by reinforcing and maneuvering elements. As we have seen, this especially pertains when units are utilizing roads and fronts crowded with cooperating divisions and detachments. It even applies when division commanders themselves are visiting forward echelons.* If there were more effort at constant lateral communication useful to regimental and battalion commanders, the actions of striking forces could be made more rapid and effective. A well-organized service, composed of messengers, MP's, radio, telephone, air observation and other facilities, would lighten the communications burden of combat forces, and working with them might considerably enhance the all-round entire efficiency of forces in their area.

The objection might well be posed that a special area ground and radio network would provide the enemy with much useful information. In reply, many disastrous incidents from our own military history and repeated maneuver experience, and finally the Allied fiascoes against the Germans may be cited. In contrast is the open use of radio, flares, rockets and air panels by the German Army. There is a strong argument in that the policy of secrecy and security is per se a conservative trend abnegating the spirit of the offensive which underlies our military doctrine and animates our Army. Indeed, if it is maintained that, given information, we shall not be able to act upon it and render it obsolete before the enemy can react, in so ruling we are undoubtedly assuming an attitude of defeatism.

Quite as surprising to newsgatherers as the handling of combat intelligence was the lack of thoroughness exhibited by the majority of troops. One would have thought that the news despatches and gory pictures of the European War would have instilled an anxiety to work hard and well at their new profession. But no. No care whatever was taken in emplacing machine guns to select real fields of fire, cover or proper concealment. Though generally maintaining safe intervals, truck convoys seldom halted to dismount and scatter when strafed by aircraft. Here and there anti-aircraft machine guns of convoys would be laid on the offending planes, but normally not. There was a pleasing and distinct improvement in camouflage discipline, but it is a far cry from the requirements laid down by engineers who coach reporters on camouflage stories.

Over the entire Army phase there was an atmosphere of unreal and indecent haste which seemed to compound ordinary errors and force many into doing, that they might not be left behind, what they might ordinarily avoid.

*The reader is reminded that three ranking British generals were so captured by the Germans in Libya recently.

This held even for air. At flying fields, seldom was even lip-service paid to reality as squadron commanders persisted in parking planes wing tip to wing tip, seeking servicing convenience and military precision rather than practice at dispersion. In view of the fact that this habit of lining 'em up has lost the Poles, the Dutch, the Belgians, the French, the Yugoslavs their air forces—and the Russians a good part of theirs if pictures tell the tale—practice of this sort was extremely alarming to the press. Crowded though the fields were, the need for rapid servicing ought not to have precluded the cultivation of good habits.

Not so noticeable as haste, but in many ways more significant, was the unreality of maneuvers where fire-power was concerned. Troops in contact with hostile forces will discover in a trice, come war, that they cannot advance across open fields against machine-gun fire, because in war there are no weak-willed umpires. Troops will learn to take cover and dig in, when now they make little pretense of so doing. But without Gen. McNair's idea of using live artillery ammunition as an object lesson in connection with training, it is difficult to see how the full realization of the tremendous destructiveness of artillery fire is to be brought home. In spite of the superhuman job done by artillery umpires, right now the lack of appreciation is appalling. Anyone who has seen demonstrations of time shell at Sill and glanced at casualty statistics of past wars must shudder at the careless exposure of movements and positions to artillery fire prevalent in the maneuvers. One is alarmed to see that commanders even went so far as to forget their own artillery and its tremendous value. In some cases—as in maneuvers past—it was left in march order on the road when it should have been supporting the effort of its division. Too often, except in more or less elite outfits like regular infantry, cavalry and armored divisions, the usefulness of forward artillery went unappreciated. Infantry was put to costly use where artillery would have won for nothing.

Almost worse than this ignoring of artillery was a widespread failure to react to air firepower. Since all the difference between security on one hand and practical annihilation and transport paralysis on the other lies in a few simple precautions, this is amazing. The appearance of a major general of cavalry should not be required, before engineer vehicles concentrated at a bridgehead disperse into neighboring woods. Neither should the wise security measures taken in a CP like Gen. Patton's so contrast with lackadaisical performances by some lower echelons as to make headquarters personnel appear almost freakish. As a practical lesson to officers, a demonstration of air bombardment and machine gunning was staged at Barksdale Field in the middle of the army phase. Ninety generals and selected juniors totaling 4,000 were invited. Because high winds retarded the schedule, many generals left before the conclusion of the show.



Overworked umpire received protests for allowing Blue advance. Even though he did his best to keep the Blues back, while he was ordering them to retire in one area they would come forward in another. Undoubtedly Blue infantry here had fine spirit, but their actions would in war have been productive of nothing but casualties.

All these points were of interest. But they were neither as fascinating nor as unexpected as a thought which these first large-scale maneuvers of our new Army have generated. The thought is this:

Following recognition of the high promise of the Army, critics have sought—as above—to enumerate the mistakes observed so that correction through future training may be accomplished. There has been much bloodthirsty talk, too. Dark hints are passed that heads



Artillery umpire's assistant indicating fire on bridge south of Zwolle. The Red half-tracks in the background are about to drive right through this fire to escape Blue cavalry which has worked in among them. It is laid down by 105-mm. howitzers in Zwolle.



A demonstration of camouflage was staged during the maneuvers at Esler Field, Camp Beauregard. Here men of the 21st Engineers (Avn) take their simulated cabbage patch across the runway. They constructed revetments which they had intended the Blue pursuit planes stationed at the field to use. Only after the greatest persuasion could the Air Corps be induced to utilize the camouflaged facilities.

shall fall right and left in the most approved *Alice in Wonderland* manner. Guard officers must go. Reserve officers are to get the sack. A thorough purge of the Regular list will occur immediately.

It is to be hoped that, having been rushed into an emergency which it has long warned against, the Army will not be hustled into anything that it has not pondered long and well. And thus comes the question: would such thought reach the conclusion that the majority of maneuver mistakes were not in themselves evils, but merely surface manifestations which would disappear when the root and source was located and removed?

The author is convinced that most maneuver errors are attributable to a few basic psychological factors, and that these should be made the target of intensive corrective effort. The great majority of these factors stem from the fact that the United States Army today is a civilian army.

The Regular—the soldier well-grounded in the profession of arms—is a rare phenomenon. Rarer still is the reserve or guard officer whose peacetime pur suits have permitted him to convert himself into the practical equivalent of a professional. Both types are submerged in a tremendous flood of civilian personnel. Inevitably these civilian soldiers must carry all before them, and, for a time at least, impose on the Army the behavior patterns of civilian life.

Civilian life in the United States is peculiar. Our prize idiosyncrasy is our famed aptitude for bustle and haste. Stranger still for an army where all should work together is that unfortunate democratic development: rugged individualism. This trait has made "mind your own business" a national rule, and daily causes citizens to neglect their civic duties and to tolerate unfair business practices not directly affecting them. Probably rugged individualism, like haste, is an outgrowth of that pushing business enterprise which has sought to place a premium on individualistic success of a materialistic nature. Truly our God is Mammon, and woe betide him who wastes his time or falls behind through assistance rendered to his fellow men.

The most recent American psychological development also seems to stem from this neglect of the concept of group service and solidarity. In seeking material advancement, American enterprise has discovered and developed advertising and sales techniques to the point where it is a simple matter to make an inferior product outsell a superior one.

The cumulative effect has been a lack of thoroughness in our people. The cagey man will try to push ahead with outward show; the dull will see no point in hard labor if comparative results are negative. In short, it is regrettable but true that neither business enterprise nor unionization has yet made positive contributions towards the democratic ideal of service—towards group action and consciousness; towards thoroughness in thought and deed; and towards rapid and methodical—but not hasty—action.

It must be acknowledged, of course, that the opposite should hold for the regular. He has sworn himself to the service of his fellow countrymen. Unlike the civilian soldier, much is to be expected of him. If he has so far forgotten his ideals and the standards of thought and workmanship inculcated by every military precept, he has betrayed his trust, and he should go.

Actually, the regular must absorb his own psychological patterns—those peculiar to the military profession and to the conditions under which the Army has labored during the past 20 years.

Under the former heading come some pretty common attitudes of mind. Like any tight organization of men, a regular force is as susceptible to clannishness as to esprit de corps. Clannishness has a tendency to develop into prejudice against those who do not belong: against the Guard and against the reserve and selectees. Worse, among officers it progresses into a secretiveness more congenial to a high school fraternity than to an organization built to create an army from military ignoramuses, and bred to the offensive spirit. We must face the facts: some of these evils do exist.

Unfortunately they have been compounded where they do pertain because of two decades of military neglect by a pacifistic public. Officers have been compelled to substitute theory and desk work for troop duty. Dearth of funds has caused them to waste time in accounting for every picayune little item. It is not surprising, then, that an officer who had to salvage for training purposes the wood and nails from furniture crates might suffer from habitual inability to think in the broad terms of modern war's vast wastage.

On comparing these attitudes of civilian and military minds with maneuver faults, it should be possible to see how they motivate almost—if not absolutely—all the errors previously listed. The tank company commander was a reserve officer—the crews of the Red half-tracks near Zwolle were selectees and new recruits. They were minding their own business, and not speaking until spoken to. So slack were their security precautions that the Blues could and did work in to defeat them. Haste and want of thoroughness is seen throughout. The good old military mind is to be found permeating intelligence, and in the line-up of planes on fields. Finally, the small-minded commander is betrayed in the officer who forgets about his artillery. And so it goes.

The solution might well be the institution of psychological drills which would instill the characteristics desired—at least in the junior officers and enlisted men. Once these drills had made the individual's mind and habits receptive to military training, the purely military program should be completed rapidly. There cannot be the slightest doubt but that the raw manpower the Army has today is the best an army ever had. It is not to be compared with regular enlisted personnel of the past 20 years, nor even with that of 1917-18. Having the advantage of rising educational standards, it is highly intelligent. With prejudices removed, it will easily absorb combat training because military action is simply logical action in any given situation.

To facilitate this plan—or even to facilitate the present program—the essential must be constant, clear answers to the implied question "Why?" during all phases of training and operations. The increasing trend to wards visual and pictorial instead of written instruction should be continued because it is quicker, less boring, and more self-

explanatory. The dryness should be removed from military instruction and especially from manuals, so that pupils may replace the longing for the end of instruction and study with the interest to ask the question "Why?"

In this the Germans have set us a strong precedent. It is ill-fitting that we should fall behind, and continue to treat junior officers and especially enlisted men as children. Conservative regulars and strutting reserve and guard officers must avoid maintaining their authority by pulling rank and social distinctions, and by trying to make a mystery out of their professional knowledge. Conduct of this nature is mortally resented by any intelligent person. Today it is foolish, for many enlisted men possess a general—if not a military—intellect and social position well above that of their superiors. A real leader is he who commands through character and professional excellence alone; an officer who develops and guides, but does not drive, his men.

To get the most out of Americans, it must be remembered that our form of government has developed a people who respect their leaders only when that respect is returned. To explain things to them is to gain their respect, their interest and their regard. In so doing one also provides that information which develops to a maximum our national characteristic of individual initiative. Since the fog of war imposes on armies a demand for isolated and independent action on every side, it is imperative that the soldier be developed to the fullest who, through asking "Why?" has become capable of acting individually yet in harmony with his neighbors seen or unseen, joined to them by a common mind and a common purpose.

The maneuvers have indicated that this type of person is rare. Yet he is the sort vitally needed not only as soldiers by the Army, but as a citizen by present day and post-war democracy. If the Army can convert the mass of civilians to conform to such a pattern, it will perform a high service to the country, and win for an intelligent military policy a respect that may well save us from future unpreparedness.



Signal Corps sound trucks supplied battle sounds for realism. (Photo by Dmitri Kessel.)



Lake Charles airport: note the concentration of trailers, the line-up of Navy Grumman fighters faced beyond with another line of Douglas dive-bombers. In the background is still another line-up of planes. Life photo.

Lessons from the Maneuvers

Extracts from the reports of Field Artillery official observers at the Second Army-First Army exercises

GENERAL

All operations in the maneuvers were decidedly affected by two factors: First, the preoccupation of all participants with tank and antitank features; and second, the terrain, which has few roads, little observation, and is heavily wooded.

AIR OBSERVATION

One observer reported that no battalion was located which had not requested air observation but only one battalion was found which actually received action on such request. The Air Corps performed an enormous number of missions, but it is not believed that they were useful to field artillery except in lengthening the effective range of harassing, interdiction and demolition fires. Any effect thus obtained, however, was not given as the result of field artillery commanders making requests for deepening of their fires. From the fact that air observation was requested, it is deduced that it was needed. From the fact that it was

not supplied, it is deduced that (1) there were more important missions; (2) Air Corps training would not permit air observation of field artillery fire; or (3) that the Air Corps is not extremely interested in putting their planes and pilots to such a use.

AMMUNITION SUPPLY

Artillery battalion commanders and umpires were well aware of the haulage problem involved in ammunition resupply; apparently they made every effort to have the actual haulage meet the theoretical expenditures. All battalion S-4's and at least one division ammunition officer felt that the Division Ammunition Office is unnecessary, serves no useful purpose for artillery, and is a definite bottleneck in resupply.

ANTITANK DEFENSE

Weapons were generally located in pairs and in depth. The field of fire was toward the enemy and was generally well chosen. Many instances were noted where field



75-mm. antitank gun commanding road and a part of the 37th Division Provisional AT Battalion. This is the gun shown from the front.



The same gun photographed from the rear. Life photos.

pieces were used for antitank defense on order of combat team commanders.

It is believed that the individual soldier has been thoroughly indoctrinated with the necessity and desire to seek and destroy the tank. He seems to have lost his fear of tanks now that he has seen them, and in some ways appears

to show a hatred of them, engendered in part by the fact that the tank umpires have allowed the tank most unusual liberties when opposing antitank guns.

As a whole the tank attacks were stopped whenever launched. That the terrain is unfavorable for tanks may account in part for this. Nevertheless the fact remains that the attacks were stopped by the use of organic artillery and antitank weapons.

Armored forces attacked habitually in the following order: A few motorcycles, a few scout cars, more motorcycles, tanks. Our troops do not meet this method of attack in the best fashion, according to one report. The present method is to fire at each vehicle as it comes up. This is objectionable on the following grounds:

a. The position of the antitank gun is disclosed prematurely.

b. The fire is directed at the tank at the time and place where the tank is the strongest. This is because the armament of the tank is designed to fire forward most efficiently; and the front armor of the tank is thickest.

c. The successful attack on one vehicle leaves a road block between the gun and the next target.

More effective fire could be delivered on tanks if the gun crews waited until after the vehicles had passed. The probable objection is that umpires will not assess tank losses if this procedure is followed.

Two things were especially noted concerning tank attacks during the maneuvers: (1) The use of artillery to support tanks was extremely limited. (2) Tanks, no matter how much effort is exerted, always work back toward roads when they encounter obstacles.

ORDERS

Warning orders were used extensively but in many

cases their improper use defeated their purpose, as the troops were alerted only to have the orders changed later. Many warning orders caused men to be mounted and material ready to be moved hours before they could be put on the road. Numerous statements were made that poor planning was the rule rather than the exception.

Operations maps and overlays were being used. Fragmentary oral orders were in full use by the lower units. But in some cases the orders issued were indefinite and *too* fragmentary. As an example, the order issued by an antitank battalion commander to one of his companies consisted of the following statement, "Get on the road and get going." When the company commander asked as to the destination and mission, he received as an answer a repetition of the foregoing command.

COMMUNICATION

Poor results in telephone communication were chiefly due to poor technique in wire laying. It was the old story of lines crossing roads with no attempt made to protect them, leaving wires on road shoulders, laying them too tight, rough handling during recovery of wire, and so on.

Although many radios were successfully used, the troops claim that the sets, especially the 194's, were not good enough to perform the missions.

FIRE DIRECTION

In general, units were employing the technique taught at the Field Artillery School. However, more training of the FD teams is needed. The fire-direction center appeared to be the only operating installation at the battalion CP. Installations were concentrated, and were not dug in. No systematic arrangement of equipment appeared to be in use. Firing charts were in every case separate from the situation map. This may account for the fact that in one division 18 per cent of the fires marked on its leading elements were fired by its own artillery. The function of the S-2 and S-3 sections, except with regard to fire direction, appear to have been neglected. Suitable situation maps frequently were lacking.

FORWARD OBSERVATION

Because of the nature of the terrain, forward observation was the most successful means of delivering observed fires. An improvement has been made in the use of more experienced officers for this important duty.

Many battery commanders—and in one case even a battalion commander—acted as forward observer. The battery forward observers were ahead of the infantry battalion commander, and usually right in the front. Communication by radio was common; however, many batteries made arrangements to lay wires to the forward observers. Forward observers were active in making the local situation clear to their own troops, but there is still a need for teaching these details that they have auxiliary intelligence functions. Fires requested by forward observers were more reliable than those called for by liaison officers.

GUNNERY

In general, survey was by battalion. Data furnished by the division artillery headquarters or by the observation battalion seldom arrived in time to be of use initially. The type of survey performed was influenced by the heavily wooded terrain.

None of the photos, maps, or mosaics distributed were made during the maneuvers.

A great amount of confusion existed at times as to the capabilities of the various weapons. In one case 75-mm. guns "fired" on targets eight miles distant.

LIAISON

Command and combat liaison were employed, but not to the extent considered desirable. More and better artillery support would have resulted from closer command liaison. Artillery and combat teams sometimes marched without sending a liaison officer of any kind to the combat team commander. This may account in part for the



Life

A message center about as well-concealed as an airplane beacon.

fact that many supported commanders were not really "artillery conscious."

MOTOR MOVEMENTS

Many movements observed showed evidence of faulty prior planning and reconnaissance. Evidently the use of the roads was not coordinated by higher staffs; as an example, on one occasion where two divisions had been ordered to move by the same road, one element of one division was delayed ten hours at the IP. On another occasion during a night move one division crossed its own columns and occasioned a delay of eight hours in the launching of its attack ordered by a higher commander.

The road discipline of the individual soldier and officer is noticeably poor, particularly at halts. No halted column was observed in which some individuals were not on the left of the column and in many cases well out toward the center of the road. Halted columns seem to rely more on a sentry at the head and tail of columns to slow down approaching vehicles than on proper discipline to protect themselves and passing vehicles.

It is believed that the artilleryman may as well resign himself to the use of all of his vehicles for the shuttling of infantry. All type vehicles within the artillery were used for that purpose.

Many instances were observed of vehicles being overloaded, driven at excessive speeds and generally being abused, but some faults must be charged to higher commanders who required prolonged and excessive use of vehicles with insufficient opportunity for caretaking.

It is to be noted that the operation of motor vehicles has improved materially. There is still much to be desired along the lines of caretaking, cleaning, driver maintenance, tightening, drivers' inspections and servicing. In short, the drivers now know how to drive, but do not know how to take care of the transportation. The small number of accidents was a great surprise. Most that did occur could be laid directly to (1) driver fatigue, (2) blackout driving under the most difficult conditions, and (3) carelessness.

There is a tendency on the part of the troops to overload light vehicles and underload medium or heavy vehicles when shuttling.

The use of traction devices was not prevalent. The practice of winching to hard roads and staying on them was the means usually employed to the exclusion of other forms of field expedients.

Maintenance was poor. Although most motor officers knew the general requirements for motor maintenance there was not enough effort and technical knowledge to insure proper maintenance. From personal observation this failure started with the driver and continued throughout the echelons of maintenance up to the 4th. There was one exception to this statement found in a third echelon set-up. The reasons for this failing are believed to be:

- (1) Training of maintenance personnel was inadequate.
- (2) Maintenance was subordinated to such an extent that it was forgotten, due to more obvious needs such as:
 - (a) Shuttling.
 - (b) Supply.
 - (c) Cleanliness.
 - (d) Training of details and firing batteries.
- (3) The time necessary to perform maintenance is not made available by commanders.
- (4) There is a dearth of technically qualified motor officers, motor sergeants and mechanics.
- (5) The army is not motor conscious.
- (6) Abuses and faulty maintenance of motor vehicles are condoned. (This is one of the greatest sources of poor maintenance.)

In general, the 1940-41 vehicles now in use are superior vehicles. There are many who question particular vehicle characteristics but the fact is that in spite of maintenance difficulties mentioned above, the vehicles functioned. Foreign officers (British) present at the maneuvers were unanimous in their praise of all vehicles observed. They frankly admitted that our transport is the best they have seen bar none.

Notice of Annual Meeting, U. S. Field Artillery Association

In compliance with Article VII, Section 1, of the Constitution, notice is hereby given that the Executive Council has fixed 5:30 PM, Monday, December 15, 1941, as the time of the annual meeting of the Association to be held at the Army and Navy Club, Washington, D. C.

The business to be disposed of will be the selection of six members of the Executive Council; voting on proposed amendments to the Constitution (as printed in each issue of the JOURNAL beginning with June, 1941); and the transaction of such other business as may properly come before the meeting.

Proxy cards are being sent out to all active members of the Association within the continental limits of the United States, as required by the Constitution, and it is desired that they be returned promptly. Nominations may be made on the proxy cards or from the floor of the meeting.



Bareheaded We Salute Them

During the year just ending there has been recorded the "final ride" of three of our immortals.

April 15, 1941. COLONEL DAN T. MOORE, who as a Captain was the first Commandant of the Field Artillery School, and who has been suitably regarded as the founder and father of modern gunnery in the U. S. Field Artillery.

May 30, 1941. BRIGADIER GENERAL EDMUND L. GRUBER, who as 1st Lieutenant, 5th Field Artillery, at Camp Stotensburg, P. I., in March, 1908 composed the Field Artillery Song, which will be sung as long as the United States has a Field Artillery.

June 17, 1941. MAJOR GENERAL ERNEST HINDS, who as a Captain of Field Artillery in 1904-06 was a member of the Board that wrote the first Drill Regulations for our then new, rapid fire field gun, and who in 1918 was Chief of Field Artillery of the A.E.F.

Men such as these are the creators of the traditions of our Arm.

—R. M. D.

May, 1940

Some Experiences of a Field Regiment R. A.

By D/101*

[Editorial note: This superb account, by courtesy of *The Journal of the Royal Artillery*, July, 1941, needs no additional comments. It is "all there"—packed with artillery lessons on every conceivable topic.]



Loading a 25-pounder

Like the test of the B.E.F., we had had a long cold winter during which we lived in scattered farms, lofts and barns and almost entirely on a troop basis. Thus we all realized that if the threatened "Blitzkrieg" was ever to develop, we should have to take a good pull at ourselves to be ready for it. What we perhaps did not see so clearly was how valuable had been this decentralization to troops, particularly in the matter of messing and the training of large numbers of cooks.

It was a joke in the regiment that whenever we went back to train—usually to Bapaume or thereabouts—there was a "flap" which brought us back at short notice. This had happened twice and when the early part of May found

us there once more we were pretty sure we should be whisked back again; the real arguments centred round whether it would be for another "flap" or for the real thing!

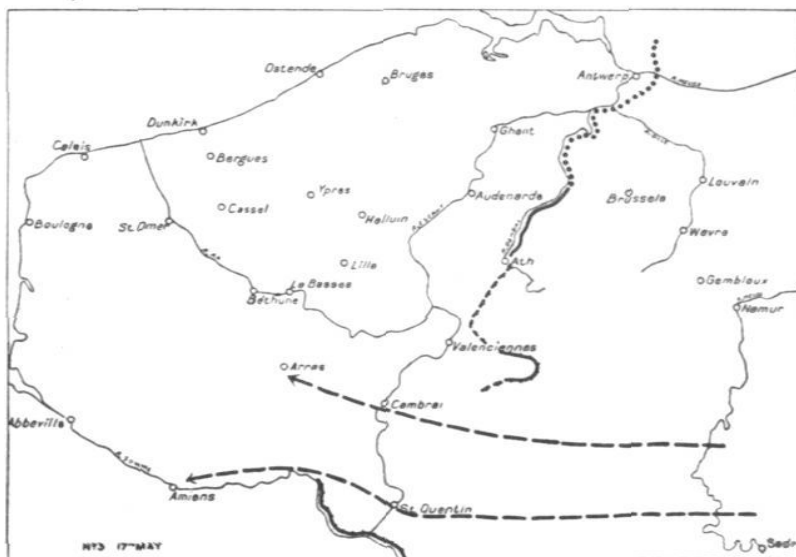
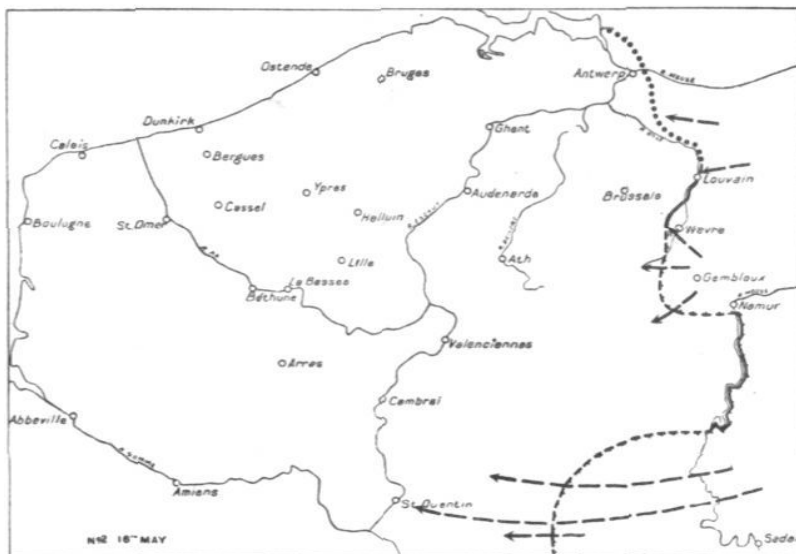
A word here as to our preparations to fit ourselves for the blitz if it materialized: We felt that although the exact form which modern war would take was a matter of some doubt, it *was* essential that we should all have a plan in our minds of how we were going to set about our job. We therefore decided upon a new system of broadcasting our regimental policy, and one that should be quite unlike any other. The result was the production of "Mrs. Beeton," a fat notebook written entirely in manuscript and containing perhaps 30 written pages and a few diagrams. This volume went "on tour" round

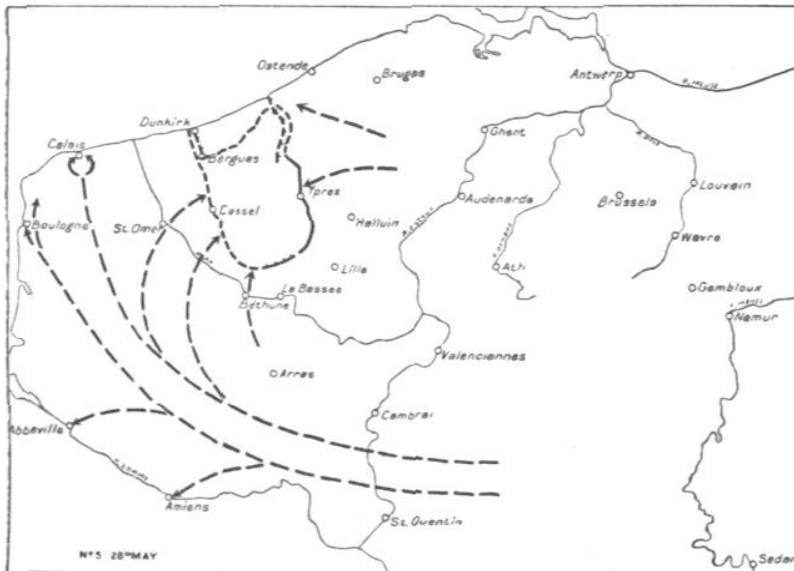
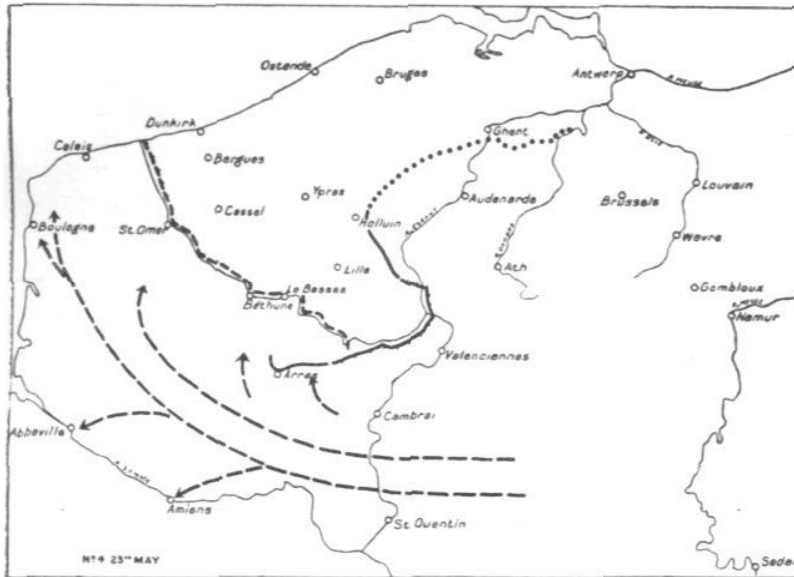
*Apparently a commander of a divisional (25-pdr.) regiment.

batteries (staying 3 or 4 days in each and often being copied out by subalterns for their own use) and then returning to R.H.Q. for a "refresher" and rest. It was a good idea. We decided that the war would be one of movement, of wireless, and of air activity. We therefore trained very hard indeed and concentrated on these points. It soon became apparent that to bring a regiment to a starting point at the correct density and speed was a great art, particularly as troops and batteries often came by entirely different routes. We were shockingly bad at this to begin with and out of it emerged the golden rule that *however low the density at which a unit is moving, someone must be in charge of every sub-unit in it*; how he exercises his command is his funeral, but it can be done. As for wireless, not only have perhaps seven sets to operate on one frequency but, far more important, the B.C. has to be able to get his personality over the ether as surely and effectively as if he were standing in front of his officers giving out orders direct. We concentrated, therefore, on *complete silence* on all sets except when traffic was passing, rigid control from the control set, and on making all officers into wireless operators (not with the idea that they would often really have to do it but to give them the interest in it which can only come of practical experience).

One other thing we practiced hard was digging by night. Fully equipped O.P. parties, with the necessary additional labour, used to sweat all night digging O.Ps opposite each other, and when daylight came sit trying to spot the "enemy" till it was time to go home to breakfast. We dug in a complete R.H.Q. only a couple of days before the "balloon" went up and when we got up near Brussels all we had to say was "same again" and it was done in a few hours. Finally, we paid great attention to the detailed packing and loading of our precious armoured O.Ps. and particularly to such vital details as the smooth running out of remote controls. Our magnificent American officer, L—, was more responsible than anyone else for the results we got with these.

So much for some of our preparations. May 10th dawned fine and still—but there was an air raid warning, an almost unheard of thing, about 0400 hours. We had a "date" with the French D.L.M. to whom we were returning hospitality for a very





SCALE IS MILES TO 1 INCH

LEGEND

British Troops ————
 French Troops ————
 Belgian Troops ······
 German Troops ————

pleasant day we spent with them near Cambrai a few days before. I strolled down the High Street to breakfast and was there greeted with the astounding news that Belgium and Holland were being invaded. Hasty orders were issued to pack up and be prepared to move at 1300 hours. (We had a bad start in the race to the R. Dyle!) It is hard to recapture the atmosphere of that day; there was little excitement, we all felt we were jolly well "teed up" for anything and we expected we were in for some fairly exciting times. We were quite prepared to start the war in the good old British method, i.e., by a retreat; but luckily we didn't see further than that! It was a great relief to have a real chance of getting at the Boche and everyone was in great heart.

We arrived in the area of our winter quarters that evening and bivouaced. Our long "scroll" map of the country up to Louvain was produced (it was mounted on two broomsticks and fitted on a simple frame) and orders for plan D were given out to the accompaniment of "noises off" from the bombing of the little town where Divisional H.Q. had been. Reconnaissance parties, limited to 15 vehicles, per field regiment, were to cross the frontier at about 0900 hours next morning—the guns moving about twelve hours later.

The move is of interest. The advance to the R. Dyle (just E. of Brussels) was based on "continuous movement" at a low density. Advance study of such maps as were available had indicated likely deployment areas and provisional plans for this, with a C.R.As.¹ co-ordinating conference that evening, had been made. We decided on certain principles connected with the move, the most unusual, perhaps, being that under no circumstances would we strip our main column of senior officers, in view of what might happen to this rather dashing forward move. Thus we left both B.Cs. and one officer per troop (or equivalent sub-unit) behind with the guns, taking forward the C.O., C.O.2, a/Adj. and liaison agent from R.H.Q., and from each battery a senior troop commander (for O.Ps.), a C.P.O., a G.P.O. per troop and a W.L.O.² Every vehicle

¹Divisional artillery commander.

²C.P.O. = command post officer; G.P.O. = gun position officer; W.L.O. = wagon line (motor park) officer.

throughout the regiment had its own supplies of food and water, with special cooking arrangements in the case of reconnaissance parties.

The morning of 11th May was brilliantly fine and in spite of some late running ahead of us, I noted that my car crossed the Franco-Belgian frontier at 10.34 a.m. A big date! The move forward went like clockwork and with no opposition from the enemy air and by 5 p.m. we were having our first look at our new gun area. This consisted of rolling arable land, covered with spring corn perhaps a foot high, some *very* narrow sunken roads and very few houses. There were terraces between some of the fields, but there was very little air cover. The regiment was the rear one in action,³ being behind the divisional reserve line and therefore some seven or eight thousand yards from the foremost defended localities. Communications were thus of vast length and so we instituted a forward exchange, dug in, where a large maintenance party (well equipped with rations) remained throughout the operations in this area—this worked well. The wagon lines were in a lovely great beech forest near Brussels, but a great distance away. We had no forward wagon lines, except for staff vehicle and for the forward troops.

As yet there were no enemy near—indeed it was our hope that the R. Dyle was to be only an intermediate stage in our advance to the northern frontier of Belgium, but we could hear ominous rumblings to the N.E. which indicated that things were not so quiet out that way.

The guns arrived early on the morning of the 12th May into the wagon line area. They were tired after their long drive without lights but everything had arrived safely barring a petrol lorry hit by a train! B.Cs. and all who could get forward came up to look at the position and that night the guns moved up. At the same time our ammunition lorries (under orders from the C.R.A.) ran all the way back to France to raid the dumps in our back areas, doing the same the following night. This was a tremendous strain on the drivers but a brilliant move as it turned out.

Owing to the lack of air cover we adopted exceptionally wide and irregular gun intervals and though Boche planes were often over very low down we had no trouble. The digging was easy, being in sand—but it was hard to revet, as one C.P.O. found to his cost in a sunken road!

On Whit Monday, 13th May, one of our two forward troops which were pushed up close behind the foremost defended localities on the R. Dyle, about two miles N. of Wavre, was put right ahead of the river to support our cavalry if need be. L, in an armoured O.P., went out to them but had some trouble with the very long communications. However, there was nothing to shoot at and the troop withdrew S.W. of the Dyle that evening.

Next day streams of refugees, amongst them Belgian and French soldiers, started coming back; Wavre, with its

narrow streets, was packed with them. We heard that the Boche were through on the frontier. The noises of approaching war got louder. There were more Boche planes about, including the Henschel reconnaissance planes which we had not seen before. The parachutist problem began to loom up—how much of it was real is hard to say but undoubtedly they *were* used. Early that morning a Do. 17 swooped fairly low over our gun area and out tumbled a little object which later turned into a parachutist. Every bren gun for miles around blazed at him as he swung slowly earthwards, to disappear behind a row of houses about a mile away. We heard he had been caught (with a slight scratch on a finger!). They were stout fellows and, if dropped into a built up or wooded area, very hard to catch. I doubt, however, whether they would have been so willing to be dropped onto a really hostile country into which their friends were not advancing at such a phenomenal rate. One result of this was, however, that all D.Rs.⁴ had to go in pairs, which made an already difficult problem still more so. (This applied chiefly to signal D.Rs. and those going back to the wagon lines through the forest and suburbs.)

I motor cycled up to the front that evening—the first we were properly in action. An extraordinary party was going on, reminding one more of Rushmoor Arena than real war. The Dyle ran through a lovely valley, with water meadows and lines of trees fringing them, and our foremost defended localities ran just our side of these meadows. Behind them the sides of the valley rose steeply, with dense woods, and where our forward troop was (the other had gone back) was a park and a large chateau. When I got there, there was an incessant roar of rifle and machine gun fire. I found the troop G.P.O. laying a gun over open sights through a gap in the trees at a vehicle and some men on the far side of the water meadows. What nationality the target was I don't know. I told him to hold on a bit as it seemed pointless to advertise the position of the guns, trapped as they were just behind the foremost defended localities, with a long plateau to cross behind them, if it was unnecessary. I enquired from all the infantry I could find as to what they were shooting at. They were all very excited and kept pointing across the meadows to groups of people on the far side. These were certainly soldiers but I believe they were mainly Belgians! Undoubtedly Boche reconnaissance parties were mixed up with them and, indeed, the enemy did close up properly that night but it all was much more like the Aldershot Tattoo (with the guns put close up so as to be sure of getting them into the arena!) than anything else.

The other forward troop had been put into action in a little hollow just behind the top edge of the woods which rose up from the valley and dawn found the regiment with this troop forward and all the others back in battle positions. The only way to fit in this forward troop was to put three of its guns one behind the other (there

³Meaning "in position."

⁴Despatch rider—mtcl. msgr.

was no room for the fourth gun anywhere). The only grouse was that, with the wide zone, no one knew which was No. 1! On the night 14th/15th we had put one section right forward to fire harassing fire tasks. This was carefully surveyed in and fired a lot, being withdrawn before daylight, across the plateau, which was in full view. On 15th May the forward troop, and the forward regiment, did a lot of shooting. I was in the O.P. area with H—, commanding one of the batteries about 1700 hours that evening when we met an infantry major who said the enemy were through on our right and that his battalion was being hurriedly moved S. of Wavre to try and do something about it. I hurried back to R.H.Q. and found the story true. What had happened was that the unexpectedly swift enemy advance had caught the nonmechanized French division, which should have come up on the right of our division, before it was properly deployed. As a result of this our right flank was in the air and round and past it were sweeping the enemy's columns. Not so good, and so much for our hopes of a further advance. I ordered forward, under a good officer, all the vehicles required to extricate our forward troop (knowing how narrow and awkward

were the lanes) and got them up as close to the guns as could be done in daylight. This was a lucky move, as quite a number of guns were lost here by other people solely through inability to get tractors forward from the far distant wagon lines.

It was this evening that we brought off a "coup." I was rung up from the right O.P., overlooking Wavre, by M—, who said his look-out man (actually his signaller) had spotted Boche tanks camouflaging themselves on *our* side of a wood! The inference was that if some were *there*, there were probably lots more inside, so I ordered a regimental concentration, all exactly as per miniature range, and at zero hour, some

ten minutes later, we put 500 rounds at rate intense into the wood without any preliminary ranging. It was a grand crash and excited chuckles down the O.P. wire confirmed that we had struck a winner. That wood blazed for several hours with big black columns of smoke indicating petrol fires. A good effort on the part of an alert O.P.

In the absence of orders I withdrew the forward troop after dark and was much relieved to hear it was safely in. The telephone was almost red hot that evening and we fired masses of ammunition. I turned in, fairly tired, at 0100 hours and two minutes later a liaison officer arrived



Gun position officer, 25-pounder battery

with orders for us to pull out at once and get back to a position on the suburbs of Brussels! Reconnaissance parties had already spent the evening on an entirely different piece of ground and so of course it was a night withdrawal onto unreconnoitred ground! We were to get used to this later.

Owing to the great distances and to traffic hold-ups and partially to the slowness out of action of our rather over equipped troops we never got the last troop away till well after dawn—however, we were behind the new foremost defended localities and the Boche did nothing about it as we had slipped away without his being able to maintain touch. We had an incredibly intricate withdrawal

through miles of greenhouses, small suburban houses and steep narrow roads and were pretty tired when we had our midday meal in our new positions. However, I was delighted at the way everyone always dug slit trenches, however tired they were—they had not yet had practical proof of how necessary these were; but they soon had it.

We got an hour or two of sleep that afternoon but not very much for me as I had a rather exhausting reconnaissance of a new line facing S. (instead of E. as previously). This involved wandering about in the suburbs and entering endless houses in the hopes of getting a view, but always without success. The great exodus from Brussels had begun and the few remaining inhabitants and such of our troops as we encountered were usually extremely suspicious, so great was the impression made by the tales of parachutists in British uniform. A large town, or a farm, suddenly bereft of its inhabitants is a most unpleasant and eerie place and it was perfectly horrible to see the animals left tied up without water or food, and the cows un milked. There was a ceaseless lowing of cattle and barking of dogs throughout the country-side.

That night we fired hard on "map shoots"—I doubt if we hit much!—and towards 0200 hours the last troop slipped away. It was a very dark night and our way ran through inky black woods. The maps, though good in themselves, showed none of the recent building developments and so were very hard to read, and of course no lights were allowed. Further we had had no time to get reconnaissance parties back by daylight and so it came about that we were again trekking through the dark to a mere "name" on the map with orders to get into action by first light to see our infantry away from Foret de Soignies when we quitted Brussels.

Dawn found our Z car⁵ and a signals' wireless truck apparently alone in a world of small villas; of the regiment there was no sign. However, by the usual series of lucky flukes we picked up some of the threads and made contact with the infantry brigadier (Brig. G——), just outside the forest. The situation was obscure. All we knew was, we were to be back behind the line of the canalized river of the Brussels - Charleroi canal that morning. And here two great lessons were brought out. First, the value of wireless in such a situation; for it was only the wireless signal, travelling on its mysterious way, that could find its destination, and without it none of the component parts of the regiment would have known where the others were in that complicated country. It was quite miraculous how the situation sorted itself out entirely by wireless, so that I was shortly installed with the infantry brigadier and my two B.Cs. alongside me and the whole show under my control once more.

The next great lesson was the need for quickness in and out of action. It had never dawned on me what was

going on at the guns and when the brigadier started thinning out, and the time came to make that critical estimate of just how long it was safe to leave the guns in action, I quite happily "thought of a number and doubled it" and ordered the various moves accordingly. To my horror and amazement I found our last infantry emerging from the forest and tumbling back towards the guns and as yet no reports of "closing down" from the guns. I dashed back to the nearest troop and found every kind of junk being slowly loaded onto the waiting tractors (stuff which might have been of use in a "thirty years' war" but certainly not in this) and no conception at all of what was required in a rear guard show. Mercifully the Boche were miles away and so we "got away with it" and, after rather an agitating morning, got the last vehicle over the bridge just before it went up.

That day was chiefly remarkable for some vast traffic jams and for the dive bombing of one of our troops, when on the move. There were some huge craters almost touching the road and the whole outfit was smothered in mud but not a soul was hurt. (Throughout the campaign only one man in the regiment was hit by enemy "air," a remarkable commentary on the relative harmlessness of air action against vehicles spread out *in the open*.) We moved back slowly, rather uncertain of what to do, till we later got orders to get back behind the next canal at Grammont, another twenty miles or so on. We pulled into some orchards about tea time and had a meal. Strong representations were made that the drivers were too tired to go on. They had had four consecutive nights' driving with no sleep at all and under the most trying conditions. However, we decided that we must go on and that we must sleep — so, posting double sentries everywhere, we slept till 23,30, had some tea and pulled out just after midnight, moving slowly through the ruins of Enghein, which was being ineffectively shelled at long range, and onto the arterial road to Grammont. Here I saw my first driver go to sleep. It was dawn and down the road came sailing a tractor and gun, going beautifully. It slowly left the road, hit a concrete pillar and stopped with a sickening jar, lying on its tummy astride a low bank. No one woke up and the engine continued to whirr for several seconds before anyone was awake enough to switch it off! Towards the end of that march we got officers onto motor cycles to patrol the column and keep men awake, for the moment a vehicle stopped "flop" went the driver over the steering wheel and that was that! It was an incessant source of trouble for the rest of the show. About breakfast time we were safely over the Dendre Canal and distributed under cover awaiting orders. I was just getting into my valise, under an apple tree, when orders came to reconnoitre for an occupation that evening. So off we went, a very sleepy lot of reconnaissance parties, and did the job and I got back only to find all was wrong and that we should have gone four miles further and not where we were told. That put the lid on it because we had lost our reconnaissance

⁵Command car.

parties and were now to do it all again without them and in failing light. It was as bad a day as I remember.

The upshot of it all was that by about 2100 hours I made my first contact with the Brigadier I was supporting and could only promise one battery in action, and that I was doubtful of. I was not very popular and I don't wonder. The Boche had come on incredibly fast and was tapping at our position on the canal at Lescelles. Luckily another field regiment was thoroughly in action and also, when an S.O.S. came through, we *did* get it off after a fashion. It was a sticky night. The cavalry who should have taken over the canal to enable the infantry to slip away never got up for some reason (an order went wrong, I believe) and the acting divisional commander, the C.R.A. and the brigadier commanding the infantry brigade were anxious as to what to do about it. Even the tenseness of the atmosphere failed to keep me awake and seeing I was quite useless the C.R.A. mercifully sent me to bed and produced a better and brighter substitute!

We left an hour or two later and I next saw the regiment (after an interlude to help clear the biggest and best traffic block ever known, at Renaix) about 1000 hours that morning (Sun. 19th May) at Ere, south of the Escaut, which was to be our next stand. We really were tired by then but luckily were left to sleep it off, which we did most successfully that day and the following night.

Here let me say a word about the vital necessity for the conservation of energy by every legitimate means. One must have an absolutely "cast iron" system of reliefs, particularly of officers, and one must stick to it.

That night was the only really decent one we got in the whole twenty days and it completely set us on our feet. By 1100 hours next day we had our maintenance fully up to scratch and all ready. This was as well, as we had hurried orders to side step to our right and get into action covering Antoing, where there was trouble. Here we had our first casualty, Captain Tim Mead being killed, to the great sorrow of everyone. We spent three hectic days here, dug into the terraced banks of fields and shot a great deal of ammunition. The difficulty was *observation*. We could not see down into the Escaut and never really knew what was happening in it, the Boche seemed to have achieved complete air superiority and O.Ps. were few and far between and mostly very unhealthy into the bargain. The cheering thing here was the extraordinary rapidity with which the regiment dug itself in. We saw to it, also, that our wagon lines were a good deal closer than at Brussels!

It was in this position that we were much inconvenienced by the necessity of running two R.H.Qs., one with the infantry brigade in a beastly place which was always in trouble and our own, back in the gun area and beautifully dug in and very safe. The lines between these H.Qs. were continually being cut and it doubled the work for everyone. It was that "hardy annual"—should the infantryman come to the gunner, or vice versa—in its most aggressive form.

We of course reckoned we would stay behind our excellent water obstacle and fight it out—but not a bit of



The battlefield of 1940—men of a British front line infantry regiment in Belgium find time for a little relaxation. One of the features of the war in the west was that it was fought mostly along the roads, with the result that the fields showed little signs of the struggle as they did in 1914-18.

it. Having had all our L. of C. cut by the Boche thrust to the Boulogne area, we got orders late on the evening of 22nd May that we were to slip away that night—and that we were to do rear guard again, with a group of one of our batteries and one from another field regiment supporting the cavalry. So that was that, and once again we were turned out, not as a result of enemy action against *us*, but elsewhere.

We had a successful get-away without any firing, and by keeping a set from each battery with me at cavalry H.Q., were able to be in a position throughout to provide continuous support, had it been needed.

Midday on 23rd May saw us back in France and *almost* in that bit of the defences which we had dug during the winter. That afternoon we were put in support of an infantry brigade and had hopes of a stand here. But again we got orders for a move—this time to strange country, Neuve Chapelle.

We started off in the dark and marched all night, occasionally having to pull off into fields and reverse the whole outfit to avoid traffic jams, and arrived rather weary at our destination to find no guides awaiting us. This had happened before and we were furious. The explanation was—and it is a point of interest—that one of two things are apt to happen, either the guides go to sleep at their rendezvous or else they go off in triumph with the first arrivals and leave no one to tell the remainder where to go. The remedy is duplicated guides and written instructions as to where to make for, which can be shown to everyone who casts up.

The refugee problem was bad in this area. The wretched people having fled to the S. were now finding themselves again involved in the German thrust and, bewildered and scared, were aimlessly wandering about short of food, accommodation and hope. It was an awful warning against taking to the roads unless absolutely forced to by enemy action.

Owing to the change of front and to the overrunning of all the rear H.Qs. and depots, an acute map shortage occurred on this day. When orders were received to hastily deploy towards Merville I remember giving out orders off the one and only map in the regiment and that a small scale one. However, the two batteries dashed off and did great work. Major S—— in particular, getting some magnificent shooting, observing from the top of a Dutch barn in the front line and earning great praise from the infantry, who were being greatly worried by the inevitable trench mortars.

(Here let me note that the enemy's support for his fast moving columns seemed to consist almost entirely of trench mortars—often of very long range—and a few well handled 4.2" gun-howitzer batteries.)

This little battle did not last long and while it was on I was busily engaged in finding fresh positions for our main job, which was to support the infantry brigade on the line

of the canal from Festubert-La Bassee. These positions were hard to find, being overlooked by slag heaps S. of the canal; however, we got into them that night and dug slit trenches to the very limited depth allowed by the water level. We had an O.P. in the church tower at Festubert, from which a grand general view was obtainable, two (one from each battery) in Givenchy, and the left O.P. at the W. corner of La Bassee. Elsewhere it was very hard to get a view and there were masses of dead ground near and S. of the canal. May 24th was a busy day, with a fair amount of shelling on both sides. Whenever we fired we were immediately shelled, and very effectively, and we had a good few casualties. It soon became clear that the slag heaps were the cause of the trouble—indeed we could see the reliefs going up to the Boche O.Ps. on them—Oh, for some 60-pdr. shrapnel.

The enemy army co-operation Henschels sat about over our guns from dawn till dusk on this and the ensuing day. We were short of tracer ammunition and made poor shooting at them. However, someone brought one down and its pilot assured us that he thanked heaven he was not an Englishman in view of the terrible fate awaiting us in the next few days! That night we moved both D and E troops, which had been badly shot up; and also R.H.Q., which moved with H.Q. infantry brigade (who had been also located and shelled), into some less pretentious houses in Richebourg L'Avoué, where we were right in the gun area and very convenient. Next day things got a good deal livelier, and there was a very great deal of trench mortar activity, especially onto Givenchy. The battle was a wonderful sight from the tower of Festubert church, quite like one of those "dioramas" one sees at exhibitions, as for a full 180° one could see it in progress.

It became impossible to maintain O.Ps. actually in Givenchy. M——, shelled out of his and sheltering behind the church, counted 25 direct hits on it in 45 minutes!

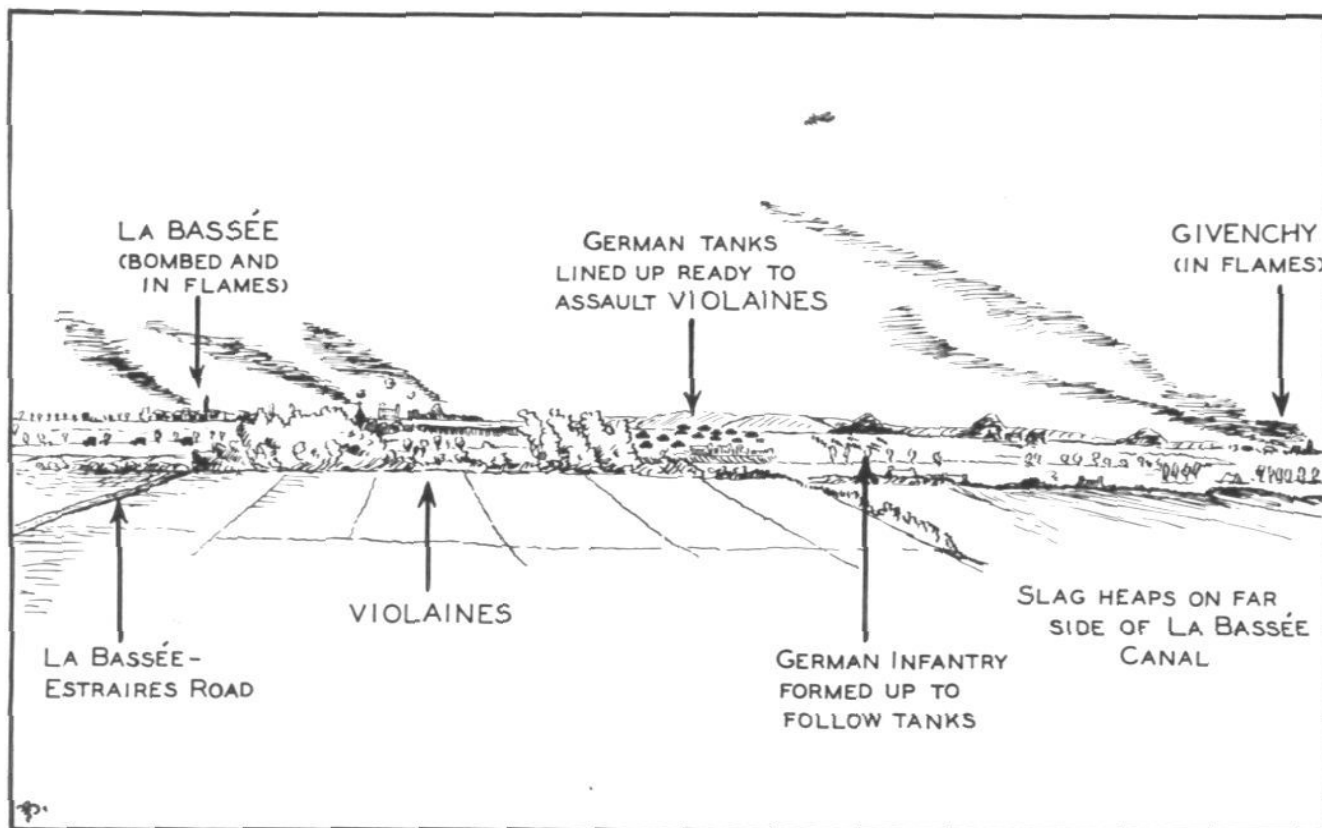
The O.P. at La Bassee also got into trouble and great difficulty was experienced with all of them except the one at Festubert church, which bore a charmed life.

That afternoon one battery was sent off to the Merville area to be grouped with another field regiment. Here there was a very sticky situation on the front of the infantry brigade and on the morning of 27th May, D troop (with three guns remaining) were ordered to take up a position on the Merville - Estaires road to engage, with direct fire, tanks reported advancing towards the canal from the S. This involved occupying a very isolated position far from the nearest infantry, and no sooner were they in action than news was received that the enemy tanks were across in the Merville area. One gun was sent post haste to Merville to try and deal with these but though it did not, in fact, shoot at any it knocked out a trench mortar and two machine guns with the loss of some men wounded. The remaining two guns, after a quiet morning, were suddenly machine gunned at short range from across the canal and later, the look-out

on a roof saw a German anti-tank gun there. This was promptly knocked out at a range of 400 yards. Directly afterwards another look-out man reported an enemy machine-gun getting into action in the same area; this was similarly destroyed. More enemy, including machine-guns on motor cycle outfits, were seen and engaged both by the guns and by the troop's Bren gun firing from an upstairs window and another machine-gun was knocked out. The enemy then brought up trench mortars and started shelling with them and about 1500 hours some enemy sidecar outfits, having crossed the canal further up, engaged the guns at close range from the flanks and rear, making the position almost untenable. The B.C., Major H—, arrived and went off to try and get some infantry to help, returning

T— was lost. This W.O. had most gallantly extricated two men from a blazing gun-pit on the previous day at Richebourg, an extremely brave action.

Meanwhile, on the night 26th/27th May, R.H.Q. and the remaining battery had been joined by another field regiment to form a group supporting the infantry brigade. This regiment had many delays in getting into action and had to occupy extremely exposed positions on account of being armed only with short range 4.5's and 18-pdrs. They were heavily shelled next morning, only to be ordered back before midday to the next position in rear. All this time the situation ahead had become more threatening. The centre battalion had failed to maintain its hold astride Givenchy, the left battalion was being hard pressed and only the right



German tank attack on Violaines

shortly with a machine-gun platoon which, however, immediately suffered heavy casualties. They got one gun into action and attempts were made to get the 25-pdrs. away. The first one to move received a direct hit in its tractor, which went up in flames, so blocking the road for the other gun and so the B.C. decided to destroy the remaining gun and get out with the surviving men. This involved crossing a belt of open ground with practically no cover, but by wading down ditches, often up to the neck in water, the bulk of the men, with most of the wounded, were got away. The B.C. himself was wounded several times and also had a lorry accident before reaching hospital, in which he was later shot up from the air before finally reaching England. In this action of D troop B.S.M.

remained reasonably secure (except that in their rear the battle around Merville was not exactly prospering!). The failure in the centre meant that there was a section of canal between Givenchy and La Bassee onto which no one could observe and it was here that the enemy got to work in earnest. At about 1500 hours on this day (27th) Brig. G—, sitting in the roof of his H.Q. looking through a skylight, called me up. We looked at the ridge running from Givenchy to Violaines (in which hamlet was the H.Q. company of the left battalion) and there saw, at a range of about 4000 yards, some 50 enemy tanks lined up facing Violaines, and behind them, as if on parade, a quantity of German infantry! It was a most spectacular apparition. This mass almost immediately

moved off from right to left, on to Violaines, halted some 200 yards short of that village, and, with orange flashes stabbing from the turrets of the tanks, sent the whole place up in flames in a few seconds, so it seemed. This done they moved on into the village and out of sight. It was beastly to watch, but impressive to a degree.

We had thinned out one of our troops, on orders just received, and so had only two left and of these one or two guns were knocked out. But Major S—— happened to be at H.Q. with his X car and, hastily shouting fire orders down to the street below, we started in on this enormous target. Observation was difficult because of the drifting smoke from Givenchy, which was on fire, but we did succeed in making the enemy infantry clear over to the far side of the crest. We fired as hard as we could and later, when the tanks appeared to the E. of Violaines, after passing through it, we shot at them again as they rallied before passing round the rear of the French on our left—but without our apparently doing them any harm.

Capt. R——, on the way out in an armoured O.P. to try and clear up the situation by a visit to Violaines, met this horrid mass as it was emerging from his destination. He very stoutly hung on to the fringes of the "fleet" and reported its progress round behind La Bassee, returning late that night wounded in the arm.

Shortly before this tank attack the infantry brigade had had orders to make a daylight "get-away" and to retire behind the canal at Estaires, and now, with the left battalion apparently wiped out and the centre battalion disorganized, there was little else to do except go. We stayed on about an hour longer, as there was no enemy pressure towards our guns, and had an uneventful trip back the five or six miles to the Estaires canal.

The actual crossing was not easy, owing to bombing and congestion generally and I was relieved to discover that all of one battery and R.H.Q. were back. Of the other battery we had no word.

It rained hard that night, road conditions were appalling and we spent a wet and miserable night huddled in our trucks waiting for the roads to clear. By about 0730 hours we had so far discovered our whereabouts and sorted ourselves out as to be in action near a place called Le Doulieu. We had also heard of the loss of the troop at Merville.

As will have been gathered, it had now become obvious that we were in a fast narrowing bottleneck, with some port—possibly Dunkirk—at the end of it. I do not think anyone was worried about all this to any great extent, we were all far too busy and too short of sleep to take a "long term" view ahead as far as the next day or two! But at about 1000 hours the G.I. (de F.) came to me and said we were to clear out, by daylight, abandoning and ditching all non-essentials and that it was hoped we would get some of it off at Dunkirk! A rear-guard, of which we were part, was being formed and we were

to move almost immediately—so *that* was *that*!

That morning enemy biplane dive bombers were much in evidence, these obsolescent aeroplanes (Henschels and Arados) having been brought out in view of the complete absence of any opposition from our own overworked Air Force. Very fortunately the afternoon turned to rain and low cloud and as the tightly packed column moved yard by yard toward the coast (with interminable delays due to other units of all nationalities "cutting in") we were thankful for the cover afforded by it.

Near Meteren progress became nil. There was heavy firing on our left, nobody knew what it was all about. Eventually, more to cheer things up than for anything else, we got some guns into action and shot at some tanks that hove in sight through the murk. I believe they were French ones! I sent officers on ahead on motor cycles and an officer's patrol (Major S. in his "T") to the left. He called up on the wireless later and said he had found a most curious situation out there but couldn't say what it was on R/T. I asked which of three possible roads we ought to try and get along and he indicated the centre one! (so presumably his views on the width of our available "corridor" weren't very encouraging). We arranged a rendezvous where we should meet shortly—it was some three miles away, but we never met till next day!

That evening we crept forward, owing to the devoted labours of our subalterns who were up to every form of ingenuity and were full of fight and drive. The road was blocked for miles and miles by units which had abandoned their vehicles (and in the case of the French their horses also) and the scene was one of which it is almost impossible, adequately, to give a description.

Suffice it to say that about 0100 hours, long after the rear party had come through and when all hope of moving our few remaining guns (we had got some of them out and away) had gone we decided we must chuck it and come on on foot. A fifteen mile march, through a burning village in one place and actually crawling under jammed lorries in another, brought us to our rendezvous, a cross roads near Watau—but at the price of the disintegration of the adjutant's feet.

We were pretty tired by then but were cheered to meet Major S—— with some guns, busily dealing out tea (boiled God knows where) to his hungry men, and shortly after still more cheered by the arrival of the C.R.A. His news was that if we didn't get across the next bridge (at Rushbrugge) pretty damn quick we mightn't ever. So off we went and into action on the Dunkirk side of it. There was still no news of one battery, but odd vehicles of the regiment cast up at intervals. A reconnaissance in the C.R.As. car fetched us up at a bridge on the Steenvoorde - Oost Kappel road, some three or four miles S.W. of Rushbrugge and about the same distance E. of Blambeque. This river was intended to be held, but of infantry there was not a sign—only an

endless stream of Belgian and French Army "refugee" traffic pouring back into Dunkirk, and a cheery English Sapper demolition party preparing the bridge for blowing. We got Maj. S——'s two guns over to cover the bridge; the C.R.A. told me to sit by the road and snaffle the first British troops that came by to hold the bridge. I sat and dozed in the sun for hours but nothing the least use came along—only our allies, in all shapes of disorder.

Here it was that we first failed in our "maintenance," for in spite of all our care our wireless batteries had at last failed us through over use and lack of time to charge them. We had long since lost all our cable (and indeed, finally, almost all our phones) and so our two guns could only sit just behind the low crest overlooking the bridge and hope for the best.

To cut a long story short evening found us still thereabouts, still without infantry and with a heavy attack developing on our immediate right. Towards nightfall the two guns were attacked by tanks and infantry, No. 1 gun (laid by the B.C.) knocked out at least one tank, No. 2 gun was scuppered and never heard of again. Maj. S—— led his survivors back in the gathering darkness to the uncertain safety of Dunkirk. I with three borrowed carriers joined forces with Major W— T— of an A/tank battery, who had two guns at the cross roads there and together we carried on an exciting little battle round Oost Kappel but, probably because the Boche were too tired to do more, the little show of activity made in the sector by the scattered

troops still in action, in which we all participated, had the effect of stopping the enemy advance that night and gave a breathing space.

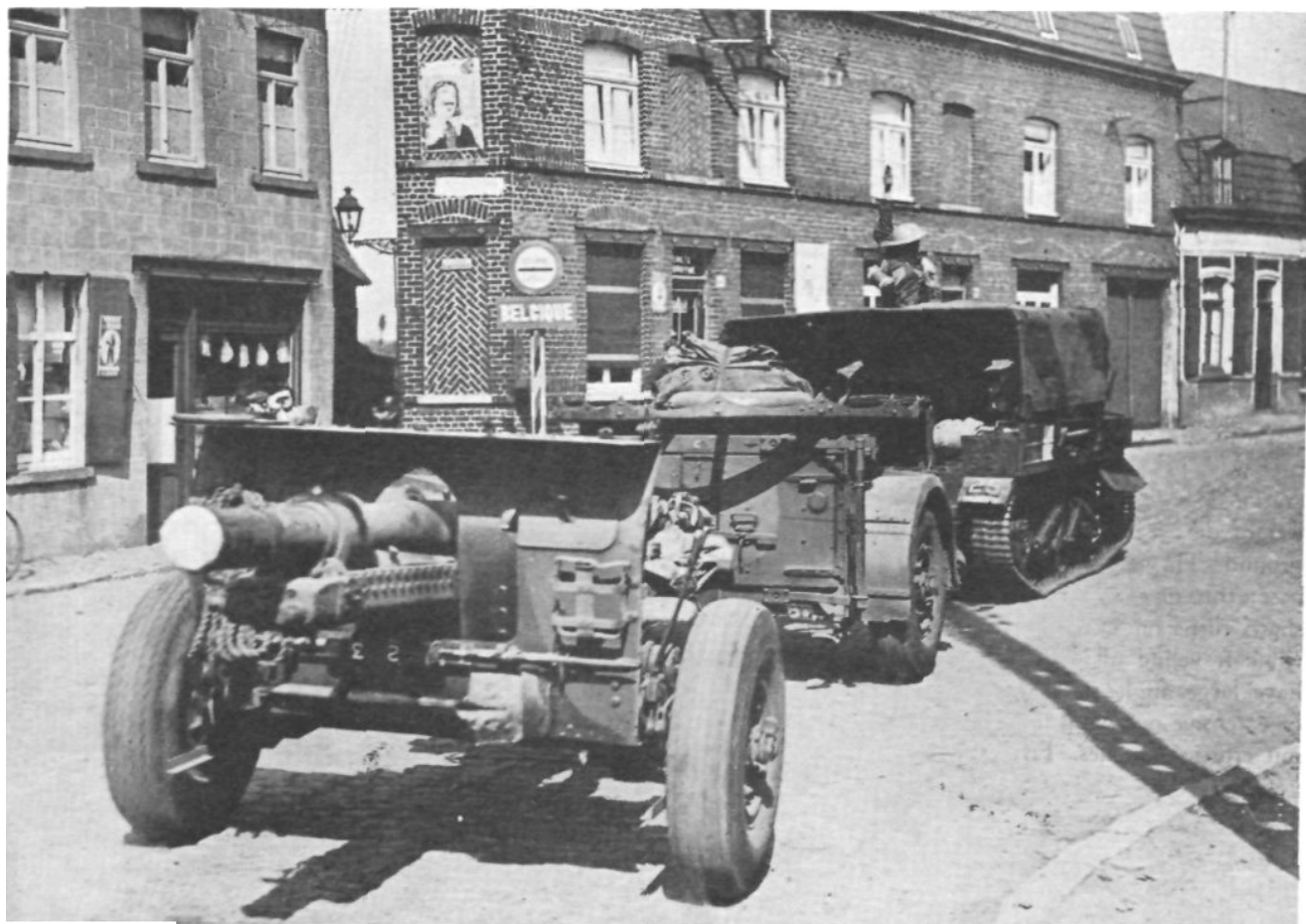
In the meantime the rest of our missing battery, along with other bits and pieces of the regiment, shoved and pushed its way to Dunkirk and remained in action about two miles E. of the mole and 100 yards from the beach, firing hard, until 2300 hours on 1st June with two zero lines, one due E. and the other due S.! I unfortunately missed this party, having been wounded mildly at Oost Kappel on the night 29th May and having to escape by push bike from a French Hospital the wrong side of our lines the following morning.

Such is a very sketchy and incomplete narrative of one Regiment's part in a hectic twenty day battle.

There is no moral to be drawn except the importance of alertness, good discipline and morale — there was plenty of that about, even on the last lap. Nothing is ever as bad as it seems and I doubt if there are many who did not enjoy themselves thoroughly for the greater part of the time. The casualties in the regiment were not great and of them about 9% were officers.

The men behaved throughout as one expected they would—it is unnecessary to say more! We re-formed at Halifax and by the end of June were a going concern again, and a few months later had "come by" enough transport to be fully mobile, to our great joy.

British 25-pounder moving through Belgian town



A SURVEY of MILITARY TRUCKS

FOREWORD

The standard by which the Army judges a motor vehicle is by comparison with the most capable vehicle in its class to which the Army has had access. If a vehicle is procured which is superior to those previously in use, that vehicle immediately becomes the standard by which others are judged. It is conceivable that the Army does not know what can be demanded of the automotive industry in the way of military vehicles and what standards should be set up. When one sees photographs and descriptions of military vehicles used by foreign armies, and differing from those provided for our service, the thought arises that perhaps our vehicles are not in all respects adequate. *This paper presents the opinions and conclusions of the author only*, and one might almost say that any similarity between the vehicles proposed herein and the vehicles actually furnished the military service is purely coincidental. Statements made as facts are believed to be accurate, and the forebearing reader will understand that in order to dig out details of quality in vehicles, it is necessary to "talk shop" and use technical terms in some instances.

WHAT WE NEED

Aside from purely technical considerations of speed, cargo capacity, and grade ability, military vehicles must meet certain special requirements. Principal among these are cross-country ability, exceptional ruggedness, and freedom from excessive maintenance. The number of types must be reduced to the minimum, and interchangeability of high-mortality units and parts must be secured.

To secure cross-country ability we must have, first, tires which are larger than those needed for ordinary operation on roads. The second requirement is a correct weight distribution which will provide flotation in soft ground. Third, we must have vehicles with a short wheel base; this gives greater maneuverability by permitting sharp turns on winding roads or in avoiding obstacles while traveling off the road. Fourth, the vehicle must have large angles of approach and departure (no low or extensive overhang in front or rear) in order to permit crossing ditches. Fifth, the truck must have a cab or other driver's compartment which

will give maximum visibility, even if at the expense of comfort in cold weather; this is necessary to facilitate driving at night without lights, maneuvering a traileed load, and, above all, to permit ready observation of hostile aircraft which may

attack the column.

Finally, we must have freedom from excessive maintenance, which is secured by types of vehicles which will operate, without breakage, for long periods, with traction devices, under exceptionally adverse conditions of weather and terrain.

To what extent do our present motor vehicle specifications provide these desiderata?

WHAT WE ARE GETTING

Until 1940, military vehicles were procured by strict competitive bids. This procedure practically required a successful bidder to offer the cheapest type of construction which would meet the letter of the specifications. If he did not do so, some other manufacturer did. The vehicles procured under this procedure were inspected to determine technical compliance with the specification and were then issued to the using arms *without service test*. That important weaknesses should appear was inevitable. Also inevitable is the increased maintenance cost. It is noteworthy that the motor vehicle is practically our only item of military equipment which has been issued without service test.

Many of the 1941 vehicle contracts have been "negotiated," that is, the requirements of competitive bidding are no longer in effect. Yet the same general type of commercial vehicle, not an engineered *military* vehicle, is being procured. The 105-mm. howitzer, adopted after careful service tests, costs about \$30,000; the truck that tows it, adopted *without* service tests, costs about \$2,400. For a few hundred dollars more, a superlative truck, engineered for the job, could be obtained.

Quality in a motor truck, as in a vacuum cleaner or a pair of shoes, does not always show on the outside; and quality costs money. For example, two types of splines may be used on axle shafts; one is the conventional square spline, the other is the involute spline—a more

costly type. Under tests, the latter showed over *six times* as great resistance to breakage as the former. Is the cheapest the best?

There are two distinct problems involved in a discussion of the suitability of military vehicles: First, do the military characteristics set up by using arms and services adequately describe a vehicle suitable for its intended use? Second, do the specifications written by the supply service procure vehicles which are technically the best obtainable under the military characteristics?

The present military characteristics of the principal motor trucks were determined at a meeting of representatives of using arms and services and engineers of the Depot at Holabird Quartermaster Depot on May 27-29, 1940. The purpose of the conference was to evaluate the results of the Louisiana maneuvers then just completed, and to set up new military characteristics which would insure better vehicles than had heretofore been obtained.

At that time the approved type of Field Artillery prime mover for light artillery was a 1½-ton heavy chassis 4 × 4 truck. This vehicle was required to carry a payload of 3,000 lbs., *excluding equipment*, and tow 4,000 lbs. up a 3 per cent grade in high gear. Its tires were required to conform to sizes recommended by the Tire and Rim Association (that is, they were based on good road load-carrying capacity), which requirement was a change from the characteristics in effect until that date. Previous characteristics required the tires to be "the largest permissible which will not require special design." The characteristics provided for both closed and open cabs, the open cab being "required to permit unobstructed view in all directions both by day and night," a requirement which goes back in military characteristics until at least 1935. This 1935-1938 vehicle was approved as substitute standard, i.e., one which does not entirely meet requirements.

The military characteristics for the 1½-ton 4 × 4 truck, issued as a result of the Holabird Conference, required the vehicle to carry a payload of 3,000 lbs. including the winch, and to tow 4,000 lbs. up a 3½ per cent grade in transmission direct gear and in transfer case high range. The tire size was specified at 7.50-20, a material reduction from the 1938 requirement of the "largest permissible size."

The new military characteristics originally provided for both open and closed cabs as had the previous ones;

however, the open cab requirement for field artillery units was deleted by the War Department before the characteristics were approved.

This truck was approved as "standard" although its greater suitability over the 1938 vehicle is questionable.

The specification for the first lot of the 1½-ton 4 × 4 vehicles provided a minor increase over the previous military characteristics.

The same conference drew up military characteristics for a 2½-ton 6 × 6 truck, a new type first procured in 1939, and an outgrowth of a previous conference on field artillery motor vehicle requirements held at the Holabird Quartermaster Depot, on January 17, 1939. In general the characteristics are identical with those of the 1½-ton 4 × 4 truck, except that the required payload including equipment is 5,000 lbs., the towed load 3,000 lbs. and the required minimum engine displacement 255 cubic inches instead of 235 cubic inches. This vehicle, with 7.50-20 tires and closed cab, was approved as a standard type.

The specifications then issued for the vehicle provided for a light chassis vehicle and for the use of not only a gear reduction in the high range of the transfer case, but also for a five-speed, over-drive transmission, *which resulted in a high gear grade ability of but 2.3 per cent, in this case a material decrease from the 3 per cent requirement of 1938.*

This is the truck which has been adopted as the principal vehicle for field artillery. It is rated to transport the same total load, and has about three-fourths of the high gear performance of the 1½-ton 4 × 4 of 1938; yet it weighs 6,000 lbs. more than that truck.

Based on intimate association of the writer with the types of vehicles procured over the past several years and study of the tests of vehicle now being supplied in comparison with other vehicles which are available, the conclusion is justified that the present military characteristics are deficient in that:

- (1) There is no requirement that the vehicle be of such mechanical strength and of such type that it will be long-lived without constantly recurring maintenance on important units.
- (2) The tire sizes required are too small for essential flotation.
- (3) The open cab should be required, but is not.
- (4) The wheel-bases and weight distribution could be improved.

A discussion which tends to prove again that, where motor vehicles are concerned, the cheapest may prove to be the most expensive in the long run.

The requirements of competitive bidding secured, for the army, vehicles of the minimum mechanical strength which would meet the specifications only. There is no assurance that these vehicles will be serviceable when a year or two old, or after ten to fifteen thousand miles of service.

Field Artillery officers have rightly been concerned over the difficult field maintenance problem presented by large numbers of different types of vehicles. The important bearing which the stamina of those vehicles has on the maintenance problem should be kept in mind. It is submitted that the simplest and most satisfactory solution of field maintenance is to buy vehicles which will not break down under ordinary operating conditions (provided preventive maintenance is properly performed).

The chief engineer of a large truck manufacturing company has stated that it is the practice of his company to manufacture road vehicles with a parts safety factor of around three, but for vehicles intended for off-road operation, such as in dump-truck service, the safety factor is around seven. Military vehicles certainly should have comparable safety factors.

The second principal deficiency in military characteristics is in tire size. It has been shown that in 1935 military characteristics required the largest size which would not necessitate special design. This was sound, in order to provide essential flotation. In 1938 the characteristics were changed to require sizes recommended by the Tire & Rim Association. These ratings are based on the maximum load-carrying capacity of the tire under various conditions of operation and have no connection with the military requirement of flotation. In 1940 the military characteristics were again changed to specific sizes, a further step backward.

The tire loads on military vehicles now exceed tire manufacturers' recommendations for even good road operation on the front wheels of the 2½-ton, 4-ton and 6-ton trucks. The tires, far from being the largest permissible, *actually are smaller than are used on the corresponding vehicle when sold commercially.*

The tire size of a vehicle affects performance in two important respects. The larger the tire, the less the vehicle sinks into soil of any particular bearing power; as a result of which, wear and tear on the engine and power transmission system are decreased because less rim pull must be exerted to move the vehicle through the soil.

A careful study of tables showing the depth of penetration of military vehicles in soils of various bearing power indicates that the 2½-ton 6 × 6 has the most adequate tire equipment of any of our current military models. This truck has 7.50-20 tires. The 1½-ton truck would give much better performance with 9.00 tires; this should be the smallest tire used on this vehicle. It is reported that the smallest tire size used on some foreign military vehicles is 10.50. A similar analysis for the 2½-ton 6 × 6 shows the same situation to exist, but because of the

necessary space for bogie action, it would be necessary to raise the body some distance if 9.00 tires were used, and would result in a material increase in the weight of this vehicle.

The use of 24" wheels would still further reduce the unit ground pressure and depth of penetration. At the same time it would increase the road clearance by over two inches and could secure interchangeable wheels between truck and gun in light artillery. Why do we cling to the 20" wheel?

The effect of tire size on the rim pull required to move the vehicle may be shown by a table which gives the total rim pull required, the total available in the engine, and the ratio of the two. This indicates that for off-road operation, the 2½-ton 6 × 6 has high torque characteristics, but the ½-ton 4 × 4 has dangerously low torque characteristics. The remedy is either a larger engine or larger tires for the ½-ton 4 × 4 truck.

Another feature wherein our military vehicles are unsuitable for war is in the use of the closed cab. Military characteristics required the open cab for Field Artillery until 1938. However, the open cab at that time was more expensive than the closed cab on the small quantities of high-production vehicles being procured under competitive bids. In the quantities now being procured, the open cab is cheaper than the closed cab; in the case of some of the larger vehicles, as much as two hundred dollars per vehicle. One manufacturer at present is having difficulty obtaining tools for building the closed cab. He has stated that his problem would be much simplified if he were permitted to use an open cab. Yet we continue to specify closed cabs!

The closed cab, in the opinion of this writer, is not suitable for the combat zone. Its disadvantages are many:

- (a) It increases vehicle silhouette.
- (b) It seriously restricts the vision of the driver in maneuvering his vehicle and trailed load.
- (c) Trucks equipped with it cannot be loaded between decks of most transports, a condition which seriously affects the loading of boats according to combat units.
- (d) It greatly increases the difficulty of night driving without lights to the point where it is often necessary to have a man stand on the running board to direct the driver.
- (e) In driving at night, it is a menace on the road with its closed windows and the inevitable tendency of a tired driver to fall asleep and wreck his vehicle.
- (f) It is unbearably hot in the summer—so hot that when operating a truck at full torque and low speed it is often necessary to prop the doors open if the driver is to be able to stay in the cab.
- (g) It presents a considerable maintenance problem in doors that will not stay closed and in door-glass and windshield replacement.
- (h) The cab is so small that there is no place for the driver's equipment, not to mention room to carry an automatic



Life

The quarter-ton trucks have been received with great enthusiasm because they are designed and built according to sound military specifications. Here we have an unusual picture of the jeep—all four wheels are on the ground!

rifle where it can be put to use quickly.

(i) Any closed cab or vehicle body is a serious handicap under air attack.

The principal advantage which has been claimed for it is that it is more comfortable for the driver, which is conceded. One infantry colonel, in his report on the 1939-1940 Louisiana maneuvers, although believing the open cab to be better for driving at night without lights, and for maneuvering trailed loads, recommended closed cabs for his regiment because the weather at its home station was cold and windy eight months of the year!

In applying the military characteristic for a closed cab, the specifications require a cab "identical in construction to the cab furnished by the truck producer commercially." This is stated to be done to prevent bidders from offering a light, cheap cab instead of the standard production article. However, it would be difficult to design a more unsuitable closed cab. If closed cabs are to be used, they should be designed for the purpose. Among the desirable features are more room, allowing space for an automatic rifle, tops which may be removed by unbolting, wider seats to

provide room for an assistant driver, as well as a chief of section, a sponge rubber crash-pad in the roof, a windshield having a top sloping forward instead of back, to prevent reflections which can be seen for many miles, and a corrugated steel floor to replace the rubber floor pad which seldom lasts through the pilot model tests.

There could be a general improvement in wheelbases, bodies, and in weight distribution. These, together with the angles of approach and departure, must be considered together because changes in one affect the others, sometimes adversely. As a general statement, wheelbases should be as short as practicable without adversely affecting angle of departure and weight distribution. The wheelbase of the 1½-ton 4 × 4 is 145"; it is reported that the wheelbase of the British 1½-ton 4 × 4 is 101".

The ideal military 4 × 4 truck, when loaded, would have 50 per cent of its weight on each axle. The commercial truck, which we are buying, is designed to have at least two-thirds of the weight on the rear axle, because it always operates with single front tires. Efforts should

be made to increase the proportion of weight carried on the front axle, by moving the cargo body forward, using "cab over engine," or cab forward construction, and by carrying traction devices on the front fenders which, of course, must be designed to carry them. If the wheelbase is shortened by merely moving the rear axle forward, both angle of departure and weight distribution are adversely affected.

Bodies can be shortened; the nine-foot body on the field artillery truck can be safely reduced to eight feet. The body must be lower—trucks of current procurement have floors 46" from the ground—too high for convenient loading.

These things can be attained. One truck company designed, at the request of the author, a 1½-ton 4 × 4 truck which has improved weight distribution and greater angles of approach and departure. Although it uses 9.00-20 tires, thereby gaining about 1½" road clearance, the height of the floor is but 43" from the ground.

The new ¼-ton 4 × 4 trucks are making a very favorable impression throughout the army. This can be because of no other reason than that they excel in those features wherein other military vehicles are deficient. These features are:

- (a) Adequate power under the hood.
- (b) Short wheelbase and low silhouette.
- (c) Low unit ground pressure.

It is possible to build the ½-ton, 1½-ton and 2½-ton vehicles with similar characteristics, so that they will appear as enlarged models of the ¼-ton, having a performance little short of amazing, judged by current standards of truck performance.

The 6 × 6 truck should have one-third of its weight on the front wheels for equal flotation if the use of individual mounted traction devices be contemplated. If band-type tracks be used, the weight on the front wheels should be about 25 per cent of the total. However, if there be too little weight on the front wheels, the vehicle is dangerous on ice and on side slopes because the bogie wheels drive the vehicle in the direction they are pointed and the vehicle does not steer when the front wheels are turned. The current 2½-ton 6 × 6 comes fairly close to the ideal with respect to weight distribution. It has 30 per cent of its total weight on the front axle, but on some icy roads it fails to steer properly.

With regard to the method of drive of military vehicles, there is reason to believe that the recent wide adoption of 6-wheel-drive vehicles, instead of the 4-wheel-drive trucks formerly used, has been a step backward; but in this it must be admitted that many of our authorities disagree with the author.

The original conception of the light 2½-ton 6 × 6 truck envisaged a vehicle identical in every respect with the 1½-ton 4 × 4 truck, except that the former had two axles in rear to provide for 5,000 lbs. cargo without exceeding tire and axle good road ratings. This was to make possible a light and cheap cargo hauler for the services, procurable in quantity, and with interchangeable units. The ideal was

never reached because not yet has the same manufacturer been able to secure an order for both vehicles. Accordingly the contemplated advantage was never realized.

COMPARISON BETWEEN THE 6 × 6 TRUCK AND THE 4 × 4

This 6 × 6 vehicle, constructed on a 145" wheelbase, instead of a 164" wheelbase, and equipped with a 108" body instead of a 144" body used by the services, was adopted as the principal field artillery cargo and prime mover vehicle after purchase of 21 of them and test by the 1st Field Artillery during 1940. The purpose of that purchase was to make possible extended service tests of the type; but before the tests could be completed, the vehicle was adopted.

Among the several disadvantages of a 6 × 6 truck, compared with a 4 × 4 truck, are:

(a) It requires a larger engine, or else a sacrifice in performance must be accepted. The 2½-ton 6 × 6, fully loaded and equipped, and towing the 105-mm. howitzer has a computed high-gear grade ability of 2.3 per cent. The 1½-ton 4 × 4 under the same condition has 3.5 per cent. This difference has an appreciable effect on ease of column control, on distances between vehicles, and on gear shifting on roads. For maneuvering off the roads, the 4 × 4 truck has the shorter turning radius, and is handier in steering, particularly when the front wheels are in slippery going. In the matter of fuel consumption, the 4 × 4 vehicle has a decided advantage. In recent pilot model tests at Holabird Quartermaster Depot, the 1½-ton 4 × 4 has averaged 6.4 miles per gallon, and the 2½-ton 6 × 6 has averaged 4.3 miles per gallon, in tests of 8,000-10,000 miles duration.

(b) Because of the bogie construction, and other constructional features necessary, the 6 × 6 vehicle is 3,000 lbs. heavier than the 4 × 4 vehicle.

(c) Of more importance in new vehicles, is the less apparent difference in maintenance necessary on the two types. In the pilot model tests conducted at the Holabird Quartermaster Depot during the past year, the maintenance of the 6 × 6 models has been very much greater than that of similar 4 × 4 types. When the present procurement vehicles are a year or more old, this maintenance differential will become more evident.

The conditions of service of a 6 × 6 truck are such that greater strength in some units is required than in a 4 × 4 vehicle of equal payload.

The apparent advantage of the 6 × 6 type is its better flotation. In commercial practice, vehicles are rated in gross weight capacity, depending on the strength of the axles and the carrying capacity of the tires; six-wheel vehicles are used to secure greater load-carrying capacity on roads. In setting up payload capacity in military vehicles we have followed a similar procedure. But even here, in the case of the 6-ton truck, we deviate from the rule because, although we call it a 6-ton truck, when it

tows a gun, it actually is but a 2½-ton truck, because it is required to carry but 5,000 lbs. payload. The sound way to rate military vehicles is to require a definite unit of ground pressure at various depths of penetration, with a specified payload.

That a 6 × 6 truck has greater flotation than a 4 × 4 truck with the same size tires, is admitted, and it will go a few places where the 4 × 4 truck is unable to go. However, by selecting the proper tire size for a well-designed 4 × 4 truck, adequate flotation can be secured to meet the necessities of field service without having the disadvantage of the 6 × 6 type. If proper-size tires are installed on 4 × 4 trucks, the 6 × 6 vehicle can be justified as a military type of tactical vehicle only when the gross weight exceeds that where adequate flotation can be secured on a 4 × 4 vehicle, estimated to be around 18,000 lbs.

The advantages inherent in a 6 × 6 vehicle are better riding qualities and greater angle of departure, surely minor advantages compared with the disadvantages of the type.

SPEED IN MILITARY TRUCKS

Another feature in connection with the characteristics of military vehicles is the insistence on greater and greater maximum speed. The military service is rightly demanding increased performance but the tyro measures vehicle performance in terms of top speed.

It is fairly well established that, while a single vehicle may profit by endeavoring to move at a high speed, a number of vehicles, such as comprise a military column, operate best at an average speed of 25-30 MPH.

The 2½-ton 6×6 truck has a governed maximum speed of about fifty miles per hour. This, of course, is on a level road. Unfortunately few roads are level. What counts is the speed on grades. Let us assume that we intend to move the column at an average of 30 MPH; and in order to provide individual vehicles with some degree of flexibility, give each vehicle a margin of 5 MPH, or a maximum governed speed of 35 MPH.

MAXIMUM ATTAINABLE SPEED

Grade (%)	On Concrete Road		On Dirt Road	
	50 MPH	35 MPH	50 MPH	35 MPH
2	38.8	35.0	22.1	27.3
3	28.6	32.8	15.8	19.6
4	21.6	27.3	11.4	15.6
5	15.8	19.6	11.4	15.6
6	11.4	15.6	11.3	15.6
7	11.4	15.6	10.0	13.9

The table above shows the computed attainable speed on various grades of the 2½-ton truck when geared (as at present) for 50 MPH, and for 35 MPH. The speed of the 35 MPH truck is much superior to that of the 50 MPH truck, except on a 2% concrete grade, which does not count because it exceeds the speed we told the operator to drive in the first place.

The higher speed of the 35 MPH truck on grades has obvious influence on ease of column control and on average speed maintained. The lower maximum speed of the 35 MPH truck has obvious influence on the pandemic of wrecks taking place in current maneuvers. The Second Army Commander found it necessary to prescribe a maximum speed for all trucks in the

maneuver area of, not thirty-five, but only twenty-five miles per hour, in Arkansas, in August, 1941. If the truck driver were able to get up grades at a higher speed, he would not try to go so fast to catch up with the column after he reached the top of the hill. For example, a serial of twenty 2½-ton trucks with a prescribed speed of 30 miles per hour goes up a 4% concrete grade at the highest possible speed. Drivers are well trained and gear shifting is perfect. At the top of the grade, the leading vehicle resumes 30 miles per hour. The last truck (with 35 miles per hour maximum speed), which has lost 115 yards on the head of the column, will be back in its proper place in 46 seconds after it reaches the top of the grade. For trucks geared as are our present 2½-ton trucks (50 MPH) to get back in place in the same time, every truck in the column after the first must run 49.7 MPH—and that is exactly what the drivers will do. This speed is independent of the number of trucks, the distance between them and the length of the grade, provided the grade is long enough to cause the trucks to lose initial momentum.

This unsound insistence on high maximum speeds on military trucks has done much to restrict the development of adequate military vehicles. It has made them heavier than necessary, augmented the difficulties of column control and increased our maintenance. Foreign military trucks have a maximum speed of 30-32 miles per hour. Don't be fooled by that "50"; it means kilometers and not miles.

SUGGESTED CHANGES IN SPECIFICATIONS

A majority of representatives of engine builders with whom the writer has talked are of the opinion that conservative practice would require that the 2½-ton 6 × 6 truck should use an engine of 320-350 cubic inches, thereby putting it in the same torque-weight class as the 1½-ton 4 × 4 and the 6-ton 6 × 6 (about 25 lbs. feet per ton). Such a requirement would have valuable effects on maintenance. There would be less breakage of power-train parts which often result from jerky application of inadequate torque instead of steady application of ample torque. As one engineer puts it, "There is no substitute for power under the hood."

Cheaply constructed engines ordinarily are equipped with top-mounted oil filters which have external oil lines leading from the filter to the engine. More expensive engines have base-mounted integral oil filters, with no external oil lines. In the first type, if an oil line should break, or a fitting leak, the engine will be seriously damaged unless the driver notices the condition at once. The use of oil filters having external piping should be barred by the specifications.

In military vehicles care must be exercised not to use too high a compression ratio. A ratio which will allow the engine to give long service without excessive wear and repair costs is the type required. "Souping-up" an engine to meet a competitive requirement can only result in trouble.

One practical reason for keeping compression ratios low is the possible non-availability of high-octane fuel or of aluminum pistons. Considering that aircraft and tanks must have high-octane fuel, and seeing that materials which only a few months ago were stated to be in ample supply are now being rationed to industry, one is

led to wonder whether ordinary trucks would be able to obtain high-octane leaded gasoline in war time.

An analysis can be made of the adequacy of the gear ratios provided in military vehicles. The ratios required in a military vehicle are, in high gear, a ratio low enough so that the vehicle attains its maximum required road speed without permitting the engine to operate at more than its peak horsepower speed; in low gear, a ratio high enough so that the engine will surely turn the wheels when equipped with traction devices (found by experience to correspond to about 65 per cent low-gear grade ability); and finally two or three ratios for use on grades and on ground of tractive requirements so great as to be beyond the capability of the engine torque in transmission high gear.

In high gear, all our vehicles have safe reduction ratios, except the 4-ton and 6-ton trucks—where the ratios exceed those permissible, thus causing the engines to run at speeds in excess of the manufacturer's guaranteed speeds. The 2½-ton 6 × 6 truck has a highly desirable reserve in the matter of engine speed.

In low gear, there is no correlation between actual reductions and required reductions; they vary all the way from barely enough to twice as much as required.

The required gear reduction of the 6-ton truck is based on 65 per cent grade ability without towed load. The military characteristics specify 30 per cent grade ability with towed load. The reason for so specifying the grade ability is unknown, but if this, in fact, does express the requirement of the using arm, the vehicle should not even be provided with a two-speed transfer case, since 30 per cent grade ability with towed load requires a reduction of 43.6 and the vehicle has a reduction of 47.8 in transmission low gear and transfer-case high range.

Excessive low-gear reductions are undesirable in any vehicle. After sufficient reduction to insure turning the wheels in low gear is provided, nothing is gained by adding more, and there are several disadvantages:

(a) When operating cross-country without tracks in moderately rough ground, there is a psychological feeling on the part of the driver that he should drive in low gear; consequently, he races his lightly loaded engine to attain a reasonable speed.

(b) The speed on good cross-country in high gear of low range, the principal operating gear, is unnecessarily reduced.

(c) Excessive low-gear reductions may cause the clutch lining to be thrown off the clutch disc by centrifugal force, particularly if the clutch is hot, when the vehicle descends a grade in low gear and the driver releases the clutch, even momentarily, to shift into a higher gear as he approaches the bottom of the grade. In the 2½-ton 6 × 6 truck, a 10-MPH vehicle speed corresponds to 10,000 RPM of the clutch, and one manufacturer claims that the clutch failures in this vehicle are caused by this fact.

The reduction in low gear is determined by the low-range ratio of the transfer case. The transfer case is strictly

a military item; so why should not the low-range ratio of the transfer case be correct?

Considerable difference exists in the facility of the vehicle on grades or in rough going, depending on whether the vehicle has a four-speed or a five-speed transmission. The specifications for the 2½-ton 6 × 6 truck call for a five-speed overdrive transmission; those for the 1½-ton 4 × 4 truck call for a four-speed transmission. Many of the favorable comments on the performance of the 2½-ton 6 × 6 truck can be traced to the use of this transmission. To improve the grade performance of the 1½-ton truck, a five-speed transmission should be specified as was done in the case of the 2½-ton truck. However, it is not necessary to specify an overdrive fifth speed as is the case with the 2½-ton truck.

Although the transmission used in the 2½-ton 6 × 6 is satisfactory, the transfer case is not. Aside from the excessive reduction in low gear, it jumps out of low range frequently. It runs at a temperature so high that the case cannot be touched with the hand; and is provided with leather grease seals, which, in the opinion of the writer, deteriorate rapidly because of the high operating temperature, and cause the frequent failures which are reported. The high temperature also tends to cause deterioration of the lubricant in the case.

The axles used on the 2½-ton 6 × 6 truck, and on the 1½-ton 4 × 4 prior to the current model, are not well suited to military use, being of competitive type secured under closed bids. They have a split housing, whereas nearly all axles used in the truck industry use a banjo, or a bowl, housing. The split type housing is difficult to repair in the field because no repairs or adjustments can be made on its internal parts without complete disassembly. Another objection to these axles is the fact that the largest practicable ratio is now installed in them. If more grade ability, larger tires, or an increase in vehicle weight are desired, the only solution is a larger engine.

The military axle uses a five-tooth pinion and 33-tooth ring gear. The combination of a 5-tooth pinion and 33-tooth ring gear results in a ratio of 6.60; a 6-tooth pinion and 40-tooth ring gear in 6.67. But the axle which uses the latter combination is more expensive, hence we are not using it! At the time one company abandoned the five-tooth pinion as unsatisfactory, its tests showed that the 6-tooth pinion lasted over 10 times as long, and stood nearly 10 times as many shocks as the 5-tooth.

The reason for the inferiority of the five-tooth pinion compared with the six-tooth pinion is not precisely known to the writer. It is possible that the five-tooth pinion has fewer teeth in contact on the average, and is, therefore, less resistant to shock loads.

Another point to consider in connection with axles is that the actual loading in the military vehicle exceeds by an appreciable amount the manufacturer's rating of the axle.

For many years, military characteristics have stated

that the use of "semi-locking" differentials is desired; that is to say, a differential which delivers a portion of the engine torque to a wheel on one side which has traction, while the wheel on the other side slips. Under this provision of characteristics, military vehicles, except the ½-ton, are equipped with the "Hi-traction differential," a patented product, the principle of operation of which is not generally understood throughout the Army. It is not a "semi-locking" differential and it does not apply engine torque to a wheel on one side while the wheel on the other side is slipping. Its action comes about through the use of differential pinion gears having teeth so shaped that, if one wheel be jacked up, and the propellor shaft of the truck rotated at a uniform angular velocity, the jacked-up wheel does not rotate at a uniform angular velocity, but increases and decreases its velocity through two cycles per wheel revolution. The mass of the spinning wheel, reacting through the differential gears, thus applies a momentary effort to the stationary wheel on the other side as the velocity changes. Thus, if the vehicle had lost traction with one wheel spinning at 500 RPM in the mud, there would be transmitted to the wheel on the other side momentary impacts 1,000 times per minute.

A truck manufacturer was requested to run dynamometer tests which would demonstrate the questionable value of this effect. The report shows the torque applied to the stationary wheel was about 140 lbs.-ft. over the average value. It must be remembered that in such a test the dynamometer parts are included in the spinning system, and the report states that the increase is in a large measure caused by resonant oscillation and may not occur in the actual vehicle. However, even if the entire increase in fact exists, this is equivalent to 96 lbs. rim pull on 7.50 tires. To move a 10,000 lb. truck through mud six inches deep, a rim pull of more than 2,000 lbs. is required. From these figures, the miniscule value of the "hi-traction" differential is apparent.

The price for this small increase is the use of differential gears which by their shape are weaker than ordinary differential gears. The military differential failed in a dynamometer test after 40,000 test cycles; the standard production differential of the manufacturer who conducted the test lasted through 325,000 test cycles.

This so-called high traction differential should be deleted from military characteristics and a full self-locking differential substituted. It is just as important from a tractive standpoint to have positive traction on the two wheels on one axle as it is to provide positive traction between the axles, now required by the prohibition of center differentials not equipped with locks. This requirement might force the development of suitable self-locking differentials which had had little attention in the military service. One type has been recently tested with promising results, sets having lasted 8,200 miles of test driving in two 2½-ton 6 × 6 trucks, at which mileage the locking cams were worn out, and the

differentials were removed. These differentials, unlike the Hi-traction type, are in more or less extensive commercial use, and their application to military vehicles should be pushed. It was found in the above tests that they cannot be used in the front axle because occasional differences in front wheel speed on the right and left sides of the vehicle cause the differential to lock with possible danger in steering.

It may be necessary also to revise ideas of when the front wheel drive should be used. It is current practice to keep the front drive engaged except when operating on dry hard-surface roads, but with a self-locking differential in the rear axle, it is possible that the front drive should be kept disengaged except in soft or very rough ground.

The brakes on military vehicles are, generally speaking, unsatisfactory. The specifications require that the brakes on the light trucks be capable of bringing the vehicle to a stop within 30 feet, from 20 MPH. Specifications for vehicle purchases by the Marine Corps require the brakes to stop the vehicle within 25 feet from 20 MPH. at a pedal pressure of less than 150 lbs. The specification for brakes on military vehicles should be changed to secure not only better stopping distance, but also brakes easier to operate and longer lived.

The brake lining used in the light vehicles is ¼" thick. When it is riveted on, it has about ⅛" of usable wearing thickness. If ⅜" lining were specified, the usable wearing thickness would be twice as great. The experimental engineer of a large truck company states that if woven lining were used instead of molded lining, the life would be increased because dirt particles would embed themselves in the lining instead of cutting it away. However, woven lining is more expensive.

When vehicles are operated in the mud for even a short time, the brakes become inoperative because the housing fills up with dirt. It is then necessary to remove the wheel hubs and wheel bearings, clean out the mud, and repack the wheel bearings, sometimes an all-night job after a day's march. It must be done by a mechanic and requires special tools. It should be possible for the operation to be performed by the driver without special tools. There are two perfectly practical methods by which this operation can be much simplified, a description of which is omitted for sake of brevity.

The frames of the light vehicles (2½-ton and under) now being furnished are not strong enough for their purpose. Those of the 4-ton and 6-ton trucks are heat-treated alloy steel and appear to be satisfactory, but the frames of practically all light trucks tested at the Holabird Quartermaster Depot during the past year have broken during the pilot model tests.

The steering gears used on some military vehicles are not of high enough rating, particularly if the use of traction devices be contemplated. Driven front wheels, combined with off-road operation on rough ground and in mud, require that the steering gear be much stronger

and of higher ratio than would be necessary on commercial vehicles, and they must be more substantially bolted in place.

None of the vehicles currently being procured are equipped with traction devices.* The military characteristics of certain sizes provide for the procurement of traction devices when specified in the *Invitation for Bids*; but, although they are authorized in Field Artillery Tables of Basic Allowances, no invitations have included them. In fact, although the specifications state the vehicles must be suitable for use with traction devices, only a portion of them are being procured with two spare tires and wheels to make such use possible. Traction devices are essential for off-road operation of all vehicles with towed loads and are highly desirable for vehicles without towed loads.

Over the past five years, reasonably satisfactory traction devices have been developed for individual wheel mounting (not for bogie mounting on a 6×6) principally through the efforts of one small manufacturer, with incidental assistance from the Field Artillery Board and Field Artillery School. These traction devices are capable of operation at relatively high speeds on hard roads if necessary, they have a life of several thousand miles of use, and have reached such a state of development that they have been supplied to several foreign governments. But they are not being issued in our service. The principal objections to them are their weight and the fact that no place is provided to carry them. That they are heavy is true (575 lbs. for a 4×4 truck, 860 lbs. for a 6×6 truck) but of what value is a saving in weight if the truck cannot go where it is intended to go?

Those tracks have been adopted for procurement with all new vehicles of the Marine Corps. On these vehicles special racks for carrying them have been installed on the truck body sides.

Until satisfactory tracks are issued, field artillery vehicles will continue to have limited mobility, but this will be the case in peacetime maneuvers only if the vehicles operate fully loaded, under actual tactical conditions, and if there should happen to be wet weather in the maneuver period.

CONCLUSION

The writer believes that many of the vehicles currently being procured for the Army are unsatisfactory in design and in mechanical strength; and that as time goes on, the

*After their experiences in France, British artillerymen stated that traction devices are an absolute necessity.—Editor.

maintenance of the large number of vehicles in service and under procurement, already a source of concern, will become increasingly serious. Two things should be done now; namely, buy vehicles—not guaranteed for a mere 4,000 miles—but vehicles which will stand up under strenuous conditions of field service; and go after first-and second-echelon maintenance in a "big way." This means an active interest in the latter problem by those far above the motor officer, the motor sergeant, the chief of section, the mechanics, and the drivers.

Regarding the procurement of vehicles of greater ruggedness, the objection will be immediately raised that such vehicles will be excessively heavy, and that they cause a vicious cycle, where we build the axles heavier, which requires a bigger engine, this in turn requiring bigger axles to support the engine. That good military vehicles will be heavier than some which have been procured is admitted. However, it is a fallacy to set up a job for the industry and then prevent manufacturers from providing the strength which they know is required to do it. There have been many examples in the automotive industry of a saving in weight of 10% of a part, with a serious decrease in strength. It would be interesting to let this "vicious cycle" work out to its logical conclusion just once and see what the resulting vehicle looks like. *The proper way to build military trucks is to select commercially produced units of adequate strength—and they are available—then put under the hood adequate power to drive them, and finally provide the vehicle with tires large enough to give it the flotation desired for the resulting weight.*

Military equipment generally has been constructed along lines of super-abundant strength and lasting qualities. Vehicles which are an exception to that practice only invite disaster on the battlefield. A vehicle which is too good for the military service does not exist. Adequate military vehicles *cannot* be procured by competitive bids where the emphasis is placed on low price, and it is wrong to continue the procurement of these types through standardization of them.

In the past year, with more money available, much has been accomplished. Appreciable steps toward interchangeability of component units on vehicles have been taken. Recommendations of the SAE-QMC Advisory Committee have been widely adopted by truck manufacturers and the results are even now appearing on vehicles being produced. Many improvements have been made on the vehicles, such as built-in brushguards, combat-zone safety lights, front-mounted winches, interchangeable oil-filter units, heavy-duty generators and regulators, and reduction in the number of types of units such as batteries, horns, windshield wipers, etc. All these changes, however, have simply been improvements in existing types of vehicles. The general problem of the suitability of the types has been untouched.

The using arms and services should get behind the supply service with cooperation and assistance to the limit of their ability. Officers of the supply service state that in the matter of deviations from commercial practice, they are restricted to such as are set up by the vehicle user as service requirements.

If we will get together, consult with disinterested engineers of the automotive industry, ask for what we want, and know why we want it, there will result vehicles not of minimum capability at lowest first cost, but vehicles which will be adequate for their intended use. More important, *if properly cared for, they will not break down in war.*



A trip on an Atlantic Convoy

FATHER NEPTUNE

By LIEUT. COL. R. F. ENNIS, GSC.

A fine rain drizzled down on the sullen river on the British coast. Our liner, recently refitted as a troop ship after being bombed in an English port, was ready to go back on her South African run as the flagship of a convoy. The group contained ships which had plied the Seven Seas—Cunarders, P & O's, Union Castle, Canadian Pacific, and dirty little tramp freighters. All were loaded to capacity with men and material.

As the passengers became acquainted, rumors spread that the mysterious ports of P, Q, S and M were Freetown, Cape Town, Durban and Aden. It was whispered that the convoy was to sail the next morning. Mail, water, and dispatch boats moved about incessantly making last minute

The chief engineer of an American vessel, anchored in the harbor of Capetown, looks at Table Mountain with its attending phenomenon, the "Tablecloth." Clouds passing over hang closely to top and sides, flowing gracefully over the edges, much like an actual tablecloth on a table. Ships are anchored, waiting their turn to dock at the overcrowded wharves, J. Tomaskovic from Black Star.

preparations for sailing. A big Cunarder from Liverpool painted a dull gray slipped behind the boom and into her position in the convoy.

During the afternoon we had our first lifeboat drill. The ship's crew in our boat was a sandy haired boy of fifteen or sixteen, a galley helper and a petty officer. The passengers assigned to the boat were casuals—a major from the Indian Army, two rosy cheeked chaplains, a doctor and the patients from the sick bay. Instructions were issued at the drill to sleep in our trousers and socks, with our equipment laid out beside our bunks in such a manner that we might collect it in the dark if the ship's lights failed.

Lieut. Col. R. F. Ennis is preparing a series of short sketches for the *Journal* which describe some of the less well known areas in which the war is being fought or may soon be fought. Naturally, these descriptions must be somewhat general in character, but the series is in line with our policy to acquaint our readers with the geography and military background of strategic areas in both hemispheres. The first of these articles, *Father Neptune*, appears in this issue. Col. Ennis, an infantry officer of long experience with tanks, has just returned from a tour of duty as observer (from our Armored Force) with British forces in the Middle East. He is now on duty with GHQ.

In the late afternoon the Commodore came aboard, which the officer commanding the troops assured us was a certain indication that we were about to sail. Thin, tall and baldish, the Commodore appeared remarkably young for his sixty-three years. He had commanded the Royal Yacht and was retired as a vice admiral. During the first year of the war he had risen from a private to a colonel in the Home Guards and recently had been put on active duty as a commodore to command the merchantmen in convoys.

Over the after-dinner coffee he talked humorously of his experiences in nursing a seven-knot convoy of old tubs across the Atlantic. He, however, was too old and too good a sailor to show any concern (and never did) about guiding our convoy through the thousands of miles of raider- and submarine-infested water around South Africa.

At ten in the evening our ship raised her anchor and quietly we led the convoy toward the sea. There were only two very dim running lights on each ship. Portholes were covered with plyboard and the approaches to all doors leading to an open deck were guarded with vestibules painted black to baffle the emerging rays of light. None of the ships were camouflaged as in World War days.

Next morning the convoy began slowly to take up its formation. Restlessly destroyers, cruisers and land-based planes moved on the horizon covering our course. Far to the northwest could be discerned the four funnels of a former U. S. destroyer. Being higher above the water line, she rolled badly in the moderately heavy sea. The carefully organized game of "fox and geese" was getting under way. Frequent and unpredictable changes were being made in the course. Trash and refuse were not thrown overboard, because of the tell-tale trail they leave.

As we approached the steely cold waters of the North Atlantic, all hoped for the sake of the men crowded below the weather decks that the passage would not be too rough. Most of them were Territorials, similar to our National Guardsmen, and many grew seasick watching the cruiser close by heel over in the passing swells. Modernized naval vessels, with their increased load of anti-aircraft armor and armament, roll badly even in a fair sea.

After continuing for many days on a false course, the convoy headed south somewhere down the middle of the Atlantic, carefully guarded by fighting ships. Among these was a carrier, which gave the Commodore a great feeling of security, for continuous long-range aerial reconnaissance is one of the finest protectors of a convoy.

As the weather became warmer and the stomachs and the sea calmer, an educational and training program got under way. In the mornings there was the never-ending close order drill, physical exercises and military instruction; in the afternoons, a wide variety of academic subjects was covered. The most popular course was

Egyptian, partly because of its practical value, but largely due to the lively instruction of Lt. Myers. He was a well known Egyptologist who had had his own excavation project before the war, and his spicy stories and Egyptian singing "brought down the classes."

Assisting him was Lt. Littledale, who was just of his teens. His father is a colorful character of the Iraq-Trans-Jordan country. A British officer during the World War, he remained in Iraq as a police official, married a Kurdish princess, who is a charming woman, became liaison officer for the Iraq Petroleum Co. and is now its Trans-Jordan manager. As liaison officer he had a Lawrence-like role. In an Arab garb his son would pass easily as a Bedouin.

The late afternoons on shipboard brought mass singing. The British soldiers sing well and enjoy it. They respond quickly to the mood of a song. With their heavy shoes they beat time on the deck and sang lustily many of our hill-billy and cowboy songs in a strange mixture of Oxford, Scottish, Welsh and Yorkshire accents. They poked quiet and good-natured fun at the first sergeant with their W.O.2 song. And with sincerity and great determination sang "There'll Always Be an England."

Their morale, under the circumstances, could not have been higher. Their calm and matter-of-fact assurance that they would win the war was remarkable. But their point of view was most realistic, for they realized that this might take years. There was little flag-waving. I never heard a single adverse comment made by the rank and file on the war-time leadership of Mr. Churchill. Their faith in him was complete. Extracts from the speeches of Mr. Churchill and our President were constantly quoted and their words appeared to be the war doctrine of the British Army.

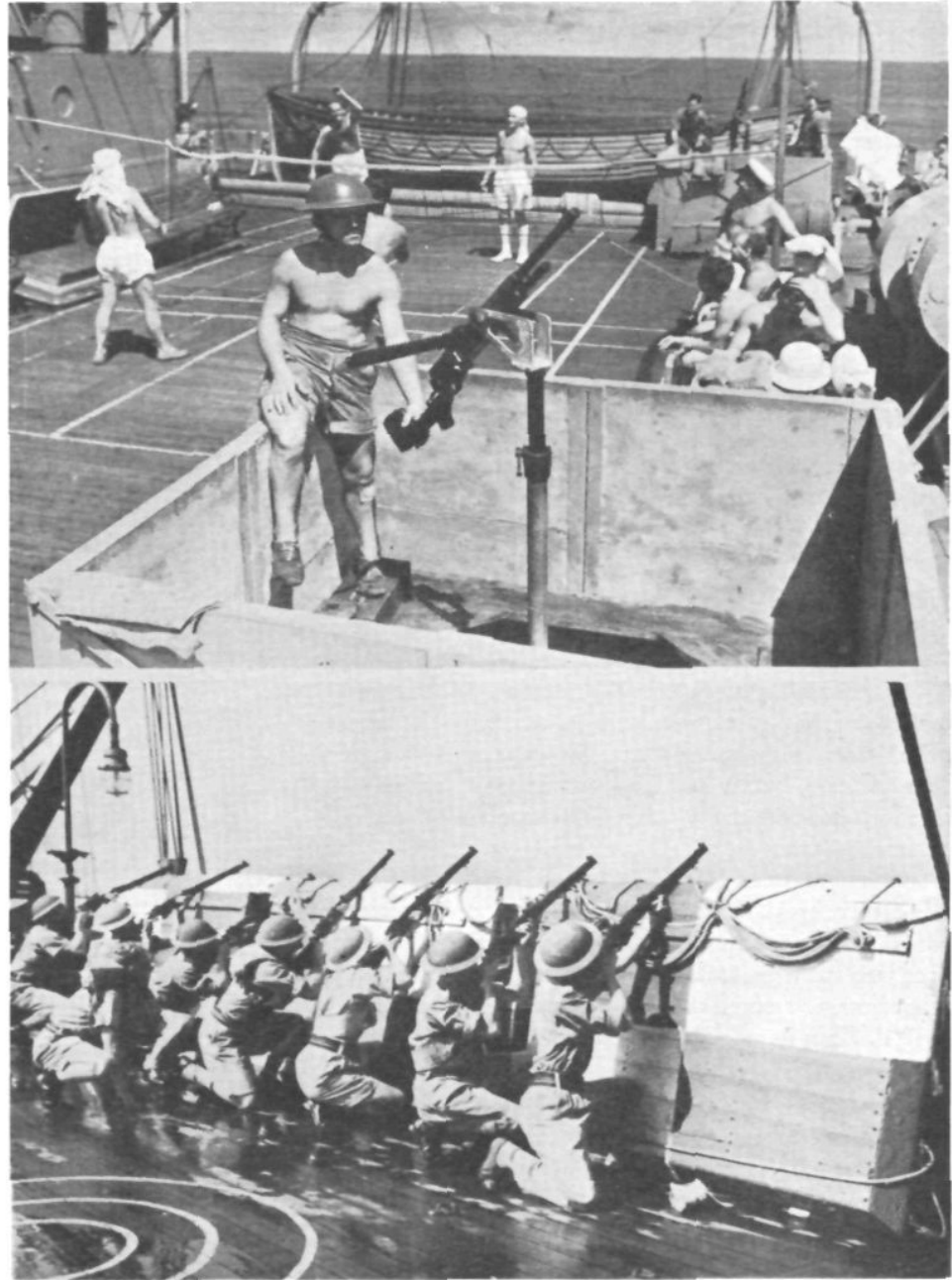
The officers bespoke the breadth of the British Commonwealth. Short, fat and bald, Capt. Batchellor had been a wealthy "China merchant." In the last war he fought as an infantryman, but now his age and weight relegated him to a supply service.

Major Bolbee, a Bengal Lancer from a family of naval officers, was tall, dark-haired and olive complexioned. He was a fine polo player. His thoughts often ran in the deep mystic channels of an Indian.

Brigadier Goldney, known affectionately as "The Baron," was being hurried to Cairo to be Chief of the Supply Service. His juniors swear by him—for he took the blame when things went wrong and gave them the credit when things went well. He was short, heavy set, reticent and mild-mannered. At 52, when he was considered a hopeless Army bachelor, he married. The military tradition of his family is as old as the Empire. Of his 5 brothers, 2 were generals, 2 brigadiers and one a colonel.

The officer commanding troops, who rose to every occasion with a lengthy speech, was an empire-minded Old Ironsides. An executive of the International Chemical Co., he rejoined the Army and enhanced, during the

Aboard a British troop transport. Former passenger liners that have probably changed their paintwork and now mount guns on their decks still maintain their sports facilities which are used by the crew when large contingents of troops are not being transported. Scenes aboard one of these ships show (top) a game of deck tennis near where an anti-aircraft gunner mans his gun, and rifle drill (bottom) with life rafts serving as cover. Associated Press photo.



dark days of Dunkirk, his World War military reputation!

As the convoy continued southward the weather grew warmer and our course took us several hundred miles west of the Azores. I became better acquainted with the junior officers; and with the oil well driller from Canada who was going out to drill water wells on the desert; the Scotch - Irish Chaplain, who would get so mad with Lt. Littledale in meal time arguments that he would leave the table before finishing his meal; the Welsh Chaplain who was a labor leader; and the Scottish captain, whose burr would saw a plank, and who must have grown weary repeating his stories which I could not understand.

Never making over 11 knots an hour, and losing 19 per cent of that by zigzagging, we made a wide detour of Dakar, where German submarines were reliably reported to be based, and headed toward Freetown in Sierra Leone, on the West Coast of Africa. Part of our convoy left us and, thereafter, the Commodore was dependent upon the planes of the cruisers for aerial reconnaissance. One was forced down near the coast. The wind started to blow it towards the shore, but changed direction and the aviators were forced to take to their rubber boat. They soon met several natives in a dugout who refused to take them ashore, repeating over and over "No, no, bad men"—meaning the aviators would be made prisoners in their village. The natives, however, went to their homes and returned with water and food and paddled the aviators into Freetown, where they (the natives) became heroes and were handsomely rewarded with sufficient money to buy themselves a couple more wives.

After almost a month at sea, the convoy formed in single file again and slipped through the opening of the protective boom and into Freetown Harbor, a magnificent natural harbor at the mouth of a wide river.

Freetown was long known as the white man's grave. Its malaria-infested swamps, overcast skies and humid climate kept the white population to a few government officials and business men. In recent years the swamp near the edge of the town has been drained, the mosquitoes controlled, and Freetown made a relatively healthy place in which to live.

The ship had scarcely dropped anchor before the bumboatmen

swarmed around her sides. Many were as naked as jay-birds. They sold everything from dives to sandals and baskets. The price of green bananas soared rapidly until some of the soldiers ended up in the sick bay with severe but old-fashioned stomach-aches—then bananas sold for a song.

Freetown, nestling on a small flat at the base of towering bush-covered mountains, looked inviting to the some 29,000 soldiers and many seamen aboard the ships of the convoy. However, only a few got ashore. There were over 100 ships in the harbor and not a single one could be berthed. Tenders had to be used for fueling and watering and could not be spared to take the men ashore.

Being a privileged character, I got ashore on the third day of our stay under the pretext of sending a cable report. I did—and at the same time sent a cable to my wife which caused an endless amount of confusion, for the censors cut the office of origin and she spent weeks guessing where I might have been on the rather long coast-line of Africa.

On the quay a black boy ("Friday") took me under his guidance and we started off down the middle of the main street, with him leading the way, on a shopping tour. Clerks, Friday and I waved our arms and shouted in efforts to close many deals. About noon we decided to buy a white coat. A cable-manager recommended Dominiques, across from the Catholic Academy. It was a weather boarded hole-in-the-wall which contained a couple sewing machines, an old man, a boy and a manager who spoke better English than I do—all were black. The manager assured me that the coat would be done by 3:30 PM but he insisted on being paid in advance.

It, of course, was not ready and after much shouting and arm-waving, Friday and I stalked back to the quay. I was willing to charge the price of the coat to experience and forget it, but my roommate and the officer commanding troops on the transport insisted that discipline must be maintained in the "Empire." So I asked the two chaplains who were going ashore the next day to pick up the coat. They got "embroiled in a bloody row" and lost their ecclesiastical tempers with the manager, who said he gave the coat to Friday.

Full of high resolve engendered by fresh pep-talks, I returned to shore the following day, got a big colored detective sergeant and headed down the center of the street. We had scarcely gone a half a block when we ran into Friday, who after a little disciplinary action on the spot, dashed home to get the coat. Dirty, bedraggled and ill-fitting, the tailor tried to alter it to make it fit—but I never had the courage to leave my room with it on. However, I had done my bit to maintain discipline in the "Empire."

After six days the convoy filed out of the harbor, spread out in line of column, and headed toward Capetown. On the third day out one of the two diesel engines of our ship

broke down but we managed to lead the convoy until on the fifth day with a great clatter the remaining engine broke a connecting rod. The engineer decided that by cutting out the one cylinder he could get the ship back to Freetown. That meant the city hotel in Freetown for me where one applied for a meal three days in advance and the lower floor was given over to what must have been an all-time high in the sale of quarts of hot beer. At this critical moment I heard the Commodore was about to leave the ship. Breathlessly, I raced to his cabin and he said I could go with him if I was ready in 15 minutes.

With the city hotel in my mind, I was soon in the middle of my stateroom with the Adjutant, Sgt. Major, two soldiers and two stewards helping me pack. With sweat popping out all over, I ripped the whole back out of my best white shorts. A runner reported after ten minutes that the Commodore was ready to go over the side. Soon my hastily organized retinue deposited me, dripping with sweat, and my baggage, into the lifeboat.

The boat was dropped over the side and we were rowed to the sleek new cruiser which was standing by. We visited the young skipper, who was clad in khaki shorts and wore no insignia. Soon the ship settled down to a fast speed to catch up with the convoy.

We overtook it in the late afternoon and while a tropical rain beat down on the blue Atlantic, the first lieutenant bundled us with our baggage into a lifeboat. The Commodore, slim and smart, in his white shorts, was piped over the side. The Captain commanded "Lower away" over the loud speaker system. When the boat hit the sea with a resounding smack, a look of apprehension spread over the face of the first lieutenant. It did not disappear as the crew of youngsters pulled clumsily away from the ship's side in the choppy sea. As we rounded the prow, the big gray Cunarder, which was to be the new flagship, loomed up against the southern skies. Our clothing, baggage, and the code books, which I had been sleeping with for weeks, were soon drenched. The Admiral's dignity was dampened. But we crossed the equator (somewhere between the two ships) in a lifeboat.

Many hundred British Tommies and airmen lined the rails of the Cunarder. They recognized the stripes of the Commodore, the pips and crowns of Col. Pearson, but the cap ornament and gold leaves of the third member of the party were too much. Word spread quickly among the "rail-birds" that this was Father Neptune boarding the ship to witness the dunking and shaving of the neophytes who had never crossed the equator.

The purser and the ship officers greeted me like a long-lost friend, for the personnel on most Cunard ships spend more time in New York than they do in England. I had to attempt to answer many of their questions about New York which they liked so well. That evening Col. Pearson and I wandered around to get acquainted. In the blackout lounge we were greeted by our new hosts

in an atmosphere as uncomfortable as a Turkish bath.

The Cunarder was carrying about 3,000 soldiers and airmen. Some 1,500 were members of the R.A.F. bound for Rhodesia, Port Elizabeth, Aden, Egypt, Palestine and Iraq. There was a territorial regiment of artillery aboard commanded by Col. Halifax. He was an indefatigable worker and the great amount of training which he and his officers gave their organizations was paying fine dividends when I saw them weeks later in Trans-Jordan.

The men of the merchant-marine are perhaps making the greatest sacrifices and are subjected to greater dangers than those of any other service. Capt. McDonald, the salty old staff captain of the Cunarder, told one of the most pathetic stories. One of the Cunard ships had its bow almost blown off at Narvik. It had to be beached and the captain and the crew were taken prisoners. The captain's wife was an American, and after it was reported that he was in prison camp, she started to return to the States with her children, who were 5 and 7 years of age. The ship was sunk in the North Atlantic and in an open boat the three soon became ill from exposure. The children died and the mother, who was losing her mind, continually rubbed their faces and kept saying how cold they were. She soon died and all were buried at sea. The task of notifying the father fell to the American Red Cross.

The faculty of the British to adapt themselves to difficult conditions is remarkable. Suddenly I found myself helping a bit by making innumerable speeches to organizations. They enjoyed pep talks and American jokes. Col.

Millikens' Leavenworth one about "Who gets the two dollars" went over in a big way. I heard it many times later—of course greatly lengthened and Britishized. Frequently after a talk the organization commander would take me to a little cocktail party given by his noncommissioned officers in the smoking room. The commissioned officers present would split up among the tables and chat with the noncommissioned officers for long periods over their drinks.

The ship's officers would often give small cocktail parties for the more senior military officers in their cabins and lounge. These courtesies were returned by the military personnel in the lounge before dinner. Often the conversation in these little gatherings would drift around to the families. Most of the wives with children had taken small places in the country where the problem of getting food and the children to school, due to the petrol shortage, was most difficult. Nearly all of the wives without children, or whose children had grown up, had joined one of the numerous women's auxiliaries. Few officers and soldiers are returned from the Middle East to the British Isles during the war, so all aboard were faced with a long period of separation from their families.

As we continued toward Capetown the weather became cooler; more birthdays and excuses for parties appeared, the talent shows became better and more frequent, and the routine of life on shipboard generally brightened. Finally one clear, cold day the ship headed through a stiff wind toward Table Mountain and the tortuous Capetown harbor.

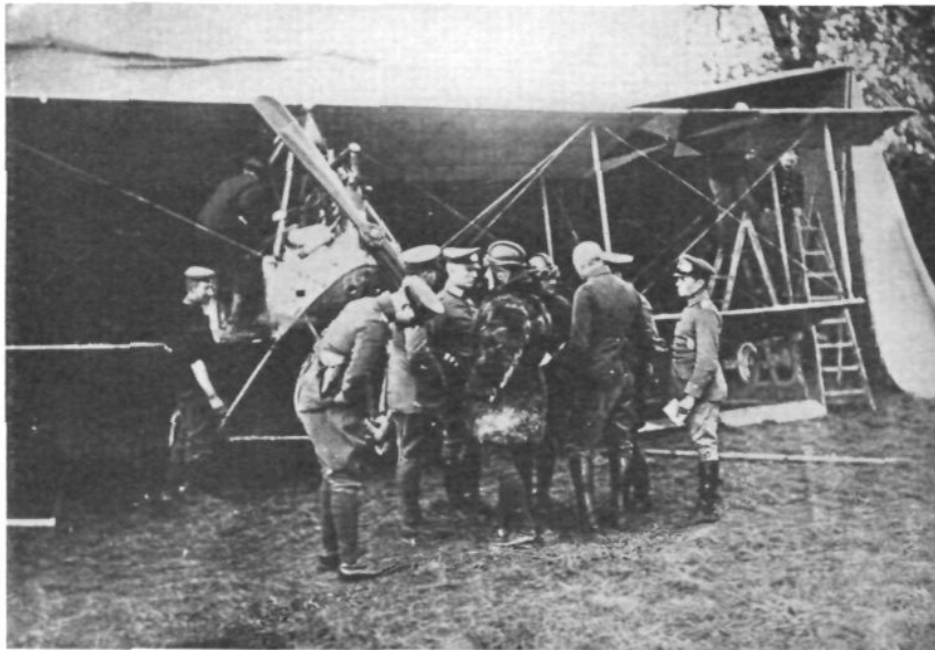
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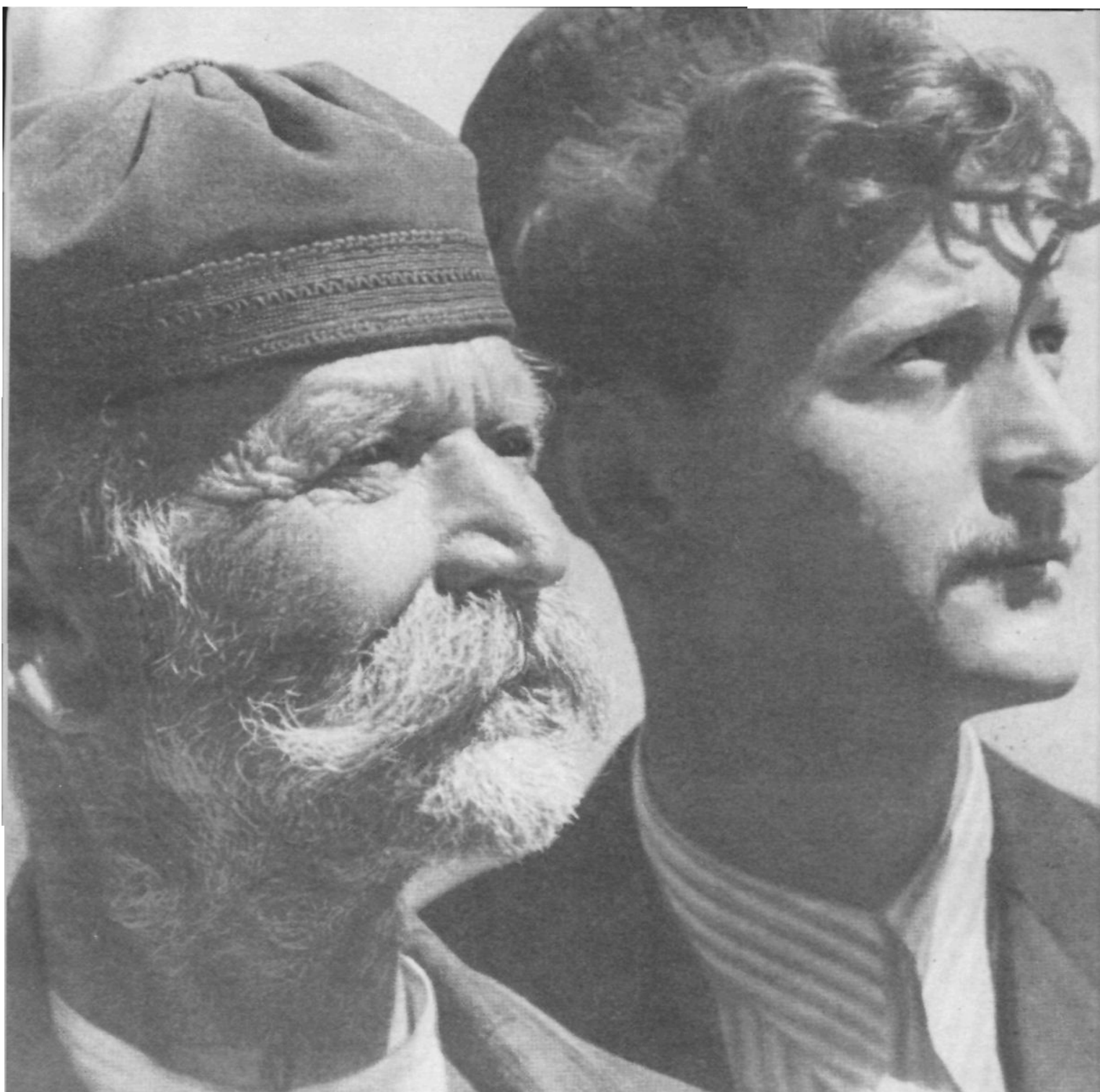
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A SUPERCHARGED HIGH-ALTITUDE MONSTER

The latest model Messerschmitt 157½F about to take off
in pursuit of ten Spitfires over Dover



Men of Parnassus

The welter of international squeeze in the Balkans developed into a high-powered poker game with big stakes and bigger risks. To play in this tense game one needed a tall pile of chips and plenty of nerve. Hitler had both. He also held consistently good cards. As a result, Molotov lost his shirt, while several lesser fry were ruined.

By Col. Conrad H. Lanza, FA

WAR

in the

BALKANS

Editor's foreword: In the November issue, Col. Lanza discussed the importance of the Balkans in the strategic clash of interests between the great European powers. Early in the war Britain and France had a plan, which was strategically sound, for establishing a Balkan front. Russia, as ever, was interested in the Balkans because of her never-relinquished dream of securing Istanbul and the Straits, and thus an outlet to the Mediterranean. The Axis, in turn, resisted such "encircling" operations directed against her. All this led to a maze of diplomatic maneuverings which eventually were to end in the great attack on Russia.

ITALY STARTS A BALKAN WAR

When, in August, 1940, Italy appeared to be on the point of starting a campaign in the Balkans, Great Britain advised Greece that her guarantee was still good. Should Italy invade Greece, the Royal Air Force and the Royal Navy could immediately come to the assistance of the Greeks. No promise was made as to ground troops. The British force in the Near East, which had indeed been earmarked for the Balkans, was now needed to defend Egypt from a threatened Italian attack. Until this danger was past, it was not available elsewhere. In view of the British promise, and after full discussion by the King and his cabinet, the Prime Minister of Greece announced on 23 August, that Greece would fight if invaded.

During September, the Bulgarian press urged their claims to Greek Macedonia, alleged to be really old Bulgar territory, which should be restored to the parent country.

In October, German forces moved into Rumania. Germany explained that these were training units intended to reorganize the Rumanian army. It now seems probable that this was exactly what they were. They were to prepare Rumania for the war against Russia scheduled for the following year. At the time, this was not clear, and it was assumed in Greece that somehow these Germans were connected with the Italian concentrations in Albania.

London considered now an Italian attack on Greece as imminent. If this happened, Greek bases would be-available to the British. Using these, in conjunction with Malta, it was believed that it might be quite possible to attack French North Africa, particularly Tunis, and from there attack Libya. This would reduce materially the danger to Egypt.

It was on 15 October that Mussolini selected the date, and decided to attack from Albania on Greece. He chose the end of the month, under advice of his General Staff, because long nights favored convoying, and because during the winter malaria was not prevalent in the expected theater of operations. It was believed possible to launch the attack before the Greeks could be mobilized and prepared to meet it.

Mussolini approved what he thought was a good plan of operations submitted by the Italian equivalent for the G-3 section. According to this, exclusive of reserves, 8 divisions plus special troops, with usual corps and army troops and services, were needed. Such a force was already in Albania.

The plan was (forces and strengths are approximate):

A. *Macedonia front*: The Ninth Army with 2 divisions—

3rd Giulia Division, Alpini	23,400 men
Parma Division	12,000
6th and 7th Cavalry	1,769
	<hr/>
	37,160

was to advance from vicinity of Corizza *east* toward Phlorina, and eventually on Salonika.

B. *Epirus front*: The Eleventh Army with 3 divisions—

51st Siena Division	11,500 men
29th Piemonte Division	5,000
23rd Ferrara Division	22,870
1st Parachute Grenadiers	4,000
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	43,370

was to push *south* along the Adriatic coast, from vicinity of Porto Edda and Argirocastro.

C. *Connecting Group* with 2 divisions—

131st Centauri Division, mechanized	6,500 men
24th Pusteria Division, about	13,500
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	20,000

based on Tepelini was to advance towards Konitsa.

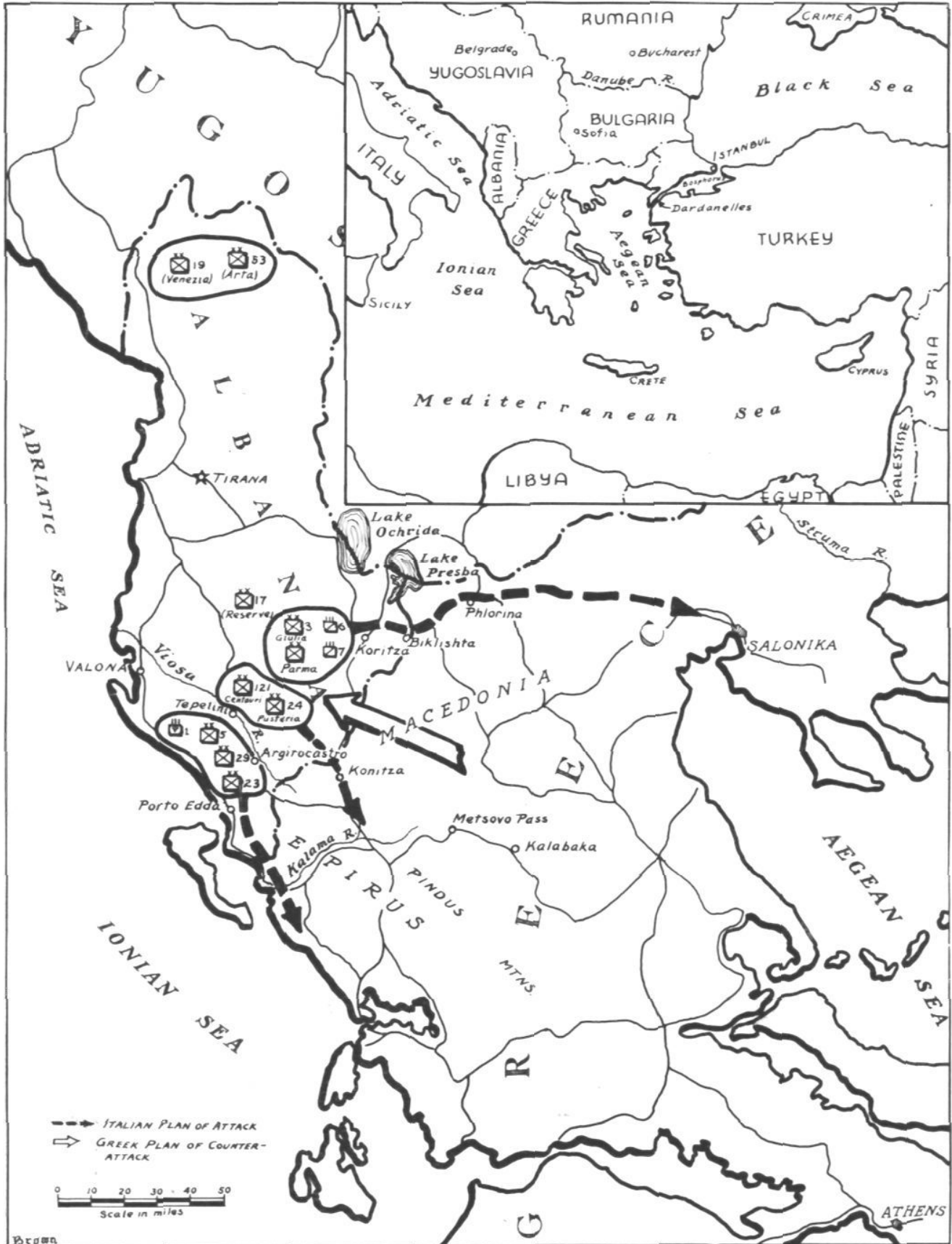
D. *Reserve*—1 division, the 17th, with about 6,400 men posted—near Puka. The whole force was commanded by Lieutenant General Francesco Jaconimi, who also commanded the Eleventh Army.

There was an additional force of 2 divisions—

19th Venezia Division	18,250 men
53rd Arta Division	17,800
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	36,050

in north Albania watching Yugoslavia. They had a purely defensive mission.

The foregoing forces amounted to 136,580 men in all. Reports indicate that in rear areas, on duty with services, and including MP's, there were 26,400 additional men, of which number somewhat less than half were Albanian troops. The GHQ command post was at Tirana.



The Italian plan called for two advances simultaneously from different bases; one moving east and the other south. The possibility that the enemy might attack between the Italian columns which were separated by a distance of some 50 miles had been foreseen. Danger from this possibility had been rejected, on the belief that the terrain difficulties were such that it would be impracticable for large forces to operate across the Pindus Mountains.

On 17 October, the British received reports that German troops in small numbers had entered Bulgaria. This caused further anxiety. Greece was prepared for an attack by Italy, and believed she could handle it; she was not prepared to meet a German attack coming through Bulgaria at the same time. Germany promptly announced that she had no demands on the Balkans; had no intention of attacking anybody; wanted peace above all else.

On 21 October, Italian GHQ in Albania detailed troops to occupy closely the frontier with Greece, and examine the Greek dispositions. The order stated:

"My intention is to reach the enemy positions without his frontier troops being able to give an alarm. . . . The essential factor is SURPRISE."

Mr. Anthony Eden, British Minister of Foreign Affairs, was at this date in the Near East. He convened all the British Balkan ministers to meet him at Istanbul. The purpose of this conference caused considerable concern in the Balkans. Possibly on recommendation of this conference, Great Britain on 22 October submitted a new proposition to Russia. All that was now asked was for Russia to adopt a more benevolent attitude toward the British in the war for democracy. If Russia would agree to this, the British undertook that at the peace settlement Russia should have a voice. Furthermore Great Britain was ready to recognize the Russian seizure of the Baltic states; and would of course agree never to go to war with Russia. As far as now known Russia never replied to this.

Italy issued a communique on 26 October alleging that a band of armed Greeks had violated the frontier of Albania near Corizza, and had fired on the outposts. Both Yugoslavia and Greece noted extraordinary activity among the Italian troops in Albania.

The British press urged seizure of the Aegean Islands. It was pointed out that it had been a strategical error to have allowed the Germans to seize Norway first. A similar situation was now present in the Balkans, and the same mistake should not be repeated. There should be neither hesitation nor scruples as to occupying territory valuable to, and presumably threatened by, the enemy.

The British estimate of the situation was: Egypt was menaced by large Italian forces in Libya. It was possible that France might reenter the war. If this occurred, Palestine and then Egypt might be attacked from Syria. British air forces in the Near East were none too strong, yet it might be possible to spare some air troops for Greece. However, if this were done, where could they be

based? The British Navy could defeat the Italian Navy, if the latter would come out and fight; but this possibility could hardly be expected. British submarines could interfere with the line of communications by sea between Italy and Albania; but it would take a long time for such interference to become decisive. The Italian attack on Greece might be a feint, to draw troops away from Egypt, where the main attack might fall later. Considering all the factors in the situation, no military aid other than a small air force plus naval assistance could be given to Greece at this time.

At 3:00 AM, 28 October, the Italian Minister at Athens delivered an ultimatum to the Greek government. According to this, attention had been invited previously to the use of Greek waters by the British Navy, and of the operation in Greece of a British Intelligence section. Italy had proofs of army, navy and air understandings between Greece and Great Britain which went far beyond the British guarantee. The ultimatum charged provocative frontier incidents in Albania. The Italian government "had reached the decision to ask the Greek government, as a guaranty of Greek neutrality, and as a guaranty of Italian security, for permission to occupy with its own armed forces several strategic points in Greek territory for the duration of the present conflict with Great Britain." The strategic points referred to in the ultimatum were not mentioned by name. Apparently no reply was expected, and none was given.

Greece appointed General Alexander Papagos as C-in-C. Mobilization was incomplete. Papagos at once assumed command. He had a prepared plan of campaign.*

The Italian expectation that they could succeed in obtaining a surprise in concealing their preparations was wrong. Friendly Albanians had kept the Greeks well oriented as to Italian troop dispositions and movements. It was known that the Italians had two bodies concentrated on opposite flanks of the Greek-Albanian frontier. In between there appeared to be only a relatively small force to cover about 50 miles of rough, mountainous country. It seemed probable (but not certain) that the two flank forces had offensive missions, and would attack on outbreak of war. As the completion of the Greek mobilization would take some days, it was decided to remain temporarily on the defensive, until the Italian plan of campaign became revealed. A lack of transverse roads parallel to the frontier indicated that it would be most difficult for the Italians to transfer troops from one flank to the other except after lengthy delays.

If the enemy main offensives came, as expected, on both ends of his flanks, with weak forces in the center, the Greek plan provided for an attack on this center. The idea was to penetrate it, thereby separating both main Italian forces. Each of the latter would have its

*The correct disposition of troops, and their strength, in the Greek-Italian war is not yet known. Only fragmentary items had been published from the Greek side. Italian records are far from complete. Consequently the campaign described hereafter is subject to correction.

flank turned, and a major disaster to the Italians would be possible. The Greeks intended to make the main thrust between Corizza and Konitsa. They realized that the country was mountainous and generally devoid of communications. They expected to overcome this handicap by providing plenty of pack transportation. Their information was that the Italians had little pack transportation, and that consequently the Greeks have the advantage. Besides, the Greeks knew their country, and the inhabitants were friendly and could be counted on to

On 30 October, the Greeks counter-attacked on the Macedonia front, but the Italians resumed their advance in the morning. The 3rd Giulia Division (Alpini) was in four columns of a reenforced regiment each. The division entered the interval between Mt. Goumari and Mt. Smolika, known as the Metsovo Pass. They anticipated no great resistance, and appear to have marched with insufficient security elements. Unexpectedly they received strong artillery and machine gun fire. In the rough mountain territory, with numerous ravines and ridges, it



Pack mules were an important feature of the supply problem during the Balkan War. Here we see an Italian pack train negotiating a winding mountain road in Albania. (Acme Photo.)

cooperate. They had about 15 divisions, as against 9 Italian divisions which included 1 division in reserve.

At 5:30 AM, 28 October, 1940, two and one-half hours after the ultimatum had been delivered at Athens, Italian troops crossed the frontier into Greece. War in the Balkans had started. The Greeks were not surprised, and their advanced units offered stubborn resistance. In Epirus they held the Italians to negligible gains. In Macedonia, where Greek outposts fell back, the Italians made a net advance of about 10 kilometers. Next day the Italians, meeting no great resistance, reached the line: Biklishta (on the road to Phlorina)—Konitsa (incl.)—Argirocastro.

was impossible to locate exactly the source of the hostile fire. Italian artillery promptly went into position. They seemed to have fired at the wrong ridges, being unable to see any targets. There were considerable casualties. The men became confused, not knowing which way to face nor where to go. The troops became mixed and under heavy fire began to fall back.

A troop of Greek cavalry, *mounted on horses*, came across country and attacked the Italian left rear. Notwithstanding the small number of Greeks in this command, the noise caused by their intervention, and the fire of Italian troops directed to their left and rear, gave the impression that the Greeks were surrounding that

locality. The Italian left column, of about 2,000 men, decided that a quick retreat was necessary. They abandoned the guns of their batteries and the heavy infantry weapons, and literally went west.

The three remaining Italian columns held for a time, then retired slightly. They appear to have discovered that other than small detachments there were no Greeks on their left rear.

Late in the afternoon the main Greek forces attacked all along the line. The Italian artillery now could see targets, and put down a very effective fire. The Italians had had time to deploy along a good defensive position. The Greeks threw in their reserves, but the last effort did not get off until after dark, and was stopped like its predecessors.

In this battle the Greeks had 4 British and 16 Greek planes for observation purposes. According to James Aldridge, American war correspondent with the Greek Army, the fighting was severe and the losses on both sides were considerable.

During the action, the Italians on the opposite flank reached the Kalama River, without meeting serious opposition.

Only slight changes occurred on 31 October and 1 November. On the latter date the Greeks made a deep raid on the Phlorina front, taking 162 prisoners, thereby securing considerable information concerning their opponent.

On 2 November, there was only minor fighting along the Phlorina road. In Epirus the Italians in considerable strength and with mechanized troops moved forward. For the first time, Greek antitank artillery went into action. Perhaps the Greek artillery was not very experienced in this type of warfare, for the antitank batteries failed to stop the enemy tanks. The Greeks were so surprised by this unexpected result, that they found it necessary to withdraw rather hastily, abandoning several field depots. This gave the Italians the opportunity to boast of their capture of large, valuable stores. The Italian line moved south several miles, and next day, without serious opposition was at Kalabaka, notwithstanding that these Greek antitank batteries did better by putting nine tanks out of commission. After the Italians had reached their objective, and had had time to prepare their line, the Greeks counter-attacked. As far as can now be ascertained, it came too late, and accomplished nothing.

While the Italians were making progress near the Adriatic, their left flank force was not so well off. Encouraged by their victory at Metsovo Pass on the 30th, the Greeks reorganized and prepared an offensive. The plan was to envelop both Italian flanks by going across supposedly impassable mountains with troops of all arms. It was believed that the Italians would not expect this, and would have no troops available to adequately cover this terrain. On 3 November, two columns moved out. A north

column of motorcyclists and tanks passed south of Lake Prespa. Contrary to expectation it did meet Italians, and had to do some hard fighting. It overcame the opposing force, and by night was in a position to threaten the Italian left. A south column, the composition of which is not yet known, was not seriously opposed and reached around the enemy's right. At nightfall, the Greeks had hopes that the two columns might unite next day in rear of the enemy.

On the 4th, the Greek columns failed to unite. They found it necessary to stop and reorganize, and bring up ammunition and supplies. On the 5th, the Greek attacks were launched. By this time the Italians knew all about the two Greek columns, and met both of them with strong resistance. The north column made no progress. The south column, in a fierce fight, seized some high ground on the extreme Italian right. They also took some prisoners. On the 6th the Greeks, again finding it impracticable to continue the fight, reorganized.

In Epirus, against slight opposition, the Italians reached and crossed the Kalamas River on the 6th.

The Greeks had just about completed their mobilization. They had verified the Italian plan of campaign as two separate advances one east towards Phlorina, and the other south along the Adriatic. The Italian attack on their left flank had already been stopped. The attack in Epirus was still moving south. It was time to start the offensive to pierce the Italian center between his two distant flanks. As a preliminary, Greek advance forces on 6 November heavily attacked toward Konitsa, apparently to obtain ground for the deployment of larger forces. Little or no progress was made toward Konitsa, for the Italians counter-attacked with tanks and strong artillery support. This battle may have enabled the Greeks to assemble new divisions in rear without the Italians becoming aware of this menace to their plan of campaign.

The Italians appear to have failed to note the assembly of Greek troops opposite their center of two divisions covering a wide territory. The opinion was that the Greeks too would only have weak forces in the difficult Pindus Mountains. The Italians were experiencing supply difficulties for their right column and center, owing to lack of roads. As they advanced slowly, labor details built new roads towards the front, and new bridges. These were excellent, but it took time, and the daily advance had been small. The only serious fighting so far had been at Metsovo Pass. GHQ announced from its CP at Tirana that including this battle, the total number of killed, wounded and missing for the first week of the war was 2,103.

On 7 and 8 November, Greek troops, avoiding roads, cautiously crept forward along mountain slopes in the rugged Pindus Mountains. They took advantage of cover of night. The Italians did not notice what was going on.

On 9 November, the Italian 131st Centauri (mechanized)

Division was moving south along the valley of the Viosa River (Aoos River on Greek maps). They followed the snake-like roads. Light scooter tanks and special shock troops formed the spear head. Only observation parties appear to have been up on the high mountain slopes on the flanks. It did not seem possible that these precipitous heights could contain large bodies of men. In rear of the advance other mechanized troops, artillery and infantry in trucks followed. The Centauri Division marched right between mountainous ridges, which the Greeks by this time had reached.

Greek infantry and mountain artillery were along the

the slopes ran into Greek traps and were captured. The remainder, finding the situation hopeless, abandoned their materiel and wounded. They went pell-mell to the rear. Night saved many.

This was the second Italian division to be mauled. The following morning found it in a bad way. The Greeks had closed in, and had extended their movements on the mountain ridges further north than the rear of the Italians. The latter had lost much of their equipment, and had a poor position. The Greeks fully expected that the Italians would surrender, since escape seemed impossible. Greece was jubilant. The Greeks closed in on the helpless



Some of the Greek artillery, along the Greek-Albanian frontier, which inflicted heavy losses on the Italians. (Bosshard from Black Star.)

high ground. Their only transportation was pack animals, and the strong arms of soldiers and natives. At the proper moment the Greeks from the high ground overlooking the Viosa valley poured a plunging artillery and machine-gun fire into the Italians. The surprised Italians had not realized that they had been making a flank march in front of strong enemy forces, both to the right and left. They turned to both sides and opposed their antagonist, concealed high up behind crags, rocks and in timber. The scooter tanks started to climb toward the enemy; the batteries went into action.

Italian resistance was ineffective. The artillery was unable to locate targets accurately. It was difficult to elevate the guns against some suspected enemy locations. Shells which went over the ridge were lost, while Greek shells fired into the valley always seemed to hit something. It was impossible to hide the tanks, batteries and motor vehicles, and they were rapidly put out of action. Many men were killed and wounded. Others who advanced up

Italians, and shelled and machine-gunned them without intermission.

To further complicate the situation for the Italians, the weather turned cold, with snow. The Italians were still in summer uniforms. They could not light fires even when under cover, as this attracted Greek artillery fire. They had to lie under cover, with little food, where they nearly froze. The Italians had, however, rallied, and in spite of their bad position fought back. They received food and ammunition by air, and held on. On their side the Greeks brought up their supplies, up over the tops of the mountains, in deep snow, using pack transportation. The local inhabitants helped. Even the women and children did what they could to bring support to their fighting men.

Mussolini lost no time in expressing his displeasure at the defeats of two of his divisions. The 131st Division was new to Albania, and was mechanized, which was not suitable equipment for that country. The 3rd Division,

had on the contrary been in Albania over a year, was a mountain division, and was supposed to be familiar with the country. Whatever the reasons for the failure of the campaign might be, a change in command was indicated. On 9 November, Mussolini relieved General Jaconimi as C-in-C in Albania, and appointed Lieutenant General Ubaldo Soddu in his place. Soddu was the Assistant Chief of Staff at Rome. He was also Assistant Secretary of War. As assistant chief of staff he obeyed the orders of the Chief of Staff; while at the same time, in his capacity of assistant secretary of war, he issued orders to the same Chief of Staff. This peculiar situation seems to be unique in military history.

Soddu promptly got into a plane and flew to Albania, where he assumed command. He found a difficult situation. There were no troops with proper equipment to meet cross-country enemy advances over the wild mountains of the Pindus range. There was too much mechanized equipment and not enough mountain equipment. There was snow at elevations above 2,000 feet, and all of the new theater of operations was above this altitude. The Italian motorized and mechanized forces, the air force and the artillery, were superior to anything the Greeks had. Had the latter restricted themselves to defending the low valleys, main roads and seacoast, the Italian equipment would have been excellent, and might well have overcome the enemy's superior numbers, now found to be nearly two to one. This superior Greek force advancing between the two Italian main bodies (along snow-covered mountain tops with no transverse roads suitable for moving Italian troops from one flank to another) presented a real problem.

Soddu ordered a counter-attack on his left flank in the Corizza area. Launched late on 11 November, it made some progress. During the ensuing night the Greeks gathered around this Italian force, now in a somewhat advanced position. In the morning the Greeks attacked the Italians from all sides, and according to their statements smashed this enemy offensive, taking 642 prisoners. According to Italian reports, they lost 96 killed and wounded.

While this fight was going on, Soddu made an inspection of the 3rd Giulia Division. Whatever his real opinion may have been, he wired Rome, "I went this morning to visit the Giulia Alpini Division, and must report a magnificent impression was brought back from this superb unit, prouder and stronger than ever." The impression from this report is that the 3d Division had received replacements to fill the vacancies caused by its previous fights. Notwithstanding this, in the next days the division slowly withdrew westwards.

Soddu succeeded in reestablishing order, and opening a line of communications to his troops in the Viosa valley. He withdrew his troops on both flanks and in the center, feeling that it was necessary to reorganize and make a new start later, after his forces more nearly approached the Greeks in numbers.

The Greeks in the Pindus mountains advanced cautiously. They consolidated each gain and opened mountain trails before they made another move forward. The snow, cold and rough country hampered them too, but they made modest advances for several days, without securing any great number of prisoners or booty.

Soddu decided that the two Italian divisions in north Albania could not be safely moved south to support his fighting troops. To do so would make it possible for Yugoslavia to start an invasion in his rear, against all his depots. The home country ordered the XI Corps of 2 divisions to Albania as reinforcements.

RUSSIA SEEKS TO INTERVENE IN THE BALKANS

On 13 November, 1940, Russia's Foreign Commissar Vyachelev Molotov was at Berlin. He had accepted an invitation from his great friend Chancellor Hitler to come and talk things over, as man to man. He was in a receptive and friendly mood, and was received in the same spirit by his German comrades. He held conferences with Hitler and prominent Germans.

Molotov knew all about German and Rumanian troop concentrations along the Russian frontier. Hitler knew all about corresponding Russian concentrations. Neither side wanted to fight the other, they said. This meeting was a showdown to determine whether the conflicting interests which had led to these concentrations could be adjusted without war. Just what did each side want? Both sides were consequently ready to talk.

Molotov was frank. He knew what Russia wanted. He believed that time was on his side. His principal interest was in the Balkans, and he believed that events in that area were moving favorably to Russian interests. As he saw it, Turkey was obviously afraid of Russia, otherwise why would she have expressly stipulated, in her agreement with Great Britain, that her engagements would not apply in case of war with Russia? Bulgaria was known to be largely Pan-Slavic and friendly to the Soviet Union. So was Yugoslavia. Rumania, it was true, inclined towards Germany, while Greece inclined toward the British. Italy had within a week been stopped in her invasion of Greece. Axis influence in the Balkans would seem to be at a rather low point. It looked probable that Russia now had the opportunity for which she had so long waited—the opportunity to obtain her greatest desire. She wanted Istanbul, with the Dardanelles and the Bosphorus—the Straits—to obtain an open port on the Mediterranean.

For this great prize, Russia was willing to fight. But if she had to fight Germany, Molotov's information was that this could not be safely undertaken before 1942, by which time certain military programs in Russia were scheduled for completion. Many things might happen before 1942. Anyway, it might be preferable to avoid a war. Perhaps Hitler might feel the same way about it, since Germany already had a major war on her hands.

So Molotov laid his cards on the table. He thought

he had the trumps. He stated exactly what he wanted for his beloved Russia. First, Rumania and Bulgaria were to pass to Russia's sphere, with the right for her to establish in those countries land, air and sea bases. To a question as to whether this meant incorporation of Bulgaria, for example, with the Soviet, Molotov was not sure. He did not believe it would be necessary to depose the present Bulgarian government. Secondly, Russia considered that free and continuous passage through the Straits at Istanbul was absolutely essential to her future. To assure this, she also desired complete bases on both the Dardanelles and the Bosphorus. With occupation of Rumania and Bulgaria, Russia would have a land line of communication to Istanbul in addition to the sea route.

Molotov stated that if Germany would agree to the Russian demands, peace might continue between them indefinitely. He would much prefer this, as Russia had no wish to fight a major war. All he wanted from Germany was their diplomatic assistance to induce Rumania, Bulgaria and Turkey to surrender peacefully what Russia wanted. If those countries understood that Germany would *not* protect them, it was reasonably certain that Russia would be able to obtain her objective without a war. Incidentally he mentioned that Russia felt threatened by new contemplated aggressions by that contemptible state of Finland. He therefore further desired that Germany make known to that country, also, that no assistance whatever would come from Germany in case Finland went to war with Russia.

According to his own statement Hitler told Molotov that Germany had given Rumania a guarantee. He considered this binding on Germany, should Russia attack Rumania, although he had not given the guarantee with any such idea in mind. He had given no other Balkan guarantee, and had not intended to give any. He had, in fact, made a special effort to avoid Balkan politics, which was none of his business.

Replying to Molotov's proposal to establish Russian bases in Rumania, Bulgaria and on the Straits, this was a new one to him, and he would first have to consult the countries interested and see how they felt about it. He had no objection in principle to modifying present treaty arrangements as to navigation through the Straits in favor of Russia, but he would have to think over the question of establishing Russian bases there. He was not prepared to agree to this now. He disapproved of the proposed war against Finland, telling Molotov that it was ridiculous to claim that that small country was a peril to Russia.

Hitler invited Molotov to have Russia join the Axis. Molotov declined. Russia preferred to stay out of the war, remaining uncommitted to either side. She intended to show no preferences, and would maintain trade relations with all nations.

Hitler then assured Molotov that, although some of his questions could not be answered at once, they would receive full consideration. He expressed pleasure at

Molotov's visit, and the resulting opportunity of talking things over. He would give thorough consideration to Russia's propositions. He would give his conclusions later.

This historic conference had most important results. For Hitler it was a huge success, as he had found out the Russian plan. He had not revealed his own. Molotov went back to Moscow under the impression that he had put something over. Neither his actions nor the Russian diplomatic correspondence following this conference (so far as now known), show that Molotov appreciated that his admissions had placed Russia in a highly dangerous position.

The German estimate of the situation upon Molotov's departure formed the basis for their next move. Russia was out for control of the Balkans, occupation of the Straits, and, as a side line, occupation of Finland. These desires were perfectly understandable, and were in line with Russian history. The important point was that Russia was not ready to fight now, and according to intelligence reports would not be until 1942. In the meantime she desired to play a lone hand, associating herself neither with the British nor with the Axis. She would sell supplies to both sides, in order that the plutocrats (democracies) and the Fascists (Axis) could fight each other to exhaustion. In 1942 she would then be free to join whichever side then seemed preferable.

If Russia prior to 1942 secured peaceful possession of the Straits and occupied Rumania and Bulgaria, and should then decide to war with Germany, possibly allying herself with Great Britain, a powerful and hostile Balkan front against Germany would appear certain. It was quite possible that, if Russian troops marched into the Balkans, Yugoslavia would definitely decide that her interests had better coincide with those of the great Slav nation and that she would prepare to fight against Germany. Of course, Russia was uncommitted, and might join *with* rather than *against* Germany in 1942. But the danger was too great to risk.

It was decided to oppose Russian entry into the Balkans, and since Russia had stated she would if necessary ultimately fight for this, to attack Russia before she was ready. The first mission would be to clear the Balkans of British influence and thereby separate the British from the Russians. The second mission, effective upon completion of the first, would be to overwhelm Russia.

There was no time to lose. Hitler acted instantly—the very day Molotov left. He called the King of Bulgaria to Berlin. Nothing was done about Rumania, as German troops were already in that country and were preparing it for war with Russia in accordance with the prior agreement. King Boris of Bulgaria was Hitler's welcomed guest on 17 November. Hitler explained to him so much of the situation as he thought it wise for the Bulgarians to know. King Boris stated his terms—Bulgaria demanded cession to her of all Greek territory

east of the Struma River. In return for this, and for the cession of Dobruja, already received, Bulgaria would take into consideration an out-and-out alliance with the Axis, and in the meantime promised a benevolent attitude toward the Axis. It was agreed that German troops could enter Bulgaria for operations against Greece. There appears to have been no agreement as to Bulgaria participating in a war against Russia. Hitler accepted the deal. He hustled Boris back to Sofia the same day.

Molotov started his activities in Moscow one day late. Upon arrival he found that the British press had, on 15 November, published the British proposal (of 22 October) inviting Russia to join Great Britain. It was assumed in London that at the Berlin conference Russia would be invited to join the Axis. No rejoicing over such an event having been observed, it seemed likely that Russia had turned down this proposition, and that consequently she was inclining toward the side of the democracies. The press reminded the Reds that the British offer was still open. Molotov paid no attention to this.

He was not, however, inactive. Slow compared to Hitler, he knew he wanted as a first move Russian penetration into the Balkans, involving the blocking of any German advance in that direction. On 18 November he "advised" Yugoslavia against joining the Axis or supporting its policies. As Yugoslavia naturally would need some support, Molotov offered to ship to her arms and munitions via the Danube River route. Germany would not be able to find out much about this. Price and terms were immaterial. Whatever Yugoslavia thought she could pay would be entirely satisfactory.

Yugoslavia accepted the proposition. She took the arms and munitions, and on 22 November announced that should

she receive an invitation to join the Axis she would reject it. With caution she added that her intentions were to maintain an "armed neutrality" in the present war.

Following the same course, Molotov on 22 November "advised" Bulgaria to steer away from the Axis. He was five days too late. Still, Bulgaria was frightened, and the result of the Russian advice was that next day she informed Germany that, while she would stand by her agreement of the 17th, she did not see her way clear at this time to sign a formal alliance.

Hungary and Rumania, being decidedly anti-Russian, and advised of what was pending, signed proffered treaties of alliance with the Axis, respectively on 20 and 23 November.

On 26 November, Great Britain tried her hand at the Balkan puzzle. She invited Bulgaria to remain neutral, promising that if she would only do this, her independence and integrity would be preserved when peace came. This also was too late.

Hitler inquired of his friend Mussolini as to what assistance he needed in Albania. Mussolini wanted none, provided Greece alone fought. The failure of the Italian campaign to date was admitted. With winter coming, it would probably be necessary to wait until spring before the Greeks could be disposed of. However, if the British intervened, German assistance might be needed.

The stage was now set for the German plan of clearing the Balkans as a preliminary to a war with Russia.

EDITOR'S NOTE: In our next issue Col. Lanza will describe the last phases of the war between Greece and Italy, up to the invasion of Yugoslavia and Greece by Germany.

Correction

In preparing the article "Who Shot Polaris?" for publication in the October, 1941, issue, one essential step was omitted through editorial oversight. For the second sentence in the second paragraph, column 2, page 760, the following should be substituted:

Simply note the watch (standard) time of observation counted from the preceding midnight; from the pocket ephemeris (such as that furnished by C. L. Berger & Sons), find the time of last upper culmination of Polaris at the place of observation. The difference between these two times, plus a correction of ten seconds per hour for each hour of difference, is the *hour angle* of Polaris. Enter the chart with this hour angle and project it to the east-west axis, from which the true azimuth is read by inspection.

Table A, referred to on page 761 of the article, is not printed in TM 6-200 but may be found in the pocket ephemeris published by C. L. Berger & Sons, and in similar publications of other instrument makers.



The Air Center-of-Impact

Captain R. H. Adams and Lt. Robert Fullerton, III, Field Artillery

What is a center-of-impact adjustment?

According to FA Book 161, "A center-of-impact adjustment is used for registration when a precision adjustment on an accurately located check point is impracticable either because a suitable check point is not available or because of darkness at the time of registration. Two observers are used; for accurate results, their observing lines should intersect at an angle of 500 mils or more. The position of the piece and of each observer must be plotted accurately on the firing chart. Each observer reports the deviation of each round from a designated reference point, which also must be accurately plotted on the firing chart. The adjustment consists essentially of determining the center of impact of a group of rounds fired with the same data; this center of impact is taken as the position of a check point."

This definition implies the need of two observers, and the question arises, "Can a center-of-impact adjustment be made without the necessity of two observers, and if so, how?"

The answer is that the center-of-impact can be satisfactorily performed during daylight with the aid of a single *air* observer, provided that a gridded K-type photo (single vertical) of the target area is available.

The procedure used in the air center-of-impact adjustment may best be demonstrated by taking an example.

Let us assume that we are using a wide-angle photograph as our firing chart, and that identical gridded K-type photos of the target area are available to the air observer and the battalion fire-direction center. It should be noted that the grid on the K-type photos does not correspond to the grid of the firing chart. The K-type is normally of a larger scale than the firing chart, and an arbitrary grid is used to facilitate designation of targets. This is perhaps the simplest situation, calling for the simplest solution; but the principles used apply essentially to a set-up involving any other type of firing chart, such as

a map or a grid sheet. The only difference is in the methods of restitution and tying-in between the K-type photo and the firing chart.

In our particular situation, a suitable location for the air center-of-impact is selected by the battalion commander or the officer conducting fire, after a study of the firing chart. It will usually be near some prominent terrain feature easily identified on the photo and on the ground in order to facilitate sensing by the air observer. This point is then restituted to the gridded K-type photo, and its approximate coordinates determined.

A message is then sent to the air observer, telling him to prepare to observe a center-of-impact adjustment. The coordinates of the area selected are given to him, referring to the gridded K-type by the serial number corresponding to the K-type photo at the fire-direction center.

When the air observer has identified the area on his photo and on the ground, he reports, "Ready to observe CI."

The fire-direction center now fires one round with data computed from the firing chart to hit in the area selected for the CI. This round will normally be fired by the base piece of the center battery of the battalion.

If the first round falls near the prominent terrain feature, as intended, the air observer calls for three rounds. If, however, the first round falls in a place such that the plot of a center of impact would be difficult, the observer will give a sensing to place the rounds nearer the terrain feature. If he is sure that his sensing will place the next round in a suitable location, he may call for three rounds at that time. If he is not sure of his sensing, he will not call for three rounds until he has had an opportunity to check the accuracy of his sensing by means of the second round. The observer's procedure will depend upon his experience and the distance of the initial round from an identifiable terrain feature.

When the group of three rounds has been fired, the

observer plots its center of impact on his gridded K-type photo by inspection, and reports the coordinates of the plot to the fire-direction center.

The fire-direction center, using these coordinates, plots the point on their identical gridded K-type, and restitutes it to the firing chart. This can be done by inspection in the case of a wide-angle photograph.

The "should hit" data for the plot of the center of impact is now determined from the firing chart. By comparing this with the "did-hit" data with which the three rounds were fired, a *K* and a deflection correction are determined by the usual procedure.

The accuracy and the results of the air center-of-impact adjustment compare favorably with those obtained by the center-of-impact adjustment using ground observation. Furthermore, the air CI obviates the necessity of flank observers and the additional communication which they entail.

The time saved by this method is an additional advantage. If the plane is in the air, the whole adjustment should not take more than eight minutes. Compare this with the time involved in picking flank OP's, sending out observers, establishing communications, determining a suitable reference point, reference angles and sites for the two observers, firing eight or ten rounds in adjustment, computing and

plotting the average deviation sensed by both observers. The time advantage is self-evident.

When would the air center-of-impact adjustment be used? As the tacticians will tell you, that depends on the situation. A little thought will suggest many situations where the air CI will be both feasible and advantageous. A few such possibilities are mentioned below.

Where the terrain or tactical situation is such that ground observation is impossible, or impracticable, an air center-of-impact adjustment facilitates the determination of corrections which could not otherwise be obtained.

In a rapidly moving situation where speed is essential and survey is limited, the air CI permits a prompt registration involving a minimum of time and survey.

Another excellent example demonstrating the efficacy of the air CI is the case where surprise fire is desired on a target outside transfer limits. By firing three or four rounds, the fire-direction center can quickly establish a convenient check point, compute corrections, and transfer fire promptly and accurately to the new target.

The great effectiveness of the air center-of-impact adjustment and air adjustments in general may be anticipated when the Field Artillery has its own pilots and observers in the air, working in close cooperation with its ground units and anticipating their needs and requirements in advance.

Notes on Aiming Circle, M1

For the information of all officers who have been troubled by 100 ~~th~~ errors in deflection caused by reading the left-hand graduation on the plateau scale, instead of the index, the following quotation will be of interest: Par. 10c. of TM 9-2530, an Ordnance publication which has been approved for publication reads in part as follows:

"The plateau scale consists of a quadrant subdivided into 200 mil spaces each halved, one half being plain and the other cross-hatched. This scale is provided primarily for use in conjunction with the Sight, M1901 (French), on the 75-mm. Gun Carriages, M1897 and M1897M1. *The plateau scale can be removed to exposed a plain index engraved on the body casting. . . .*"

The italics are our own. It is recommended that any unit not armed with guns equipped with Sight, M1901 (French) remove the plateau scale from the aiming circle to eliminate confusion in making readings.

How The Poles Fought in France

Part II

Conclusion

In Part I, Col. Onacewicz told how the Polish contingent was organized in France, and how it occupied a sector in defense of the Maginot Line in the Saar sector. In this issue he concludes this fragment of current history by describing the actions of the 1st Polish Division during the withdrawal actions during June, 1940.



Polish light battery in France

The 1st Polish Division, deprived temporarily of its artillery, was located on the 10th of June south of the general line: St. Lening-Domfessel. Its mission was to hold a front of about sixteen miles in case the enemy should break through the Maginot Line. At this line our infantry found a half-finished antitank ditch and about twenty shelters under construction.

During the night of the 12th and 13th of June the division actually occupied a slightly shorter front of about ten miles, from Leming to Altviller (excl.). On the 15th, the Division got back its artillery and other units except its divisional antitank battery. This was assigned by the commander of the XX French Corps to the 52d French Division and never got back to us.

From the 15th to the 21st of June the 1st Polish Division, as part of the XX French Corps, fought a series of very hard withdrawal actions as a unit of the Army of Lorraine. This Army had been virtually encircled by the enemy since the 16th, when the German motorized army occupied Dijon and Epinal.

At the end of this fight, the German pincers closed around the XX Corps. On the 21st of June the French Army, with the

By Col. Włodzimierz Onacewicz, of the Polish Army

exception of Polish divisions, capitulated.

I shall give a concise record of these withdrawal fights.

THE 15TH OF JUNE (MAP 2)

At dawn the Division occupied a defensive front from Leming to Altviller (excl.). Our outposts along the dammed-up river Albe consisted of the divisional motorized reconnaissance group and advanced elements of the 2d Infantry Regiment. On our left was the 52d French Infantry Division; on the right were French fortress battalions under Col. Dagnan.

The divisional artillery formed two mixed groupments: the eastern (which I commanded) consisted of one battalion of 155's and two battalions of 75's, while the western consisted of one battalion of 155's and one battalion of 75's. Moreover, a French groupment under Col. Bourgeois (two battalions of 105-mm. guns) was put at the disposal of our division.



Map No. 2

The enemy had occupied the Maginot Line since dawn and had pushed back the French contact troops. Our artillery delayed the enemy advance by a dense fire on well-known roads, woods and the approaches of the Albe. The Germans soon made contact with our outposts along the Albe and, supported by a strong artillery fire, attacked them. Our outposts withdrew slowly to the main defensive line.

At ten o'clock the enemy launched an attack by one regiment on the position of our First Infantry, along the front Vittersbourg-Altville. This attack broke down under our infantry and artillery fire. Later in the day, the enemy renewed his attacks on the whole front of our division, with the strong support of artillery and bombers; but all the attacks were invariably stopped by our fire.

losses and the lack of resupply.

If the Germans did not obtain any success on our front, the situation of our western neighbor, the 52d French Division, was different. This unit did not resist the German attack and thereby uncovered our left wing.

The failure of this 52d Division was fatal to our divisional antitank battery, which had been temporarily attached to it. Contrary to common sense, our battery, horse-drawn and armed with 47-mm. antitank guns weighing 2,000 pounds each, was put (by the French) into the foremost infantry lines. The reasonable mission of these guns would have been to bar the way to enemy tanks *within* the defensive position.

³Their wave length was too short and power too low.—Editor.

I must draw attention to the fact that the artillery-infantry collaboration was extremely difficult owing to the lack of means of communication. As a consequence of belated orders for retreat, the necessity for firing up to the last moment, and the destruction caused by enemy fire, we lost the greater part of our wires, and on the 15th had just enough for the internal communications of the groupment. We had no wire for the long lines to our forward observers in the first infantry lines, and our few wireless sets could not penetrate the woods.³ Our forward observers gave proof of an inspired initiative and great energy when they used the infantry's lines, or set the radios in the open with linkage through the woods by messenger or telephone. They always directed our fire where it was needed. This desperate situation concerning our means of communication grew worse every day, on account of the inevitable

After the French had fallen back, the brave battery commander, who could not withdraw his guns, fired his armor-piercing shells at the German infantry up to two AM and, according to a few gunners who escaped, perished with most of his battery and twenty French infantrymen. Later we got three other antitank guns which we organized into a new small battery.

Our division received orders to withdraw to a new position at dusk, but just at nine o'clock the Germans attacked again at Vittersburg and engaged one of our infantry battalions. The battalion counterattacked energetically, repulsed the Germans, and withdrew in good order after a slight delay.

Our division disengaged itself from the enemy, leaving a covering shell, and marched during the night over badly congested roads to its new position near Maizieres-Dieuze. The losses of the division on this day were 5% of its effectives.

THE 16TH OF JUNE (MAP 3)

At dawn on June 16th, the main body of the 1st Division occupied a new defensive position on the general line which extended along the northern border of the forest south of Dieuze and Assenoncourt, up to Azoudange inclusive. The main body was protected by two rear guards: No. 1 was composed of the 1st Infantry (less one battalion) and one battalion of 75's less one battery. It operated in the direction: Munster-Bisping-Azoudange. No. 2 was composed of one battalion of the 2d Infantry

with one battery of 75's operating in the direction of Marimont-Dieuze. This rear guard was supported by the divisional reconnaissance group.

Both rear guards occupied at first the general line: Marimont-Ginseling-Lostruff-Loudrefing. At dawn they were attacked by motorized German infantry supported by tanks. They repelled the attacks until noon. Our French neighbors on both our wings fell back very early without informing us. Our rear guards started to withdraw in the afternoon, still continuing the assigned delaying action. Rear guard No. 1 (1st Infantry) went through a particularly hard fight, and I would like to give some details of it.

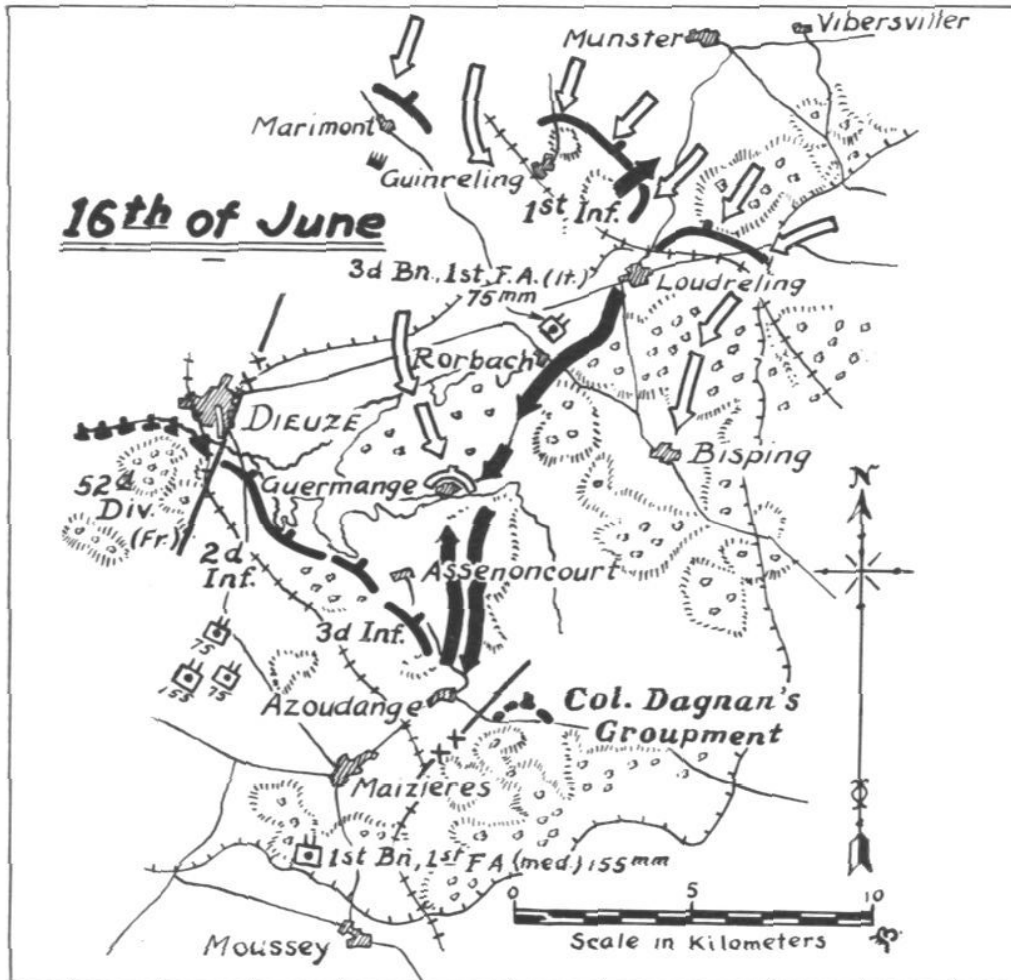
The 2d Battalion of this regiment was attacked first at daybreak, in the woods of Ginseling. It repelled this first frontal attack with bayonets, took two German antitank guns, and inflicted heavy losses on the enemy. Between seven and eight o'clock the enemy launched a new attack with a whole regiment against this battalion. This time the enemy combined a frontal attack with an outflanking attack from the west, after having pushed down rear guard No. 2 from Marimont. The fight was undecided until noon.

At the same time, the enemy attacked the 1st Battalion of the 1st Infantry in Loudrefing and tried to outflank it from the east. The attack was repelled after heavy fighting.

About twelve o'clock, the commander of the rear guard, pressed at the front and threatened on both wings, decided to fall back towards the region of Guermange-Desseling. When he came to this region, he



Part of the 1st Division's Motorized Reconnaissance Battalion



Map No. 3

found it already occupied by the enemy, who tried to cut off the regiment from the division.

Owing to this situation, new hard fighting began; and the divisional reconnaissance group was sent to the rescue. The rear guard forced its way to the division, but at the price of heavy losses; during this day the 1st Battalion lost 70%, and the 2d about 50% of its effectives! The artillery lost some men but saved all the guns.

German prisoners, among them an officer with a map showing the direction of the attacks, stated that our division was attacked by two German divisions — the 60th and 75th Divisions!

In the afternoon the enemy made contact with our main defensive line and launched some attacks in order to reconnoiter it. All these attacks were stopped by fire.

About noon, the Germans sent us a major as *parlementaire*, who asked for the evacuation of the civilian population, but also urged us to cease the fight, as we were already encircled by the enemy. We sent him to the XX Corps and then to the Army Command and, after his return, sent him back to the Germans. The losses of the division up to the 16th amounted to 15%.

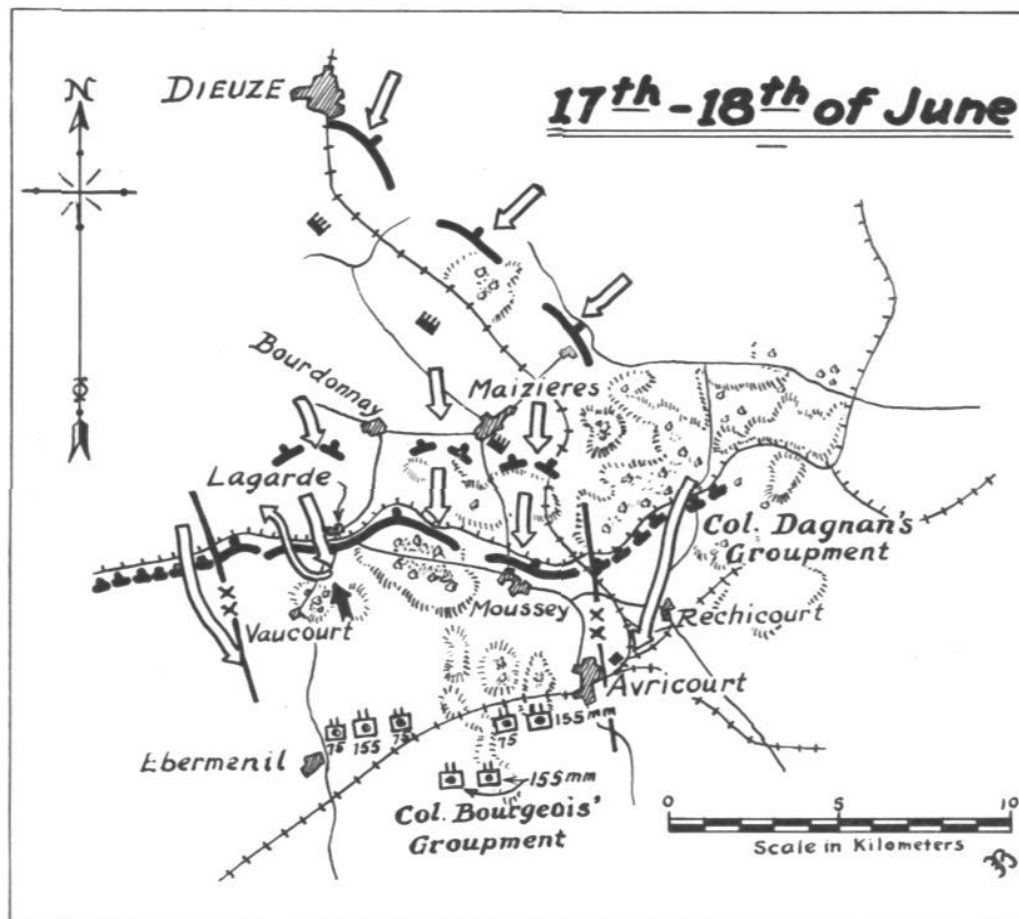
From a tactical point of view, this day demonstrated how dangerous it is to detail isolated infantry detachments as rear or advance guards when you face motorized infantry supported by tanks. Such detachments always run the risk of being outflanked and cut off from the main body, and if they succeed in getting through the enemy pincers, it is at great and useless cost. The rear guards should be composed exclusively of motorized and armored troops capable of swift withdrawal to a new delaying position whenever endangered by outflanking.

The French tactics were obsolete and were imposed, against his better judgment, on the commander of the 1st Polish Division, who had formerly commanded a division in the Polish Campaign against the

same enemy in the autumn of 1939.

THE 17TH OF JUNE (MAP 4)

According to the orders of the XX Corps, the 1st Division had to leave part of its forces at the defensive position of the 16th and to move (during the night of the 16-17) its main body behind the Marne-Rhein Canal in order to prepare a new defensive position along the canal. The commander of the 1st Division tried to induce the French command to change this order, by which our forces would be divided and one part isolated some 6-10 miles away and again exposed, out of supporting distance, to the enemy blows. Our commander proposed to locate strong outposts about two miles north of the canal on the northern border of the woods. But the commander of the XX Corps refused to change his decision, despite the costly experience with the rear guards on the previous day. Thus the 1st Division left three battalions with three field batteries at the Dieuse-Asoudange position, namely; one battalion south of Dieuse, one south of Tarquimpol, and one near Asoudange. The main body of the division moved south of the canal.



Map No. 4

Already at dawn the enemy had attacked our advanced battalions. At five AM, the enemy attacked in force our eastern advanced battalion and the eastern French neighbor, and captured the woods of Assoudange. Our counterattack stopped the enemy's advance, but the general pressure was very strong and our advanced battalions at Assoudange and Tarquimpol withdrew slowly toward Maizieres and then to the woods north of the canal. They held the woods until night, but suffered losses. Our French neighbor on the west, an advanced battalion of the 52d Division, withdrew at three AM without informing us of its move.

Our advanced battalion at Dieuse had suffered heavy losses from artillery fire during the night of the 16th-17th. Then at 11 AM it was attacked simultaneously by strong forces from the north and from the rear, owing to the early French withdrawal. Suffering heavy losses, it fell back towards the woods south of Lagarde, where the remainder was encircled. Very few soldiers of this battalion succeeded in escaping to the canal. The battalion was annihilated.

In the afternoon, a strong enemy attack supported by dense artillery fire was launched against the western wing

of the main defensive position at the canal. After some time it succeeded in breaking into the position. Our 2d Infantry maintained with the utmost effort the hill south of Vaucourt and prevented the enemy from widening the breach. The moment was critical. Our whole defensive position was endangered.

The commander of the 1st Division gathered all his reserves: the divisional reconnaissance group, two infantry battalions, and a French tank company, and launched a counterattack which he commanded personally. By nine PM the enemy had been ejected from behind the canal with heavy losses and the defensive line was re-established.

Prisoners taken belonged to two German divisions: the 75th and the 282d.

This day we listened in on the radio to the historic speech of Marshal Petain who announced that France had asked for an armistice. This news came like a thunderbolt to us. It was a complete surprise because at the front we knew very little about the general French defeat.

This news was the final blow to the morale of the French soldier, who now hoped only to see the war ended soon and was no longer willing to risk his life. A poisonous German propaganda, which worked mostly by means of leaflets thrown from planes, prepared and deepened the demoralization of the French Army.

THE 18TH OF JUNE (MAP 4)

During this day, the 1st Polish Division continued to defend the canal position. The terrain was unfavorable to the defense. It rose continuously towards the south and was exposed to enemy observation. The only possible area for the artillery positions was a wooded spot west of Avrıcourt, but it was very small and the batteries were dangerously crowded. A wooded area north of the canal offered the enemy an easy approach to the canal.

Early in the morning the enemy attack started on the whole division front. The enemy tried again to crush our left wing in the Lagarde direction, but was beaten off by several counterattacks.

About one PM, the enemy succeeded in breaking the French defense on both our wings: On our eastern wing, the Germans crossed the canal in the direction of Rechicourt. The French withdrew towards Avricourt and thus endangered our eastern flank battalion, which had to withdraw its right wing and counterattack several times. On our western flank, the Germans entered the Forêt de Parroy in the sector of the French 52d Division, attacked our western battalion and took a small wood north of Vaucourt.

The 1st Division was now threatened by an out-flanking maneuver on both its flanks. It made the utmost effort to maintain its position until darkness, since it had already received an order to fall back to a new position. All the reserves, namely, the divisional reconnaissance group and the 1st Infantry, entered the line. Finally the division maintained itself until night and then withdrew towards the south, though some of its units had to force their way *through* the German lines.

It had been a hard day for the infantry as well as for the artillery. On the western flank, some of our batteries had to fire at the enemy tanks and infantry at a range of 500 yards. The guns protected the infantry until the last moment and then were withdrawn. The commander of the artillery regiment withdrew with his last battery.

The Eastern Groupment also had its good moments. By a heavy and repeated concentration of four groups (two Polish and two French) on the woods north of the canal, it stopped an imminent German attack and apparently inflicted such losses on the enemy that he was silenced for several hours and never tried to attack again on this part of the front. This groupment had the unique luck to shoot down by its machine-guns a German plane. At the end of the day and under the fire of enemy machine guns it withdrew its batteries without losses, but the groupment command post suffered this day serious losses in men and material from German artillery fire.

The two French groups under Colonel Bourgeois collaborated with us during these two days and rendered us excellent services.

We caught on the wireless General Sikorski's message to the Polish units, ordering them to withdraw to southern France and join the rest of the Polish Army, which about this time was being evacuated to Great Britain. Since the French had asked for armistice, we had no more to do in France. Our place was with Great Britain, who continued to fight Germany.

On the other hand, we were engaged in a battle. If we would withdraw from the battle line, the French would accuse us of treachery and would probably attribute their defeat to our withdrawal. *The honor of the Polish Army was at stake.*

After having taken this situation into account, the commander of the 1st Polish Division decided to fight as long as the French would fight. The commanders of the



Polish infantry in France

regiments supported him in his decision. Later, General Sikorski approved this decision.

THE 19TH OF JUNE (MAP 5)

In consideration of heavy losses (about 35%) and the weariness of the 1st Division, the French command granted it one day of rest, except for the artillery and the reconnaissance group, which should continue to fight in support of French units on the line Luneville-Avrincourt. Our infantry was directed to the wooded area south of Merviller.

The actual effectives of the 1st Division were now the

following: *Infantry*: 1st Infantry Regiment — about 2 battalions; 2d Infantry Regiment—about 1½ battalions; 3d Infantry Regiment—about 3 incomplete battalions; *Artillery*: 75-mm., 2 groups in fighting condition, 1 nearly annihilated; 155-mm., 1 group in fighting condition, 1 nearly annihilated. Moreover, the artillery was almost entirely deprived of means of communication. The whole division had been badly supplied and lacked ammunition (especially for 155-mm. howitzers), as well as food and forage.

The enemy pierced the French defenses early in the morning and smashed the 52d French Division, formerly our western neighbor.

The commander of the XX Corps, having no reserves available, appealed to the 1st Division. He assigned it at eleven AM a new defensive line facing northwest: hill 328 north of Baccarat-Merviller-hill north of Merviller. Our infantry, which had not yet gathered in the area assigned for rest, began to organize a new position and came in touch with the troops of Colonel Dagnan on our northern wing.

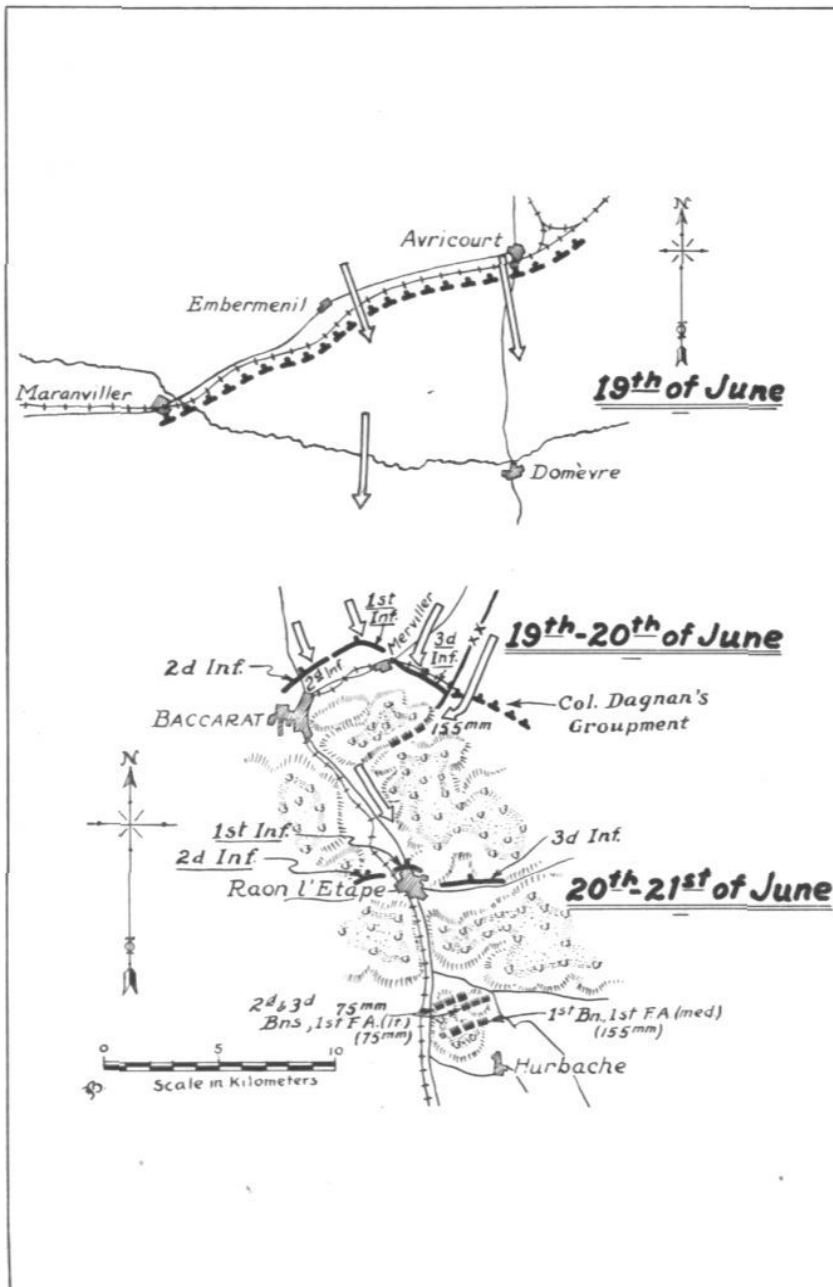
Before the fall of night the enemy patrols reached our new position and tried an attack in the direction of Baccarat, but were repelled.

THE 20TH OF JUNE (MAP 5)

Dawn found the 1st Division on the same line. It had only 4 batteries of 155's; the rest of its artillery was still with the French units. The southern flank of the division was uncovered; the northern was connected with the troops of Colonel Dagnan.

Early in the morning, the enemy infantry, which had been rapidly transported forward by motor vehicles, attacked our position supported by artillery fire. The enemy had no success. At noon, a strong attack was launched against our northern wing and our northern neighbor. The French troops yielded and uncovered our flank.

In accordance with the orders of the XX Corps, the 1st Division fell back to the new position near Raon l'Etape astride the river Meurthe. The withdrawal was protected by the reconnaissance group and one infantry company along the Baccarat - Raon l'Etape road. In Baccarat, civilians shot at our rear company and inflicted heavy losses on it. The division was so tired by daily fighting



Map No. 5

and nightly marches that the French command decided to give it some rest. The 1st Infantry was relieved during the night; the two other regiments were to be relieved in the morning.

During the night of 20-21 June the commander of the 1st Division summoned all the colonels to the divisional headquarters and explained the actual situation. We were encircled on all sides; the French troops were not reliable; a general French capitulation seemed imminent. *He decided not to surrender with the French*, but in case of a capitulation to

destroy the arms, to disperse his division by small groups, and to try to get through the German lines, taking advantage of the Vosges mountains and forests. A prearranged signal would be given to carry this order into execution. We all agreed with the decision of the General.



Part of the French Army that crossed the border into Switzerland in the final days of the Battle of France. Some 50,000 French troops, most of them from the Maginot Line, were interned.

The same day, a French colonel informed the commander of the 1st Division that the whole division was cited for bravery in the order of the XX Corps.

THE 21ST OF JUNE



Poland still resists! After the fall of France hundreds of Polish volunteers joined the British. Here are a few of the Polish boys who are with the British in Palestine.

Our two infantry regiments maintained the same position. They were supported by three battalions of artillery. At dawn our infantry found out that the French unit, which had relieved our 1st Infantry in the evening, had withdrawn without fighting, and had left a gap between our regiments. A battalion of the 1st Infantry was quickly dispatched to fill this gap.

The 1st Polish Division stayed alone on the position. The northern French neighbor disappeared, the southern flank had been uncovered for two days. Unarmed French troops were walking along the roads to the south and were urging our soldiers to surrender. At this moment,

at nine AM, the commander of the 1st Division gave the prearranged signal. The division destroyed its arms in a few hours and disappeared in the forests. During the night small individual groups tried to crawl through the German lines. Many succeeded and after a perilous march of about 300 miles through the enemy occupied area, reached unoccupied France.

Our soldiers thought they were at last safe and could leave France to join the Polish Army in Great Britain. But they were bitterly deceived, when they found out that the Vichy Government took all measures to prevent them from leaving France. The Vichy Government, headed by two soldiers—Marshal Petain and Admiral Darlan—interned these Polish soldiers, who had come to France freely and had shed their blood so generously for that country. The Vichy Government even put into a penal camp for international communists seven Polish officers who tried to escape in a small boat through the Mediterranean. I leave judgment on these dismal facts to my readers.

Despite all these precautions of the French authorities and thanks to some brave Frenchmen, a few of us succeeded in escaping France by most fantastic means and ways which cannot be yet disclosed.*

CONCLUSION

We can draw some general conclusions from this historic episode:

1. *Modern infantry must be motorized.* This was an encounter of an old-fashioned infantry division with horse-drawn artillery, very few antitank guns (1 per battalion), deprived of any support of aircraft, fighting against modern motorized German infantry lavishly equipped with antitank weapons, supported by tanks, motorized artillery and powerful aircraft. No armored divisions took part in this encounter.

The advantage possessed by the motorized infantry was obvious. Our division had no respite in the withdrawal fights. After exhausting night marches, we had to fight at daybreak an enemy transported quickly by trucks and supported by motorized artillery and all other necessary weapons.

It is true that the 1st Division maintained all its positions and never withdrew without a formal order from the XX Army Corps, but at what cost! After a campaign of one week, it had lost 45% of its effectives. The French could

*Two more Polish units were engaged in the Eastern part of France: the 2d Polish Division commanded by Major-General Prugar-Ketling and a small armored brigade commanded by Major General Maczek.

The capitulation of France found the 2d Polish Division not very far from the Swiss frontier, so Gen. Prugar-Ketling fought his way through the German troops and brought his division (and the commander of the French Army Corps) to Switzerland, where it is interned. Gen. Maczek, who was protecting the retreat of the VII French Army Corps from Epervain to the area of Dijon, found himself finally in a situation similar to that of the 1st Polish Division; he also destroyed what was left of his tanks; and tried to pass through the German Army to unoccupied France.

The 3d and 4th Polish Divisions were in Brittany waiting for armament and could have been evacuated to Great Britain.

not stand this pace of operations.

It is necessary to state that the attacking Germans also suffered heavy losses, probably heavier than we. All prisoners admitted it and were extremely weary; one wounded company commander, whom we captured, told us that in five days of fighting with the Poles he had 7 men left of his company.

2. *Advance and rear guards must consist of mobile units.* In front of a motorized enemy, it is inadmissible to leave behind or to advance forward isolated infantry detachments (rear or advance guards), for they will run the risk of being cut off and destroyed. Advance or rear guards must consist of motorized units, tanks, armored cars and antitank weapons. They must possess a sufficient striking force and must be capable of swift reconnaissance and of swift withdrawal to new positions.

3. *The defense must be organized in depth.* A thin defensive line, as used by the French Army of Lorraine in its withdrawal operation, is particularly dangerous in front of a motorized enemy, who can easily concentrate a strong offensive force for the attack in a selected direction.

The defense must be rather concentrated and deep, and be protected by a natural or artificial antitank obstacle.

4. *Artillery.*

a. Only direct antitank gunfire is really efficient against tanks. It is necessary to have antitank guns of two calibers—37-mm. in the first infantry lines and 57-mm. (six-pounder) in the second. The 57-mm. are absolutely necessary against medium tanks. A division should have about 100 antitank guns and about the same number in reserve not far from the front, for a quick replacement of losses.

The efficiency of the indirect fire of the divisional artillery is limited. It has chiefly a moral effect and must be applied by heavy concentrations.

b. In every operation, except pursuit, the divisional artillery should form, together with infantry units, a strong barrier in the depth of the area along some important direction. This artillery must have a sufficient field of fire (500-1,000 yards) for direct antitank shooting.

c. The artillery must be motorized, in order to be capable of long and swift marches and of swift change of position. Motorized artillery is less vulnerable to bombardment.

d. The artillery observation and communications are two capital points.

Although most artillery fire is prepared on unseen targets, the artillery must have an observation network and a liaison with infantry as good as possible. The reason is that observed fire upon an observed enemy is immensely more efficient and that, in a critical moment, one has no time to prepare one's fire—one must strike immediately or it is too late.

Observation and artillery liaison require good communications. The only reliable means of communication

with forward observers is the wireless, and it should be today the basic means of communication. The telephone is good chiefly for the rear communications. On a prepared position the telephone is still very important, but the cable must be underground.

e. A division must have its own AA artillery.

5. *The importance of trained cadres for a swift organization of an army.* The organization of the Polish Army in France demonstrated that it is possible to form good fighting divisions in 4-5 months, if good cadres are available. I must stress that in our Army in France we had about 50% regular officers and 20% regular noncommissioned officers. The rest were reserve officers and noncommissioned officers. The enlisted men were nearly all absolutely untrained at the beginning.

6. *The legend of an invincible German Army is unfounded.* Finally, I would like to express my profound conviction that the legend of the invincible German Army is unfounded. Despite our poor armament, all counterattacks by our division were successful; the Germans did not resist them. That is the opinion of all the Polish commanders who took part in this war and in the last one, that the average German infantry soldier is today not as good as he used to be in the last war.

Germany owes all her victories to a tremendous superiority of material and to the obsolete armament and tactics of her adversaries. She already has been defeated in the air over London in September, 1940, when she met well-armed and determined airfighters, and that despite her great numerical superiority. She certainly can be defeated on land when she loses the superiority of her armament.

Proposed Amendments to the Constitution, U.S.F.A. Association:

TO THE SECRETARY, UNITED STATES FIELD ARTILLERY ASSOCIATION, WASHINGTON, D. C.

1. *Amendment to the Constitution.* The committee appointed by the President at the annual meeting December 16, 1940, proposes that the Constitution of the United States Field Artillery Association be amended as follows: (suggested changes are italicized)

ARTICLE V. Combine sections 3 and 4 to read: *Active and associate members shall be entitled to receive the JOURNAL without payment other than the annual dues.*

ARTICLE VI, Section 1—The Executive Council shall be composed of nine active members, five of whom shall be officers of the regular army, two officers of the *National Guard* and two officers of the Field Artillery Section of the Officers' Reserve Corps, to be elected biennially for a term of two years by a majority vote; *such majority vote to consist of a majority of active officers present or represented by written proxies at a meeting of the Association.* The Council shall hold its meetings at the headquarters of the Association, which shall be in the city of Washington.

ARTICLE VII, Section 1—The regular meetings of the Association shall be held annually at Washington, D. C., or at such other place as may be designated by the Executive Council, who shall also prescribe the time of meeting and *give at least thirty days' notice of same, by publication in THE FIELD ARTILLERY JOURNAL or by such other means as the Council may prescribe.*

ARTICLE VII, section 3—Special meetings may be called by the Executive Council, upon written request therefor signed by twenty members. At least thirty days' notice thereof shall be given in THE FIELD ARTILLERY JOURNAL, or by mail, to active members. The object of the meeting shall be stated in the request and in the notice.

ARTICLE VII, Section 4—*The number of active members present at a meeting or represented thereat by written proxies, shall constitute a quorum, except as provided in Article IX.*

2. *Reasons for the amendments.*

a. Sections 3 and 4 of Article V should be combined as indicated to permit the Association to augment its income by publishing books or pamphlets (if so desired) for profit.

b. The reasons for the other changes are as follows:

(1) It has now become practically impossible to obtain a quorum, which, according to the Constitution as now written, must consist of fifty per cent (by proxy) of all active members in the United States. This failure to secure a quorum arises because erroneous mailing addresses or frequent changes in address prevent proxy cards from reaching many members; and also because many members fail to return signed proxies.

(2) The proposed changes will obviate the necessity for sending out proxy cards. This will save the Association \$100 (or more) annually. No member who desires to vote will be deprived of his vote; he still will receive due and timely notice in the JOURNAL, and will still have the privilege of sending in his proxy if he so desires.

(3) In effect, and in brief, the changes will merely mean that all members and proxies on hand at a meeting will be counted, and a majority of this count will constitute a majority vote.

(4) There is no change in the authority of the Council, which will still continue to administer the affairs of the Association as in the past.

3. In accordance with Article IX of the Constitution, we (members whose signatures are appended below) accept the report of the committee, and propose that the foregoing amendments be made to the Constitution.

R. M. Danford; W. C. Potter; I. T. Wyche; Thomas North; J. V. Phelps; M. McClure; Rex Chandler; J. A. Stewart; J. F. Uncles; Rex W. Beasley; Stuart L. Cowles; John B. Anderson; David S. Rumbough; J. A. Lester; L. M. Riley; H. E. Maguire; Townsend Heard; B. M. Sawbridge; C. G. Helmick; I. Spalding; B. M. Bryan; A. W. Waldron; J. W. Mackelvie; A. F. Kibler; I. L. Foster; A. C. McAuliffe; F. A. Henning; John H. Hinds; L. Whitlock.

THE MAN WHO KEEPS THEM SHOOTING



Should the battery mechanic merely be a man who puts up pantry shelves and daubs paint?

By Lt. Col. John P. Eckert, FA

Many elements contribute to victory on the field of battle. In presenting a formula for success, the military writer emphasizes this or that factor, according to his particular interest or enthusiasm at the moment. Among the subjects enjoying a plentiful share of attention are leadership, staff and supply organization, teamwork, mobility, communications, training, and morale. Certainly each pulls a strong oar. Nevertheless, it is true that an excellence achieved in all such matters is not sufficient to vanquish a foe who is ready and willing to fight. The influences mentioned, however admirable, serve only to set up a favorable situation for the real issue-decider. On land, on sea, and in the air, fire superiority is the ultimate arbiter. Its attainment depends upon the intelligent use of more and better guns and ammunition than the enemy can assemble. The German breakthrough at Sedan, one of the greatest tactical surprises in history, was not accomplished merely by the advance of tanks at an unsuspected place. They arrived *shooting*.

Not the least among the elements that sustain fire power is an efficient system of repairing and replacing weapons in battle. The first army ever mustered had its maintenance problem. In the course of centuries, as engines of war developed in complexity, the difficulty magnified. Two distinct solutions have evolved. By one scheme, which may be called centralized, all repairs are made by non-combatant specialists in traveling shops. In the other, or decentralized system, a rough and ready service is performed by soldier-mechanics of the front line combat units, leaving heavy machine work to immobile or semi-mobile agencies in the rear. A compromise between these extremes has usually been in effect in the field artillery.

The United States Army has been profoundly influenced by French and German military doctrine and

technique, but our basic organization, military law, tactics and technique were derived from the British. A study of the history of the Royal Artillery shows that in the matter of repairs of materiel the decentralized system has been favored. In the British service, in addition to the "matrosses" of old and the "bombardiers" of today, there have been individuals known as

"artificers," who by virtue of training and special tools were capable of making repairs and adjustments. The junior grade of these soldier-craftsmen was usually rated between sergeant and corporal; the more experienced were able to attain the highest non-commissioned and warrant grades. Those engaged in weapon repair were variously known as armament artificers, armourers, machinists, mechanics, jobbing-smiths, and fitters. For example, the British light battery of 1898 included five artificers, of whom one was a machinist whose duty it was "to be conversant with the construction and mechanism of the gun, and competent to make the ordinary repairs it may require." In 1918 the British 6-inch howitzer battery included four artificers, listed as one fitter staff-sergeant, two smiths, and a wheeler. The fitter staff-sergeant seems to have had a position corresponding to that of our former chief mechanic.

In the artillery of the American revolutionary army there were many craftsmen. Pay tables show that they received a higher compensation than duty sergeants. The British names of armourer and artificer had been retained. In 1820, General Lallemand, in his *Treatise on Artillery*, recommended for the American foot regiment a "minor regimental staff" consisting of a master artificer, a master armourer, a master wheelwright, and a master smith, whose duty it seems to have been to operate a regimental repair shop as well as supervise the work of the company craftsmen.

Military problems have a habit of recurring. The tendency in times of peace for the artillery to rely too much upon the fixed ordnance repair shops is commented upon in the *History of the Royal Artillery*. Concerning the period 1899-1914, this statement is found: "As rifled guns came in, they required more attention, and an 'armament artificer' belonging to the Army Ordnance Corps was attached to each brigade. . . . Wheelers were replaced by fitters because of the substitution of metal for wood. . . . The increased complexity of the equipments and the insistence on accurate adjustment of the various gears, led in some cases to a tendency to leave such work to inspectors of ordnance machinery and armament artificers. Steps were taken to impress upon regimental officers their responsibility in such matters, and to provide them with the means of carrying out their duty. . . . The taking over of artificers by the Ordnance had been protested by the Royal Artillery, and their return to the regiment recommended."

What method is employed by the present German army is not known, but the old Imperial Army seems to have followed a system similar to the British, with perhaps a little more leaning toward centralization. In 1876 a company of foot artillery included three "tradesmen" or artisans. In 1888, the same type of unit is found to have one or two sergeant-major artificers (oberfeuer-werker), and three or four sergeant-artificers (feuer-werker), in addition to the normal complement of sergeants and corporals.

A modified decentralized method of making repairs and replacements was adhered to in the American A.E.F. in World War I. The division ordnance company would have been swamped had it attempted a peacetime maintenance. The light horse-drawn battery in 1918 was allotted three mechanics (assistants) and one chief mechanic. The regimental headquarters company had two mechanics, the supply company, one. That at least one expert gun technician was indispensable in the firing battery will be attested by every artilleryman with front line experience. Lt. L. E. Reigner, in *THE FIELD ARTILLERY JOURNAL* of April-June, 1919, listed ten cardinal lessons learned by him in action with a battery of 155-mm. howitzers. One of these lessons was: "A chief mechanic who knows his job is worth his weight in gold." The writer, whose own war service was with a battery of French 75's, remembers that the same was true in the light artillery; this despite the fact that the soixante-quinze was as near to being a fool-proof machine as has ever been designed. The chief mechanic was the executive's right-hand man — almost a privileged character. He watched over the mechanical functioning of the pieces with an eagle eye, and the chief of section who ran afoul of him in questions of care and maintenance usually came off second best. He was a one-man ordnance department on the spot; in a literal sense the man who kept 'em shooting.

Let us see what has happened to our hero during these twenty-three piping years of peace. His decline began on November 11, 1918, at eleven o'clock in the morning. After the armistice most of the veteran chief mechanics, who were expert machinists, were demobilized and went back to civil life. At the few posts where a considerable amount of firing was continued, such as Ft. Sill and Ft. Bragg, there was always a well equipped and well staffed ordnance establishment to keep the materiel in repair and adjustment. Other types of battery specialists had to be kept efficient, but not a gun mechanic. In the most realistic maneuvers it is impossible to reproduce the firing of the pieces twenty-four hours a day, for weeks on end, without benefit of ordnance. The chief mechanic soon fell from his high estate, and became a battery jack-of-all-jobs, principally concerned with butchering wood and daubing paint. In many organizations he was never permitted to lay hands on a gun. Simple disassemblies and adjustments, in fact even the filling and draining of recoil mechanisms and the alinement of sights, became great mysteries, understood only by civilian technicians. At the Field Artillery School in the period just prior to the present emergency, only 16 battery mechanics were trained a year. Nearly all of these were detailed from units stationed at Ft. Sill, and were returned thereto. A battery commander, in any batch of recruits, could find a passable carpenter or painter. The ordnance people took good care of his guns, and if nobody else tinkered with them there was less chance of getting skinned at the annual inspection. It was inevitable that, having little or no function with anything vital to tactical peacetime efficiency, our chief mechanic went down the scale of rating and prestige. In 1938 he was a specialist 4th class, and his assistant had only a 6th class rating. In 1940 he was stripped of even the empty honor of the appellation "chief."

About two years ago, things began to look up a little. The specialist rating of both the battery mechanics was raised one grade. When the present emergency began, the battery mechanics' course at Ft. Sill increased its output from 16 per year to 67 per month, and National Guard units began to send men. A training battery for mechanics was made a part of each of the three Field Artillery Replacement Training Centers. These agencies will eventually supply the necessary number of mechanics, but as yet there remains much to be improved in the selection of the right type of men to attend these schools, and in their distribution and proper use after graduation.

After twenty-three years we are again faced with a situation in which we may be called upon to serve our pieces twenty-four hours a day. In October, 1941, there are over 1,600 batteries of all types in the field artillery. Since the expansion, the Field Artillery School has graduated 732 artillery and general mechanics, of which number there have been considerable losses caused by discharges, transfers and promotions. It is reported that

some of these highly trained men have been deflected to other jobs. There is no possible source of supply of trained men with this specialty from civilian industry, as there is in the case of many other categories of mechanics. Armorers and gunsmiths are found only in the arms factories and in the Ordnance Department, neither of which will be in a position to release men.

With reference to the materiel itself, how do conditions today differ from those of 1918? It is common knowledge that we have a far greater number and variety of weapons than in the last war, and that these new weapons are more complicated and less rugged than the constructions of 1918. In combat we are more dependent than ever upon mechanical functioning. The airplane and the tank are a deadly menace to the field artillery, necessitating new machines to fight them. On the Vesle, or in the Argonne, if a gun went out of action during the firing of a mission, it could be repaired at leisure, while the remaining pieces increased their rate of fire. Today, if a gun fails mechanically in the face of a tank attack, it may mean the loss of the gun and the lives of all the crew. At the same time, in the interests of streamlining, the centralized ordnance repair service which was part of the 1918 division has been moved back to the corps. From every point of view, it would seem that the burden upon our gun mechanics will be greater than ever before.

Although it may be regarded as an unimportant detail, it is desired to present what is believed to be an improvement in designations. In the tables of organization we have the "artillery mechanic" and the "general mechanic." Many older officers and men continue to refer to them as the "chief mechanic" and the "assistant mechanic." In official and authorized publications the generic term "battery mechanic" is still used indiscriminately for both. There is an objection to the latter term since the army specialist on storage batteries is called the "battery mechanic." In some organizations the term "general mechanic" is considered to imply a wider and more technical knowledge than the "artillery mechanic," this in spite of the fact that occupational index 121 calls for only a helper or handy man, whereas index 114 calls for a master mechanic. It is noted in this connection that certain Quartermaster Corps tables seem to rate the general mechanic (index 121) higher than the master mechanic (index 114). The term "artillery mechanic" is a misnomer, because motor mechanics in the artillery are just as much "artillery mechanics" as the weapons expert. Now it happens that in every combat branch of the army, except the field artillery, the specialist whose work corresponds most nearly to that of our artillery mechanic is called the "armorer" or "armorer-artificer." It is always defensible to make a change in the interest of simplicity, so why not substitute a

single word for a double term, especially when we can use an accurately descriptive term, honored by former long usage in the artillery? It is recommended that the designation of the "artillery mechanic" be changed to "armorer" and that the "general mechanic" be rechristened "artificer."

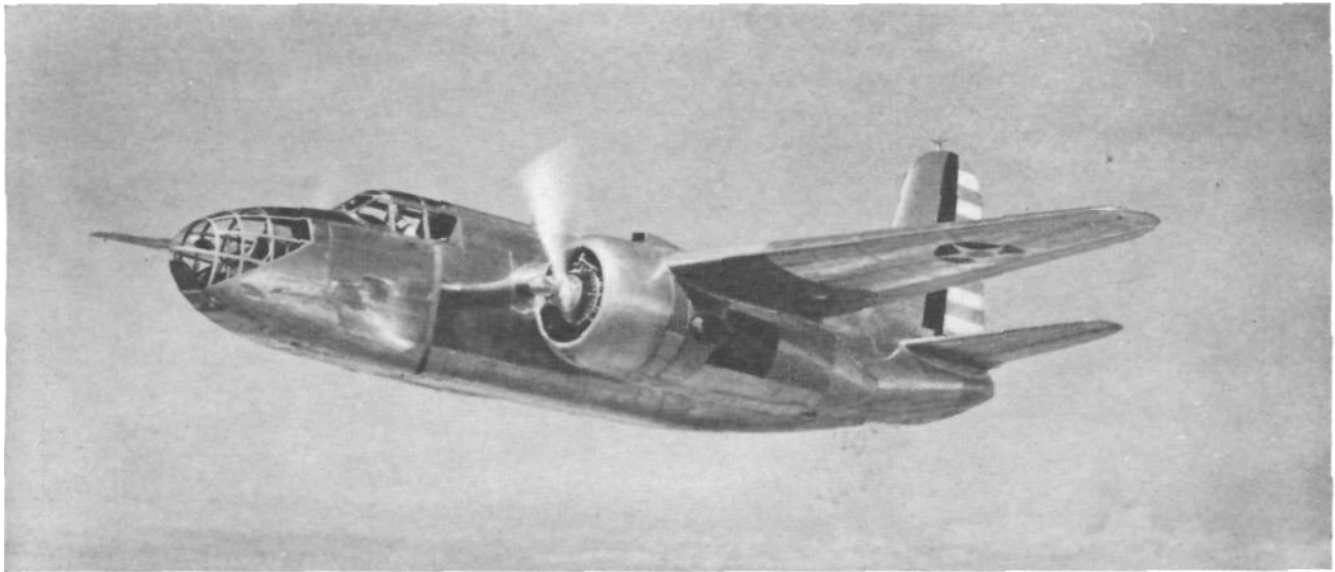
The situation with respect to pay should also be improved. A motor mechanic can hope to become a motor sergeant, the cook to become a mess sergeant, but the weapon specialist is finished as private first class, specialist third class. There is no staff-sergeant artificer or master armorer in the field artillery as in days of yore. For this reason it is difficult to induce the bright ambitious type of soldier to interest himself in the subject. It is recommended that the specialist rating of the artillery mechanic be raised to first class, and that of the general mechanic to third class.

To the battery commander the following advice is offered: Verify that you have at least two men in the battery who are really qualified to make the tests, adjustments, and repairs authorized by the FM's, TM's, and SNL's pertaining to your ordnance materiel. If you have not, inquire whether your battalion may have elsewhere one or more graduate battery mechanics, or otherwise qualified armament technicians, who are not being utilized in their specialty. If given the opportunity of sending a student mechanic to Ft. Sill, select the man with care. Choose an intelligent youngster who has mechanical aptitude and is interested in the work. He will be returned to you at the end of three months a qualified armament mechanic. Since May, 1941, no graduate battery mechanic detailed from an organization has been retained by the school as an instructor.

In concluding, it is desired to reemphasize that maintenance of ordnance materiel at the front is a totally different matter than in garrison, cantonment, or maneuvers. That battery whose artillery mechanic is qualified only as a cabinet maker or wood finisher will be in a serious predicament when suddenly thrown on its own resources. Take note of the number of pistols, carbines, automatic rifles, machine guns, antitank guns, fire control instruments and cannon that must be kept in mechanical condition, not to mention reels, gasoline ranges and other non-ordnance materiel. However useful the carpenter may be around the barracks and camp in the building of shelves, tent frames, and duckwalks, he will displace just about his weight in sawdust when the guns begin to boom. The non-spectacular experiences of a war we "little note nor long remember," but in this business of the mechanic, let us heed one lesson of 1918. Let us provide every battery with at least one of those fine fellows who was found to be "worth his weight in gold."

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A light bomber, Douglas A-20A. Official U. S. Army Air Corps Photographs.

WITH THE OTHER ARMS AND SERVICES

DEVELOPMENT AND EXPANSION

Army Air Forces may be said to have originated in the United States with the use of balloons for military purposes in the Civil War and in the Spanish-American War. In 1904 the Wright brothers brought forth the airplane but lack of military attention resulted in no action until 1907, when the American Army was provided with one plane. When this plane was wrecked in September, 1908, a Field Artillery officer (Lt. Self-ridge) lost his life and furnished a name for the big air base near Mount Clemens, Michigan. The following year another airplane was provided for military use as a replacement for the first one. In 1910, the Army had one plane and three balloons operated by three officers and nine enlisted men; by 1911 there were five planes, six flying officers and one obsolete automobile which together constituted our embryo Air Forces. All this development occurred under the Signal Corps, which had in it a component known as the Aviation Section.

In 1914 when the first World War began, it has been stated that Germany had 1,000 airplanes. At this time the United States had one squadron composed of sixteen

Editor's note: Here is the sixth of a new series, each of which will describe one of the other arms and services. The complete series, together with articles on the War Department, General Headquarters, etc., will constitute a valuable handbook on the Army as a whole; so we suggest that readers preserve each issue of the Journal containing this series.



VI—THE ARMY AIR FORCES

By Lieut.-Col. Ivan L. Foster, GSC,
G-3 Division. War Department

Official Photos by U. S. Army Air Corps

officers, seventy-seven enlisted men and eight airplanes. By 1917, the Signal Corps aviation section had grown to a total of sixty-five officers (of whom thirty were not

pilots); 1,087 enlisted men and 55 airplanes. In 1918, we had at the front overseas for front-line action, 757 pilots, 98 observers, 750 planes and 7 balloons organized into 43 squadrons. The peak of expansion resulted in 1,800 officers, 135,000

enlisted men and several thousand airplanes being assigned to duty in the Aviation Section of the Signal Corps which, in 1918 to facilitate command and control, was designated as the Air Service. After the war ended and the Army was reorganized in 1920, the Air Service as a separate branch was reduced to approximately 1,000 officers and 10,000 enlisted men. Later a redesignation occurred which changed the name from Air Service to Air Corps. By 1938 approximately 2,000 officers and less than 50,000 enlisted men were available to initiate the present enormous expansion program. In 1940 the Air Corps development including Arms and Services led to the adoption of the 54-Group Program with its initial allotment



Airacobra, P-39, a pursuit type used to intercept and destroy enemy planes while in the air.

of 16,800 officers, 15,000 flying cadets and 187,000 enlisted men. Under this program, the 26 Air Corps schools were charged with producing 12,000 pilots and 48,000 enlisted technicians yearly. Early in 1941, this latter requirement was stepped up to produce more than twice the above numbers of pilots and technicians per year. To man the increased facilities for this huge training project and to provide additional personnel required for Air Corps combat units it was necessary to augment the Air Corps (and its Services) by over 150,000 enlisted men. In June, 1941, the desire for a better organization and control resulted in setting up what is known as the Army Air Forces which includes all Air Corps units and personnel as well as all units, detachments and personnel of the Arms and Services on duty in stations of the Army Air Forces (formerly known as Air Corps stations). The reorganized Army Air Forces is subdivided into the Air Force Combat Command (Air Corps units and field services) for tactical and combat purposes; and the Air Corps (non-combat units and non-mobile services), which operates schools, depots and maintenance activities or, in other words, procures personnel, trains and hospitalizes it, and provides necessary equipment and higher echelon maintenance service for all Air Corps units. Station complement activities and personnel involved such as Quartermaster Corps detachments, Signal Corps detachments, and Station Hospitals are included in the responsibilities now placed upon the Chief of the Army Air Forces. The major elements involved are shown in Chart No. 1.

By June 30, 1942, the authorized personnel strength of the Army Air Forces is expected to exceed 400,000. It has recently been made public that the development of a total of 84 Combat Groups is planned and that the man-power of the Army Air Forces may reach a half million.

It should be noted at this time that for the approximately 130 stations occupied by elements of the Air Forces, all Station Complement personnel such as Quartermaster Corps, Signal Corps, Finance Department, Medical Department, etc., are charged against the Army Air Force personnel totals shown above and are a part of the Arms and Services with the Army Air Forces.

In publicity given to the 54 Combat Group Program, it was stated that in connection therewith at least 25,000 planes of all types would be required. The number necessary to implement the 84-Group Program has not been made public.

ORGANIZATION

The combat units in the United States under the general control of the Air Force Combat Command are divided into Air Forces and various types of Commands (formerly Wings), Groups and Squadrons depending upon the specific duty to be performed by the units concerned. There are four Air Forces for the Continental

United States; the first assigned to the Northeast sector, the second to the Northwest, the third to the Southeast and the fourth to the Southwest. Each of these Air Forces has to be prepared to cooperate with ground combat units and provide for a high degree of coordination of combat activities. See Chart No. 1. Similar Air Forces have been organized in Overseas Departments under control of the Department Commanders.

It may be necessary for an Air Force to take over the problem of delivering attack against distant enemy industrial or other areas which will require employment of a part of the Air Force known as the Bomber Command composed of heavy and/or medium bombardment elements as well as certain pursuit types which must accompany the bombers in order to defend them against enemy air action. This type of bombing action may occur as part of a joint Army and Navy activity or as an independent action on the part of the Air Force alone at ranges beyond those possible for non-flying Army and Navy units within the time allotted.

Another grouping within an Air Force is the Interceptor Command. It has the primary mission of so employing its Aircraft Warning Service, antiaircraft artillery and Air Corps elements as to discover and destroy or turn back enemy air elements before they can reach their intended targets. The very important Aircraft Warning Service is a part of the Arms and Services with the Army Air Forces, as will be shown later.

An Air Force may be required to render close support to a particular ground force action. For this purpose it has an organization known as the Air Support Command which provides observation and reconnaissance aviation, including photographic facilities; air transports for parachute troops and air-borne troops; light bombers; dive bombers and other essential air support which will be discussed briefly later to show its relation to Field Artillery.

Lastly, there is required in each Air Force a grouping of those elements which furnish service of all types for the Air Force. This is provided by the recently organized Air Force Base Command. All mobile or field services whether Air Corps personnel or Arms and Services with the Army Air Forces should be in this group.

ARMS AND SERVICES WITH THE ARMY AIR FORCES

The Arms and Services with the Army Air Forces, more generally called the ASWAAF's, include representatives of Chemical, Engineer, Ordnance, Quartermaster, Signal, Finance, and Medical components of the Army. The Signal Corps in addition to having started the Air Corps on its way, as stated under *Development and Expansion*, has ever since maintained detachments and units to assist in the handling of communication requirements which are involved in the employment of the airplane as a military weapon. Arms and Service units range from small detachments of two or three men to companies and battalions as shown in chart No. 2.

Chart #1
General Organization
(major components)

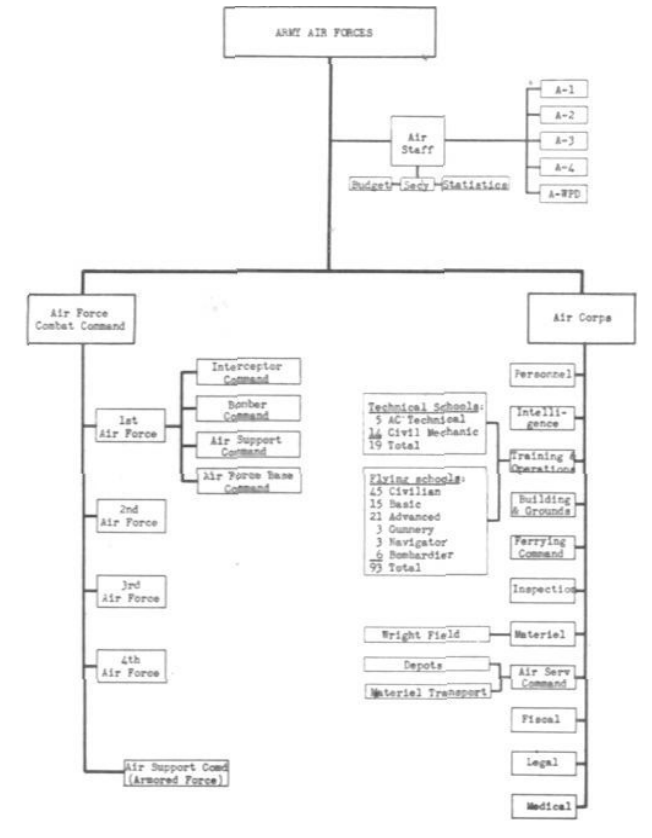
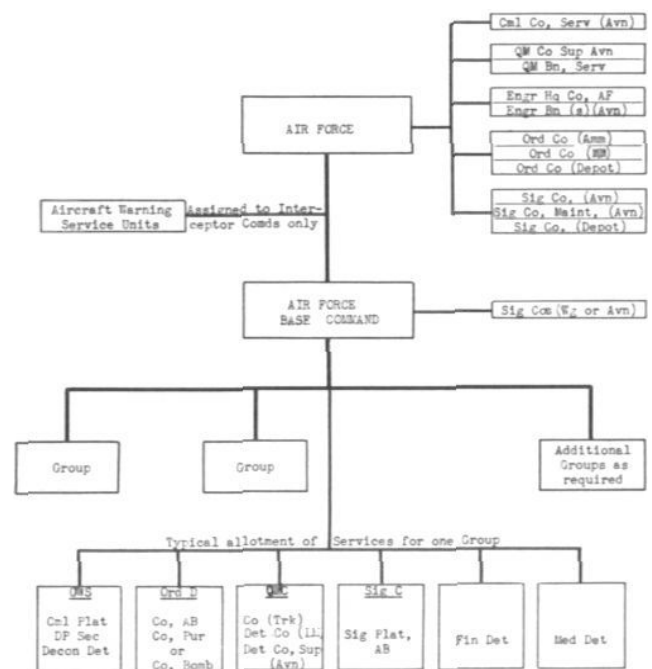
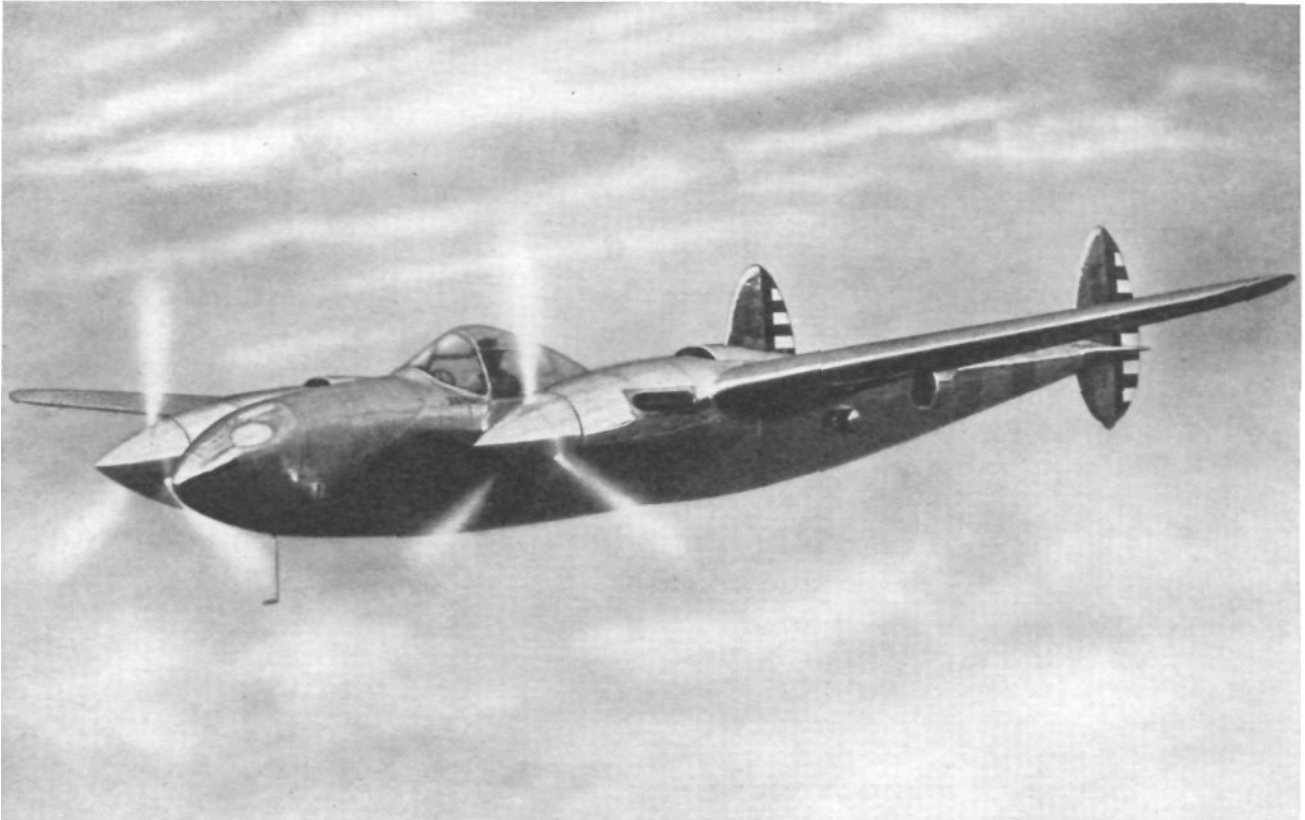


Chart #2
Arms and Services with Army Air Forces
(major components)



Note. All Service elements except Aircraft Warning Services are assigned to Air Force Base Commands.



Interceptor pursuit, designated as the P-38.

Frequently the question has been asked, "Why 'Arms'! Aren't all the elements 'Services'?" The answer is, "Yes, but the Engineers, Aviation, have combat functions and must, perforce, be Arms." If present tendencies toward "all inclusive" defense against "all out" attacks continues, every service will be so heavily armed and so trained in the use of weapons against parachutists, airborne personnel and mechanized attacks as to deserve the distinction now claimed by the Engineers.

A major development in Signal Corps activities connected with the expanding Army Air Forces is the Aircraft Warning Service with its many new types of units and equipment and its great demands for officer and enlisted personnel. Supplemented by civilians interested in assisting in the discovery and reporting of approaching enemy aircraft, this service under control of the Interceptor Command in each Air Force determines locations and possible projected flights of enemy air raiders. With this information the Interceptor Command determines what action should be taken by pursuit (Interceptor) Air Force units and by the anti-aircraft artillery which may be under control of the Interceptor Command. This activity is worthy of primary consideration in order to hasten its development and make it fully capable of fulfilling its mission. An elaborate Aircraft Warning Service organization is planned for each Air Force.

In addition to the units shown in Chart No. 2, headquarters sections of each service are required in the Air Force Combat Command, or AFCC, headquarters and

in each Air Force headquarters. An Engineer Regiment, Aviation; a Signal Company, Aviation; and a Signal Maintenance Company, Aviation, are assigned to the Air Force Combat Command.

These Arms and Services are necessary to provide the Army Air Forces with all of the auxiliaries required to make the Air Corps combat units self-sustaining by providing the Chemical defense agencies; the Engineer assistance in construction of runways, camouflage and maintenance of Air Force installations; the care and maintenance of weapons and the provision of ammunition by Ordnance elements; the Quartermaster truck, light maintenance and supply service; communication facilities, both wire and radio, and the Aircraft Warning Service units which can be furnished best by the Signal Corps; the fiscal service provided by the Finance Department; and the omnipresent Medical service. In addition to the above, the services of officers from the Adjutant General's Department, Chaplain's Corps, Inspector General's Department, and the Judge Advocate General's Department are necessary. Many of these are specialists in a way because the problems which they must solve in serving the Army Air Forces are sometimes different from those encountered while providing service for the ground units. An outstanding example is the Flight Surgeon, or the highly trained Aircraft Warning Service soldier.



WHAT BECAME OF THE AIR CORPS

Dive bomber, Douglas A-24.

Having shown something of the combat elements and their immediate auxiliaries, it seems appropriate to consider the men behind the men (mechanics) behind the men (pilots) who go into the air with the airplanes. As indicated in the beginning of this article, the procurement of personnel and its training, the acquisition of materiel, the higher echelons of its maintenance and, in general, its delivery to using agencies are all responsibilities of that sub-division of Army Air Forces which is still called the Air Corps and kept under a separate chief. An outline of the organization involved was shown in Chart No. 1. Not all of the elements shown therein will be discussed in this article.

AIR CORPS SCHOOLS

The Training and Operations Division controls training of pilots through three huge training centers: the Southeast with headquarters at Maxwell Field, Alabama; the Gulf Coast with headquarters at Randolph Field, Texas; and the West Coast with headquarters now at Moffett Field, later to be at Santa Ana, California. Each under the supervision of a general officer, these three training centers are charged with annually supplying 30,000 pilots trained for combat. They control the activities of 41 civilian schools giving 10 weeks of elementary training; 15 military and 3 civilian schools giving basic flying training; and 21 advanced military flight training schools, of which 7 are single engine types

and 14 are multiple engine types. Besides these schools, there are also 3 flexible gunnery military schools; 1 civil and 3 military navigator schools; 6 bombardier military schools and 3 replacement training centers for pilots, bombardiers and navigators. Last, but not least, from a Field Artillery point of view, there are courses which provide special training for observers.

Keeping a proper supply of trained pilots available is only a part of the difficulties which beset the Training and Operations Division. It is necessary to develop and maintain an annual output rate of 100,000 enlisted specialists. This is being done through the medium of the Technical Training Command under a general officer who from his headquarters at Tulsa, Oklahoma, controls 5 large technical schools: Chanute Field, Illinois; Scott Field, Illinois; Lowry Field, Colorado; Biloxi, Mississippi; and Wichita Falls, Texas, as well as 14 civilian mechanics schools.

In addition to the activities of these schools, three Enlisted Replacement Training Centers (technicians): Jefferson Barracks, Missouri; Biloxi, Mississippi; and Wichita Falls, Texas, are employed in order to provide the technicians necessary to "Keep 'Em Flying."

Technicians everywhere; airplane mechanics, aircraft welders, engine mechanics, weather observers, weather forecasters, armorers, machinists, metal-workers, supply and technical clerks, Link Trainer instructors, parachute



The B-24, a heavy bomber with characteristics similar to those of the Flying Fortress.

riggers, photographers, radio operators, radio mechanics, teletype operators, carburetor experts, ignition experts, and bombsight experts—on and on so that there seems to be no end to them—goes the list to include approximately 65 per cent of all of the enlisted men in the Air Corps.

PROPER PLANES

No matter how well-trained the pilots may be nor how able the technicians, the machines which they fly are apt to be no better than production standards demand. The Materiel Division is charged with insuring that United States Army aircraft and equipment are the best that money can buy. It searches for solutions to unsolved problems and applies these discoveries to production without delay. This activity began in 1917 when the War Department decided to set up an engineering laboratory at McCook Field, Dayton, Ohio. It later became the Engineering Division and in 1926 after being combined with the Supply Division to form the Materiel Division it was given a permanent home at Wright Field, Ohio, and charged with the functions of supply, procurement, and maintenance of all Army aircraft and equipment in addition to its engineering and research activities.

For 20 years this agency, it is said, has directly or indirectly influenced every important aircraft development. The United States war planes of today are evidence of the thoroughgoing efficiency of the Materiel Division. Without the far reaching vision of these men at Wright Field, the Air Forces of today might be in practically the same

relative position with respect to equipment as was the Aviation Section of the Signal Corps in 1917.

AIR DEPOTS AND AIR TRANSPORT

The Air Corps has another major sub-division, the Air Service Command (formerly the Maintenance Command). This activity, until recently a part of the Materiel Division with its headquarters at Wright Field, Ohio, may be said to be to the Army Air Forces what the Quartermaster Corps is to the rest of the Army. As shown in Chart No. 1, it operates the Air Corps Depots and provides a Materiel Transport service which is undoubtedly the largest air-freight carrying organization in the world. One transport wing, six transport groups and a number of transport squadrons are at present included in the Materiel Transport facilities of the Air Service Command.

Eleven depots are required to purchase and receive, store, maintain and issue the thousand and one supply items required in the Army Air Forces. Thousands of civilians are employed in these depots under the supervision and control of military personnel. All other components of the Maintenance Command are manned by military personnel. These depots handle all manner of supplies: spark plugs, engines, wing sections, rudders, elevators, wheels, tires, cowlings, machine guns, bombs,

bomb-sights, ammunition, rivets, seats, armor plate, gasoline, oil, special compasses and other delicate instruments, photographic film, chemicals, paint and innumerable other items. Special storage facilities are required for many of these items. Rubber must be kept in temperature-regulated hangars to prevent contraction, expansion or decay. Ailerons, elevators, rudders and wing sections must be kept in dark rooms so the highly evaporative dope and paint will not warp their surfaces. Compasses and other delicate instruments must be stored in special vaults to protect against deflection. Film is stored in cold rooms.

Skilled metal workers, welders, propeller experts, machinists, patternmakers, aeronautical mechanics, electrical workers and radio experts are required to render efficient depot service.

Records show that at one depot alone, 600 railway carloads—about 33,000,000 pounds—of merchandise have been received in one month. Multiply this by the number of depots involved and discover how much freight must be received, stored, issued, transported and maintained after crack-ups. Now contemplate the matter of keeping the voluminous records involved in accounting for this and rejoice that someone else has to do it.

This Air Service Command was organized in April, 1941, but it already asserts that it can supply anything from a needle to a complete engine upon a moment's notice, and furthermore that it will deliver it anywhere in the United States or its foreign possessions by air transport. "We

deliver anything from a generator to a general anywhere from Arkansas to Alaska," is their boast.

BUILDING AND GROUNDS DIVISION

The Navy is unable to operate efficiently without an adequate number of bases, suitably placed. Likewise must the Army Air Forces have air bases suitably placed throughout the continental United States, and the areas which include Alaska, Hawaii, the Philippines, Panama and the Atlantic Bases. The multiple supply and maintenance facilities found in a naval base are more than duplicated in an air base.

What is an air base? It is a great deal more than a mere landing place or airdrome. It is really an area which in war time may be many miles in extent and in peace or war certainly should include not only a number of airdromes but also maintenance and repair shops, warehouses, gasoline and oil supplies and service facilities, stores of bombs and other ammunition, sleeping quarters, mess and recreational facilities and adequate means of communication both wire and radio to say nothing of suitable housing for administrative and hospital services. Weather observation service, radio homing and landing devices, a photographic laboratory and shelter for the auxiliary arms and services must be included in the air base installations. All of these must be

Advance trainer, AT-8, for training in use of twin-engine planes and for instruction of navigators.





Flying fortress, B-17, a heavy bomber type whose transposable bomb or gasoline load permits great variation in range and bomb loadings.

suitably dispersed to avoid concentrated attacks but not so widely scattered as to unnecessarily interfere with efficient operation.

Defense of air bases requires consideration of ground defense, particularly antimechanized, as well as protection against attacks from the air. Passive means, such as camouflage, obstacles, revetments or bunkers for airplanes and gun turrets or other weapon shelters, are all required. Active defense is provided by suitable plans for non-delayed action of all available personnel employing combat planes, ground weapon installations, armored cars, and individual weapons as deemed most suitable against any particular type of attack. For instance, the employment of combat aviation might be essential in defense against a bombing attack, while defense against parachutists might hinge upon the proper employment of ground weapons both installed and individual.

By now the reader is no doubt curious concerning the title given to this section of the article he is perusing.

So we belatedly explain that the Building and Grounds Division of the Office Chief of Air Corps is responsible for the development of the detailed plans for placing adequate housing and landing runways on suitable ground areas acquired by purchase or gift to provide the necessary air base facilities in the general location approved for strategical reasons. These Building and Grounds Division plans require a knowledge and consideration of the many matters involved as shown above and considerable technical skill is required in their preparation. The

execution of the plan, i.e., the awarding of contracts for grading, paving, construction, etc., and the completion of the scheduled project are functions of the Corps of Engineers.

Approximately 45 air bases, averaging a personnel load of 3,500, have been provided with facilities during the past year in accordance with the plans of the Building and Grounds Division, which during the same time has been responsible in a similar way for the development of 48 schools (with personnel loads ranging from 2,500 to 15,000), 11 depots previously mentioned in this article and 16 miscellaneous stations.

FERRYING COMMAND

The Ferrying Command, one of the newest members of those organizations which may be classed as Air Corps Services (not ASWAAF's), has been organized for the sole purpose of moving combat and other planes from the factories to the station or area in the United States where they are turned over to the representatives of those who are to use them. Recent orders of the War Department have established six Ferrying Command stations at suitable points in both the eastern and western parts of the United States in addition to the headquarters located in Washington, D. C. At the time this is being written, the slogan of this organization might well be "Bombers for Britain."

IMPORTANCE TO FIELD ARTILLERY

Of all the above, the most important from a purely Field Artillery viewpoint is the Air Support Command including particularly the provision of air observation.

In critical phases of battle an immediate and concentrated delivery of heavy fire upon certain targets may be necessary. Action by combat aviation may be quickly decisive under such circumstances. The high mobility of mechanized or armored forces make fire action by combat aviation almost essential in addition to, or as a supplement to, field artillery support.

But, just as it does for artillery, this action requires special activity in the way of liaison and communications on the part of the Air Support Command. Hence special staff officers are required from the ground arms for duty at Air Support Command headquarters.

Reports from observers of events in the war in Europe indicate a very special need for combat aviation assistance in armored force action where field artillery finds the greatest difficulty of communication and in maintaining a gun-mobility and an observation-ability necessary to place fires on enemy command and supply installations; reserves and assemblies of combat units; antitank weapons; artillery and other activities.

The Air Support Command assists the Field Artillery by fire against targets beyond the range of the artillery guns or defiladed behind obstruction which prevents artillery fire from reaching them. It does not in any sense supersede artillery as a battle weapon and should be considered as a means of extending Field Artillery fire but not a substitute for it.

A solution to the question of how best to provide air observation for Field Artillery has not been agreed upon at the time this is being written. However, some definite action on this question should be taken without further delay. Light commercial airplanes appear to be a suitable means if operated over friendly areas. Questions yet to be answered are: "Who will pilot them?" and "How will they be maintained?"

An ever-growing cross section of ordinary everyday Americans, including women, are flying this type plane using filling-station gasoline and oil, and garage-type maintenance obtained at ordinary municipal airports.

Dozens of licensed commercial light plane pilots are already in service with the ground forces. The established examples set by the Quartermaster and Ordnance echeloned means of maintenance are before us.

It appears therefore that this problem could be solved by the ground troops themselves, except for higher echelon maintenance, thus relieving the Army Air Forces of this "limited pilot" activity which no combat pilot enjoys. Except for higher echelon maintenance of the light planes the Air Corps could then devote its full attention to the gigantic task of providing combat planes, long-range reconnaissance planes, other types of machines, and the necessary combat-trained crews. This would keep all concerned fully occupied.

If the ground arms do not operate and maintain this air observation service as suggested above, it will be necessary to require the Army Air Forces already fully occupied with the first priority demands of combat aviation to advance this, from their viewpoint, "limited" or low priority activity to a high priority status.

Last but not least important is the personnel morale question. Undoubtedly morale will be high among ground arms personnel organically assigned to this duty. Beyond question will the morale of Air Corps personnel deteriorate as they find themselves necessarily on a duty they generally do not like and detached away from their own kind for extended periods of time as they will be in order to develop the successful air-ground observation team which we must have.

God gave us the hills and the trees which Field Artillerymen climb and use as OP's. Sometimes they are not high enough. Give the Field Artillerymen the airplanes necessary to extend their observations and they will accomplish their missions.

Observation-liaison plane, O-49, may be replaced by "grasshopper" plane for field artillery observation.



CAMPAIGN of FLANDERS 1940

Illustrations by
Andre Jandot



Observation post at Noyelle sous Bellones

By Captain Leo Framery, French Army

Part IV

MAY 21ST—BATTLES IN FRANCE

At dawn we witnessed an imposing sight: a mighty fleet of more than three hundred German bombers passing above our heads, going northwest, probably headed for Boulogne or Calais. They flew at a considerable altitude and there was almost no reaction from our anti-aircraft batteries. The whole northern section of the sky was darkened by huge columns of black smoke with red darts of flame showing now and then, vivid on the somber background. The large stocks of oil and gasoline gathered in the reservoirs and warehouses of Corbehem were ablaze.

Firing orders began pouring in shortly after sun up. The visibility was excellent, permitting us to observe most of our fires. We had had time to complete our telephone organization and were directly linked not only with the three batteries and the OP, but also with the dragoons at Tortequenne and the colonel commanding our regiment, who had his CP at Noyelles. In all, about eight miles of double line had been laid. By radio, we were connected with the OP, the dragoons at Tortequenne and the artillery CP, of the division, located at Gouy sous Bellonne.

The enemy had brought forward his artillery—105-millimeter howitzers exclusively. They shelled the CP of the dragoons at Tortequenne as well as our OP; fortunately, we had had time to dig a slit trench with a small shelter

adjacent, so the observers and telephonists were but mildly disturbed in their work. They sighted a German battery in position on a small road leading from the east toward Etaing. Its four guns fired leisurely, probably registering, on some target in the vicinity of Sailly en Ostrevent. We let go at them, but unfortunately, they moved quickly out of our sight, before we could do any damage. It was probably a battery of self-propelled guns.

Firing orders now arrived at the CP in rapid succession: barrages east of Lecluse, north of Etaing, concentrations on Hamblain-les-prés. We had but short respites.

Confirmation was received of the intended counterattack, oriented southeast, to be made soon in cooperation with the British armored division.* The beginning of the action was to be announced by rockets. Lookouts were placed at vantage points, watching eagerly for the expected signals.

It was obvious that, in order to prevent the Germans from encircling the allied armies in the north, the delaying tactics which had been followed since May 10th should be replaced by a vigorous action undertaken simultaneously from the north and the south, to cut the advancing columns from their base and build a continuous

*This was the attack made by a brigade of British heavily armored infantry tanks, described several times in various service journals. This attack had some initial success, but finally had to be called off.—Editor.

front facing east. It was evident also that it had to be done as soon as practicable; any delay would give the enemy opportunity to reinforce his positions.

The infantry facing us certainly was not losing any time in organizing Lecluse as a strong center of resistance. We could see men at work in many places, handling picks, shovels and sand bags. We kept them under fire as much as we could, to hinder their progress. But we were already confronted with a grave problem: The re-supply of ammunition. In this respect we were in an unfavorable situation, as we did not know when and where it would be possible to fill up our caissons. A strict economy was therefore observed.

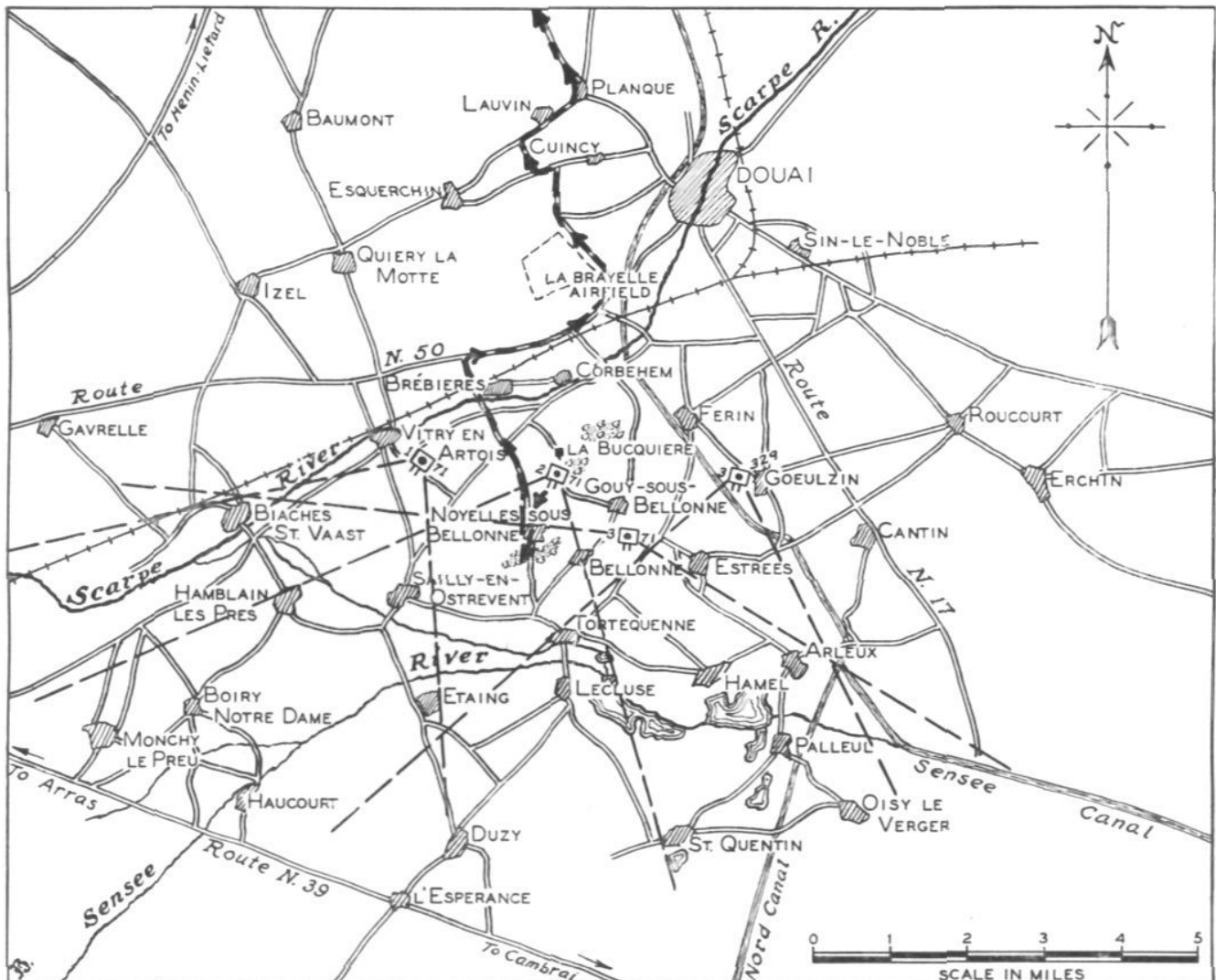
We had entered Belgium on May 10th with five "fire units," i.e., 1,000 rounds per gun, 12,000 for the battalion. Since then we had been re-supplied only once, during the night 18th/19th. While the batteries were on the road going back to France via Valenciennes and Denain, the combat trains had repaired to the Ermitage Woods 1½ miles south of Peruwelz, 10 miles north of Valenciennes, to re-

complete our five units. This was what we had in our caissons when we arrived at Noyelles.

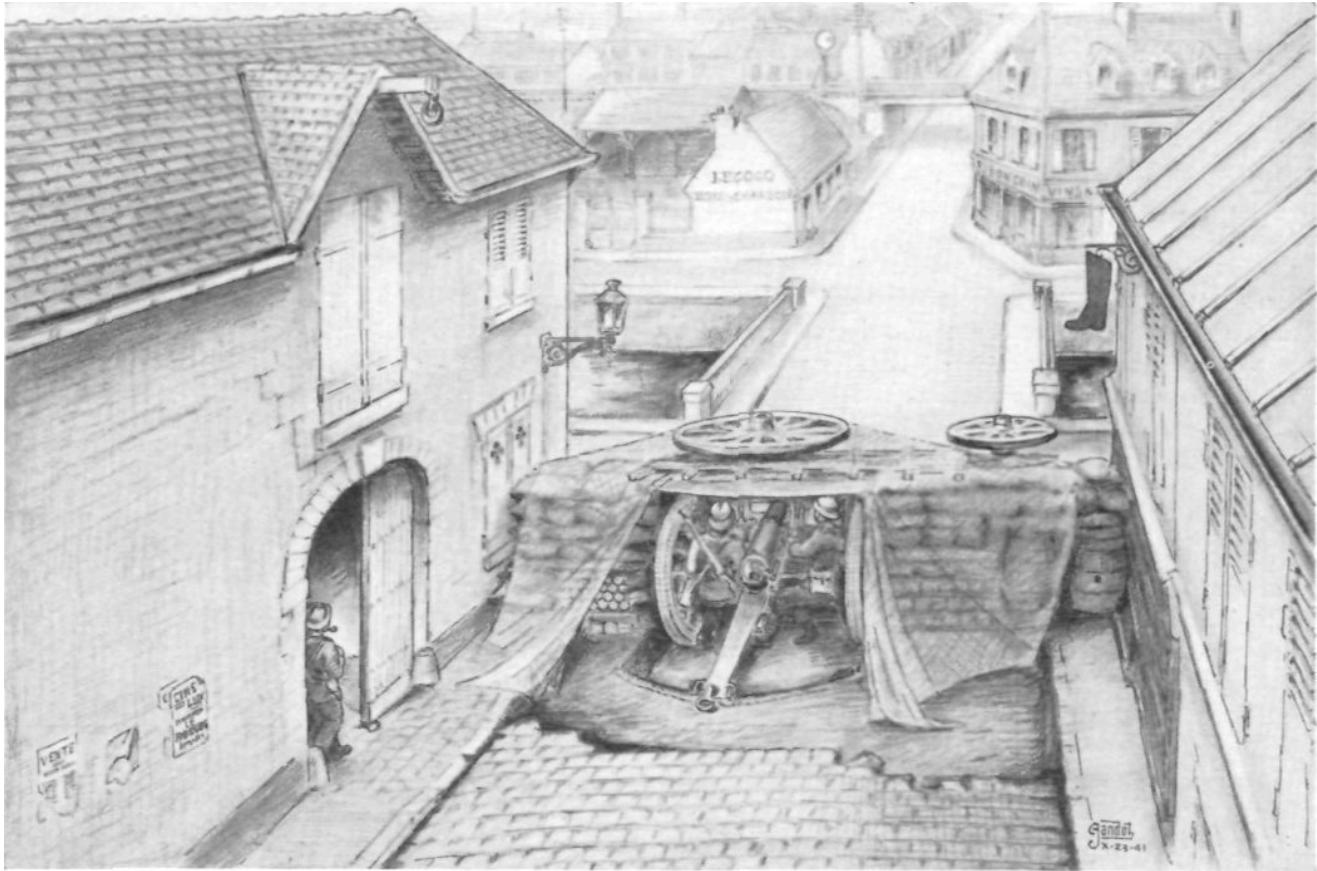
Twelve thousand rounds—it may seem considerable, but a battalion of 75's consumes it in a short time during hot action. A simple five-minute barrage, for example, may cost 500 rounds. A very strict control of the expenditure of projectiles was therefore imperative since we could not be certain of being resupplied. This changed radically our outlook on the situation. An artilleryman facing a shortage of ammunition has a strong propensity to pessimism.

During the afternoon, the German batteries became increasingly active. They repeatedly shelled our OP and also regimental headquarters in Noyelles, causing casualties.

In Lecluse, the enemy infantry was also very enterprising. In several instances grenadiers, supported by intense machine-gun fire, attempted a crossing of the river. The attack was repeated several times during the night and barrages were required from us. The night 21/22 was thus employed. No further news of the proposed attack towards the southeast was received.



Map No. 1



75-mm. antitank gun in Brebieres. The bottom of a farm cart has been knocked out to permit the vehicle to form the framework of a barricade.

MAY 22ND

We fired our first barrage for the day slightly before 4 AM, at the break of dawn. From early morning the visibility southwest was excellent. The enemy, having to observe in an easterly or northwesterly direction—against the rising sun—was at a strong disadvantage. Our observers did not fail to make full use of these favorable circumstances; they directed fires on batteries, OP's, parties of workers, etc. As usual, in such cases, the foe retaliated by flinging stiff neutralization volleys against our OP's.

An incessant stream of German vehicles was observed on the highway N 39, going in the direction of Arras. Running at high speed, 50 to 100 yards apart, they filed by, hour after hour. They were certainly parts of the panzers rushing towards Abbeville and the sea. The first idea we had, in order to stop or hinder the flow of cars, was to put down an interdiction fire. Unfortunately, the highway was at a ten-kilometer distance; to obtain any effect at such a range, on an objective but 15 meters deep, would have required many hundred rounds of ammunition. It was probably felt at artillery HQ that such a mission was more justifiable for general-support batteries than for a direct-support unit. Anyway, we were not allowed to fire on N 39, even though I repeated my demand several times

during the day, whenever the traffic on the highway appeared to be especially active.

In the afternoon an order from the division requested us to send a platoon (two guns) to Brebieres on antitank mission to defend the village's two bridges across the river Scarpe. The 2d Platoon of the 6th Battery was selected. It proceeded at once to the position, only a mile away from La Buquiere.

I do not know, to this day, the actual facts which motivated then the order. It was totally unexpected since the two bridges were almost directly in our rear. Anyway, I considered it as the ominous sign of an imminent withdrawal northward of the Allied forces which, up to that moment, had occupied positions covering our right flank, on the other side of the river Scarpe. It could mean only one thing: the contemplated counterattack which we had been expecting was abandoned; the hope of organizing a continuous front to stop the enemy's onrush could no longer be entertained. The most favorable outcome we could now anticipate was a slow retreat to the north and an eventual stop along some line of resistance—the Aire-La Bassé canal possibly. We were irrevocably committed to the defensive, with the sea at our back. . . . Gloomy portents.

However, as I inspected the two sections on their way

to take up antitank positions at Brebières, I could not help being cheered by the appearance of the cannoneers. They looked hard and fit; certainly no trace of doubt as to the future could be detected on their ruddy faces. Their eyes, when meeting mine, registered only trust and eagerness. Our outfit obviously had reached a commendable degree of training, and I had the comforting feeling that any mission entrusted to these men would be fulfilled efficiently.

While the day was drawing to an end and dusk was falling, the Germans in Lecluse and the dragoons facing them were as enterprising as ever; bursts of musketry and machine-guns were frequent. Fire orders arrived in rapid succession. One of our radio operators intercepted an enemy message conveying a demand for artillery reinforcement. It stated that the French batteries were very active, their accurate fire was causing heavy losses. We considered this as a flattering compliment.

The night May 22nd/23rd was spent without any appreciable change in the situation. We had to fire on Lecluse several times.

MAY 23RD

At dawn, reconnaissance parties from the 222d FA appeared. A battalion of 155-millimeter howitzers was to occupy a position in the woods, by the château.

Meanwhile the enemy had installed a battery of trench mortars close to Lecluse church. Before they could do much damage in Tortequenne, the dragoons referred the matter to us. Easy work for our observers.

At 5.30 PM we were relieved by the 155's, and received orders to proceed north. Itinerary—Noyelles, Brebières (where we picked up our two sections), Highway N 50; then we turned north to cross La Brayelle, airfield of the city of Douai. The road had been copiously bombed, probably while columns of refugees were passing by. Bodies were still lined up on the side, awaiting burial. Thence, Lauvain and Planque where we had to wait for further orders. Planque was a small, dismal village, overcrowded with refugees who had fled Douai during the preceding days.

The expected orders were received at 11 PM: we were to take antitank positions to defend the bridges on the Aire-La Bassée canal.—

The 4th Btry. was to guard La Bassée's two bridges;

The 5th Btry., Cuinchy's single one;

The 6th Btry., the two bridges of Berclau.

The withdrawal towards the north of all the allied units which the troops on our right flank had begun on May 22nd, was extended to our division.

We started at midnight. Itinerary—Courcelles, Dourges, Oignies, Carvin, Annoeulin, Sainghin, Marquillies, Salome. In the latter village, the batteries separated to go to their respective positions. The staff battery and the combat trains had left the column at Annoeulin, and turning east went to take cover in the Phalempin woods, 8 miles south of Lille.

MAY 24TH

Half a mile beyond Dourges our route crossed the High Deule canal; we found ourselves in the British sector. The night being very dark, the Tommies standing guard at the various crossroads were disquieted by the unfamiliar outlines of our matériel, so we were smartly challenged and I had to get out of my car many a time to obtain the right of way.

The batteries were in position at 4 AM.

Cuinchy, LaBassée, Berclau, these are three names which appeared often in the British communiqués back in 1915 and 1916. My old battery fired many an HE into Berclau in September/October, 1915, while we were artillery support of the Brigade of Scots, holding the trenches in front of Loos-en-Gohelle.

In the sector, the civilian population had been evacuated. However in La Bassée roamed a few doubtful individuals who claimed to be Belgian refugees; their papers were in perfect order and in the absence of MP's we had to let them go and even urged them on. They may have been fifth columnists. If so, they certainly found themselves in an ideal hiding place, in La Bassée: a fair sized city completely deserted by its inhabitants; there were no police and only a few dozen cannoneers much engrossed with their particular work.

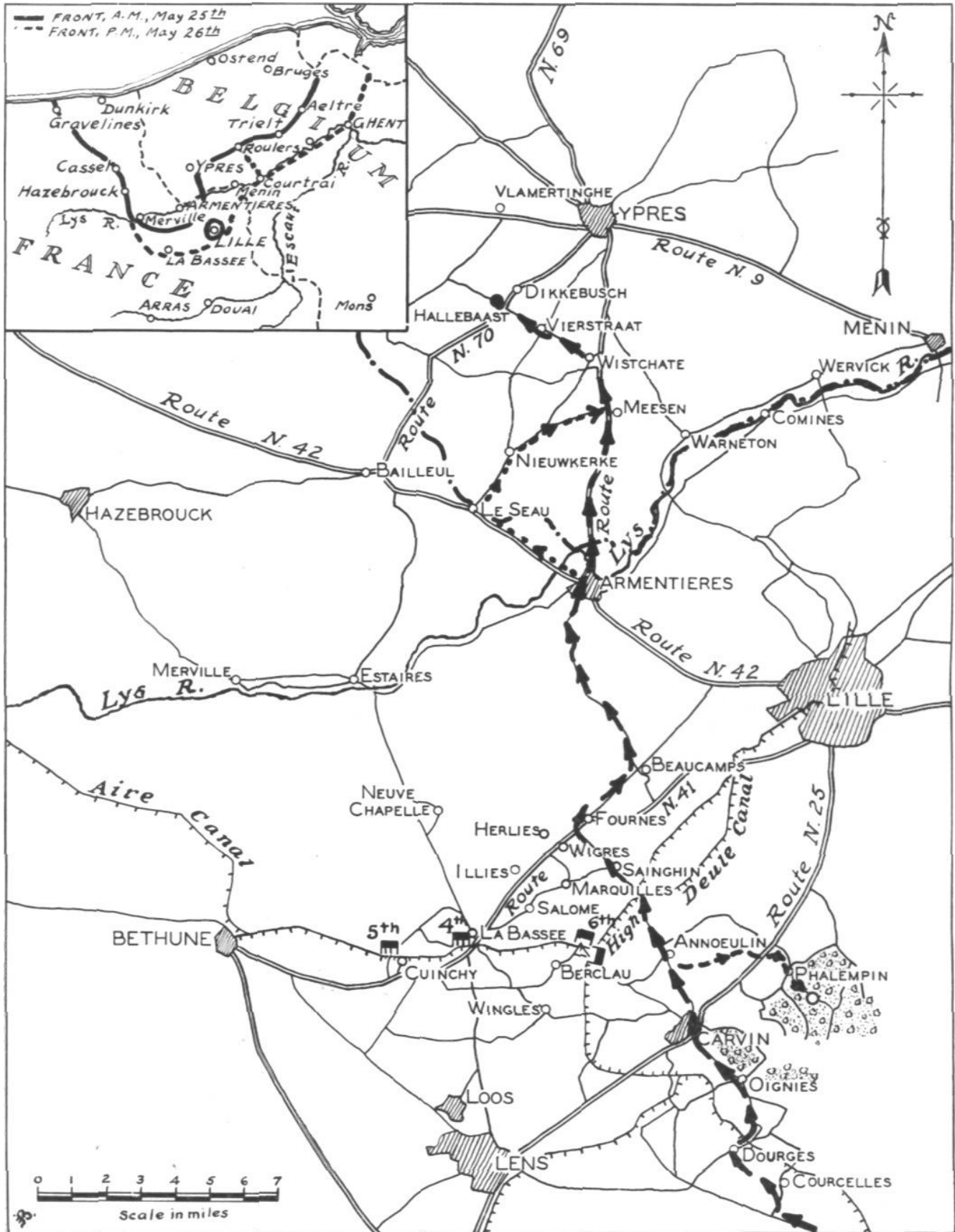
The Phalempin Woods, where had gone the battalion's staff and combat train, had been occupied by British troops and had sheltered several large ammunition dumps. It had been liberally bombed the previous day, but with little damage.

On May 24th it was perfectly quiet; the Luftwaffe did not appear, except for two observation Henschels probably on photographic missions, which flew over the sector, one early in the morning, the other in the afternoon. The considerable number of antiaircraft guns which fired at them in both cases gave us an idea of the high density of troops located in the vicinity, though hardly anyone was to be seen. On the Aire Canal, quiet also prevailed in front of our gun sections.

At 2 AM an order was received from the division to reconnoiter positions in the vicinity of Herlies, 4 miles northeast of La Bassée, to be occupied at dusk.

The battalion staff and combat train left the Phalempin Woods at 7 AM to join the batteries. On the road between Sainghin and Wicres their column was halted for a few minutes by a company of British infantry; a parachutist dropped from a German plane had been reported as having landed in fields nearby. The company deployed in skirmish lines to comb the countryside. I doubt if they succeeded in locating their man, as dusk was falling rapidly.

The battalion was ready to open fire at 9 PM. The batteries were placed on the side of a pond, on the southern edge of a copse, pretentiously named on our map "Chombart Woods." It may have been a real wood before World War I. It was now a mere succession of



Map No. 2

clear thickets. I may add that the place is but one mile east of Neuve Chapelle, scene of many fierce fights between 1914 and 1918, which explains the absence of real trees in "Chombart Woods."

The battalion CP was placed in the Baschamp (Low Field) farm.

Mission: direct support of the "1st Dragons Portés" holding the Aire Canal, east and west of La Bassée.

Base deflection: 3200 mils, due south.

The CP of the 1st Dragoons was at Marquillies.

A very quiet night which gave us ample time to polish up the firing data.

The Baschamp farm, surprisingly enough, was still inhabited—two women: mother and daughter, and a few children. The mother refused to move, claiming that as she had lived in a dugout on the ruins of this same farm from 1914 to 1918, she would act likewise in 1940.

MAY 25TH

At daybreak the following morning, the Luftwaffe invaded the sky. First, the Henschels to reconnoiter, then squadrons of Stukas and bombers. The RAF soon appeared; the AA guns, the pompoms, the machine guns began to bark. In a short time the whole sector was very much alive.

The dragoons reported having established contact with the enemy and, as a consequence, fire orders began to arrive at our CP: long-range harassing fires mostly. One objective, among the others, retained my attention: it was the mining village of Wingles. In October, 1915, we fired many hundreds of rounds into Wingles. At that time the British front line followed the highway N 347, La Bassée-Lens. Wingles was two miles east of it, and the Germans had many troops sheltered there.

In the afternoon three German planes, hedge-hopping over the battalion emplacement, dropped twelve large bombs on the 4th Battery. One hundred kilo projectiles primed with 15-second delay fuzes, they made huge craters in the soft earth. A caisson was damaged by splinters, but no casualty occurred. The men had dug slit trenches, and were well sheltered.

These hedge-hopping planes were quite baffling in terrain cut up by rows of houses, lines of trees and similar obstacles. They were too low for the AA guns and travelled so fast over the ground that the machine guns had but very few favorable seconds to fire.

One of the dragoons' listening posts warned us that a German observation plane had announced in clear over the radio the information that Herlies was swarming with allied troops, French, British, Belgian, and that consequently a bombing was highly advisable. Ten minutes later a squadron of five Heinkels arrived, flying straight toward Herlies. The bombing was short but severe, in spite of the AA guns.

The night 25th/26th was especially quiet, an unmistakable sign that important events were happening in some other sector. We were soon to learn that on the 24th

the enemy had succeeded in crossing the river Lys in two places, north and south of Courtrai. On the 25th, reinforced by fresh divisions, pursuing his gains, he threatened to force the Allied front in the direction of Ypres, at the junction of the BEF with the Belgian army. This was almost straight north from us, in our rear.

As the reader will see on Map No. 2, our position was critical; the enemy's last move threatened to cut our line of retreat toward the sea.

MAY 26TH

I was therefore not surprised when early the next morning, Colonel de B . . . , commanding the 13th Dragoon, brought us a new operation order.* We were to move northward, toward Ypres. In view of the uncertainty concerning the enemy positions, the movement was to be made in approach-march formation.

Our reconnaissances left immediately with the vanguard, 8th Cuirassiers, 13th and 29th Dragoons. The column of batteries followed with the 1st "Dragons Portés." Itinerary: Herlies, Highway N 41, Fournes, Beaucamp, Armentières, Wijtschate where further orders were to be given us.

From the beginning the traffic was considerable. Many British units moved along with us. At an important crossroad on Highway N 41, Colonel de Bellefond, commanding officer of the 1st "Dragons Portés," personally directed the traffic, so as to have the various units occupying their proper places in the column. This action avoided many pernicious jams.

We found Armentières badly damaged by numerous bombings. The R. R. station was but a mass of rubbles. On the main square of the city, by the church, the Road Circulation Detachment had stationed two men to direct the columns. The third brigade of the division, commanded by Colonel de Bellefond, was to turn left and take the Bailleul road. The 4th Brigade (ours) Général Lacroix commanding, was to proceed straight ahead on the Ypres road. The R.C.D. man directed us on the wrong route. As soon as I discovered the fact, I sent back a motorcyclist to the square in Armentières to limit the error to the five or six vehicles immediately back of my car. For those vehicles the only solution was to find a byway which we could follow to return to the Ypres road.

The congestion was such that we had to drive four miles along the wrong route before we were able to disentangle ourselves from the traffic and turn right at "La Seau." At that point we crossed the border and reentered Belgium. Our new road went through Nieuwkerke.

*The exact order was, tersely, as follows:

1. The enemy has crossed the river LYS, North and South of COURTRAI and has reached MENIN, IZEGEM and INGELMUNSTER.
2. The 2nd L.M.D. will proceed, as reserve of G.A. to the Sector: ZONNEBEKE, GELUWELD and ZILLEBEKE.
3. All elements of the Division ready to move on receipt of this order, in the general direction of: ARMENTIERES, YPRES.

(Signed) BOUGRAIN

While approaching we could see a squadron of Heinkels showering bombs on the town, two miles away. A major traffic snarl ensued, as was natural to expect. We lost twenty minutes, to my great dismay, as I was eager to return without delay to the Ypres road and resume my position ahead of the battalion.

A pitiable sight awaited us in Nieuwkerke; the bombing had caught many victims, whose bodies were now lined up on a lawn in front of the church. At the northern end of the town, the bombs had set fire to a British supply train including twenty trucks which, unfortunately, were marching in close order. Most of the drivers had been killed and burned; their charred bodies were scattered on the road, so we had to countermarch to find some other way. Finally we succeeded in rejoining the Ypres highway at Meesen and overtook the column at Wijtschate where we halted to await further orders.

Our halt lasted from 11 AM to 1 PM. The Luftwaffe had many planes up and I was uneasy during these two hours lest the battalion be selected as objective by some bomber squadron. Our vehicles were parked at irregular intervals, as close as possible to trees, houses, walls, etc., anything that could provide the least bit of cover against aerial observation. Machine guns and carbines were held in readiness in case low-flying craft appeared. Actually none came; it seems that the Royal Air Force, much in evidence on that day, kept the German squadrons at high altitudes. Furthermore, a heavy shower which fell around noon, the first rain since May 10th, greatly impaired the visibility for half an hour.

We could hear a violent cannonade east of us, an unmistakable sign that the enemy was endeavoring to close on Ypres.

At 1 PM, a major from our brigade staff brought me the order to turn left and via Vierstraat reach Hallebast where I was to halt the head of the column before reaching the Highway N 70. At Vierstraat, I was stopped for half an hour by the Road Circulation Detachment to enable a long and woeful column of refugees to file by. They were inhabitants evacuating the city of Ypres and going to France by way of Nieuwkerke and Bailleul. The fact that the Wehrmacht was closing in on us from all sides did not deter these Belgians from moving. I was told that Ypres had been so cruelly bombed in the morning that the whole population was fleeing via the Nieuwkerke road.

We reached the small village of Hallebast at 5 PM. I expected to find there at least a motorcyclist detailed by the battery reconnaissance parties, with instructions concerning our future movements. However, the place was completely deserted. The major and the three battery commanders with the reconnaissance groups had gone ahead of the column almost twelve hours previously; and since then I had not had any direct liaison with them. For all I knew, they might have been led astray many hours away from us, without any knowledge of the batteries' whereabouts.



Tenth Battery bombed by Heinkels at Chombard Woods. Bombs are exploding in the small pond in front of the guns.

Four of our brightest motorcyclists were dispatched at once to the four places most likely to shelter our brigade headquarters, to report our arrival and ask for instructions. The search was of short duration: our brigade CP was in Dikkebusch, one mile northeast of Hallebast.

The orders were to occupy Hallebast's cantonment, organizing it as a tinged center of resistance with guns and machine guns held in readiness, the personnel alerted. In the meanwhile, the reconnaissance groups had rejoined the battalion. They reconnoitered battery positions northeast of Dikkebusch pond, to be occupied later and only if necessary. We consequently hastened our occupation of Hallebast.

The village was composed of eight or ten farms rather widely dispersed. Most of them, surprisingly enough, were still inhabited. This did not facilitate our work, as these people spoke only Flemish and only a few of them understood French. Finally, a group of only four farms was selected and its defensive organization completed shortly after nightfall.

Information concerning the enemy line east of Ypres was scant and rather unreliable. It seems that during the day the German forces had exerted a terrific pressure on the Belgian forces holding the front there, compelling them to fall back on the railroad track between Ypres and Roulers, organized as a line of resistance. R. R. cars had been disposed on the track to form a continuous chain.

South of the Ypres-Menin Highway (N 9), the situation was much more confused: to all appearances, a gap existed there between the Belgian Army and the Allies. German forces had been able to make a thrust as far as the R. R. line Ypres-Wervik. This explained the violent cannonade we had heard in the morning while halted on Highway N 69.

Enemy armored units were consequently only a few miles away from our cantonment, with probably but scattered and weak elements limiting some sort of a front. Under these circumstances, the reader will understand readily why, during this night of Sunday, May 26th, circled in Hallebast, we kept a strict vigil.

(To be concluded)

This New Fire-Direction Technique

By Captain Walter D. Atkins, FA

The majority of those who have practiced the new fire-direction technique as taught at the Field Artillery School are more than sold on it. We feel that it is *the* solution in the effective handling of battalion fires. Many units, however, have their individual problems, and must work out variations in the prescribed technique in order to fit their own situations. In the 2d Battalion, 160th Field Artillery, such a problem arose owing to the difficulty of providing sufficient officers to act as computers at the fire-direction center. Many of our officers were absent on detached service, at schools, and so on, so the point of assigning officer computers was "out." The only solution was to employ enlisted men in this capacity.

It was with considerable trepidation that we commenced training, but our fears proved groundless. With the cooperation of the battery commanders we soon had as many selected enlisted men as were required for this work. We chose three per firing battery and four from headquarters battery—all these to act as horizontal- and vertical-control computers. Of course we had to adjust this instruction to fit our regular training schedule, but in about a week we had the team ready to take the field. I have never had a more pleasant duty than working with these

soldier computers. They were anxious to have the training, and glad to get to the spot where the "wars are really fought" so to speak.

We found, on our first trip to the field, that we hadn't planned quite as well as we had thought. Our fire-direction center looked like an Old Grads' Reunion, what with all the personnel we had present. It was evident that a change would have to be made. The reason for this condition was that there were present all the spare computers who in actual combat would be held in reserve; but even then we had too many. The solution to this problem, and it solves another vexing matter, was to put headsets and chest-sets (we obtained the headsets and chest-sets from our switchboards) on the computers, and make them combination telephone operators and computers. This accomplished two things: first, it eliminated the extra personnel at the FDC; second, it reduced the chance for error by eliminating one step in the transmission of firing commands.

The results to date have been excellent. In the problems which we have fired, effect has been obtained quickly and accurately. We have tested our new team with an MDC, a K transfer, a CI, and with several forward-observer problems; on no problem did we fail to get effect.

**A plea for a return of a form of the old Basic Course, which
did so much for junior officers in the early twenties.**

IS IT TOO LATE?

Much has been written, much discussed recently, officially and unofficially, regarding Army morale. We listen to radio programs, read editorials and comments in the news forums, we overhear conversation in public conveyances. Opinions vary, as they do with every subject. The subject has been publicized extensively, and it is the responsibility, in my opinion, of the Army to do all possible to correct all conditions which in any way may even appear to be lowering morale.

One of the conditions which some charge has helped to break morale is that of untrained officers. For sake of discussion let us admit that such condition exists. One of our general officers included in his comments on a recent maneuver the following: "The officer personnel is not ideal in ability and leadership," and, "The principal weakness revealed was in the training of small units, a weakness due fundamentally to inadequate leadership." Accepting that there is a fault, untrained officers, I am inclined to feel that the fault, in the greater extent, will be found with company grade officers. Why? Because they carry the burden of direct contact with the enlisted men. They give the commands, they do the instructing, they mete out punishment. True that they perform under the orders of field officers—but the enlisted men, especially recruits, as a whole, give credit to or condemn their battery officers. So again for sake of discussion, let us eliminate (from the discussion) the field officer, and sort of keep in mind to reach him in another way. We might term it "starting at the bottom."

We then have before us the problem of correcting the deficiencies of company grade officers to a point where they can properly assume their responsibilities and properly perform their duties before enlisted men—without embarrassment, without attempting to bluff their way, without relying on the whispered assistance of a helpful non-com. Enlisted men are not easy to fool, especially when you have a cross-section of education and ability, as with selectees. In one small group you may find a college graduate, an illiterate, a common laborer, an expert

mechanic. Whatever their vocation it does not take long to spot an officer who does not know his "stuff." I have always felt that the first impression of an officer formed by enlisted men is usually lasting. If the officer fails in his first appearance before enlisted men, he is on difficult ground. This is applicable to Regulars, National Guard, and Reserves.

For the purpose of this article we have agreed to admit there is a fault, and we have confined it to company grade officers. Let us go one step further and limit it to Reserve officers. Why? Because I am a Reserve officer, and for publication desire to see that Corps overcome its faults. If the shoe fits the other components—well, we know the old saying.

Questions may now be raised such as: "If they don't know their duties"—"can't handle troops"—"why are they holding commissions?" Well, the answer is, there are certain requirements laid down by regulations for commissions in the three components. These officers have met those requirements and therefore are commissioned. They have also met the requirements for retention of those commissions. It might be suggested that the regulations should be changed; but that is beside the point. We are in an emergency and are interested in making good officers of those who hold commissions, and those who may receive them under our present system. They have the necessary educational background or they would not have been commissioned. In commissioning an officer—whether it be from West Point, a military school, or civil life—do we know whether he can "stand up" before troops? There are perhaps a few exceptions, but generally I believe the answer is "NO." One may be a wizard in mathematics, know history from A to Z, be a master of language, be accomplished in other similar ways—yet he is a foul ball when it comes to handling troops. Army officers may be likened to professional men, some of whom may graduate with honors from a good school but fall by the wayside in practice before the general public.

By Major Irwin A. Lex, FA

ARMY OFFICERS DON'T MEET THE TEST UNTIL THEY
STAND BEFORE THEIR MEN

It may then be argued that after these Reserve officers were commissioned they had the benefit of military training by instruction from Regular instructors at conferences, at summer camps, and through correspondence courses. That is true, but let us be frank and admit that despite such instruction there is still something lacking. Whether that is due to the instructors, to limitations placed on instructors by regulations and appropriations, or to the Reserve officer, does not matter for this article. Let us not criticize anyone or anything; there may be a combination of conditions contributing toward the fault. The problem is to make good officers of those we have. To criticize their having been commissioned, to being held, will not help at this time.

What then can be done to detail these officers with troops so that they may report to an organization and know how to take over duties expected of them—know how, by their positive actions, to impress on the men that they do know their "onions." The quickest way to gain confidence of a soldier is to make certain he knows that you can do anything you direct him to do.

Therefore, let us take all these company grade officers and before ordering them to duty with troops send them to a school where they will receive *intensive basic* training in their particular *branch*. I emphasize *branch* because every branch has its own drill regulations, certain customs, certain peculiarities. He should be schooled by practice; a Field Artilleryman, for instance, among other things, should be drilled in the various formations of a battery, procedure at stables, at materiel cleaning, nomenclature of all materiel and equipment, inspections, drills, mess, road discipline, proper use of all instruments, and, very important, the art of giving commands, and leadership. It may then be pointed out that such things can be learned from the book—which is true, but the book does not give us the same confidence out in front of those men as would actual practice. It might also be argued that there are schools for officers held in the various organizations and posts. That is also true, but they do not meet the situation, for the reason that the schools are in addition to the duties with troops. And the object there is to keep officers away from troops until they know the "works." The type school I am referring to should be entirely away from enlisted men. Officers should not be paraded around or instructed in the presence of enlisted men. And we certainly should get away from the habit of some commanders who detail enlisted men to instruct a group of officers. That practice has certainly not helped the Reserve officer situation. It has been resented by those who are sincere. I hope this will not be taken as criticism of an enlisted instructor—it definitely is not meant that way—for there are many of them who can outshine officer-instructors, and who would never consider an opportunity to embarrass. But where an officer

is the instructor, not considering morale, a stronger arm can be used.

If there is anyone who agrees so far, then the question arises as to where and how such schools should be conducted. I feel they should be conducted at a post or place where all company or battery equipment and materiel is available; and should, of course, be by *branch*. A post would be preferable provided the instruction was kept away from general observation by enlisted men. The schools should not be a part of the present special service schools. Those schools are for more advanced training. My thought is that we should have at least one such school in each Corps Area. It would be quite possible, more satisfactory for instruction purposes, and more economical to have all branches instructed at the same place or station, there being of course experienced instructors from the various branches.

As to the length of such course, I have worked over several schedules and do not believe the course, in fairness to the officer and the service, should be less than three weeks—and I mean three weeks of work—not using the first few days to buy toilet articles, inspect the officers' club, etc.

As to instructors, they should be the type who can put it across, in fact, the hard-boiled type, those who can fold a horse blanket and don't need a book from which to read the directions while a non-com does the folding. They should be the type who like to eat dust. They should be, as officers, similar to the non-coms we had at recruit barracks before the World War, and the non-coms who in those days had the duty of preparing us for the change of title from recruit to private in the least possible time. One may wonder why I suggest these "tough" instructors. It is because we are trying to make "field soldiers" of these officers. Let's skip their dancing technique. We want to send these officers to an organization knowing that from the first day they can stand before their men without fear or embarrassment, that when they sing out a command it will carry meaning and authority, that when in gun park they can show a man how to disassemble a breech block, to set up instruments and manipulate them, and the many other basic things that officers should know—and which enlisted men expect the officer to know. Such an officer will be the type who the men will speak of as a chief who knows his job, rather than referring to him as just another Joe Balloon. He will be the officer who can do what he directs others to do. He can take over. When these conditions are met in any organization morale is bound to go way up.

One further condition as to instructors is that they should be Reserve officers. I am confident that there are a sufficient number who can fill the bill. Why Reserve officers? Because they know the problems of Reserve officers, know how to pick out the sincere from others—know the excuses peculiar to the Reserve officer, etc. In connection with this, however, I believe I should be permitted to say at this point in fairness to the Reserve officer

that I also believe the groupings of "sincere and others"—"peculiar excuses," etc., likewise apply to the other components.

I do not of course class the school commandant, commanding officer, or whatever title he should have, as an "instructor."

Further argument may also be made that if such a school—with such definite purposes—were authorized, some officers would not make the grade. To that I say—so what! It is not unreasonable, and it is giving them the opportunity to show what they have. This is an emergency; the men called into service need training, and officers are supposed to do the training. Our conscience should certainly bother us if we were forced to send untrained troops to war (if it should come) untrained because the officers they had were themselves untrained.

In every walk of life—past, present and future, there were, are and always will be men, good men, who were not, are not, and will not be given the right chance. It is impossible to eliminate that problem completely, but we can reduce the number who miss the chance.

Now as to those field officers who were eliminated from the discussion. They do not have the contact with the men the lower grades have, and good ones leave actual instruction to the battery commanders. Therefore, it must

be assumed that they have gone through the mill. However, there is more advanced work in which they should be proficient, which does not affect morale in the same manner, nor nearly so much, as untrained officers attempting to train untrained men. As to the test of their proficiency, that is another problem.

IS IT TOO LATE to consider the possibilities suggested in this article? It perhaps is for those who have completed their service or are about to leave with ratings not satisfactory—some of whom may well be in the class of not having been given the chance. Perhaps they would have made the grade if they had gotten off to the right start, as the school would do. But it is not too late for those not yet called, and those now in service with a reasonable period yet remaining of their tour. Would higher commanders object to three weeks' absence of those officers, even though it meant the temporary curtailing of training, if they knew they would receive after that period officers who could take over. The better training the men would receive thereafter would more than offset the three-weeks' partial loss.

In conclusion, I wish to state that this article is not intended in any way to condemn any person, or system, but solely to correct what I believe we must admit is a fault.

New Insignia for 3rd FA Observation Battalion as Specialized Unit Completes Six Months of Active Service at Fort Bragg, N. C.

The one word on this insignia recently issued to four hundred fifty officers and men at Fort Bragg summarizes the basic mission of their organization, the 3rd Field Artillery Observation Battalion. "LOCAMUS . . . *we locate!*"

Constituted as an inactive unit of the Army on October 1st, 1933, the battalion was activated June 1st, 1941, at its present location by the transfer of personnel from the neighboring 1st FA Observation Battalion. Within a month, the three batteries of the battalion had received a full quota of men—the majority of them qualified selectees who had completed their period of basic military training at the Fort Bragg FA Replacement Center. In another two months, marked by intensive instruction and practice, these men had mastered the various flash and sound ranging techniques by which the battalion operates and were prepared to take to the field as a seasoned outfit.

The insignia, itself, consists of the shield and the "Locamus" motto of the battalion's coat-of-arms. Superimposed on the gold and maroon background of the shield is a bomb burst from which emanate pairwise three lightning flashes. Simple in its design, symbolical in its content—the new insignia has already been the object of much favorable comment.





Reasons *for the* Success of the German Field Artillery

Since the outbreak of hostilities in Europe on September 1, 1939, readers of THE FIELD ARTILLERY JOURNAL have sought information as to the underlying reasons for the swift German successes, with emphasis on artillery lessons to be derived. The JOURNAL has consistently printed such "lessons" as quickly as they could be obtained, in some instances even securing original and exclusive articles prepared for us by artillery commanders who are serving with the German armies. A recent (August 25, 1941) "release" of an agency of the German government summarizes these artillery lessons as clearly and succinctly as anything which has come to light so far. These statements deserve the most careful study on the part of all our artillerymen. We shall quote the pertinent paragraphs, followed in each case by brief editorial comments:

The events of the war up to the present time, in the various campaigns, have furnished us in all arms much experience that has already been discussed in detail. At first the extraordinary great differences in

the course of the battles seemed to oppose the gathering of such a treasure of experience; but still, the general course is such that we can piece together a fairly good picture which, for artillery gives us some interesting facts. The differences in the course of combat in the different corps and divisions has brought about great differences in the employment and command of German artillery. But one fact stands out, and this is that the basic combat principles which constituted the basis for training of German artillery in peacetime have fully proved their worth in the various campaigns. This is particularly true of the basic principles of combat regulations which require that artillery have mobility in command and fire control, and that it be able to concentrate for securing maximum effect.

The German regulations *Command of Artillery*, and *Artillery Firing*, which correspond, respectively, to our regulations for Tactical Employment of Field Artillery,

and Firing, have been fully available to us for study. The most striking thing about them is the close similarity with our own texts and doctrines. For years our artillery commanders, under the leadership of the Chief's office and the School, have preached mobility, flexibility of command and fire control, and above all the ability to concentrate artillery fire power for maximum effect. The Germans have proved the golden value of these ideals in *modern war*, and in so doing they have *proved our own* manuals and methods. We must never allow catch ideas, hastily considered novelties based on snap judgment or scanty evidence, or, what is equally vicious, pressure from ill-informed individuals and groups who have schemes of their own to "put across," to lead us astray from these sound basic principles.

In the course of these battles, which in most cases lasted only a short time, neutral observers were confronted with the question as to how the command of German artillery was able at all times to have the proper amount of artillery at the proper place when it was needed. Of course, there are fixed limits to the mobility of non-motorized units. And it was a natural consequence that in the course of the battle operations, which in all campaigns up to the present have quickly turned into a pursuit, the local pursuit combats were generally fought by the motorized army artillery assigned to divisions.

The great percentage of German divisional light artillery is still horse-drawn, as are the combat and field trains of the infantry. The Germans have not possessed sufficient motor transport (and gasoline?) to fully motorize such units; and they have steadfastly maintained that, as a result of extensive tests prior to 1939, they do not desire to do so. Moreover, animals are a military resource to be utilized in suitable places in lieu of a machine that costs more. However, for swift pursuit they have recognized that motorized infantry and artillery are indispensable. So far as the artillery is concerned, they have formed a mass of GHQ motorized artillery, and have allotted it as needed to divisions charged with pursuing operations. The infantry of these teams has also been motor transported, using trucks, buses, or any available (including captured) vehicles. With the Germans, there is no longer any lingering argument between animal and motor enthusiasts. They employ both means of transport according to the requirements of the situation.

The special importance of observed fire has showed itself clearly. In this respect let us say that the cooperation between infantry and artillery, necessary for the successful support of an attack, was always good; and in this case the artillery forward observer played a very important part. On the other hand, the extraordinary effect of individual pieces used in infantry combat for the breaking of local resistance, particularly in combat in and around buildings and towns, was confirmed. This fractional employment of

artillery proved very effective. Even in combat around permanent fortifications, particularly for firing at loopholes, such cannon were successfully employed.

No comment is indicated as to the value of observed fire and the use of forward observers. We in the U. S. are fully sold on these ideas, and will not omit any efforts to secure efficiency in these respects. As to the use of individual cannon to assist in street fighting and for employment against bunkers, we have had little practice, even theoretically, in this. We should give it some attention. This notion of artillery employment seems contradictory to the stated principle of employment by mass; but the Germans do not hesitate to take appropriate exception to their own principles. They always lay stress on the flexibility of tactical employment. *They have provided their infantry with organic cannon which we would term "accompanying artillery,"* and more recently have given them a few assault guns or armored self-propelled artillery. It appears that these weapons are the usual ones used on the missions for single artillery pieces and thus the divisional artillery remains available for massed fires. The point for us is that artillerymen must be versatile, and must not hesitate to obtain single weapons and push them forward to accomplish such specific missions as are necessary at the decisive moment.

In all campaigns of this war it has been found that artillery combat carried out in a systematic manner will always be successful. In the West, for example, in the attack across the Aisne it was able on the first day and in a short time practically to eliminate the enemy artillery. In the breakthrough of the Maginot Line in a frontal attack south of the Saar bridges, one half hour of strong artillery fire was sufficient to reduce French artillery in such a manner that the weak fire of the latter had scarcely any effect upon our infantry which was advancing to the attack. Of course, a prerequisite for such an effect is that the enemy artillery be sufficiently well located by artillery reconnaissance. Artillery reconnaissance saved our own infantry many losses. After a breach was made in the Maginot Line, 24 firing positions of enemy batteries which had been located and attacked by the German artillery were examined at random in one sector. Seventeen of the 24 which we visited had actually been occupied. This represents an extraordinary favorable result for our artillery reconnaissance.

The appearance of the emplacements showed that our counterbattery fire had been highly effective. In five of the positions the materiel was completely destroyed. Prisoners said that the German artillery attack against their positions simply could not be resisted. Most of the emplacements had been hastily abandoned.

After the preliminary attacks of the second operations sector in the West we examined 31 firing positions

which our artillery had fired upon. In 14 positions there was destroyed materiel—cannon and ammunition wagons; in 9 we found destroyed ammunition. In nearly all the other positions, the dead soldiers and horses, as well as the shell craters, attested the effectiveness of the artillery fire.

Numerous other examples are available. One of the outstanding lessons of this war is the fact that the German artillery reconnaissance played its part extremely well, and it did this not only where the combat lasted for a longer time, but its work was also effective in the combats of short duration. Artillery planes also played a part in the location and attack of hostile artillery. The efforts of the enemy artillery to escape the action of our counterbattery by very mobile methods of employment were of no avail. Likewise the deep echelonment of enemy artillery, which was resorted to in an effort to escape our counterbattery, as a rule limited the artillery support which the enemy was able to give his own infantry.

This lesson for us is that the artillery methods of static warfare are still useful, and must not be forgotten. Counterbattery, especially, is a worthwhile battle occupation. By "artillery reconnaissance" the Germans mean flash and sound ranging, and terrestrial observation—all the methods of locating hostile batteries. They have systematized this and laid great stress on it. Apparently their efforts were well repaid.

On the German side the liaison between tanks and artillery in combat was effected to a large extent by the employment of special artillery observers. In the Panzer divisions the German cannon distinguished themselves particularly in defense against enemy heavy tanks.

Artillery observers in tank units usually accompany the attack in observer tanks, and call for fire by radio. Artillery fire is laid on the shoulders of the area of penetration, on hostile counterattacks, and on located antitank weapons.

Any standard artillery methods which fit the situation are used.

The German summary concludes:

The secret of the success of the German artillery lies for the most part in the excellent training and the importance of observed fire so strongly emphasized by the German regulations. The flexibility of fire in keeping with the tactical situation and its great effect were the natural consequences. The direct support of the infantry by fire observed by numerous forward observers also contributed to this success. In addition, however, the superiority of German artillery fire is to be attributed in part to the modern artillery materiel and the use of more effective ammunition. Cannon, traction means, and vehicles have far exceeded expectations.

The German claim to superior materiel is probably justified. The German artillery was almost completely equipped with new materiel, whereas the French and other opponents had mostly materiel left over from the World War. The principal German field piece is a perfectly orthodox-design 105-mm. gun-howitzer. There is nothing unusual or mysterious about it. Like a battleship, a cannon is the result of a compromise between desirable characteristics and limitations imposed by weight. Improvements in metallurgy have been made, optical equipment refined, ammunition is better. The German cannon are sturdy and well made. The need for mass production has not been used as an excuse for the manufacture of crude or poorly finished guns. Neither has there been any noticeable reduction in the use of good materials, or the sacrifice of quality through use of "ersatz." The lesson for us is that the Germans designed their cannon for today's war, and have provided them in the numbers considered necessary. It has not been necessary for German artillerists to modify their tactics to meet deficiencies of materiel; this has been a tremendous advantage to them.

POPULAR MISCONCEPTIONS

FANCY: The German Army has a large proportionate strength in Armored or Panzer Divisions, larger than the American Army.
FACT: Panzer divisions in the German Army constitute ten per cent of the total armed forces. Our armored forces likewise constitute ten per cent of our total forces.

FANCY: The sergeant was killed by a piece of shrapnel.
FACT: The sergeant was killed by a shell fragment. Shrapnel consists of perfectly round pellets which are dispersed by propulsion from a cylindrical projectile.

FROM



THE CHIEF'S OFFICE

NEW TRAINING LITERATURE Publication and distribution of the remainder of the series of Gunnery pamphlets, parts of the new F. A. Book 161, *Gunnery*, containing subject matter to be included in the revision of FM 6-40, *Firing*, has been completed.

The most important changes, not previously reported in this column, appearing in these pamphlets are:

a. Axial Precision Fire: With light and medium weapons, the unit of range change is *c*, instead of *f* as heretofore. With heavy weapons, the unit of range change is always the fork. In fire for effect an adjusted elevation is computed after the first group of six sensings as heretofore, using the *c* used during adjustment. If the fork has been used in adjustment, the fork for computation is that corresponding to the quadrant elevation at which the group was fired. When the mission is destruction, the elevation may be adjusted after each group of six if necessary; the procedure is the same as that for adjusting after the first group. The old procedure taken from the French prescribing $\frac{1}{2}$ the indicated change after the 2d group of 6, $\frac{1}{3}$ after the 3d group, etc., has been found to be an unnecessary refinement and has been discontinued.

b. Axial Bracket Fire: If the target has little depth and is visible, a single range is sought and fire for effect is delivered at that range. A 100-yard bracket gives a beaten zone of 200 yards, which is too great for a target of little depth. The 200-yard bracket is used for zone fire since the exact location of the target within the bracket is indefinite.

c. Small T—Precision Fire: The first group of six rounds fired for effect is divided into half groups of three as heretofore. The rounds of each half group are fired at the same elevation but may be fired one round at a time in order to speed up the deflection adjustment by making a deflection change immediately after a positive deflection sensing.

Revised F. A. Book 161, *Gunnery*, has been published and is now available at the Book Department, Field Artillery School.

Technical Manual 6-605, *Field Artillery Individual and Unit Training Standards*, is now in the hands of the printer and will be distributed in the near future. The contents of this manual are:

Section I—GENERAL. This section includes duties of commanders of training organizations, duties of commanders of troops, and organization qualifications.

Section II—THE SOLDIER. In this section appear all the subjects that a field artillery soldier should know, citing

references to FMs, TMs, Army Regulations, Training Films and Film Strips pertaining to each subject.

Section III—SPECIALISTS AND NONCOMMISSIONED OFFICERS. Each noncommissioned officer and specialist appearing in T/Os is listed, showing his qualifications, and reference is made to pertinent FMs, TMs, ARs, TFs and FSs.

Section IV—THE BATTERY AND BATTALION. This section sets forth the standards in mobility, tactical and technical functions, and administration, supply and maintenance for all types of batteries and the battalion. It gives a table of time limits within which an efficient unit should perform various types of operations. For example, the table shows that a light battery, prepared for action and laid on base deflection, should get off the 1st round in 12 to 20 seconds from the time the elevation is announced.

Appendix I is a firing program divided into

Phase I—The Battery

Phase II—The Battalion

Phase III—The Artillery of the Division—the Field Artillery Brigade.

Each phase is divided into several exercises. They consist of a series of tests and are a suggested guide for the use and aid of commanders in the preparation of training directives and programs.

Appendix II consists of suggestions for training a firing battery. It consists of extracts from the article "How to produce an efficient firing battery," by Majors H. F. Handy and V. F. Burger, which appeared in the October and November issues of the FIELD ARTILLERY JOURNAL.

RECENT DEVELOPMENTS IN MOTOR TRANSPORT Among the recent developments in motor transport which affect the Field Artillery, the following may be of interest and are furnished in order that troops may keep abreast with what is being done to improve motor transport.

Universal Gasoline Can Bracket.—The Engineering Division at Holabird Quartermaster Depot has recently developed a gasoline can bracket for mounting on motor vehicles. The bracket has a metal base for supporting the gasoline can and a web strap over the top for holding the can in the bracket. The base and back are perforated in order to permit mounting the bracket on a variety of places on different types of motor vehicles. Ten thousand are on order for issue. Figures 1 and 2 show the bracket and a suggested mounting on one type of truck.



Figure 1

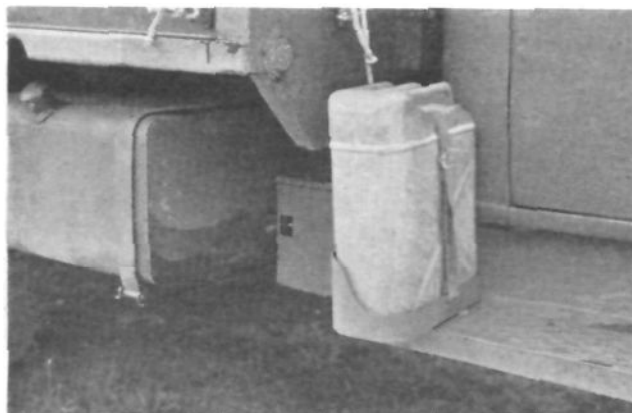


Figure 2

Portable Air Compressor.—No provision is made in Tables of Basic Allowances for an air compressor, for use in the artillery battery, which is of capacity great enough to inflate tires quickly in daily maintenance or to operate air grease guns with which many organizations are equipped. Developments under way at Holabird indicate the early solution of this problem. It was decided to perfect an air compressor which would be portable, light enough to be lifted in and out of trucks conveniently and of sufficient capacity to operate a grease gun (the determining factor). A pilot model of such an air compressor has recently been furnished to the Field Artillery Board for preliminary inspection (Figure 3). This air compressor uses the standard wheel now on the front of the 1-ton cargo trailer, has a pipe frame which serves as an air storage reservoir and has a heavy duty air compressor and gasoline engine. The example shown in the photograph weighs 175 pounds. It has a transmission and direct connected drive between the air compressor and the engine. In production it is anticipated that weight may be reduced to about 125 pounds by using a belt drive for the compressor with the elimination of the transmission and shaft between the two and with strict attention to other features of design. It is contemplated that the compressor will be furnished with a hose on one side containing a tire chuck and on the other

side with an additional hose with a connection for attachment to the grease gun.

Program for Simplification of Lubricants for Military Vehicles.—With the Dodge ½-ton and Chevrolet 1½-ton vehicles (which use hypoid axles), additional types of hypoid lubricants for these axles became necessary. This results in several additional types of lubricants being carried by organizations in the field and it was decided to make a study to determine whether the lubrication of military vehicles could not be simplified. It was found that vehicles in current use required a total of 7 engine oils, 8 gear oils, 8 greases, 3 brake fluids and 3 shock absorber fluids as shown in Figure 4. After considerable study and cooperation with the industry, it was found that the number of lubricants required could be reduced. With regard to engine oils, the most-used engine oils between —32° F. and 130° F. atmospheric temperature were S.A.E. No. 30 and No. 40. The motorcycle required No. 50. It was, therefore, decided to eliminate No. 40 (since No. 50 could not be eliminated)

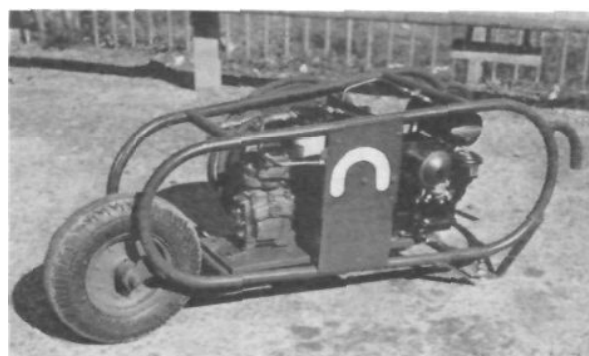


Figure 3

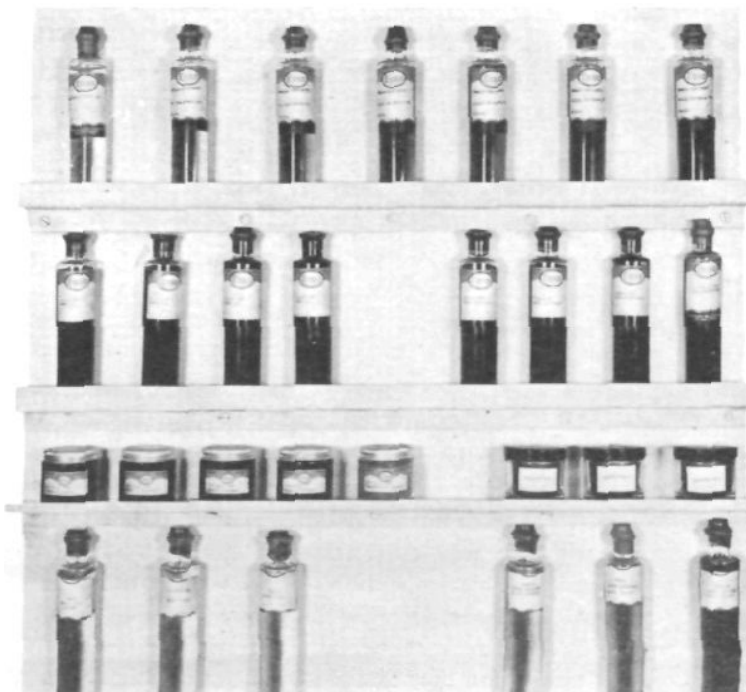


Figure 4

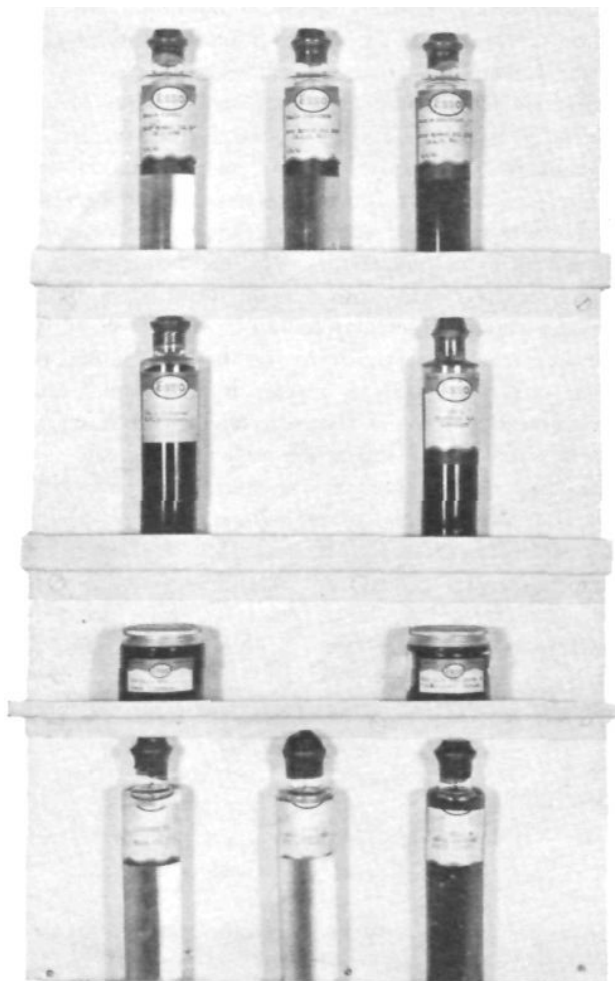


Figure 5

and to obtain the approval of the industry for the substitution of No. 30, or No. 50 for it.

At the same time, the industry was requested to develop a universal EP gear lubricant which would take the place of the EP lubricants being used in the hypoid axles and the straight mineral gear oils being used in transmissions, steering gears and non-hypoid axles. This universal EP lubricant has reached the stage where it is considered acceptable to the motor vehicle manufacturers concerned in the military program and its adoption has been recommended by the Holabird Quartermaster Depot.

Among the factors considered in the development of this universal lubricant was whether it could substitute for the straight mineral oil in non-hypoid axles. The Holabird Quartermaster Depot ran a test of 30 2½-ton trucks, 15 of them filled with straight mineral oil and 15 filled with the new universal gear lubricant. It was found that the oil temperatures of the vehicles using the universal lubricant averaged 50° lower in high speed operation than those containing the straight mineral oil. It was also found that of the 15 vehicles containing the straight mineral oil, 8 of

them had a total of ten final driving gears in the axles, which ranged from scraped to badly scuffed at the end of the test. These 8 vehicles were further tested by filling the axles with universal gear lubricant and at the end of additional testing for 300 miles, several of the gears revealed healing action on the scuffed surfaces. The final recommendations for lubricants included 3 engine oils, 2 universal gear lubricants, 2 greases, one brake fluid and 2 shock absorber fluids (Figure 5). Of these, two items are needed only where the atmospheric temperature ranges continuously below 32° F.

STANDARDIZATION OF UNITS AND PARTS FOR MOTOR VEHICLES

During the past year, much has been accomplished by the joint SAE-QMC

Committee to effect standardization of subsidiary units and parts used on military vehicles. Many of these recommended items are already appearing on vehicles being delivered to troops. Certain others are not yet in production but will appear in the relatively near future.

Ignition Units.—Two ignition systems have been standardized; one Delco-Remy and one Auto-Lite. The two systems are not interchangeable but the parts are interchangeable as units. The ignition coil, generator and regulator can be interchanged as such but the parts of these units do not fit each other. All vehicles have 6-volt ignition systems and all to include the 2½-ton truck have 6-volt starters. Trucks of 4 tons or over use a 12-volt starting motor, with two 6-volt batteries. A series-parallel starting switch is supplied which puts the two batteries in series for starting and returns the two batteries to parallel as soon as the engine starts. In the near future, the battery ground to frame will be changed from positive to negative on all vehicles to include the 2½-ton truck, in order to provide for possible radio installations.

Batteries.—Two types of batteries are being used, the Federal Standard 2H battery (116 ampere hours) on the ¼-ton and ½-ton vehicles and the Federal Standard 4H battery (150 ampere hours) on the others. All vehicles will be equipped with an ignition suppression system to prevent interference with radio installation which may be in or near the vehicle. Further, in the near future, all command reconnaissance cars will be provided with a 12-volt battery so that radio transmitters may be installed in them. The 2H battery is being used only in those vehicles where space and weight considerations have rendered the 4H battery inadvisable. The batteries are not interchangeable but the 2H battery may be mounted in the box which carries the 4H battery in emergencies.

Fuel Pumps.—The 17 types of fuel pumps used until recently on military vehicles have been reduced to two: one, the inverted bowl type used on the Bantam, Willys, Ford, Chevrolet and G.M.C.; the other type for all other QM vehicles. It was found necessary, however, to use a

different type of rocker arm in the pump on different vehicles in order to permit installation in the location used on different engines. In order to prevent breakage of sediment bowls, a new metal type bowl has been designed to substitute for the conventional glass bowl and will be issued in the near future.

Oil Filters.—Two kinds of oil filters have been standardized. On the ¼-ton and ½-ton vehicles where space and weight considerations are of prime importance, a filter having an efficiency life of 150 hours (by Bureau of Standards standard test) has been adopted, for all other vehicles one having an efficiency life of 200 hours. On engines up to 335 cubic inches, one filter element is being used. On engines between 335 and 709 cubic inches, two elements are installed, and on engines of over 709 cubic inches, three elements are required.

Windshield Wipers.—Two kinds of windshield wipers have been standardized—one, vacuum operated; one, air operated. The vacuum wiper has two types of arms, a hinge-type and a straight-type. The air operated wiper has only the hinge type arm.

Keys.—Locks have been omitted from the doors of trucks of recent procurement and ignition keys for all vehicles are identical, being Code H-700. All tachometers use the same key of Code H-800.

Rear View Mirrors.—All the component parts of rear view mirrors except the mounting bracket have been standardized. On the Dodge, however, it was necessary to provide an arm shorter than could be interchanged with any other kind.

Panel Instruments.—A standardized group of panel instruments has recently been adopted. All the instruments are round, with keys or pins to hold them in place. Only two size holes are necessary in the dash. The smaller hole is for all the gauges, and the larger hole takes the speedometer and tachometer. Instruments are directly lighted by a bulb set in a lamp bracket and a 2-position push-pull switch is provided for actuating the panel instrument lights. The mounting for the foot dimmer switch has been standardized, thus making the foot dimmer switch interchangeable for all vehicles.

Horns.—One type of laminated motor vibrator horn has been standardized for all trucks to include the 2½-ton. On trucks larger than 2½-ton, an air-electric horn is used if the truck has hydraulic brakes, or an air horn if the truck has air brakes.

Reflex Reflectors.—Two types of reflex reflectors are in use, the individual marble type and one formed of pressed plastic. The mounting holes on both types are such as to secure interchangeability.

Spark Plugs.—All engines, except the motorcycle, are required to use either the 10-mm. or 14-mm. spark plug.

Radiator and Gasoline Tank Cap.—Standardized radiator and gas tank caps of the pressure type have been adopted. The pressure feature of the gasoline tank cap prevents vapor lock in hot weather. The gasoline tank cap

is required to be chained to the tank but this was not done in the case of the radiator cap because of the danger of the cap falling into the fan.

Air-Brake Hose Fittings.—All air brake hoses will have replaceable type fittings in order to facilitate service in the field when so special equipment is available.

Oil Filler and Breather Cap.—On all vehicles, if the oil filler and breather cap are removable for engine servicing purposes, it must be securely fastened to the engine with a chain or other satisfactory device. In addition, there have been many small items standardized which, although unimportant individually, will assist in field maintenance when considered collectively. Among these may be mentioned the radiator drain plug, the gasoline tank outlet fitting, the gasoline tank drain plug, the chassis lubrication fittings and the oil pan drain plug.

Attention—Organization Motor Officers.—The Field Artillery maintains a Liaison Officer at the Holabird Quartermaster Depot. This officer will be glad to assist organization motor officers with any of their problems which involve contact with the Quartermaster Motor Transport Service. Address — Field Artillery Liaison Officer, Holabird Quartermaster Depot, Baltimore, Maryland.

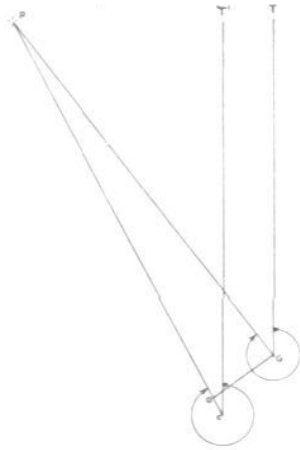
MISCELLANEOUS COMMENTS ON THE MANEUVERS IN LOUISIANA

From the notes of an observer from the Chief's Office.—Many artillery pieces were seen being towed along dusty and muddy roads without muzzle or breech covers. In two separate batteries the guns were found to be rusty, the breech mechanism filled with sand and mud, and the bores caked with the residue from several days' firing of blank ammunition. The care and maintenance of motor transport cannot be overemphasized, yet in not one instance was there evidence of drivers inspecting their vehicles at march halts or in bivouac. It must be constantly borne in mind that the gasoline-propelled motor vehicle is now the artillery prime mover and it requires the same care and attention as is devoted to the horse in horse-drawn artillery. FM 25-10, Motor Transport, is explicit as to what should be done and must be followed religiously, if the motorized artillery is to be kept mobile.

The shuttling of infantry by artillery prime movers was the rule rather than the exception throughout the maneuver. It resulted, as expected, in infantry arriving in the combat areas without adequate artillery support, the complete exhaustion of artillery chauffeurs, and a disproportionate number of serious vehicle accidents. The division and higher staffs do not appear to be aware of the fact that the present T/O and T/A provide only the minimum of personnel and transportation to meet artillery requirements. The question of shuttling troops with any of the organic motor transportation is a command decision and must be made with discretion. It is a dangerous procedure after contact is made or when a meeting engagement is imminent.

Not in the BOOK

HOW TO MEASURE GUN-AIMING POINT RANGES



Although the new instructions for handling the sheaf take much of the burden from the battery executive, I believe he will still want to know the ranges to his distant aiming points in order to (1) check his deflections and (2) relay the battery parallel when necessary. Here is a fast method for getting the range to any visible distant point.

Having used his aiming circle (C) to lay the battery parallel initially in the direction of T, and having commanded the gunners to refer to a distant aiming point (P), the executive sights his instrument on P, using the upper motion, and notes the clockwise angle T'CP which is thus measured. He then requires an assistant to move out from C, staying on the line CP. The gunner of any designated piece (G) halts the assistant at a point (O) so that the line OG is approximately perpendicular to the line GP. The assistant now paces off the distance OG. Meanwhile, the executive has taken the difference between the angle TGP (the actual referred deflection as given in the routine report from the gun G) and the angle T'CP. When this difference is divided into the distance OG, the quotient is, of course, the range GP in thousands of yards.

It will be seen at once that this method is merely a rough adaptation of the "short base" used in surveying. Obviously, the gun used should be the one which will give the maximum OG line.

This operation can be performed in less time than it takes to describe it. Perhaps many will feel that the gun-aiming point range is not worth even the few seconds needed to get it, but most old-school executives are happier when they know this fundamental element in the composition of their sheaf.

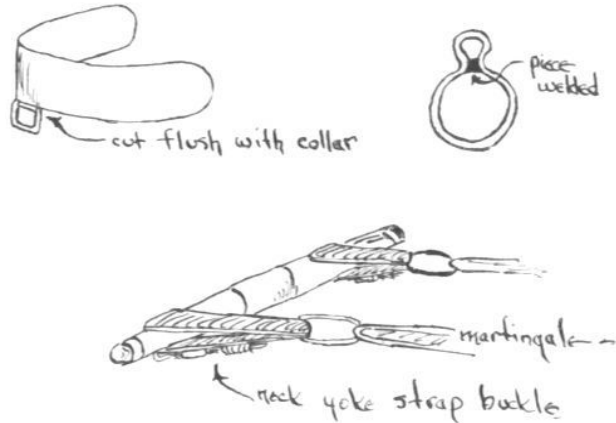
BY CAPT. BERNARD THIELEN, FA.

HARNESS ADJUSTMENTS

Certain minor adjustments of harness, while not mentioned in our field manuals, have been in limited use in the service, and have proven their worth in the reduction of accidents and bruises to animals. Some of them are:

- Cutting off the D-ring for the choke strap on the breast collar. This will minimize collar abrasions.
- Removal of the martingale latigo on the neck yoke and replacing with a shortened neck yoke strap. This gives positive adjustment and assures cleaning and inspection.
- Piece-weld the neck yoke ring to form a complete circumference, thus eliminating the possibility of a spreading ring from sliding down the limber pole.
- Elimination of the snap or hook from the back strap by passing the back strap proper through the cantle D-ring. The

EDITOR'S NOTE: This feature is devoted to ideas sent in by our readers describing methods or devices which, though not specified by official literature, have proved useful in service.



failure of this snap or hook has caused the breeching body to drop to the hocks or lower.

e. Shortening the free end of the side straps after proper adjustment. The length of the standing end is excessive and invariably rides the trace.

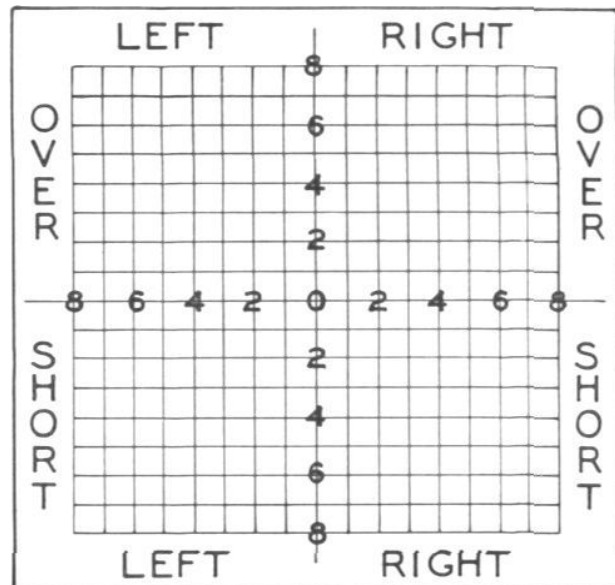
BY MAJ. R. M. MCMASTER, 34th FA Bn.

A CELLULOID TEMPLATE

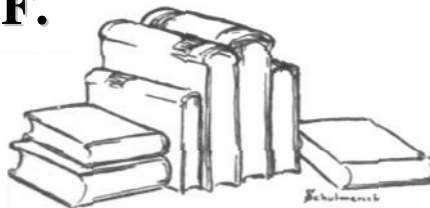
In order to eliminate the possibility of error at the fire-direction center in the plotting of targets which are reported by giving the relative position of another point, i.e., BP (is) 400 RR, 200 øø, the writer has been using a celluloid template which makes the plotting almost foolproof and also serves to reduce the time required.

The template is shown in the sketch below. Its use is self-evident. The grid lines are scribed on the under surface and the figures on the upper. The hole in the center is countersunk.

BY LIEUT PAUL HARTMAN, FA.



BOOK By H. S. F. REVIEWS



A perfect general, like Plato's republic, is a figment of the imagination. Either would be admirable, but it is not characteristic of human nature to produce beings exempt from human weaknesses and defects.
—FREDERICK THE GREAT.

GREAT SOLDIERS OF THE TWO WORLD WARS. By H. A. De Weerd. W. W. Norton and Company, New York, 1941. \$3.50.

Already the present war has one excellent accomplishment to its credit; the beginnings of a respectable body of military literature in the United States, long and not unjustifiably regarded abroad as a desert of military thought. Of the many books which have so far appeared, this one, by the editor of *Military Affairs*, is surely one of the very best from any angle.

Starting with an able introduction, the author points out that the French have always been prepared for the *last* war. With their eye on 1870, in 1914 the French were ready for a war of movement, and instead found siege warfare; and in 1939, looking back to 1918, they counted upon a stalemate and were lost when mobility returned. It is ironic that the French Plan XVII of 1914, so often derided, would probably have seemed far more realistic had it been designed for 1940.

De Weerd then proceeds to consider twelve leaders of both wars, and in these analyses the overwhelming influence of personality upon the conduct of war is plainly evident. First there is Schlieffen, whose masterful plan for the defeat of France was so nearly successful in 1914, and which only failed because his timid successor lacked the courage to carry it out in full. But indirectly Schlieffen performed his greatest service to his country in this war. The French confidently expected his plan to be reenacted in 1940, and that the decisive blow would be delivered by the German right. When instead the blow was delivered by the left, the French were unprepared to meet it.

Next there is Hindenburg, the commander in chief who never commanded, and who served only as a front for Ludendorff and his capable assistants. Hoffman follows, brilliant, temperamental, sardonic, perhaps the most able of all the German staff officers, who engineered Germany's greatest victory in the last war with the defeat of Russia. Kitchener appears as the colonial general, ignorant of European conditions, who wrecked Haldane's carefully laid plans for the Territorial army, and who maintained long after the war was well under way that any more than four machine guns per battalion was an unnecessary luxury. His crumbling reputation was saved only by his death on the *Hampshire* in 1916. By contrast, the next portrait is that of Lawrence, the most spectacular and unconventional soldier of modern times.

The sketch of Pershing is a bit disappointing, but perhaps it is too early to expect a definitive study of the commander of the AEF. Petain is seen consistently cautious and pessimistic in both wars, but no modern general has been closer to his troops, and it is too soon to deliver a final judgment upon him. Gamelin is a mystery: able to foresee the German moves yet failing to counter them, he is summed up by the author as a theoretical and academic soldier. In Wavell we have the one soldier among the armies opposed to Germany who stands out, both in mentality and by achievement, as clearly superior. Although Seeckt died in 1936, evidence of his work is everywhere in the present German Army. The real author of Mackensen's victories in the Great War, after the Armistice Seeckt set about to make the best he could of the treaty-restricted, hundred-thousand-man Reichswehr. His best was very good indeed, for without this nucleus of highly trained personnel the great expansion of the German Army would have been impossible.

By including Churchill and Hitler the author has added two men who, despite considerable personal military experience on the part of both, are commonly considered as politicians, not soldiers. Yet, as he maintains, both men have exercised so close an influence on war that their military abilities must be considered first. In Churchill's case, the emphasis is on his actions in the Great War. Although there is very little evidence upon which to build, this reviewer's guess is that Churchill's conduct of the present war will compare very unfavorably with his part in the last war. In the case of Hitler, the author comes to the conclusion that he is not the dupe of the General Staff, but is actually the author of Germany's successful strategy.

In sum, then, we have here a military book of lasting importance. It deserves serious reading.

THE ARMY WIFE. By Nancy Shea. Harper and Brothers, 1941. \$2.50.

Moss' Manual and more recently the Officers' Guide have covered well for the army officer questions pertaining to customs and courtesies of the service. Mrs. Shea's book does the same thing for the army wives. It is addressed principally to the army bride or to any other lady whose husband has recently been called to active duty. The book is astonishingly complete, and covers, in addition to all the intricacies of social affairs in the army, such things as household management, how to get along on an officer's pay, the military wedding, advice to

CHRISTMAS SUGGESTIONS

INDIAN FIGHTING ARMY

By Fairfax Downey
Scribners, 1941 \$3.50

The hero of this book is the old United States Army of the West in the period between 1865 and 1895. It was a unique institution, isolated, unhonored, and unsung. But its morale and its personnel were unequalled. Mr. Downey, grandson of an Indian-fighting officer and himself a Captain of Field Artillery in the AEF, is well qualified to give us this saga of the West. Army ladies, too, will read this book with delight, particularly those portions dealing with the difficulties of living and making a home in the Army in the early days.

THE ARMY WIFE

By Nancy Shea
Harper, 1941 2.50

Everything the army bride should know about the customs of the service and the management of an army household, explained with understanding and humor.

GREAT SOLDIERS

By H. A. DeWeerd
W. W. Norton & Co., 1941 3.50

The great soldiers of the two world wars—Hindenburg, Hoffman, Kitchener, Lawrence, Pershing, Petain, Gamelin, Wavell, Churchill, Seek, Hitler—are here portrayed with an interpretation of their contributions to military science and military thought. In GREAT SOLDIERS Mr. DeWeerd presents biography as military history, brilliantly illuminating the men and events that have shaped the destiny of our time.

INSIDE LATIN AMERICA

By John Gunther
Harper, 1941 3.50

From Mexico through Central America and South America John Gunther takes us into each nation on this continent excepting only the United States and Canada, explaining its policies, its problems, its leaders, its peoples—and how each affects the world and ourselves. Sure to be a best seller!

BALKAN CORRESPONDENT

By Derek Patmore
Harper, 1941 2.75

This is an eye-witness account of the political, diplomatic and military maneuvers on the Balkan stage, told in clear, vivid fashion.

GENERALS AND GENERALSHIP

By Gen. Sir Archibald Wavell
Macmillan, 194150

In his lectures delivered at Trinity College in 1939, General Wavell considers the qualities required in a good general. These lectures reveal the theories General Wavell has put into practice in his recent campaigns.

BERLIN DIARY

By William L. Shirer
Alfred A. Knopf, 1941 3.00

This is an uncensored and intimate account of Germany in the Second World War, written by a man who witnessed practically every important step in Germany's program of rearmament and dominance, and who combines knowledge of the facts with ability to tell them in full. Book-of-the-Month selection for July.

OUR HAWAII

By Erna Fergusson
Alfred A. Knopf, 1941 3.75

Anyone interested in Hawaii's political and economic position could ask for no better evaluation than this; indispensable for prospective visitors to the islands.

HE'S IN THE ARMY NOW

By Captain Wm. H. Baumer, Jr.
Robert McBride, 1941 2.00

This book describes the varied types of military service: field artillery, coast artillery, infantry, cavalry, air corps, armored force, etc. It also pictures the other side of army life—games, sports, and the various forms of entertainment provided for the selectees. Generously illustrated.

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an officer's widow, and notes on best way to avoid the difficulties of changing station. There is a chapter devoted to the various foreign service posts. Definitely, this is an authoritative reference work and, while interesting reading in that it casts much light on customs peculiar to military service, it is not a book which one can read through like a detective story. It must have required considerable research to obtain all the facts contained in its 300 pages. No army family, either new or old, should be without *The Army Wife*. The author is the wife of Lt. Col. A. F. (Gus) Shea.

—W. S. N.

THE ARMY OF TENNESSEE. By Stanley F. Horn. The Bobbs-Merrill Company, New York, 1941. \$3.75.

Every large war seems to produce partisans who insist that this or that particular theater of war must be considered as the most important. In the Great War "Easterners" and "Westerners" fought bitterly over the respective merits of the fronts in France and the eastern Mediterranean, and their quarrels by no means ceased with the Armistice. The same situation prevailed in the Civil War, especially in the Confederacy, where, unlike the North, no serious effort at coordination was ever made. Until the end, the Confederate high command—Lee and Davis—continued to maintain the Virginia salient and, apparently, never fully understood that their real danger lay in the west. This was their fundamental error, for Grant and Sherman suffered from no such strategic misapprehension, and when Sherman finally broke down the back door of the South the Confederacy was finished. This book tells the little known story of the Confederate western army.

"An army has a personality," says the author, "it has a character of its own." In this substantial, 500-page volume the development of the Army of Tennessee is traced from its origins: the enthusiastic, untrained volunteers who filled its ranks in the beginning; the chaotic early skirmishes and the first great fight at Shiloh; Perryville and Murfreesboro, fought by a transformed army of skilled veterans; Rosecrans' brilliant Tullahoma campaign, Chickamauga, Chattanooga, Atlanta and Nashville; and finally the surrender of the ragged, broken remnants to Sherman in North Carolina. Albert Sidney Johnston, Bragg, Joseph E. Johnston and Hood provided leadership that was sometimes excellent and sometimes the exact opposite; but, except for brief interludes, the Army of Tennessee consistently faced the best the North had to offer—Grant, Sherman, Thomas and Sheridan. Nevertheless, the Army of Northern Virginia was the first to surrender, and the western army was not inferior on any count. In presenting here for the first time the complete and comprehensive story of the Army of Tennessee the author has made a most considerable and significant contribution to American military history.

THE IMPACT OF WAR. By Pendleton Herring, Farrar and Rinehart, Inc., New York, 1941. \$2.50.

This book is not a history of American military policy, although nearly every phase of that policy is discussed and analyzed. Venturing into a new field, the author writes without preconceived prejudice to any group. He sees the defects of political leadership: suspicion of the army, short sighted peace-time economy, and eagerness to derive political advantage from the expenditure of military appropriations. Likewise, he recognizes that the self-centered life of the soldier often results in a lack of sympathy and understanding for the civilian viewpoint, and in a tendency to narrowness and undue conservatism with regard to new ideas. But he also realizes that "politics" is the very essence of democracy, and that the army of a democratic state can no more be divorced from politics than can any other phase of national life. Moreover, he knows that the army withdrew into itself only because of the widespread indifference and apathy to military problems on the part of the general public.

Setting debit against credit, the author arrives at a favorable balance, and the conclusion that the carrying out of an extensive military program does not automatically require the abandonment of the democratic system. If perhaps he might have taken a sharper tone in writing of the period of "divided purposes," particularly since 1933, his fairness and objectivity are to be commended, and his plea for democracy is far more effective than the public pronouncements with which we have recently become so familiar.

INDIAN FIGHTING ARMY. By Fairfax Downey. Charles Scribners Sons, New York, 1941. \$3.50.

No army man (or army wife) can fail to be interested in Fairfax Downey's thrilling accounts of the Indian fighting days of our army. Many of us are vaguely—or even fully—familiar with these stirring events; but they are well worth re-telling, especially today when there is such an effort being made to bring the army and the people of the nation closer together. Fairfax Downey's family and military background (he was a captain in the 12th Field Artillery during the World War) qualify him well to write these pages of our history. And he is a craftsman. The result is a gripping book—one you will not want to put down until you have finished it. There are chapters—such as the one on Fort Sill—which describe places and events of most immediate and intimate interest to field artillerymen. There are others with which we are less familiar, for example, the one dealing with the Nez Percé War, which describe campaigns less well known but of great interest militarily as well as for the description of picturesque parts of our Western Frontier. One chapter, well worth the price of the book, is that which describes the difficulties of living and making a home in the army in the early days. This will be

CHRISTMAS SUGGESTIONS

CARBINE AND LANCE. The Story of Old Fort Sill
By Captain W. S. Nye

University of Oklahoma Press 3.00

Everyone who has ever been at Fort Sill or expects to go there (as what Field Artilleryman does not?) should have a copy of this stirring account of the background and founding of the Field Artillery School. Several printings of this book have been sold, and it is still in demand. Profusely illustrated with rare old photos of early day Indians and other western characters who were at Sill in frontier days.

THE PRIVATE PAPERS OF PRIVATE PURKEY

By H. I. Phillips

Harper, 1941 1.50

The hilarious jeep's-eye-view of army life, as told by a draftee, in letters to his Ma.

THIS IS ENGLAND TODAY

By Allan Nevins

Scribners, 1941 1.25

Professor Nevins, thrice Pulitzer Prize Winner, has recently returned from England, where he delivered a series of lectures at Oxford. He gives here his personal observations and experiences among English men and women in all walks of life. As an evaluation of the English character and a picture of a nation under fire, this book is brilliant and stirring.

WHAT THE CITIZEN SHOULD KNOW ABOUT OUR ARMS AND WEAPONS

By James E. Hicks, Major, Ord.

Illustrated by Andre Jandot

W. W. Norton & Co., 1941 2.50

This book gives detailed and authoritative information about every sort of weapon from the pistol to the heaviest coast artillery. Fully illustrated.

TRANSPORTATION AND NATIONAL DEFENSE

By Joseph L. White

University of Oklahoma Press, 1941 1.50

The subject of present-day American transportation facilities is presented in this volume with admirable clarity and in the briefest possible form. Numerous tables and illustrations provide a ready reference to statistical data.

LATIN AMERICA: A DESCRIPTIVE SURVEY

By William Lytle Schurz (Author of "Manila Galleon")

E. P. Dutton & Co., 1941 3.75

A mature, unhurried book, the result of thirty years of travel, observation and study, and the first complete and unified picture of all the twenty countries of Latin America. Fascinating reading as well as an exciting source book of reliable and exact information.

THE PANAMA CANAL IN PEACE AND WAR

By Norman J. Padelford

Macmillan Co., 1941 4.00

This book deals comprehensively with the rights and powers of the United States over the Canal and the Canal Zone, the administration of the undertaking, and its place in American life. The study is particularly timely in view of the construction of the new locks, the development of the Canal Zone as a major military establishment and the emergency regulation of shipping. The book is published under the auspices of the Bureau of International Research of Harvard University and Radcliffe College.

THE DEMOCRATIC SPIRIT

Edited by Bernard Smith

Alfred A. Knopf, 1941 5.00

This collection of American essays, poems, sketches, stories, and orations includes the writings of our most brilliant thinkers from the earliest times to the present day—Emerson, Whitman, Carl Sandburg, Thomas Jefferson, Benjamin Franklin, Woodrow Wilson, Edwin Markham, Edna St. Vincent Millay, to mention a few. 1040 pages. A treasure-house of literature in one volume. Superb gift!

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Coward-McCann, 1941 1.50

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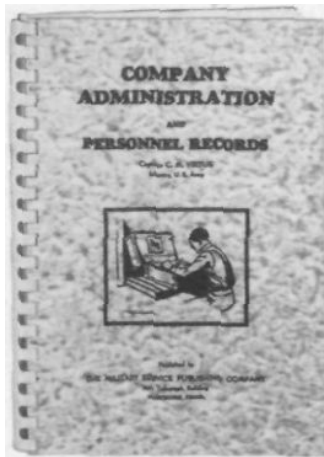
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—W. S. N.

THE SOLDIER AND THE LAW. By John A. McComsey and Morris O. Edwards. The Military Service Publishing Co., Harrisburg, 1941. \$1.50.

The authors are instructors in the Department of Law at West Point, and the book carries a foreword by the Superintendent of the Military Academy. Their double purpose has been to aid in the prevention of military delinquency, and to provide practical assistance to those concerned with the administration of military justice. To this end the book is divided into three parts, respectively entitled "Trial Prevention," "Procedure," and "Practical Illustrations," to which is appended a loose supplement outline of procedure for trials before courts-martial. The first part of the book, occupying nearly half of its pages, amounts to an essay on morale. It consists of advice to both enlisted men and officers to the effect that sensible understanding on the part of the former, and good leadership on the part of the latter, will eliminate military delinquency and result in a first rate unit. The remainder of the book is made up of practical illustrations of military legal practice, of obvious and continuous utility.

HE'S IN THE ARMY NOW. By Captain William H. Baumer, Jr. Robert M. McBride and Company, New York, 1941. \$2.50.

This book follows the trainee from the reception center through the replacement training center to his assignment to a unit in the field. The different characteristics of the several arms and services are described, and about half of the book is taken up with photographs of army life. The man awaiting the call of the local board will get some idea here of what lies ahead of him.

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