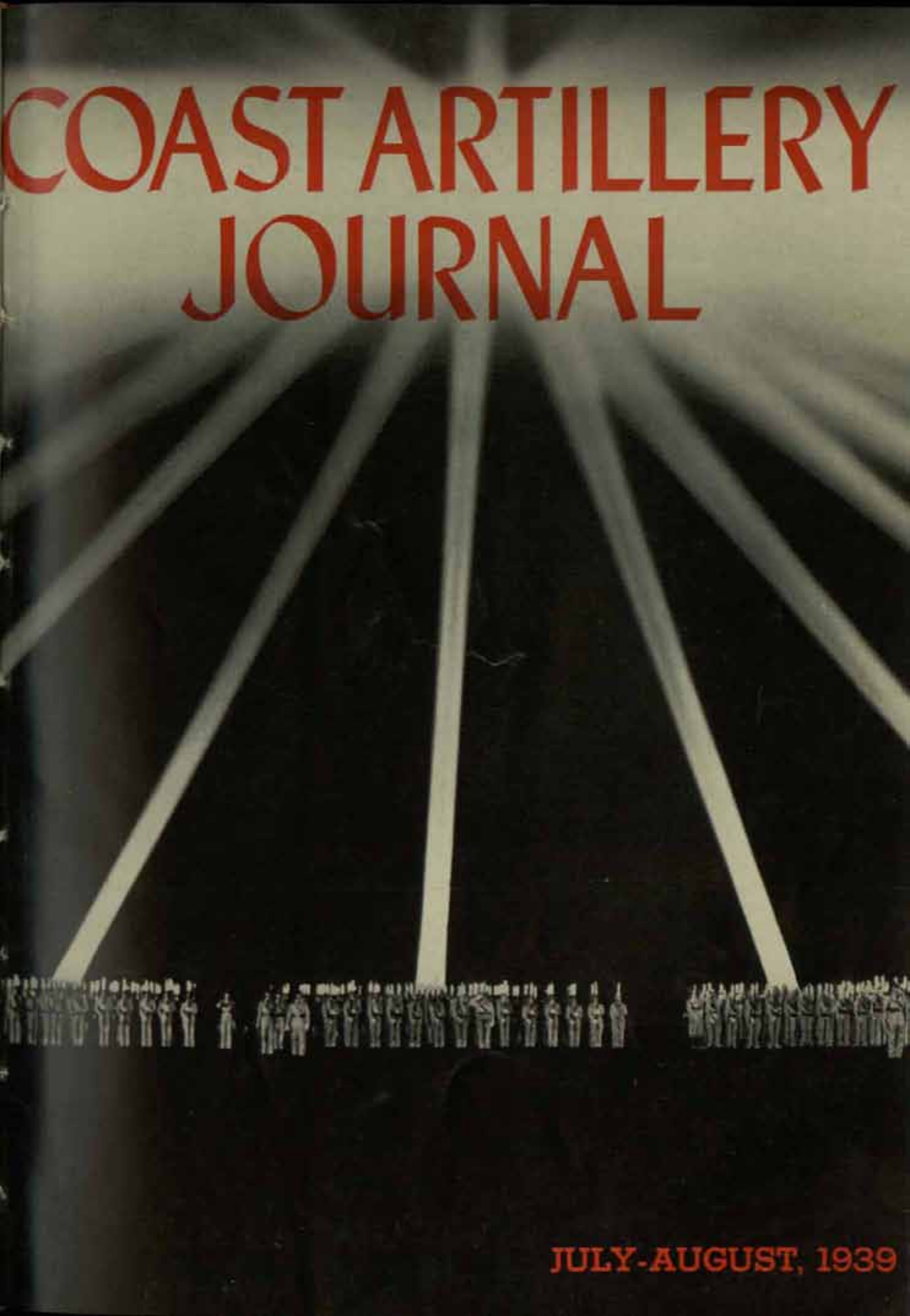
COAST ARTILLERY JOURNAL



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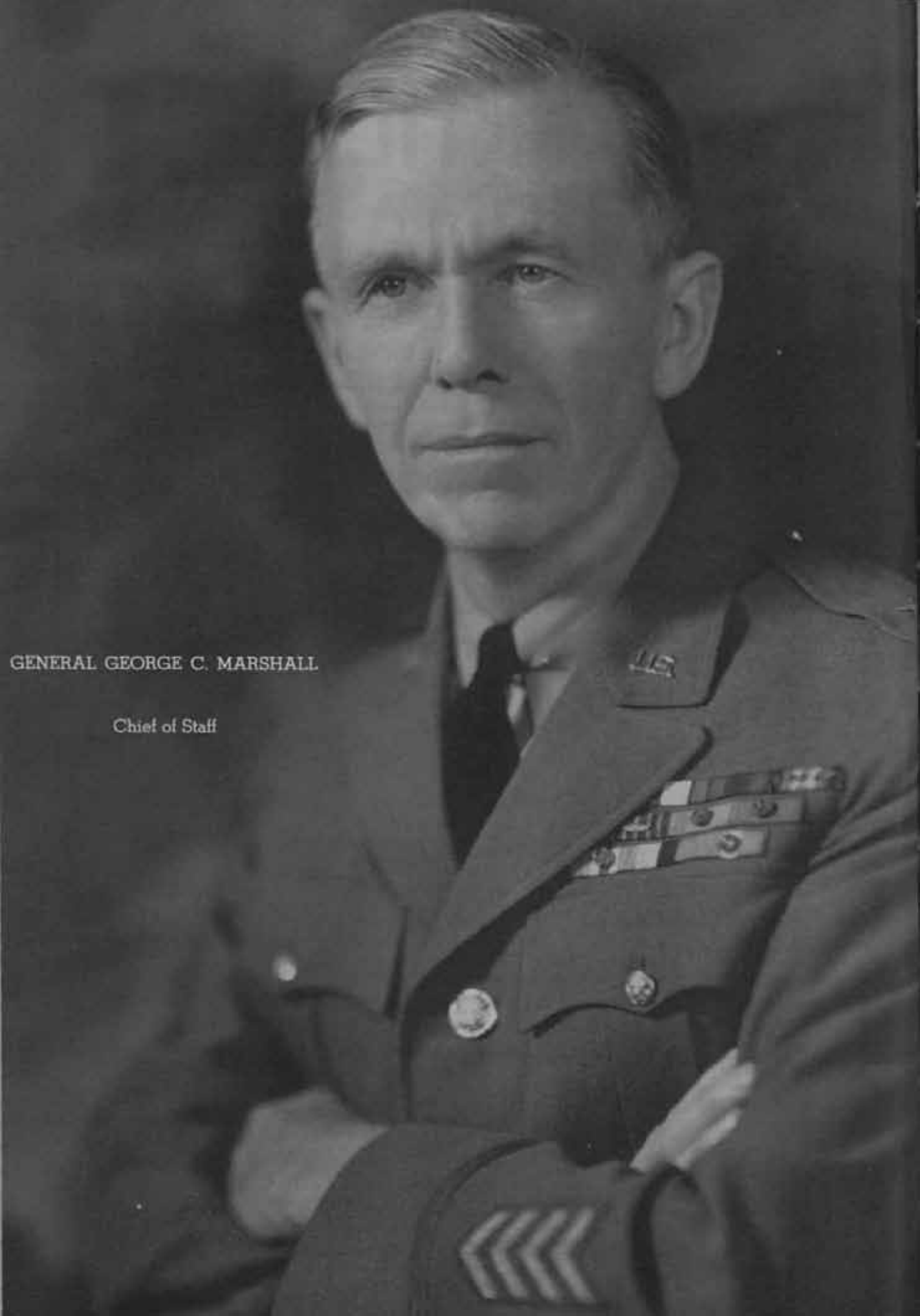

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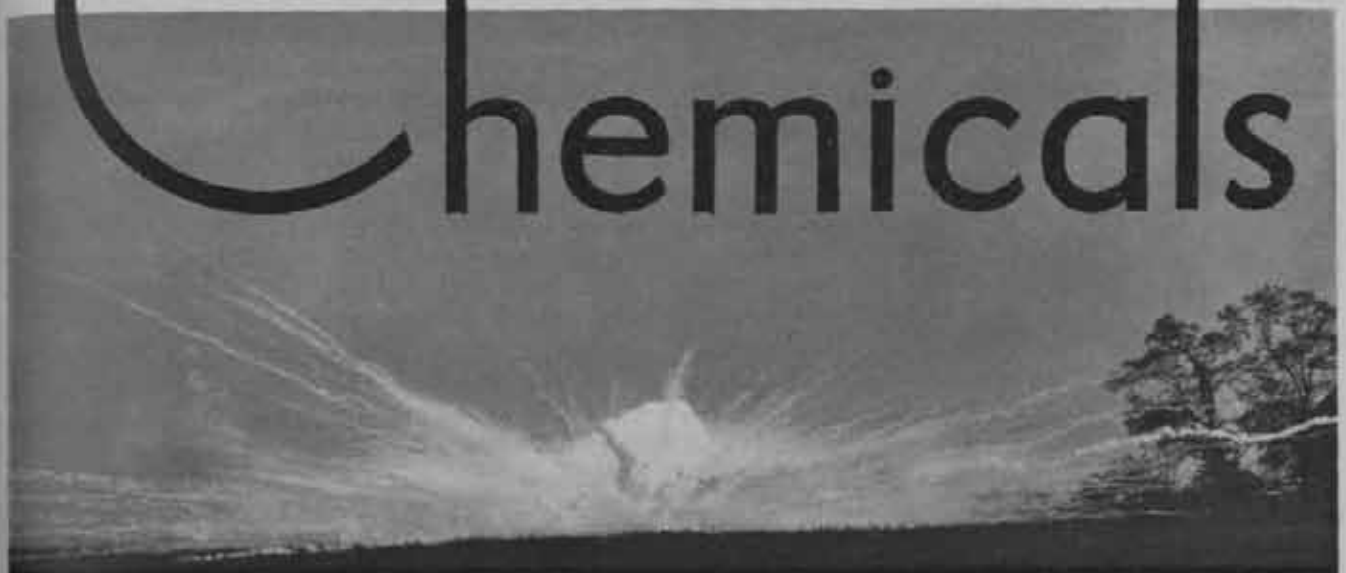
Chief of Staff

Chemicals



AND COAST DEFENSE

By Lieutenant Colonel A. M. Prentiss, Chemical Warfare Service

With the exception of the use of smoke in the British naval attacks on Zeebrugge and Ostende in 1916 and 1918, the World War yields no examples of the use of chemicals in the attack or defense of a coast. But in the light of our present knowledge of the capabilities and limitations of chemicals in war, and the rapidly increasing power of aero-chemical attack, today it is becoming increasingly apparent that chemical warfare constitutes one of the major factors to be reckoned with in modern coast defense.

The outstanding characteristic which renders permanently emplaced sea-coast defense peculiarly vulnerable to chemical attack is their fixity of position. Another characteristic of seacoast defenses hardly less vital, is their difficulty of concealment. Most seacoast fortifications are located in, or immediately adjacent to, important harbors, the topography and general plan of which are known to all nations. Thus, the *general* location of such fortifications is a matter of universal knowledge while their exact location can be readily ascertained by aerial reconnaissance, as they constitute well-defined and extensive targets, almost impossible to effectively camouflage. Since troops in coast defenses cannot avail themselves of mobility and concealment—two of the most effective means of countering the effect of chemical attack—they must be protected from chemicals by the most effective anti-gas means that can be devised. Fortunately, the very nature of sea-coast emplacements makes it possible to furnish their personnel with a far more elaborate and efficacious system of anti-gas protection than is possible to provide for troops in the field.

Before examining these anti-gas means in detail, let us first briefly review the various ways and means that chemicals may be employed offensively against and by coast defenses.

In a purely seacraft naval attack on a seacoast fortification, it is doubtful if simple gas shell would be employed for the reason that naval projectiles are very inefficient chemical carriers. The high muzzle velocities of naval guns necessitate a thick-walled shell of low cubic capacity so that only a relatively small amount of gas is contained in even the largest caliber shells. It would, therefore, require a very large expenditure of such ammunition to set up an effective gas concentration. Moreover, the flat trajectory of naval gunfire militates greatly against the ef-

The aero-chemical attack will constitute a serious threat to coast defenses in the future

fective placement and proper dispersion of the gas content of the shells.

There appear to be but two possibilities of using gas in naval gun shell and then only, in a secondary way, to supplement the primary high-explosive effects of the shell. The first method is to insert in the regular high explosive charge a small percentage of some type of gas which exists in solid form, will withstand the heat and pressure of explosion, and is effective in low concentrations.

The most serious limitation of this type of shell is that, to be chemically effective, it must burst in an enclosed space where the released gas can be retained in sufficient concentration to produce its physiological effects. When burst in the open air, the explosive force of such shell is so great that the small chemical charge is too widely scattered to be effective. The requirement of release in an enclosed space is met when ships are firing against other ships, since any hits secured with armor-piercing shell are apt to explode inside of the hostile ship. But, when ships are firing against land batteries, practically all shell will burst in the open air, so that the chemical effect against land batteries would be almost negligible.

Another attack on the problem of producing an effective naval gas shell has been to find a type of high-explosive which has all the power of the present standard explosives and, at the same time, produces *toxic* gases as products of explosion. As most explosives generate some carbon monoxide and hydrocyanic acid—both very toxic gases—it is not hard to find a compound which will generate a sufficient amount of these gases to be physiologically effective under certain conditions and still not lose an appreciable amount of its explosive force.

The difficulty in such a solution of the problem arises out of the nature of the toxic gases generated. Both carbon monoxide and hydrocyanic acid are among the most lethal gases known, and are very difficult to protect against, but they are lighter than air and are extremely non-persistent, being dissipated within a few seconds after release into the air. Hence, unless they are released in some enclosed place they are almost wholly ineffective. This requires that the shell burst in an enclosed space, which is possible in a battle between two ships, but almost impossible when ships are engaging land batteries. For this reason, it is very improbable that shells of this type would be employed against seacoast fortifications unless some new chemical compound is discovered which will generate a persistent type of gas. This possibility now seems remote but always remains a possibility.

From what has been said above, it appears highly improbable that combination high-explosive and gas shell will be employed against seacoast fortifications. This conclusion, however, is based only on the types of shell mentioned above and it must always be borne in mind that some nation may discover, or have already discovered, some new and more powerful chemical agent which will meet the requirements of effective distribution from naval type shell, even when exploded in the open air.

In the case of smoke, the situation is quite different. White phosphorus (WP), the best smoke producer, is a heavy, solid material which may be loaded into shells without leaving a void for expansion, as in case of a liquid gas. Hence, cubic capacity is not so important for smoke shell as for gas shell, and effective smoke concentrations may be established and maintained even by long-range, flat-trajectory fire with a relatively small number of shell. The burst of a smoke shell is also easily observed even at long ranges, hence a smoke shell bombardment from ships can be satisfactorily placed and controlled by observation of the shell bursts, even though the shells are impacting on land and create no splashes. Furthermore, the smoke cloud, once found, can be maintained over the desired areas by observing its limits, density and drift, and adjusting the fire accordingly.

When an effective smoke blanket is laid on a battery, the resulting obscuration not only greatly reduces the speed and efficiency with which the guns can be served, but completely cuts off the field of view of the battery. Smoke thus materially reduces the rate of fire of all types of shore batteries and may even completely silence batteries firing by direct aim on the target (Case I and II fires). Batteries employing Case III fire can, of course, continue to fire at reduced rate if their observation stations are not obscured, but if the smoke blanket also covers the observation stations, or such stations are simultaneously smoked by other naval guns, even mortar batteries will be silenced.

When the batteries and observation stations of a seacoast fortification are crowded into a relatively small area, as when forts are located on a small island or restricted peninsula, the amount of ammunition required to establish and maintain an effective smoke blanket on the fortification is relatively small and conditions thus greatly favor the use of smoke by attacking ships. On the other hand, where shore batteries and observation stations are widely scattered, the effective smoking of a fortification requires a relatively large amount of ammunition which may easily reach prohibitive proportions.

The effectiveness of a smoke operation is also more or less dependent upon weather, although not to the extent formerly believed to be the case. Of the several weather elements, wind direction and intensity have the greatest influence on the formation and maintenance of smoke screens. In general, a wind paralleling the front of the target area, and blowing with a velocity between three and twelve miles per hour, is the most favorable for smoke screens. Steadiness of the wind is also important with screening smoke, as varying winds cause turbulent air conditions which produce breaks in the screen. Cool, moist and overcast days also favor the formation and maintenance of smoke screens, since the smoke persists longer and clings to the ground better under such conditions. The most favorable weather conditions usually occur at dawn. This is also the most opportune time to launch a naval attack on a seacoast fortification, as the approach to effective battle dispositions can be made under cover of darkness.

While the foregoing meteorological conditions are the most favorable for smoke, it must not be inferred that smoke can only be used under such favorable conditions. On the contrary, successful screening operations can be carried out, with corresponding increases in ammunition, in almost any weather except when winds exceed twelve miles per hour and in torrential rains.

As an example of the influence of weather conditions on smoke screen operations, there may be cited the ammunition required for smoke screens in winds blowing from different directions. For screening purposes, winds are defined in terms of direction, in order of favorability, as follows: a wind blowing parallel to the target front and in general at right angles to the line of fire, is a "flank" wind; a wind blowing at 45 degrees with the line of fire, or target front, is a "quartering" wind; one blowing directly from the target to the firing point is a "head" wind; while one blowing directly from the firing point to the target is a "following" wind.

With the winds thus defined, the number of smoke (WP) shells, required for screening effects, is as follows:

Smoke Screen Ammunition Requirements

Rounds per minute, per hundred yards, of target front.

	Flank Wind	Quartering Wind	Head Wind	Following Wind
3-inch gun shell	3	4	6	6
6-inch gun shell	.5	1	1.3	1.3

From the foregoing it will be noted that it requires from two to two and a half times as much ammunition to maintain a smoke screen in the most adverse (following) wind as in the most favorable (flank) wind.

In addition to its obscuring power, phosphorus (WP) also has a considerable demoralizing effect and casualty value against personnel, owing to the serious wounds inflicted by the pieces of burning phosphorus which are scattered from each bursting shell. When these pieces come in contact with a man, they adhere to his clothes and if of sufficient size, burn through the clothing and produce incapacitating burns.

The question of whether or not smoke shell will be used by surface vessels against shore batteries will depend primarily upon the object of the attack and the extent to which shore batteries and their observation stations are dispersed. Where the object of the naval attack is to effect a run-by of a shore battery; or to conceal other naval operations, such as: (1) a raid on mine-fields; (2) the sinking of a ship in the channel of a harbor; or (3) the landing of troops within the range of the shore batteries; smoke will undoubtedly be widely employed. It may even be used in the direct bombardment of a seacoast fortification to help neutralize and gain fire superiority over the shore batteries. Extensive field tests of a .30-caliber rifle firing through smoke show that when the *target* is obscured by smoke the percentage of hits falls to one-third that are secured when the target is visible; and when the *firing point* is covered by smoke, the percentage of hits falls to only eight per cent of those normally obtained. Hence, if ships smoke shore batteries, the ships will obtain thirty-three per cent hits while the batteries will be able to secure only eight per cent, thus giving the ships a four to one fire superiority. While smoke (WP) shell may be effectively used by ships against shore batteries, it is extremely difficult for the shore batteries to use them effectively against ships.

Summarizing the foregoing discussion, we may say that combination high-explosive and gas shell, but not smoke shell, may be used effectively by shore batteries against ships, while smoke (WP) shell, but not gas shell, may be effectively used by ships against shore batteries.

As there is practically nothing inflammable in either modern naval vessels or coast fortifications, incendiary shell would appear to have no rôle in coast defense operations.

Up to this point we have considered only the action of *surface* vessels against seacoast fortifications and find that chemicals will probably play but a minor part. However, when we explore the field of naval *aircraft* action against coast defenses, we find the situation entirely different. Here, it appears that chemicals are destined to play a major rôle and the resulting combination—aerochemical attack—will probably constitute one of the most serious threats against coast defenses in the future.

Chemicals are used from airplanes in two general ways: first, in drop bombs; and second, in the form of spray. Bombs are particularly efficient for disseminating gas because, unlike an artillery shell, they do not have to withstand the shock of discharge and can therefore have much thinner walls and higher cubic capacity. Thus, while the most efficient artillery shell contains only from ten to fifteen per cent of its total weight in chemicals, an air bomb will hold from one-half to two-thirds of its total weight in chemical filling. The chemical efficiency of the air bomb is thus about five times that of the artillery shell.

As in other forms of chemical attack, for use in air bombs, gases are generally divided into two main types (1) non-persistent; and (2) persistent. Non-persistent gases are generally quick-acting, attack the lungs and respiration passages, and are lethal in effect. They are usually very volatile, and when liberated are rapidly dissipated in the air; hence they remain dangerous in the vicinity of the point released for a very short period, usually less than ten minutes. Examples of such gases are: chlorine (Cl), phosgene (CG), and irritant gases and smokes (such as DM), derived from various arsenical compounds.

On the other hand, persistent casualty gases are generally slow-acting, attack all surfaces of the body, producing burns that are disabling but seldom fatal. They are usually non-volatile liquids which, when released, evaporate slowly and continue to give off toxic vapor for many hours in summer to even weeks in winter. Examples of such gases are: mustard gas (HS) and Lewisite (MI).

Smoke also may be used from aircraft, both in drop bombs and by spraying. The most efficient smoke agent

for bombs is white phosphorus (WP), while the best liquid smoke producer for spraying operations is sulphur trioxide solution (FS). Both of these substances react with the oxygen and moisture in the air and produce dense white smoke which generally persists for from five to ten minutes.

In addition to gas and smoke, incendiary agents are employed in air bombs. The most effective incendiary materials are thermite and magnesium. On ignition, both of these materials burn vigorously, producing a white hot molten mass, with a temperature exceeding 3,000° C which readily ignites all combustible materials with which it comes in contact.

Gas bombs vary in weight from 30-lbs. to 300-lbs., depending upon the type of gas filling. In general, the smaller bombs are more efficient for the persistent gases, while the larger bombs are more effective for the non-persistent gases. The chief difference between the use of large and small bombs is in the distribution of contaminated spots over the target area. For the same load on the airplane, large bombs produce a relatively small number of well defined and heavily contaminated spots, while small bombs produce a larger number of centers of contamination which are more difficult to locate and decontaminate.

In the case of *non-persistent* gas, the whole contents of the bomb will form near the point of impact a cloud nucleus which immediately begins to expand and drift down-wind. The size of the cloud nucleus first formed is relatively small and of maximum gas concentration. As the cloud is swept along by the wind, it becomes diluted with more and more air, thus increasing its size and reducing its concentration. After traveling a considerable distance, the gas will become mixed with so much air that it becomes harmless. The rate at which this process of drift and dilution proceeds depends upon the weather and particularly the strength of the wind.

In winds exceeding twelve miles per hour, a cloud of non-persistent gas will be rapidly broken up and dissipated. For this reason, non-persistent gas is not ordinarily released when the wind exceeds twelve to fifteen miles per hour.

On the other hand, calm weather with little or no wind, presents the most dangerous situation with non-persistent gases, although the danger area is smaller. Under these conditions a dense cloud of gas will be formed at the point of burst and will remain in that area until it is gradually dissipated through expansion and diffusion into the atmosphere. In the meantime it will flow into all low places and depressions in the ground and will penetrate into any inclosed structure which is not gas-tight. Once the gas has penetrated into a confined space, it is not subject to the influence of the wind and air currents prevailing outside and is not as easily cleared as the gas in the open. Hence, it may continue to be dangerous long after the gas in the outside air has become harmless.

Non-persistent, *irritant* gases, such as Adamsite (DM), may also be disseminated by air bombs which contain some form of generator for dispersing the chemical in the form of a particulate cloud or toxic smoke. The gas is emitted from such bombs for several minutes after they strike the ground and the distance from the point of impact to which the gas cloud will travel with an effective concentration is generally considerably greater than with the other types of non-persistent gases. The irritant gases (toxic smokes) are highly penetrative to gas masks and are, therefore, one of the most difficult types of gases to protect against.

A bomb containing *persistent* gas, such as mustard, will make a large splash of liquid at the place where the bomb strikes the ground or other object. A larger concentric area will also be covered with fine droplets, while the finer mist and vapor will drift down-wind from the point of impact. The size of the area infected and the degree of contamination of the ground and air are dependent upon the size and type of the bomb, the nature of the ground on which it falls, and the strength of the wind. On hard ground, the bomb penetration will be slight, and the liquid will be more widely scattered over the surrounding area. Again, if the wind is fairly strong, (i.e. over twelve miles per hour), the droplets and vapor formed by the bursting of the bomb will be carried down-wind for a considerable distance. Thus, a dangerous concentration of persistent gas (HS), may travel down-wind in exactly the same way as a cloud of non-persistent gas, (CG).

A 30-pound mustard gas bomb, bursting on average ground, scatters its liquid contents over an area approximately forty yards in diameter. However, for an effective (though not lethal) concentration only one of such bombs is required per square (100 yards x 100 yards) when the target area is wooded. When the target area consists of open terrain two 30-pound mustard bombs per square are required to insure an effective concentration. If the weather is cold (i.e. below 50° F.) the quantity of mustard bombs required to effectively gas a given area must be increased by twenty-five per cent.

A bomb filled with persistent *tear* gas, such as Camite, (CA), will splash over the ground in the same manner as one filled with mustard. Since tear gases are effective in extremely low concentrations, the contents of a single small bomb will produce a cloud of tear gas sufficient to render a large area intolerable to troops who have no protection for their eyes. Thus, if its contents were evenly distributed, one 30-pound bomb containing CA could cover with an intolerable concentration a circular area two miles in diameter.

Since tear gas produces no casualties, many believe that it has no rôle in war and will not be used. This view is undoubtedly sound where tear gas is considered alone. However, in conjunction with other forms of attack, it may still serve a very useful purpose, by forcing the enemy to mask in the heat of battle and thus add to his difficulties. It is estimated that even the most improved modern mask causes a twenty-five per cent reduction in a soldier's physical vigor and combat efficiency. When to

Figure 1: Attack airplane (A-17) (With chemical spray tanks).

this is added the element of surprise and the resulting confusion and effect on morale, the extremely small quantity of tear gas required to produce results would seem to be well worth while when used in conjunction with high explosives and other chemical agents.

Non-persistent gas bombs may be dropped from either light or heavy bombers. With full fuel load, the *average* bomb load of the light bomber is about 1,200 pounds and of the heavy bomber about 2,400 pounds, so that a light bomber can carry four, and a heavy bomber eight, 300-pound gas bombs, or a proportionately larger number of smaller bombs. Modern airplane developments are rapidly increasing bomb loads so that substantially larger bomb-carrying capacities may be expected in the near future.

Theoretical computations indicate that, under most favorable conditions, one 300-pound phosgene (CG) bomb can establish a lethal concentration over a circular area 200 yards in diameter, or one hundred such bombs can effectively cover one square mile. In order to insure a *lethal* concentration, double this quantity of phosgene would be used under *average* conditions, so we may say that an average of two hundred 300-pound phosgene bombs will effectively cover an area of one square mile. To drop these bombs would require twenty-five heavy bombers (about two squadrons), or fifty light bombers (about four squadrons). These figures are significant for the following reasons:

When a *lethal* concentration of a non-persistent gas, such as phosgene, is established on an area, it means that every *unprotected* man and animal remaining in the area for the period of persistence of the gas—about ten minutes—will become a serious casualty and over half of them will die. Moreover, the gas drifting down-wind will gradually cover an additional area, at least equal in size to the original area, with a concentration which, although not fatal, will still produce serious casualties.

Nor is this all, for experience in the World War showed that non-persistent gases, such as phosgene, continued to cause a large percentage of casualties long after adequate gas mask protection was available. Thus, the American gas mask was fully adequate to protect against non-persistent gases, such as phosgene, yet twenty-five per cent of the gas casualties sustained by our army in France were caused by this type of gas. Investigation showed that over ninety-five per cent of casualties caused by the World War non-persistent gases were attributed to poor gas discipline and causes other than the adequacy of the mask. This human element will always be an important factor in any future war.

Lethal concentrations of non-persistent gases have the most penetrating and searching effect over the area covered and constitute the most severe test of the efficiency of the chemical defense of a command, since the slightest failure of personnel or matériel may be fatal.

Persistent gas bombs are usually dropped on land forces from *attack* airplanes. If employed by a naval force against a seacoast fortification, they would probably be used from light bombers which most nearly approach the army attack type of plane. This type of aircraft has a pay load of about 500 to 600 pounds and a speed of about 200 miles per hour. With a pay load of 600 pounds, each plane can carry twenty 30-pound mustard gas bombs which is sufficient to establish an effective (though not lethal) concentration over twenty squares (100 yds. x 100 yds.) of wooded area, or 10 squares of open terrain. At this rate, one square mile of wooded area would require sixteen planes and a square mile of open terrain thirty-two planes. As there are generally about twenty-seven planes in an attack squadron, one squadron can ef-

fectively mustardize a square mile of *average* terrain, partly wooded and partly open.

For *spraying* from aircraft only the persistent gases (HS, MI, CA) are used, since non-persistent gases suffer prohibitive evaporation losses before reaching the ground. In addition to persistent gas, liquid smoke (FS), and incendiary agents (liquid phosphorus and oil) may also be sprayed from aircraft.

The apparatus for spraying comprises one or more light metal tanks containing chemicals with the necessary electrically controlled valves for regulating the emission of the chemicals.

The tanks are generally suspended under the wings of the plane, as shown in Figure 1. Since the pay load of the attack type plane is about 500 pounds, the spray tanks for these planes have a maximum capacity of twenty-two gallons, or 250 pounds each, depending on the specific gravity of the chemical contents.

In the spraying apparatus, the speed of the plane is relied upon to atomize the chemical agent and to build up the necessary pressure through vents in the top of the tank. The sizes of vent and discharge pipe determine the time required to empty the tank, which generally varies from about five seconds for a small tank to about fifteen seconds for a large one. When the discharge valve is opened in flight, the chemical agent flows out and is broken up by the air currents in the slip-stream of the plane into droplets which fall to the ground like rain. (Figure 2.)

The larger drops fall nearly vertically, while the smaller droplets are carried farther down-wind. The width of the area covered varies with the altitude of the plane and the velocity and direction of the wind, while the length of the area depends on the speed of the plane and the amount of chemical released. The most favorable winds are from five to fifteen miles per hour and the best spraying altitude is from 50 to 150 feet above ground. Under these conditions, the *average* area covered by an attack plane, using one tank at a time, is 1,000 yards long by 200 to 300 yards wide. If evenly distributed over the area, the chemicals carried by sixteen attack planes can cover one square mile of target.

As compared to bombing, mustard spraying produces a higher initial concentration in the air but less persistency on the ground. This is due to the atomization of the liquid into small droplets which rapidly evaporate while falling through the air and hence a considerable portion of the liquid is converted into vapor before it reaches the ground. For this reason the persistency is lowered and in summer an open area sprayed with mustard can be safely entered after twenty-four hours, whereas a mustard bombed area would not be safe for seventy-two to ninety-six hours. The high initial concentration of mustard vapor and liquid droplets in the air make the spray one of the most dangerous forms of gas attack. This is particularly true since mustard spray may fall directly on the face, neck and any exposed parts of the body without being noticed, and even the vapor will penetrate ordinary clothing, including leather and rubber. As mustard attacks all surfaces of the body with which it comes in contact, gas masks alone do not afford adequate protection and means must be provided for protecting the entire body. This greatly complicates the problem of anti-gas protection.

From what has been said above, it seems clear that persistent gas sprays will ordinarily be used against personnel unprotected by overhead cover, while persistent gas bombs

Figure 2: Attack plane laying smoke blanket.

will be used where personnel is protected by overhead cover, such as trees, foliage and light wooden structures. Gas bombs will also be used in conjunction with high explosive bombs to heavily contaminate places and structures which have been damaged by high explosive bombing, in order to delay repairs and increase casualties.

As applied to naval attack on seacoast fortifications, both gas bombing and spraying seem destined to play an important part. Seacoast batteries are well-defined, fixed targets which cannot readily be concealed and are very vulnerable to gas attacks unless prepared to counter them.

Gas bombs may be expected to be used to heavily contaminate gun and mortar emplacements and against observers and other personnel sheltered by light wooden structures, while the spray will be very effective against gun crews, ammunition handlers, and other personnel who must work in the open air. The spray will also be used for general contamination of the area surrounding the batteries. Blanket contamination of this kind is extremely difficult to neutralize and is apt to cause heavy casualties before it can be cleared up.

The principal limitation on the use of persistent gas, (such as mustard), against coast defenses is the time required for it to produce casualties. As a rule, mustard gas requires from two to six hours to produce incapacitating effects. This delay would preclude its use in a rapidly delivered attack where the whole engagement may be over in one or two hours. On the other hand, its delayed action is far less important in a serious investment of a coast defense where the action may extend over many days, as at the Dardanelles, in the World War. Here, the daily casualties will be cumulative and will rapidly become critical.

Not all persistent gases are as slow acting as mustard. Thus, Lewisite is about twice as quick as mustard, but it is still a matter of hours before it produces incapacitating symptoms. Other gases have also been used which are still quicker, but far less powerful in effect than mustard gas. In the past, the increase in rapidity of action has always been at the expense of virulence in effect, so the net gain was doubtful. However, in a rapidly developing science, such as chemical warfare, it is not safe to judge the future by the past, and we must constantly bear in mind that new and more powerful gases are always a possibility.

Another limitation on the airplane spray attack is the vulnerability of the plane when flying at low altitudes. However, this may be largely overcome by the use of cover in approaching targets, by diving quickly on the target from high altitudes, and by attacking under cover of smoke laid by other airplanes. This last technique seems to hold out considerable promise and, if its possibilities are fully developed, may well prove to be the answer to the small caliber antiaircraft gun and machine gun.

It is generally admitted that the large caliber antiaircraft guns (i.e. 75-mm. and up) are unable to engage small, fast attack planes and light bombers when flying only a few hundred feet above the ground. To meet this type of attack reliance must be had on small caliber (e.g. 37-mm.), rapid fire guns and machine guns. In order to make hits, these guns must be sighted on individual planes which must be continuously in view during the firing. If a smoke screen is interposed between the attacking planes and the antiaircraft guns, the guns are blinded and their percentage of hits will be reduced to almost zero. By approaching the target under cover of masking hills, clouds, etc., or by diving from high altitudes on the target, smoke protection is required for only a few seconds while the planes are within range of the guns, i.e., almost directly over the target.

From one to three planes per *flight* of attack or light bombardment aviation is generally sufficient for adequate smoke protection during a low-flying attack, the number of smoking planes required being chiefly dependent upon the wind conditions during the attack. If the prevailing wind is generally parallel to the line of flight, and the planes are flying in close formation, only the leading plane in each flight is necessary to lay the smoke screen. If, however, the wind is oblique or perpendicular to the line of flight, or the planes are flying in more open formation, three planes per flight may be required for screening purposes. The smoking planes then fly on the windward side of the flight. If the smoke operation is properly executed only the nose of the leading or windward plane in a flight is visible from the ground, and it is said that with automatic controls this plane would probably drift a sufficient distance to protect the other planes with smoke, even if its pilot were killed while flying over the target area.

By diving on the target, attack and light bombardment planes may attain a speed of 240 miles per hour. At this speed they cover one mile in fifteen seconds. Since a small chemical tank is emptied in five seconds, each attack plane can screen a distance of one-third mile if the tanks are discharged simultaneously, or two-thirds of a mile, if they are discharged successively. When flying in ordinary squadron formation, the tanks are discharged simultaneously in order to obtain the maximum width of smoke blanket from each smoking plane. The number of smoking planes required per flight of attacking planes is, therefore, also a function of the length of the screen required to protect the squadron during the attack. By approaching the target under cover of masking hills, or clouds, or by diving from a high altitude, smoke screens exceeding one mile in length will seldom be required. Such screens can be furnished by two smoking planes per flight, each plane discharging its own tanks simultaneously, but successively after the other, in the line of flight.

Of course, smoke also cuts off the view of the target from the planes, but when bombing at altitudes of a few hundred feet, sights are not essential and bombs can be fairly accurately placed within a desired *area* by dead reckoning. Moreover, for chemical bombing and spraying, it is not necessary to hit material objects but simply to cover an area. This can be easily accomplished through an intervening smoke blanket. In order not to blind the

pilots by enveloping them in smoke, the smoking planes fly echeloned in altitude just below the bombing and gas spraying planes so that the latter are in the clear above the smoke blanket

From what has been shown above regarding the relatively small number of attack planes required to gas a comparatively large area, and the probable effectiveness of such operations, it is apparent that this form of attack is very economical of military effort as compared to the tactical results obtained. For this reason, if for no other, aero-chemical attack will probably figure prominently in future naval operations against coast defenses.

There are, however, additional reasons for expecting chemical attacks from the air in conjunction with naval attacks on seacoast fortifications. A fleet air force is a component part of every first class navy. This force comprises not only bombing planes, but also the other classes of light, fast combat planes which are necessary to protect the bombers from hostile aircraft. These auxiliary planes are usually equipped to carry small high-explosive bombs which would be almost wholly ineffective against the massive construction of modern seacoast emplacements. If, however, gas and smoke bombs and sprays are substituted for the small high-explosive bombs, these light planes become very effective in supporting the attack of the heavy bombers since chemicals act on personnel even when protected against high explosives by the most massive fortifications.

Aside from the ability of smoking planes to protect the heavy bombers from antiaircraft fire during an attack on a coast defense, smoke screens from such planes may serve as powerful aids to various forms of naval operations. By blinding the shore batteries, smoke helps the ships to gain and maintain fire superiority during an engagement, and by cutting off the field view of shore observation stations, smoke protects ships while raiding mine fields, running by batteries, and even when landing troops within the range of the seacoast guns.

Of course, if smoke blankets could be placed on the ships by the coast defenses, it would work an equal disadvantage to the fleet. But here there are technical difficulties which are due to the inherent differences between ships and shore batteries. It has been mentioned that it is impracticable to establish smoke screens over the water by gun fire, so the only way in which a coast defense could smoke a fleet would be by using attack planes. But here again the difficulties of smoking a fleet are enormous, owing to its wide-spread disposition in battle and the facility with which the ships can change position and quickly move out of any smoke screen that might be laid down by land planes. Also, smoke screens can best be established by planes when they can approach the target behind an initial smoke screen established by gun fire; this is feasible for the fleet, but not for the coast defense.

All things considered, it appears that the manifold advantages of smoke are heavily in favor of the fleet and this fact alone constitutes a serious problem for the Coast Artillery. It means that coast defenses must either devise some means of working effectively in and through smoke screens, or prevent their establishment by attacking vessels. Both of these are formidable tasks.

What has been said regarding the fleet's advantages in the use of smoke also applies, to a greater or less extent, to the use of gas. Moving targets, such as ships, are much more difficult to gas than fixed targets, such as shore batteries. Also, it is easier to provide adequate anti-gas protection for a ship, as it is a single, compact, unitary structure, without surrounding objects, such as vegetation, to hold and multiply the effect of gas. Again, gas and smoke go hand in hand in battle and, without the protection of smoke to aid in putting down gas, the use of the latter becomes far more difficult.

An important part of coast defense is the protection of landing beaches, particularly those outside the range of the coast defense batteries. Here chemicals can be advantageously employed by both the landing force and the beach defense.

In landing on a hostile shore the approach to the shore is generally made under cover of darkness, but experience at Gallipoli has shown that it is extremely difficult to execute the landing operation itself in darkness. Lack of visibility adds greatly to the general confusion of landing and in making a coördinated attack to establish a beach head. For this reason, it is generally believed to be better to make the small-boat run to the beach just at dawn, so as to effect the actual landing in daylight. Under these circumstances, the most dangerous part of the landing operation is in the last thousand yards of the approach run to the beach when the boats come under effective rifle and machine-gun fire from the shore. Here the best protection for the landing force is a smoke screen placed on the beach just back of the water line, so as to blanket the beach defense forces but leave the water line of the beach visible to facilitate landing of the men from the boats.

This smoke screen can be established by gun fire from supporting naval vessels, but is much more quickly and easily laid with small, fast, smoking planes. If smoke is successfully laid on the beach defense machine-gun positions and riflemen, it not only screens the landing operation, but gives the landing force a four-to-one fire superiority as long as the smoke screen is maintained.

The beach defense usually concentrates its efforts against the larger units of a landing party as they come within range. Since the approach of the small boats is generally made in successive staggered waves, each boat zigzagging at high speed, they are very difficult targets to hit with field artillery, even when using shrapnel. Hence, the boats do not, as a rule, come under effective fire from the shore until they get within machine-gun range. While attack planes may be used to some effect to oppose the approach of the boats with machine-gun fire, their small fragmentation bombs are not effective since these bombs must score a direct hit on a boat to cause casualties. This is even more difficult than securing direct hits with high-explosive artillery shell.

Since gas does not have to score direct hits on physical objects, but has merely to cover an area in order to be effective, it is far more efficacious than impact weapons in opposing a landing operation.

Attack planes can readily spray with persistent gas, such as mustard, a water area of such dimensions as to insure the inclusion of the landing of boats within its boundaries. As the boats are usually open boats, every occupant is affected. Also the spraying planes can heavily contaminate the landing beaches and thereby greatly increase the casualties among the landing force. To further supplement the beach defense, mustard gas barriers can be laid down with chemical land mines across the routes of approach from the beach inland. The beach defense artillery can also assist in mustardizing landing beaches and in establishing gas barriers across approach routes.

In crossing these barriers the landing forces will sustain heavy casualties, unless fully protected by masks and protective clothing. Even if so protected, the landing force is at a serious disadvantage in having to fight in such impedimenta against an enemy not so encumbered. All things considered, chemicals appear to afford one of the most effective means available for opposing a landing on a hostile shore.

Having explored the field of the aggressive use of chemicals in naval operations against coast defenses, we may now pass to a brief consideration of the purely defensive measures that may be taken by the coast defenses to counter hostile chemical attacks.

Anti-gas protection generally comprises: (1) individual protection; (2) collective protection; and (3) tactical protection. Since tactical protection makes use of dispersion, concealment and mobility, none of which is usually available to garrisons manning fixed fortifications, coast artillery must rely almost wholly upon individual and collective protection to withstand chemical attacks.

Individual protection comprises the anti-gas equipment of the individual soldier; knowledge of how to use this equipment; ability to carry on his combat duties effectively in gas and smoke concentrations; and last, but not least, a high degree of gas discipline.

Individual anti-gas equipment consists essentially of the gas mask and protective clothing. Gas masks are of three types: (1) the service mask; (2) the diaphragm mask; and (3) the optical mask. The service mask is the simplest form and is for general use. The diaphragm mask closely resembles the service mask, but is equipped with a sound-transmitting diaphragm to facilitate oral commands and telephone conversation, and is supplied to unit commanders and those whose combat duties require the use of the telephone. The optical mask is a mask especially designed to facilitate the use of optical instruments such as telescopes and range finders, and is furnished only to those having these special duties.

A gas-proof clothing consists essentially of a coverall made of gas-proof fabric and a hood of the same material to cover the space between the neckband of the coverall and the gas mask. This coverall is supplemented with shoes and gloves which have been specially treated to render them resistant to mustard gas.

When properly worn this equipment affords several hours protection against the heaviest concentration of mustard gas, even including the liquid itself. The great disadvantage of these protective suits is that they preclude body ventilation and can, therefore, be worn for only a few hours without exhaustion of the wearer. Men, such as gunners, decontamination squads, and others who must work in the open air and remain at their posts regardless of enemy activities, and who have to wear protective suits, must be relieved at frequent intervals. As a rule, this means about two hours on duty, with four hours off duty, for all such personnel during active periods.

In addition to adequate masks and gas-proof clothing, soldiers must be taught not only when and how to use this equipment properly, but also how to maintain their combat efficiency when using it. It has already been mentioned that simply wearing a mask lowers the physical vigor and stamina of a man. The magnitude of this reduction depends largely upon the amount of previous training and experience in wearing the mask. The more a man becomes accustomed to breathing through a mask, the stronger his lungs become and the less the mask interferes with his breathing and physical exertion. Learning to work in a mask is, therefore, very much like learning to march; the proficiency attained in each is almost in direct proportion to the amount of training received.

In addition to wearing a mask without exhaustion, each individual soldier must also learn how to carry on his combat duties, when masked, with the minimum decrease in efficiency. Gas masks necessarily interfere to some extent with vision and this operates in many ways to reduce combat efficiency. Thus, it has been determined by extensive field tests that simply wearing a mask reduces the fire efficiency of riflemen by 17 per cent, and firing in smoke, reduces it by 92 per cent.

While no definitive tests are known to have been conducted with *artillery* firing, the same general results have been experienced with field batteries firing in smoke, and it stands to reason that substantially the same adverse effect is exerted by masks and smoke on seacoast artillery fire efficiency. The only situation in which smoke might prove somewhat of a less handicap in seacoast artillery fire is in the case of mortars which are fired by indirect laying. Here, some semblance of fire effectiveness might be maintained as long as observation stations were not blinded by smoke. When, to the disadvantages of operating in smoke, gas is added, the problem becomes even more difficult. This is believed to be a very serious problem for the Coast Artillery, in view of the relative ease with which hostile naval sea and aircraft can place effective concentrations of gas and smoke on seacoast batteries. Some means for solving this problem must be found and frequent target practice conducted to test battery firing efficiency in gas and smoke.

No matter how effective gas masks and protective cloth-

ing may be, there are certain kinds of work which cannot be efficiently performed in masks, such as the plotting of moving targets, and there are periods when men must be able to remove their masks and gas-tight clothing, such as when eating, sleeping, and even resting between duty periods. To meet these requirements, collective protection is provided by gas-proofing certain vital elements of each emplacement and constructing gas-proof shelters in each coast defense. A plotting room, shelter, or other enclosed space may be gas-proofed by simply closing all extraneous openings and providing a continuous supply of pure air to the enclosed space. The air supply is most simply obtained by pumping outside air into the inclosure through a chemical filter.

A special machine has been devised for this purpose and is known as a "Collective Protector." It consists essentially of a power-driven fan connected by pipes, through a large canister, to the outside atmosphere and equipped with valves and controls for regulating the amount of air drawn into the room. This machine maintains a small superatmospheric pressure in the room and the escape of air through any extraneous openings that may exist prevents gas-contaminated air outside the room from entering.

Double doors are generally provided at the entrance to the room to form an air lock. This helps to prevent an undue escape of air from the room when the door is momentarily opened and, when the air lock is equipped with an air blast from the collective protector, it also provides a means for removing adhering gas from the clothing of persons before entering the room.

The principle of collective protection has recently been very extensively developed in Europe, where each country is providing thousands of public gas shelters, equipped with collective protectors, for the civilian population, in case of hostile air raids on the big cities. These European collective protectors are generally designed to supply gas shelters with from one-half to one cubic foot of pure air, per man, per minute, and vary in size from a small man-driven apparatus, having an air capacity for about twenty-five persons, to a large electrically-driven installation having a capacity of 8,000 persons.

The air purifying units of these collective protectors operate on the same principle as a gas mask canister. They comprise a compartment containing activated charcoal for removing toxic vapors and a mechanical filter for removing toxic smokes from the air. The larger sized air purifiers are composed of a battery of smaller units arranged parallel with the main airduct.

As applied to foreign defenses, collective protection is usually provided for plotting rooms, power casements, signal communications, restrooms, and mess facilities. In general, collective protection is afforded all personnel when the defenses are not in action. When action begins, a large percentage of personnel are unavoidably exposed to chemical attack, since it is impossible to protect gun emplacements, ammunition rooms, and observation stations. For all such personnel only individual protection can be provided while they are on duty.

Effective collective protection is more difficult to apply to coast defenses that are not modern, since they do not lend themselves to modification for this purpose. Therefore, the older fortifications do not usually have the degree of protection found in modern installations. To the extent that collective protection is lacking in a coast defense, the burden of the defending garrison is increased, and the percentage of casualties resulting from enemy chemical attacks will be correspondingly greater.

In addition to sufficient collective protectors, every coast defense should have an adequate gas alarm system, including gas sentries trained to detect and identify gases in low concentrations, and sufficient decontamination personnel and material to quickly clean up any mustardized areas in the coast defense.

The principle of decontamination is simple and consists essentially of treating all contaminated surfaces with a neutralizing chemical which will destroy the gas. The chief difficulties encountered are determining the location and extent of highly contaminated areas, reaching inaccessible contaminated surfaces, and being sure that all contaminated surfaces have been treated. The best neutralizing chemical for mustard gas and Lewisite is chloride of lime which may be applied to the contaminated surface in either powder or liquid form. For well defined, heavily contaminated areas, such as shell holes and bomb craters, the powdered chloride of lime is preferred, while for extensive areas lightly contaminated, the liquid chloride of lime solution is more convenient to apply.

About five per cent of a garrison should be specially designated and trained to perform decontamination work. It is essential that decontamination personnel be well organized and trained for this duty, as decontamination work must be very thoroughly executed with a full understanding of the dangers involved and the technique required to obtain the best results. They must also be fully equipped with the best clothing and with special apparatus for applying the decontaminating gas-proof materials. (Figure 3.)

While anti-gas measures will not completely neutralize the effect of a chemical attack, and some casualties may always be expected, a well organized system of individual and collective protection will reduce the effect of such attacks to a minimum and enable a garrison to survive and stay in action.

Conclusions

1. In a purely *seacraft* naval attack on a coast defense it is improbable that *gas shell* would be employed on account of the technical difficulties involved.

2. On the contrary, *smoke (WP) shell* would undoubtedly be used by ships against shore batteries and observation stations, to reduce the fire effectiveness of the guns, to screen the movements of the ships, and to secure casualties.

3. Combination *high-explosive and gas shell,* but not smoke shell, may be used effectively by shore batteries against ships.

Figure 3: Squad decontaminating mustard gas shell hole.

4. *Incendiary shell* would probably have no rôle in navy vs. coast defense operations.

5. In naval *aircraft* action against coast defenses chemicals are destined to play a major rôle and *aerochemical* attack will probably constitute one of the most serious threats against coast defenses in the future.

6. *Gas* may be effectively employed in both drop *bombs* and *sprays*. *Nonpersistent* gas, such as phosgene, will probably be used in *medium size* (e.g. 300-pound) bombs, while *persistent* gas, such as mustard, will be used in *small* (e.g. 30-pound) bombs and in *sprays*.

7. *Irritant* and even *tear gases* might also be used to a limited extent in small drop bombs, owing to their widespread effectiveness in extremely low concentrations.

8. *Smoke* (FS) will also be employed in the form of *spray* but not likely in drop bombs.

9. Attack and light bombardment planes will probably be utilized to lay down gas and smoke concentrations, since these types of planes always support heavy bombers and their high-explosive armament is too light to be effective against heavy seacoast fortifications.

10. Gas and smoke constitute serious handicaps to the effective functioning of coast defenses and may even completely neutralize them, unless effective measures are taken to counteract the action of these chemicals.

11. Smoke constitutes one of the most effective means of facilitating a landing on a hostile shore while persistent gas affords a most formidable means for opposing such an operation. Hence, we may expect smoke to be used by the landing force and persistent gas by the beach defense.

12. Since coast artillery in fixed fortifications cannot utilize dispersion, concealment or mobility for protection against chemical attack, it must rely almost wholly upon individual and collective protection for this purpose. This emphasizes the necessity for bringing individual and collective protection up to their highest degree of efficiency.

13. The most efficient anti-gas equipment, including gas masks, of special design where required, and gas-proof clothing are essential for all coast defense garrisons, and an excellent state of gas discipline must be maintained.

14. An adequate gas alarm system and gas sentries should be available in each coast defense and special organization, training and equipment are required for decontamination personnel.

15. While effective anti-gas measures will not prevent chemical attacks they will greatly lessen their severity and will enable a coast defense to remain in action.

16. All in all, chemicals constitute one of the major factors to be reckoned with in modern coast defense.

Note: In general, the developments outlined in this article are based upon world-wide trends and do not reflect the situation in any particular country. The views expressed herein are also solely those of the author and are in no sense the official views of the War Department.

The Chinese soldier is convinced of his man-for-man superiority » » » » » » »

A NEW PHASE IN CHINA

By Lieutenant Jack W. Rudolph
Infantry

Weeks before the fall of Hankow an authoritative observer of Far Eastern affairs, William Henry Chamberlin, wrote that the Yangtze campaign might be the last operation in which Japan's military superiority was paramount. The Japanese were making their supreme bid for a badly needed decision. China's reaction to the loss of Hankow would be the key to the ultimate issue.

Hankow fell nine months ago. The war is in its third year, with China apparently more determined than ever, despite an almost unbroken series of defeats. The Dragon has not collapsed militarily, socially, or financially. The conflict has entered a new and important phase, during which the Japanese army may discover that the eye actually can be bigger than the stomach.

One-Two Punch in Asia

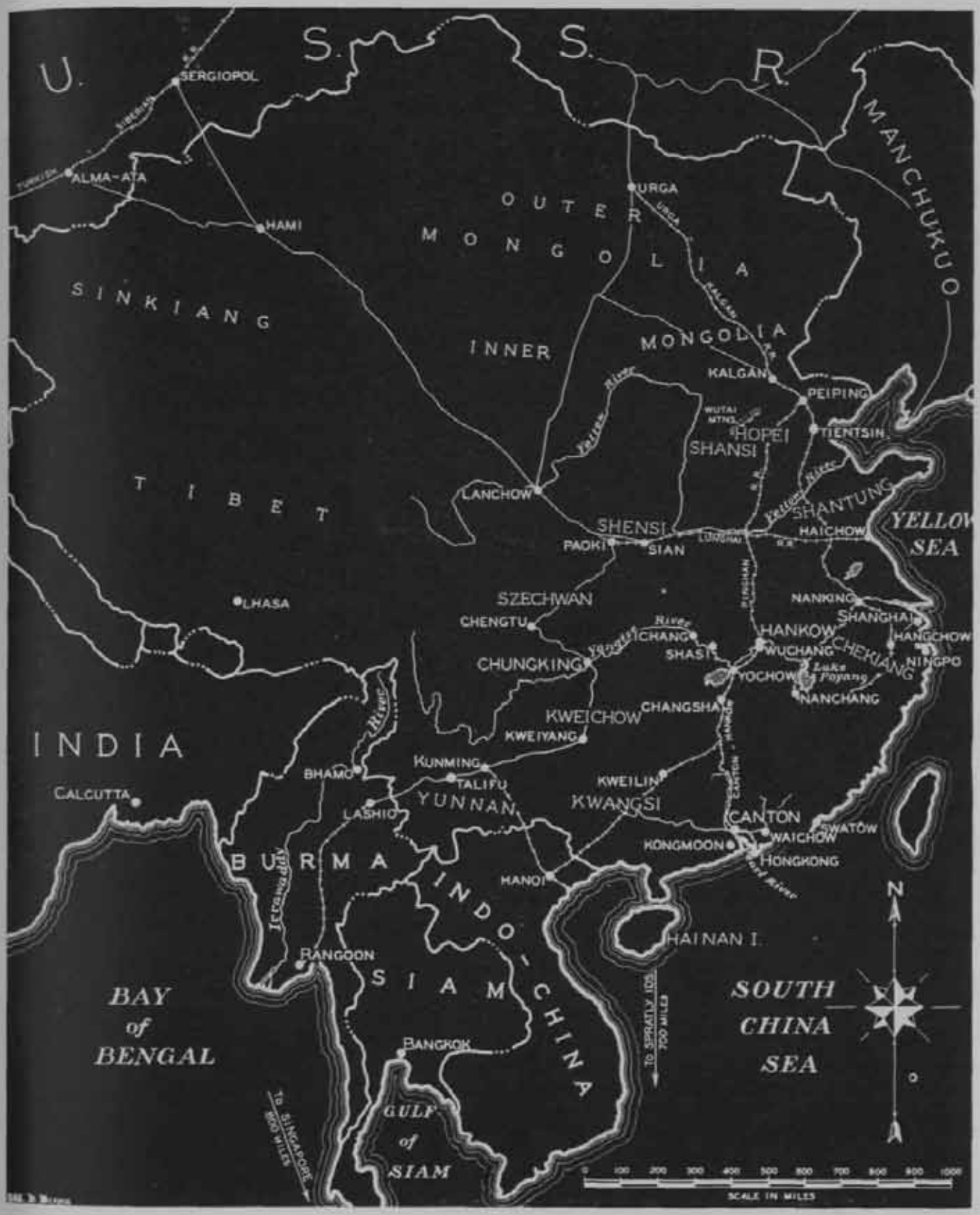
Six hundred miles south of the Yangtze-kiang, at the base of a great valley formed by the convergency of the principal rivers of South China, Canton dominates the Pearl River at the sea. A paradoxical metropolis of modern skyscrapers and miserable hovels, Canton has been for centuries the focus of life below the Yangtze basin. The commerce of a third of China once flowed through its strategically placed harbor.

When Shanghai fell, Canton became China's sole remaining outlet to the sea. The recently completed Canton-Hankow railroad constituted Chiang Kai-shek's lifeline over which he drew an estimated sixty per cent of his heavy munitions. Proximity to Hong Kong was Canton's best defense, for the Japanese navy could not blockade the British port, which became a gigantic gateway for supplies pouring through Canton to the north. In spite of repeated bombardment, the railroads continued to function so effectively that destruction of Chiang's supply artery became a military necessity.

A hundred miles southeast of Canton, the wooded, hill-rimmed shores of tropical Bias Bay once sheltered hordes of coastal pirates. Just before daylight on October 12, 1938, boatloads of Japanese soldiers swept in toward the sleeping village of Hachung from transports lying offshore under the guns of a naval convoy.

Behind the advance guard followed longboats packed with infantry, barges loaded with field guns, light tanks, trucks, and supplies. Into the great beach-head formed, a stream of men and munitions poured in orderly torrent for thirty-six hours. By the morning of October 14, a "model" army of two divisions—40,000 men, with artillery and mechanized weapons—was poised for its dash to Canton.

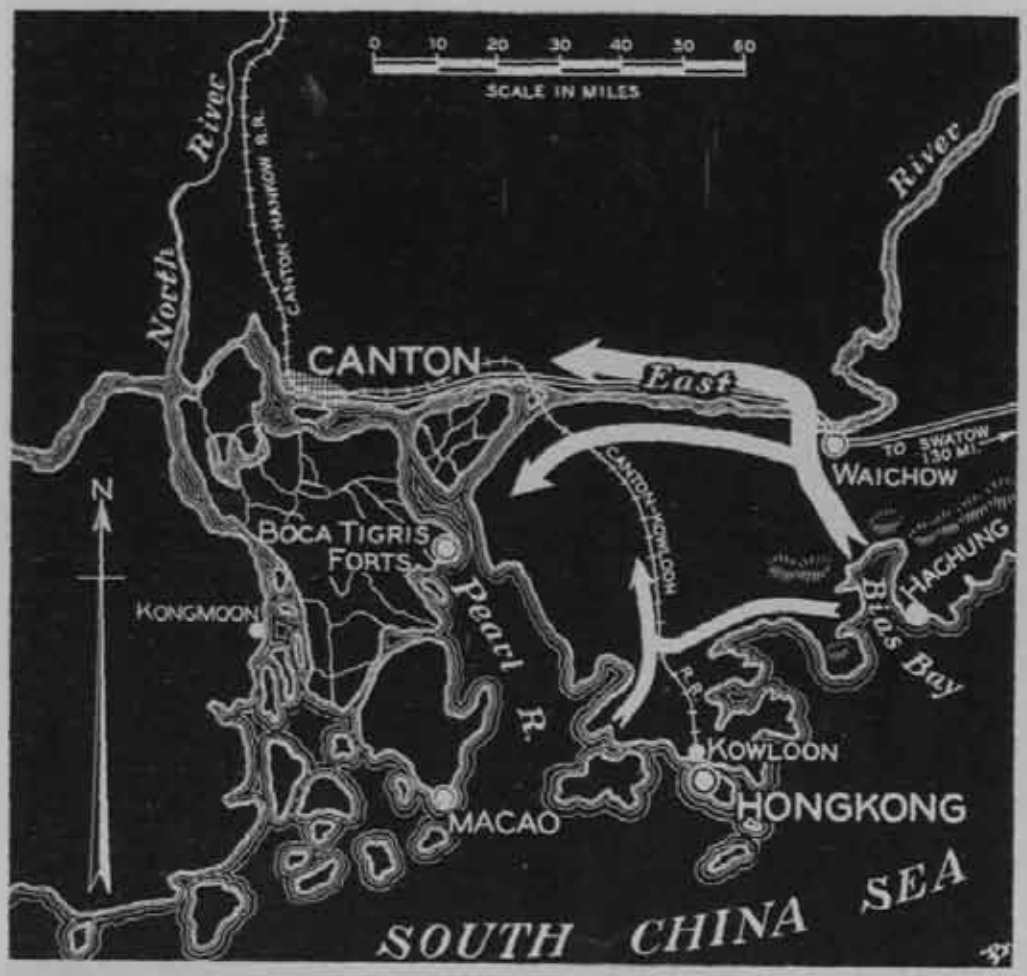
Striking north, the force moved toward Waichow, thirty-five miles away on the Canton-Swatow highway. While the main body swept virtually unopposed to its objective, a small column raced westward across country and two days later severed the Kowloon-Canton railroad about fifteen miles north of the Hong Kong border, joining another force which had landed on the opposite side of the peninsula. The united columns then turned north up the railway.



General Map

Entering Waichow after the city had been razed by bombing, the Japanese crossed East River and approached Canton astride the paved Swatow highway. Part of the force moved parallel along the south bank until it reached the railroad, then struck west toward the Boca Tigris forts guarding Canton harbor.

From Canton, seething with rumor and panic, one of the great mass flights of history began as over a million



The Fall of Canton

people abandoned their homes. For three days and nights the principal avenue of the city was choked by humanity fleeing into the western hills, its flow accelerated by swarms of Japanese planes. Barricades and trenches laddered the streets as the garrison dug in for house-to-house defense.

First intimation that resistance had collapsed came on the morning of October 21 when the $8,000,000 Pearl River bridge was unexpectedly dynamited. All morning the practically deserted city rocked as the retiring Chinese blew up ammunition dumps, railroad yards, public buildings, and utilities. Fires sprang up and swept unchecked through native districts.

Shortly after noon, Japanese tanks appeared from the north closely followed by motorized infantry and artillery, and rolled down the East Bund to hoist the flag of the Rising Sun. By nightfall the main army was pouring in from east and south. Next day Japanese warships, having silenced the forts, steamed into the waterfront.

A whirlwind campaign of less than ten days had netted a most important objective and made inevitable the speedy fall of another. China's last important rail and sea communications had been throttled.

The force of the blow registered five hundred miles to the north, where the main Chinese armies were clinging to Hankow. When the Bias Bay operation began, the Japanese were still a hundred miles from Hankow and advancing so slowly it was considered safe for at least another month. Five days after the fall of Canton, Hankow was in Japanese hands. Further defense was useless with all railways cut. Furthermore, most of the supplies and machinery previously concentrated at Hankow had been transferred deeper into the interior.

When the main elements of the Chinese armies had safely cleared, Hankow's covering forces simply melted away before the Japanese. Columns reaching the railroad south of Wuchang matched strides with troops coming down on Hankow from the north to be the first to enter, while the navy forced its way up the swift Yangtze as fast as current and defensive obstacles would permit. On October 25 advance guards scouted cautiously into the ruined and burning cities.

The double capture of Canton and Hankow was the greatest blow Japan had struck since Nanking. China's last railroad had been choked off, stopping the flow of at least sixty per cent of Chiang Kai-shek's supplies. The defense had been driven back into a rugged and undeveloped hinterland in which it could not hope to recoup the loss of modern communications. Contact between north and south China, though not severed, had been made extremely difficult.

China's armies having once more escaped destruction, were able and willing to continue the conflict. Their retirement was not the retreat of a beaten army. As long as they remained organized and managed to supply themselves with the means to fight, the war was not over.

Aftermath of Hankow

Spurred by General Hata's threat to destroy Chiang Kai-shek if he had to chase him all the way to Chungking, the weary, victorious army continued the pursuit up the Yangtze, fanning out to the north, west, and south. It failed to catch its foe but drove well beyond Yochow and threatened the important Changsha rail and supply base.

The rapidity of the advance frightened the defenders

of Changsha into precipitate destruction of the city while the Japanese were still more than fifty miles away. But the retreat halted and then swept the invaders back with a sudden counter-thrust. The Nipponese retired to establish lines about thirty miles south of Yochow.

Far behind the spearhead of invasion, a determined Chinese defense continued to hold west of Lake Poyang, where nearly six months of steady attacks had netted the Japanese only negligible gains. Working around the Chinese left, exposed by the break-through to Hankow, the Japanese finally drove the defenders from Teian. An orderly withdrawal stopped south of Teian and continued to impede the advance on Nanchang, forty miles away.

Meanwhile, in South China the captors of Canton spread out in a huge semicircle of some fifty miles, until mountain defenses and wide dispersion called a halt.

During the winter, the situation remained static. In Canton the Japanese patrolled a ghost city to whose ruins less than 25,000 inhabitants returned.

North of the Yellow River, the Eighth Route Army continued to block Japanese exploitation of North China. Communist-trained partisan battalions roamed Hopei, Shansi, and Shantung. During January the Japanese reported more than one hundred serious clashes in Shansi alone. Counter-guerilla operations achieved some success in southern Shantung and in the Shanghai-Nanking-Hangchow triangle, but partisans held their own elsewhere.

Early in November the Japanese tried to drive the former Red army from its stronghold in the Wutai Mountains. Six columns reported steady progress into the very heart of the Communist position. Suddenly, all news of them ceased. Weeks later, Eighth Route Army headquarters announced annihilation of the force with a loss of over 6,000 men. The report was probably exaggerated, but it appears certain that the Reds had achieved another victory under conditions advantageous to their tactics.

Most significant event of the winter was the sudden occupation of Hainan Island in February. The island, strategically placed athwart French and British sea lanes, was seized with little difficulty. This invasion was followed, on March 31, by Japan's formal annexation of the Spratly Islands, a group of seven small islands claimed by France, lying 700 miles south of Hainan and within 650 miles of the great British naval base at Singapore.

Renewal of bickering between the USSR and Japan, which nearly precipitated war last summer, again threatened. Several clashes were reported along the Soviet-Manchukuo boundary, while anti-Russian sentiment again flared in Japan. Hallet Abend of the *New York Times* wrote in mid-February that Japan was quietly withdrawing troops from China and concentrating on the Soviet border. War with Russia was freely predicted in Japan, but a crisis was averted through agreement.

The Picture Changes

Thus one phase of the conflict closed and another opened. The Japanese, in control of all seaports and most important rail centers, announced a halt in the pursuit of Chiang Kai-shek and the beginning of a campaign to

The Hankow Area

Man-power is applied to a stalled truck during sub-zero weather

consolidate their gains. The Chinese began harassing, mobile warfare to foil consolidation and to enable them to raise new armies for an eventual counter-offensive.

Admitting that the Chinese armies had not been destroyed, the Nipponese strategists based their plans on the premise that they were no longer a menace; that cut off from adequate supplies Chiang's troops were powerless. Operating from the keypoints in their possession, the Japanese would exterminate the guerrillas swarming behind and between their far-flung lines.

Although natives within conquered areas were hostile and uncooperative, the invaders counted upon absence of patriotism, combined with other weaknesses, for eventual success. Sooner or later desire for trade and profit would lure them into the Japanese-held trading centers. Meanwhile, a "reform" administration headed by amenable Chinese would take over the functions of government.

The scheme presupposed Chiang Kai-shek's utter impotency. It ignored or eliminated the probability of continued and coördinated action among the guerrillas and of Chiang's opening new avenues of supply. More important, it discounted the possibility that although the Chinese might lack patriotism in the full sense, they hated Japan.

From its mountain fastness at Chungking, another seven hundred miles up the Yangtze, the Chinese government proclaimed the "second phase" of its resistance. New armies were to be raised, trained, and equipped as fast as communications could be pushed west into Burma. In the meantime, hundreds of thousands of partisans, specially trained in guerrilla warfare and reinforced by a million regular troops organized and equipped for mobile tactics, would be unleashed upon Japanese supply lines. These fighters would prolong the expensive and morale-shattering war, and would arm and educate the peasant masses for increased resistance.

Within two years, according to Chungking computations, supply lines would be functioning and armies ready. Some time in 1941 a host of three million trained men would sweep over the mountains and drive the invaders into the sea. An optimistic picture, but even more of a gamble than the Nipponese program.

Spring Comes to the Orient

The winter stalemate ended early in March. Large-scale operations began north of the Yangtze and quickly spread to at least five widely separated fronts. It was estimated that before the first of April, more than two million men were in action in central, south, east, and north China.

North of Hankow Japanese columns struck west from the Pinghan railroad, aiming at the Yangtze river cities

of Shansi and Ichang, about two hundred miles above Hankow. The attack smashed through to the Han River, almost halfway to its first objective, then bogged down before the water barrier and determined resistance.

In Chekiang Province, the Japanese moved south from Hangchow, crossed the Chientang River, and advanced on the seaport of Ningpo, supported by naval bombardment. The drive made small headway and stopped when the Chinese 88th Division crossed the Chientang and counter-attacked on the flank. In Shantung the Japanese finally occupied Haichow, eastern terminal of the Lunghai railroad and important supply center for irregulars south of the Yellow River. This seriously handicapped guerrilla operations in southern Shantung.

The situation in Shansi and Hopei remained unchanged. Here where partisan resistance was most active, the Japanese experienced the greatest difficulty in supplying their troops for any large-scale movements. Occupied cities and railroads were attacked regularly. A fifth campaign to drive the Eighth Army from Shansi met the same fate as the earlier efforts. Plans for a crossing of the Yellow River and a drive on Sian have repeatedly been postponed. Partisan activity in Shansi during April brought 338 battles in less than thirty days, according to Japanese reports.

A Nipponese offensive across the Pearl River west of Canton was routed by a surprise Chinese counter blow that cost the invaders a reported 3,000 casualties. At the battle's height the village of Kongmoon changed hands four times within a week. Apparently the defense forces of South China, believed to be native Kwangsi divisions commanded by Pai Chung-hsi, were of high caliber and numerically far superior to the Japanese forces there.

South of the Yangtze the Japanese struck on a 150-mile front, extending from Yochow to Lake Poyang. The main blow fell against the Nineteenth Army defending Nanchang, Chinese air base, where five heavily mechanized Japanese divisions forced the Siao River, stormed Wucheng, last important defensive position north of Nanchang, and swung west to occupy Fengsin. Outflanked, the defenders in Nanchang withdrew swiftly, leaving another ruined city for the invaders.

This loss cut a valuable supply line for regulars and guerrillas operating in the lower valley and necessitated a complete revision of the supply system in central China. It eliminated the threat of a Chinese counter drive against Hankow, and it placed the invaders in favorable position to coördinate a push south from Yochow with a westward offensive against Changsha, last important rail center still held by the defenders.

In this battle reappeared the Chinese air force after months of eclipse. Japanese bombers, whose raids against troops and cities had been unopposed since before the capture of Hankow, now found their way disputed by new pursuit squadrons. Chinese bombardment and attack planes raided Japanese supply bases and airdromes. The Tokyo government even reëstablished air-raid precautions in Japanese cities.

West of Fengsin the attackers pushed on to the pivotal city of Wuning and took it after savage fighting. With the right half of the Chinese line bent sharply back,

The Japanese landing parties at Bias Bay just before the push to Canton

the Japanese launched a converging attack against Changsha from north and east. The maneuver was halted, however, by intense counter-attacks against Yochow threatening the Japanese right.

By mid-April the Chinese had wrested the initiative from the invaders and were hammering them in a series of local offensives along a 1,300-mile front from Shansi to the southern sea. How serious the situation actually became, it was impossible to determine, for rigid censorship was suddenly placed by the Japanese upon all news from the front. Early in May the Japanese announced the complete repulse of a major offensive. The Chinese, admitting that their attacks were beaten off, said they were merely a series of "strength-testing" operations. It appeared, however, that a large-scale attack actually was launched to recapture Nanchang, where fifteen divisions drove almost to the city. Chinese reports differed greatly from the Japanese, and stated that more than five hundred separate engagements had been fought.

The Three M's of China

For two years the Japanese war machine has rolled steadily deeper into China. Over a million Chinese soldiers have died and unnumbered thousands have been maimed in the unequal struggle of flesh against steel. Unbeaten and defiant, China has pitted her numbers against Japan's machines and is still confident.

The question is not how soon China will collapse but what her capacity is for continued resistance. The outcome depends largely upon three factors: the strength of China's fighting forces, her means, and the determination of her people. It is a matter of men, munitions, and morale.

Men. In July, 1937, China had more men under arms and fewer soldiers than any other nation. More than a million were enrolled in a score or more provincial armies, in all stages of equipment and training. Except for Chiang Kai-shek's personal troops there was no national army, and there was no central control over the provincial war lords. Artillery, antiaircraft batteries, mechanized units, supply and medical services were virtually nonexistent. The Kuomintang air force, widely publicized, was small and not overly efficient.

During the opening phases of the war, this poorly directed military mixture suffered terrific casualties. Wirh-

Japanese troops file up the mountainous terrain that leads from the coast at Bias Bay to Canton

out defense before airplanes and tanks, pounded by artillery to which they could but feebly reply, pawns in the provincial bickerings and corrupt politics of incompetent generals, these coolie soldiers died by tens of thousands. Those who survived became the core of a vastly different war machine, still far from ideal by occidental standards but a stouter fighting force than China had ever known —her first truly national army.

According to the dispatches of an unnamed Associated Press correspondent who spent months behind the Chinese lines, the Chinese combat forces at the end of 1938 consisted of 198 full-strength divisions of 10,000 men. In addition there were 400,000 men in training camps and an estimated half million irregulars operating behind the Japanese lines. Except in the backbone of the field armies, the twenty-eight divisions trained by Chiang's former German advisers, the quality of these divisions varied little.

Steadily increasing in importance and now the mainspring of Chiang Kai-shek's mobile campaign, are the guerrilla bands formed in villages throughout Japanese-occupied territory. Led by selected officers trained in guerrilla tactics at special schools, these wage incessant and savage war against supply lines, killing sentries, wiping out small parties, and destroying railroads, bridges, and supply trains. Pai Chung-hsi, deputy chief of the Chinese general staff, has estimated that Japanese casualties behind the lines are now greater than in open battle and exceed more than 500 men a day.

Equipment for this huge and scattered force is meager. Supporting an army of 3,000,000, Chiang is estimated to have some 1,500 pieces of artillery and practically no antiaircraft or antimechanized equipment. He has no tanks. The air force has been replenished with machines but lacks a competent ground establishment.

The supply of small arms and ammunition, in the opinion of informed sources, appears adequate for another year. Reserves on hand, plus ammunition trickling through from the USSR and the output of China's one remaining arsenal, are deemed sufficient for two years of mobile warfare.

Lacking railroads, China must rely upon motor caravans. The total number of trucks now in use must be over 10,000. Mortality due to general mechanical ignorance is high, the life of a motor vehicle rarely exceeding 8,000 miles. A great problem is motor fuel. To conserve fuel, trucks are used only on main supply lines. Within the zone of the interior China uses her age-old methods—mule cart, river junk, and the backs of men.

Perhaps the worst inefficiency is in the medical service. In January, according to the anonymous AP reporter, there were 380 base hospitals with 220,000 beds to care for over a million wounded. Their staffs, totaling 216,000, included only 6,800 classified "doctors," many with little knowledge of medicine. Some base hospitals were directed by coolies promoted from the grade of stretcher-bearer without regard to qualification. Red Cross surgical units, which furnish about the only efficient service, are few and their directors have no authority.

Regardless of his deficiencies in weapons, the Chinese soldier is convinced of his man-for-man superiority. Foreign observers unanimously rate him a first-class fighting man. One American officer has called him the best combat soldier in the world, capable of outmarching and outfighting any other troops on earth, if properly led.

Although generally well-trained, the majority of the Chinese officers have the weaknesses of conceit, inexperience in battle, and what Edgar A. Mowrer calls an "overdeveloped sense of self-preservation." There are, of course, many excellent leaders, some of whom have risen to authority, but in general they are not recognized and promoted as in other armies.

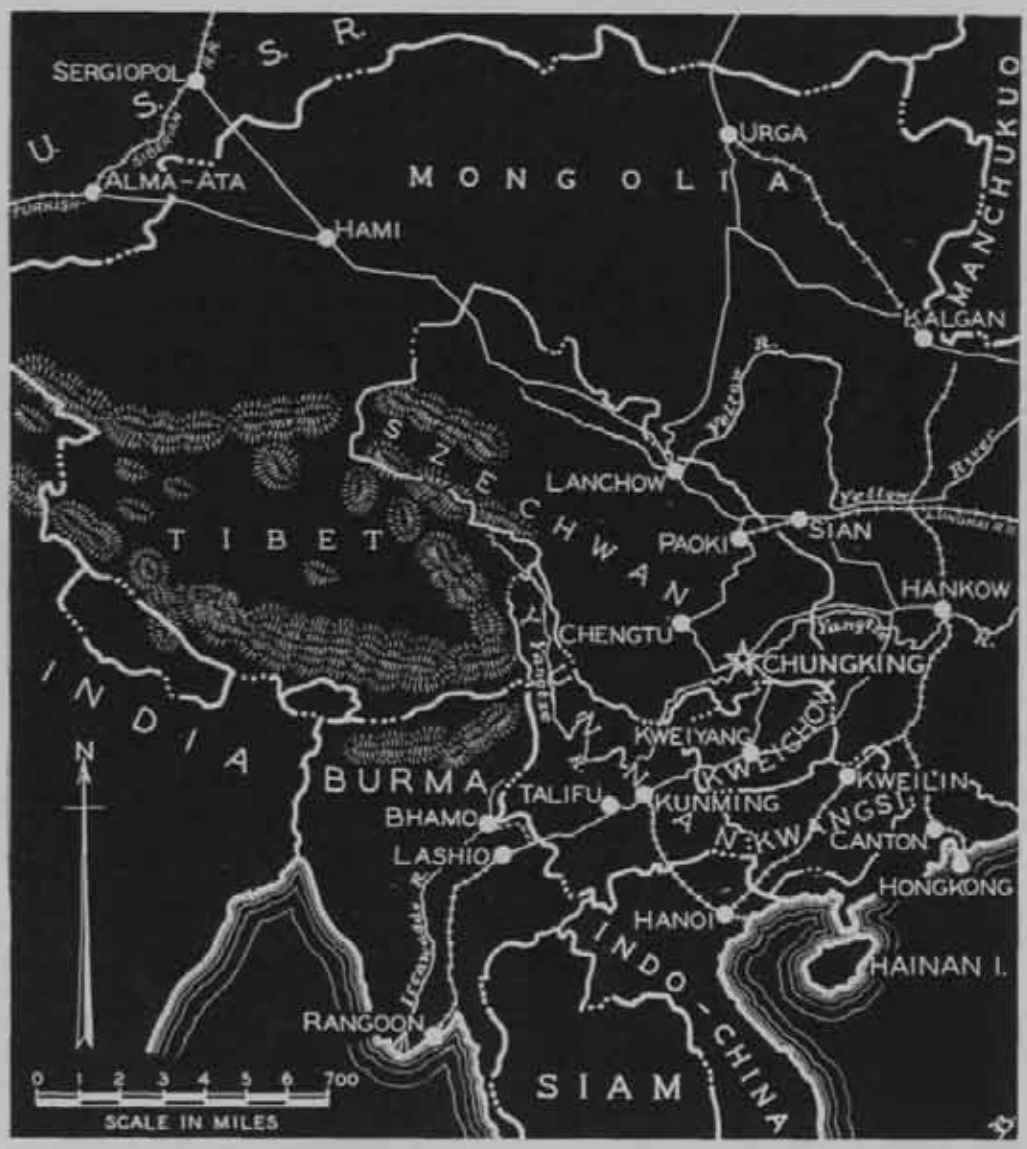
Most of the disasters and blunders of the war can be attributed to the incompetent generals Chiang Kai-shek retains in command. The Chinese field armies contain about one hundred corps and two hundred division commanders. Of the corps commanders, at least half are old war lords who owe their posts to the politics which Chiang shows a regrettable tendency to play. A few executions for failure to carry out instructions have taken place, some incompetents have been cashiered or kicked upstairs to posts with resounding titles and little authority, but on the whole, the conduct of major operations has been entrusted to a group of feudal relics.

Lack of efficient staff work and a proper chain of command are other basic defects. Chiang makes all important decisions personally and issues all battle orders. Instructions are issued to armies, corps, and even divisions without regard to sequence or proper channels.

Chiang's general headquarters, divided between Chungking, Kweiyang, and Kweilin, employs about four hundred staff officers in administrative duties. Four men comprise the most influential group about the commander in chief, two of them old enemies for whom Chiang has a healthy respect. Blunt, hard-driving Pai Chung-hsi of Kwangsi, a tough, quiet man, is deputy chief of staff and most frequently mentioned for supreme command in case anything happens to Chiang. Another former enemy is the Communist diplomat Chou En-lai, universally acknowledged one of the best brains in China. The others are the chief of staff, General Chen Cheng, and General Ho Ying-chin, minister of war.

China today has a fighting force of nearly four million men. Even this great mass, however, represents less than two per cent of the population and could probably be doubled overnight if Chiang had the equipment to arm it. On the basis of American World War mobilization, China could raise an army of 15,000,000. An approach to Germany's effort would give her 40,000,000. China has scarcely tapped her vast human resources.

Munitions. China is a huge and diverse country, rich in resources but lacking means to convert raw materials. Dependent upon imports, the loss of her ports and railroads has necessitated the creation of new outlets on an unparalleled scale. Meanwhile she must fight with what she has. Her success in establishing and maintaining new



"Rump" China

supply lines, as well as her ability and will to carry on until they are ready, will determine the outcome.

When the Chinese forces abandoned Hankow they withdrew into their last and strongest line of defense, the mountainous southwest. The citadel of what Mowrer has dubbed a "Rump" China embraces a most colorful region.

Even by Chinese standards the four southwest provinces are "backward" areas. Mountain ramparts have protected them from the impact of modern life. Yet from these primitive and feudal provinces has flowed for centuries the trade upon which has been built the wealth of Canton and Shanghai.

Rugged Kweichow produces good soldiers and possesses untapped deposits of antimony, iron, copper, and coal, and land for cattle grazing, fruit growing, and lumbering. Neighboring Yunnan, bordering on Burma and Indo-China, has valuable minerals including tungsten and enough tin to satisfy twenty-five per cent of the world's peacetime needs. Agricultural products are fruits, legumes, and every type of cereal.

Treasure house of "Rump" China is Szechwan, whose incredibly fertile soil, yielding two and more crops a year, produces practically everything grown elsewhere in China. Its rice crop is more than sufficient to feed its sixty millions, and tobacco, cotton, sugar cane, and silk are important products. There are reported to be large deposits of iron, coal, copper, zinc, and nickel, and gold enough to produce 80,000 ounces a year. Near the province's famous salt domes have been located petroleum deposits. Other products are tung oil and live stock.

In spite of considerable progress already made, it will be years before a reasonably adequate industrial system can be built in the southwest. Lack of machinery is only one technical difficulty, further burdened by inadequate transportation. Although thousands of tons of factory machinery were evacuated ahead of the great retreat, much of it has been damaged or lost in transit. Little new machinery can be imported as long as the limited trade routes are clogged with munitions. For a long time to come, China must fight with what she has.

It is little enough. The one arsenal in operation is producing a small amount of infantry weapons and ammunition. There are no plants for artillery or planes, and only makeshift powder mills. The lone steel mill at Chungking, of uncertain efficiency, lacks ore and scrap.

The loss of sea and rail communications left Chiang only the long motor road to the northwest frontier. Eastern terminal of this highway, which winds 2,000 miles across mountain and desert wilderness to the Soviet border, is Sian, capital of Shensi. Crossing the Yellow River at Lanchow, the road stretches northwest to the Mongol city of Hami, where it splits into two branches, extending to Alma Ata and Sergiopol on the Turkish-Siberian railroad. Now well along, the highway has been in continuous use for many months.

An extension of the disrupted Urga-Kalgan line has recently been pushed south to join this "Red Route" at

Lanchow, which has become a great distributing point and air base for North China. Stretches of the now useless Lunghai railroad still in Chinese hands have been torn up for a rail extension west of Sian, which has now reached Paoki. From Paoki a surface highway runs south to Chengtu in Szechwan.

A magnificent feat of primitive engineering has been the construction of a motor highway across the mountains to the Yunnan-Burma border. One hundred and sixty thousand coolies built the road almost entirely by hand in a little over seven months. Frederick T. Birchall, writing in the *New York Times* for April 20, described the new highway as traversing a series of plateaus of varying elevations, separated by deep valleys. The road now twenty-four feet wide and eventually thirty feet, in places runs above the clouds. Seventy-five thousand laborers are now at work on a parallel railway from Lashio to Kunming, but it will be two and a half years before the line is ready for traffic.

Japanese infantry combing a bamboo grove in search of guerillas

From Chungking the new road runs to Kweiyang in Kwangsi Province, then west through Kunming almost to the old Shan city of Talifu, and across the Burmese border to Lashio, railhead of the Burma railway. It has officially been open since December, but is still far from completed. There are grave doubts that it can continue in operation through the rainy season, which between May and October averages 208 inches of rain. Thousands of coolies have been assembled in work camps to deal with expected landslides and washouts.

Munitions and less bulky supplies are usually landed in Rangoon, shipped by train to Lashio, and then sent by truck to depots on the Chinese side of the border, where they are relayed over the mountains to Kunming. It has been reported that four hundred 3-ton trucks are on this run. Trucks and heavier materials are sent by boat up the Irriwaddy River to Bhamo, thence across an old border road, impassable during the rainy season, to the new highway, and into China.

Until these new communications become adequate and reliable, China's basic resources are sufficient for the type of defense upon which she has embarked. Food and clothing cause little concern. The coolie soldier requires little of either. Nor is China apparently in danger of financial collapse. Her currency has held up well and has even resisted Japanese efforts to drive it out of circulation. Recent American and British loans have strengthened her credit and stability.

Morale. "The reason why . . . China is not going to be conquered . . . is that, not only is Japan not the Manchus or Mongols of other centuries, but also China is not the ancient, formless mass conquered by the Mongols and the Manchus . . . we can say that China's nationalism is an accomplished fact, and China is assured of unity and leadership and determination to fight till the final victory, even if it takes years." Thus does Dr. Lin Yu-tang sum up China's moral strength in his *My Country and My People*.

China has not only withstood Nanking and Hankow but her central government appears stronger than ever, even extending into areas nominally controlled by the Japanese.

Even the most pessimistic observers concede that Chinese unity has been astonishing. China has displayed none of the traditional defeatism and provincial cleavages upon which Japan counted for a cheap and speedy victory. From mandarin to coolie there appears to be an un-

broken front. The soldier, once on a par with the common criminal, is now a national hero. It is generally admitted that no responsible government would dare arrange a peace on the basis of a Japanese victory.

Upon his return to the United States last winter, Ambassador Nelson Johnson told the press that nowhere in China had he found war hysteria but everywhere determination to resist and eventually defeat the Japanese. Even Japanese leaders minimizing China's morale have warned their people that the war will be long and costly.

Japan Tightens Its Helmet Strap

Although their movements have been cloaked in rigid censorship, at least thirty Japanese divisions have seen action. Concentration of an additional half million troops in Manchukuo brings Japan's mainland strength to more than a million soldiers.

Japanese losses, also carefully concealed, can only be approximated. The government has admitted 51,000 dead. Estimates of neutral observers vary from 125,000 to 450,000 killed. Disease and weather have taken even greater toll than Chinese bullets.

For Japan, the Chinese war is a major military effort. At least thirty per cent of her trained manpower is under arms, her economic and political life has been strictly regimented, and her moral fiber strengthened for prolonged sacrifice.

In the summer of 1937, Japan's economic collapse was freely predicted if her national debt ever reached ten billion yen. The war has lasted two years, the national debt stands at sixteen billion yen and is expected to top twenty billions by 1940, and there is no sign of financial breakdown.

Japan's finances are, nevertheless, the weak chinks in her armor. Export trade has failed to keep pace with heavy imports of munitions and raw materials. Denied credit throughout the world, Japan has been forced to trade on a cash-and-carry basis that has drained her treasury of most of its gold.

Notwithstanding rising taxes and shrinking incomes, Japan faces no actual famine, for she is self-sufficient in foodstuffs. There is some acute destitution, but it would take famine—or decisive military defeat—to break her national morale.

The Japanese people are undoubtedly tired of a conquest they never desired and for which propaganda has not been able to whip up enthusiasm. However, they are dominated by a powerful military government that shows no sign of cracking.

War-weariness, if carried to the armies in the field, does contain elements of danger. Some observers are of the opinion that many units of the army have already suffered a slackening of discipline and morale. Disreputably dirty bivouacs, slovenly garrisons, and long hospital lists are cited as evidence—highly relevant in western armies but of uncertain indications among oriental troops. The China war has undoubtedly lost its picnic aspect, but how far disillusionment has weakened morale it is impossible to determine.

On the other hand, the courage and endurance of Japanese troops have been splendid. Staff work, as evidenced by the Bias Bay operation, is excellent although stereotyped and without flexibility under unusual conditions. The state of Japanese equipment is unimportant, since only second-grade stuff has been used and has sufficed.

"After victory, tighten your helmet strap."

Thus significantly did War Minister Itagaki, after the fall of Hankow, warn Japan to be prepared for further sacrifice.

Conclusion

A year before the outbreak of the war, the leader of the Chinese Communists, Mao Tse-tung, outlined to Edgar Snow the Reds' conception of the strategy to use against Japan. Except for minor changes and certain miscalculations, that plan is now being employed by Chiang Kai-shek.

As the Communists foresaw, the first stages of the war were overwhelmingly favorable to the militarily superior Japanese. The Chinese armies have improved but are still incapable of defeating the invaders in the open field. Lacking equipment and communications, they are forced to a campaign of attrition until their armaments permit offensive operations. Since that may be a matter of years, China's hope of victory lies in her ability to preserve a united front.

The invaders have been drawn deeper and deeper into a quicksand from which a struggle ending in complete victory can extricate them. They may assert repeatedly that their advance is over, but they cannot stop until Chiang is crushed.

It is doubtful, however, whether Japan can penetrate much deeper into the interior without a considerable expansion of forces. Less than a million men, spread over 600,000 square miles, are trying to subdue 200,000,000 people, and have not made much of a success of their occupation. Their influence extends no further than the range of their guns, and those guns are plentiful only in the principal cities and along the main communications lines.

As T. A. Bisson analyzes the problem in *Japan in China,* perhaps the most exhaustive study yet written on the Asiatic war, the test of strength is between two "qualitatively different techniques and objectives." Japan's aim must continue to be a smashing victory and the collapse of China's resistance, objectives whose chance of success decreases with every additional month of war. China must refuse to admit defeat even in the face of apparent disaster. Fighting in self-defense and with a united country at his back, the Chinese soldier holds the moral advantage.

Field Marshal ECONOMICS

By Dr. Fritz Sternberg*

A few weeks ago, *Der Deutsche Volkswirt*, a well-known German periodical on economics formerly considered the mouthpiece of Dr. Schacht, ex-president of the Reichsbank, published an important article by Dr. Otto Barbarino, one of Germany's leading economists. At the beginning of his article Dr. Barbarino remarks that the objective is to examine "the probable maximum of war-needs from the economic point of view, that is to say, to determine how much of an economic system of given size and structure can be used in time of war."

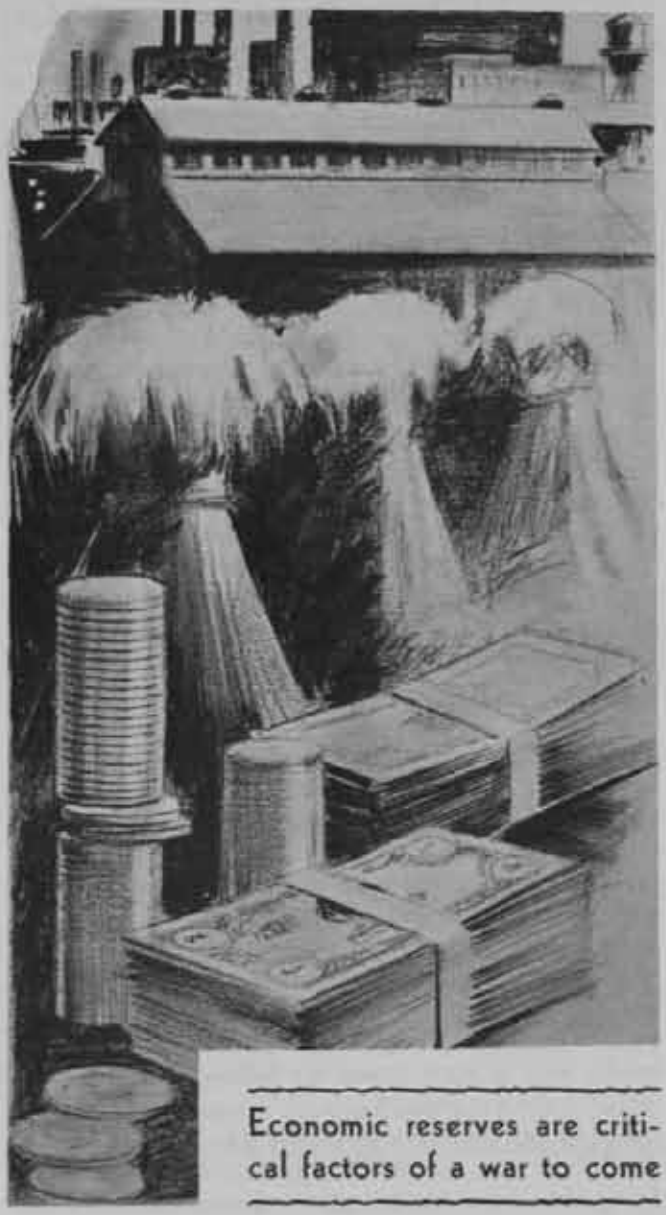
This German expert then proceeds to examine how much German economy, left to itself within the confines of the frontiers, is capable of producing. He says: "There are certainly means by which the state can obtain goods in excess of what it produces. Most important of these sources are when, at the outbreak of hostilities, the state has either large reserves of internationally accepted currency, that is to say, gold and foreign exchange, or an ability to procure foreign credits. Large blocks of foreign stocks, bonds and the like, in so far as they are not confiscated by enemy countries but can be sold unrestrictedly, may also be of great advantage."

For Germany today an economic support by means of gold foreign exchange and foreign assets is possible only to a very limited extent. In this connection Dr. Barbarino points out: "Since it appears improbable that Germany's present position with respect to gold and foreign currency reserves will undergo any considerable change in the near future; and further, since under present circumstances one cannot expect a sizable foreign loan but instead a hostile blockade, such possibilities of an equalization must be ruled out."

In this respect the position of today's Germany is decisively worse than at the outbreak of the World War.

A detailed analysis of this point is necessary because fundamental changes have taken place in this respect since the pre-war period, and because the importance of gold and currency reserves, and foreign assets of all sorts for the prosecution of a long war can hardly be over-estimated.

In the years preceding the World War Germany developed into one of the richest creditor countries in the world. She came immediately after Great Britain and rivaled France for second place in the list of creditor countries. Her capital exports increased from year to year.



Economic reserves are critical factors of a war to come

In the five years which immediately preceded the outbreak of hostilities Germany's import surplus was over seven billion gold marks. Despite this big passive foreign-trade balance, her balance of foreign payments was active, because, together with revenue from her shipping

*Author of *Germany and a Lightning War* reviewed in The Coast Artillery Journal, May-June, 1939.

her capital invested abroad brought back more in interest than the total import surplus. There is no accurate information concerning German capital invested abroad before the War, but Bernhard Harms[1] writes:

"German capital invested in foreign undertakings plus foreign securities in German hands were estimated at 25 billion marks in 1905 by Ballod and at 40 billion marks by Steinmann-Bucher . . . Let us assume, therefore, that all in all Germany had invested about 35 billion marks worth of her capital abroad . . . Taking an annual rate of interest of 5 per cent this would mean an annual return of about 1.75 billion marks."

In view of the fact that throughout the whole of the post-war period Germany was a debtor country, the circumstance that before the World War she was one of the richest creditor countries is liable to be overlooked. Perhaps the estimated total of 35 billion marks is put too high, but at least, the sum total of Germany's foreign assets before the outbreak of the World War must have exceeded 25 billion marks.

Added to these big foreign assets there were very considerable reserves of gold at home. Like the Western Powers, Germany before the World War was a country of liberal capitalism, a country in which there were no legal restrictions on currency and gold transactions, and in which the Reichsbank was legally obliged to exchange its banknotes against their face value in gold. The quantities of gold in private hands were therefore considerable.

According to the Reichsatchiv:[2]

"On 23 June 1914 the Reichsbank held 1.71 billion marks in precious metals, including 1.37 billion marks in gold, against a note circulation of 1.8 billion marks. Further, there was about 2 billion marks worth of gold in currency."

Hohenzollern Germany entered the war with big foreign assets and with gold reserves in the hands of the Reichsbank which rose (owing to the surrender of privately held gold during the course of the war) to 2.53 billion marks in July, 1917. As Germany had never experienced a moratorium up to the World War, as her credit with neutral powers was intact, and as she possessed big foreign assets she was enabled to increase her import surpluses tremendously during the war years as compared with the pre-war period. In 1915 her surplus amounted to no less than 4 billion marks, in 1916 it was 4.6 billion marks, and in 1917 it was 3.7 billion marks. For the whole of the war period Germany's import surplus is estimated at approximately 16 billion gold marks. This passive balance was covered by gold exports, by the sale of foreign securities, by the sale of German securities and shares, and by debts both in marks and in foreign currencies. Neutral countries were willing to lend money and grant credit because in years of satisfactory trading relations they had come to regard German credit as unshakable. They were supported in this opinion by the fact that even at the end of 1918 Germany still possessed gold reserves amounting to 2.26 billion marks. According to Gruger the passive balance of Germany's foreign trade was met as follows:

1. By gold exports: 1 billion marks.

2. By the sale of 3 billion marks in foreign securities and a billion marks in German securities abroad: 4 billion marks.

3. By contracting debt in foreign currencies: 3 to 4 billion marks.

4. By contracting debt in marks: 6 to 7 billion marks. Totaling between 14 and 16 billion marks.

It is characteristic that during the World War Germany's passive foreign-trade balance was met chiefly by credits (approximately two-thirds) and that these credits were chiefly in marks. Thanks to her unbroken credit in times of peace, and to her big resources in gold, foreign currency and foreign assets, Germany had to draw on only one-third of these resources to meet her obligations for goods supplied during the war. *Germany had credit.*

However, the position of the Allied Powers was still more favorable. British capital investments abroad before the World War were estimated at about 3.5 billion gold pounds, or about 70 billion marks. French capital investments abroad were at least as great as the German, so that Great Britain and France together possessed about three times as much as Germany. The Allied gold reserves were also much greater than those of the Central Powers.

The big foreign-capital assets of Germany, her gold reserves and the fact that her credit with neutral powers was intact were the most important factors which contributed to making up in some respects, despite the protracted nature of the war, for the lack of economic preparations. With an average import surplus of 4 billion marks annually up to the very last year of the war it is clear that the enemy blockade of Germany was not fully effective, and that large supplies of foodstuffs and raw materials were still being obtained.

Germany during the World War has often been compared to a besieged fortress, but it must be pointed out that the various financial factors with which we have dealt here enabled her to raise the siege to a considerable extent.

Today, Germany's situation in this field is inferior beyond comparison. What is the position of National Socialist Germany? It can be summed up in a word: Germany was a rich creditor country; she is now a poor debtor country. There is no accurate information available concerning Germany's present foreign assets, but it is quite certain that during the World War and as a direct or indirect result of it, Germany lost the greater part of them, and it is also quite certain that the total of her indebtedness to other countries is much greater than the total of her foreign assets. In 1931 a decree was issued by the Brüning Government obliging all Germans to render an exact account of whatever holdings they might have abroad. Dr. Hans Priester[3] gives the total sum of

[1]Bernhard Harms, "Probleme der Weltwirtschaft," *Volkswirtschaft und Weltwirtschaft* (Jena, 1912).

[2]Reichsarchiv, *Der Weltkrieg* 1914-18, Vol. I, "Kriegsrüstung und Kriegswirtschaft" (Berlin, 1930).

[3]Dr. Hans Priester, *Das deutsche Wirtschaftswunder*, Querido-Verlag, Amsterdam, 1936.

German foreign assets accounted for in this way as approximately 1.5 billion marks, and he points out that they consisted to a large extent of pounds, dollars, etc., and shares and *rentes* of the gold-bloc countries so that in the meantime they have naturally depreciated. Further, German industry has used part of its foreign assets to buy back its own promisory notes, and to obtain raw materials. In view of all these facts Priester estimates the sum total of foreign securities in German hands at between 300 and 400 million marks only.

The estimate is probably too low. Brüning's methods of discovering the extent of Germany's foreign assets were by no means so effective as those since adopted by the National Socialist authorities, and in all probability further quite considerable sums have probably been discovered under the stricter probe of National Socialism. However, even if we assume that Priester's estimate is much too low, and that Germany's foreign assets are still somewhere between 1.5 and 2 billion marks, the fact still remains that they represent only a fraction of Hohenzollern Germany's foreign assets.

The same is true of Germany's gold reserve. The only figures available are those of the Reichsbank, and we may assume that in addition to the officially admitted gold reserves there are quite considerable quantities of gold in Germany. However, both the official and unofficial gold reserves can hardly amount together to more than a billion marks. Before the war gold coins circulated in Germany so that large sums in gold were in the hands of the general public, and it is quite certain that Germany's total gold reserves, official reserves and secret hoards, amount only to a very small fraction of the gold in the hands of Hohenzollern Germany at the beginning of the war.

In a probable future war Germany could finance her import surplus as she did throughout the World War for no longer than six months. Dr. Barbarino is thus correct: Germany will depend almost entirely on domestic production to corral the goods for her war needs.

But has not her position improved in this very respect? Is not Germany's present production as well as her national income today in excess of the figures of 1913-'14 when Hohenzollern Germany entered the World War?

Germany's National Income Compared with 1913

In this same article Dr. Barbarino compares Germany's present national income with her national income in 1913, a comparison which, by the way, is important not only for analysis of economics in war, but for any study concerning the German nation's present condition.

Dr. Barbarino writes: "In 1913, the German national income was 50 billion marks for the then entire territory of the Reich. This figure, pro-rated for the Reich's post-war territory, shrinks to 46 billion marks. The nominal amount of Germany's national income in 1938 [said to be between 77 and 78 billion marks] is accordingly 67-70% higher than that of 1913. This difference disappears as a real increase however when one takes into consideration that cost of living to the German individual has gone up considerably during the same time since pre-war days. Despite price reductions of the deflation years, prices are still one-quarter higher than they were before the World War. Expressed in the purchasing power of 1913, the German national income of 1938 was not more than 61½-62 billion marks.

"In addition, one must consider that today there are more persons living in the same territory than in 1913. The per-capita national income, which we must calculate so as to exclude this difference in the count of the population, was, expressed in terms of pre-war purchasing power, 900-910 marks in 1938, and thus only 18% above the corresponding figure for 1913 when it amounted to 766 marks. Since the pre-war years the age distribution of the German population has also changed considerably. The proportion of children who consume less has decreased, while the number of full-consumer adults has increased. After taking this into consideration and thus calculating the per-capita income per adult for 1938, one reaches, again expressed in terms of the purchasing power of 1913, the sum of approximately 1,090 marks as compared with the 1913 figure of 992 marks. Consequently, the income index of the German people (by such calculations corrected) was but 10% higher in 1938 than it was in 1913.

"Taking these figures into consideration, two further facts must be considered even though their volume cannot be determined in actual figures. First we must point out that the value of the 1938 income was undoubtedly determined by somewhat too favorable calculations owing to certain inaccuracies in the indices of the cost of living. These indices are by no means erroneous yet fail to express those changes in quality [Dr. Barbarino means deterioration of quality] which occurred in several fields of consumption during the past few years in Germany."

Secondly, Barbarino points out that in today's Germany the total income can be ascertained better than before.

"Altogether," Dr. Barbarino concludes, "we may accept that although the per-capita distribution of income in 1938 somewhat exceeded that in 1913, the increase was a moderate one, and *remained below 10%*. For the German people the 77-78 billion marks mean as potential consumption only little more than the 50 billion marks of the last pre-war year."

These conclusions of Dr. Barbarino are extraordinarily interesting. It is a frank admission by a responsible German source (in a publication where it is least expected), that the official German indices of the cost of living are incorrect and that in their computation there has not been taken into account the deterioration in quality of consumer goods in the past few years. Barbarino further maintains that the German national income is only slightly above the national income of 1913. *The increase of income is far from being the 67-70% which is so insistently advertised by German publicity but, according to a careful study of a prominent German economic*

expert, it is considerably less than 10%. If one remembers that in Hohenzollern Germany the state took only 10% of the national income in taxes while today the German state seizes more than 50%, it becomes obvious that Germany's present standard of living falls definitely short of what it was in the Hohenzollern Germany that existed at the outbreak of the World War.

Let us conclude from this, the first of two articles by Dr. Barbarino, that, contrary to her position at the beginning of the World War, Germany today has no considerable reserves of gold, foreign currency and foreign assets; in addition, the German national income of today, which ultimately will have to carry the entire economic burden of the coming war, is higher than that of 1913 only to a negligible degree.

How Germany Financed the World War

In a second article published by *Der Deutsche Volkswirt* Dr. Barbarino attempts an examination of the economic burdens brought on the people of Germany and England respectively by the World War. On means of complicated calculations, Dr. Barbarino finds that Germany appropriated about 12% of its entire national income in 1913. "It was this levy on the national income," he writes, "that covered the cost of the World War."

How much, then, were the actual costs of the war?

	Billion marks
In the fiscal year of 1914, including eight war months, close to	12
In the fiscal year of 1915, more than	22
In the fiscal year of 1916, close to	28.5
In the fiscal year of 1917, more than	41
In the fiscal year of 1918, when a considerable amount of the additional expenditure went toward the costs of demobilization after the armistice, more than	58.5

Now, a billion marks spent in the World War must not be put on a par with a billion marks in 1913, since the value of the mark had fallen during the war. Dr. Barbarino computes the war-billions into the values of 1913, and comes to the following conclusions:

"The increase of receipts which the Reich and its federal states realized from taxes and loans above the income of the fiscal year of 1913 can be appraised, when expressed in the purchasing power of 1913, in the following sums:

	Billion marks
In the fiscal year of 1914, with only eight war months	11
In the fiscal year of 1915	14 to 18
In the fiscal year of 1916	17 to 20
In the fiscal year of 1917	21 to 26
In the fiscal year of 1918, with the armistice	25 to 33

These represent the following percentages of the national income of 1913:

In the fiscal year of 1914	22%
In the fiscal year of 1915	28—36%
In the fiscal year of 1916	34—40%
In the fiscal year of 1917	42—52%
In the fiscal year of 1918	50—60%

In the last year of the war, the German state devoted approximately two-thirds of the total national income directly to war economy. A further increase of this percentage is hardly possible, since the civilian population, too, has to live, even in times of war.

To illustrate the somewhat abstract explanations of the German economist, we are publishing a few diagrams which show the state's share in the German national income, calculated on the basis of 1913 values, in the first and in the last war years respectively.

Financing the War in England

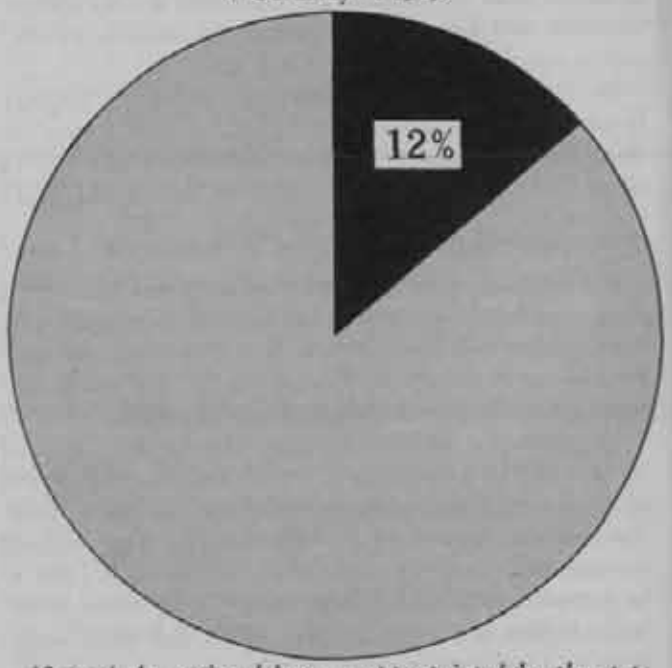
According to Dr. Barbarino, a development similar to Germany's financing of the war took place in England as well. The English state's share in the national income was somewhat below that of Germany in 1913. According to Dr. Barbarino "the actual share of the public treasury in the national income of England was below 10%, somewhere around 8%."

How did England finance the war?

England's position was somewhat better than that of Germany, since she was the foremost creditor country of the world and received considerable financial support from the United States. Dr. Barbarino writes: "Contrary to Germany, England, beginning from the earliest period of the World War, based her financing of that war on an expansion of the taxation. Nevertheless, she had to depend on the credit market as well.

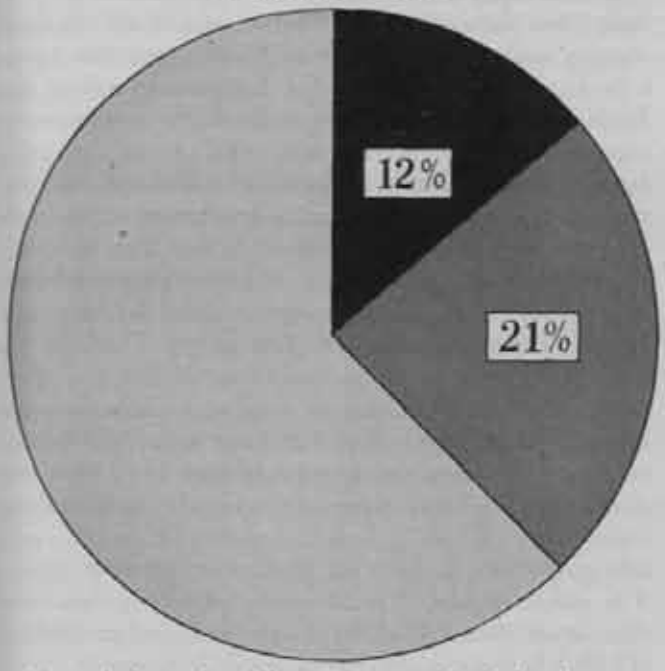
"The English national debt increased from £706 million at the end of March 1914, to £7481 million by the end of March 1919, thus more than tenfold. . . . In ad-

1. Germany in 1913.



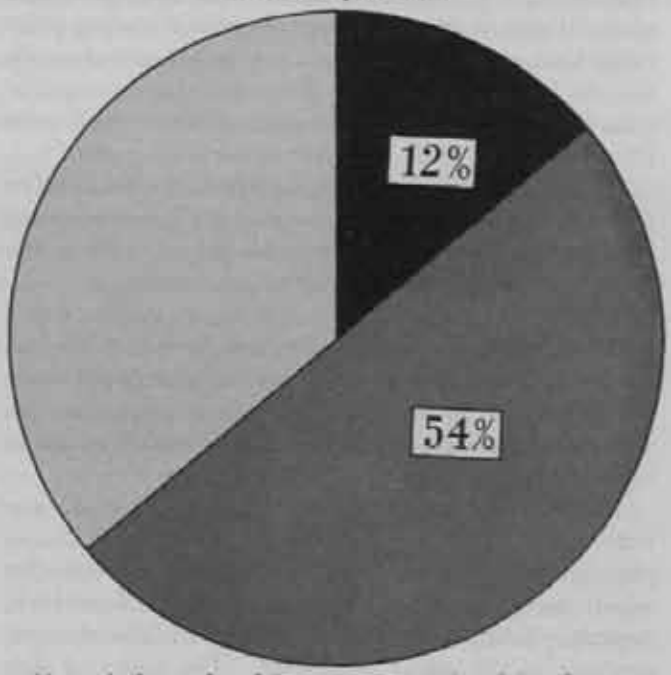
12% of the national income appropriated by the state

2. Germany in 1915



33% of the national income appropriated by the state

3. Germany in 1918



66% of the national income appropriated by the state

dition, at the outbreak of the war, England controlled the foremost and most efficient credit market of the world, fed by itself, a wealthy state in its own right as well as from other sources all over the world. Finally—and this is the most important point—one must consider that England had at her disposal huge quantities of foreign, and especially American credit. When we calculate war costs in relationship to national income, we must deduct American credits. Practically, however, we can ascertain England's visible foreign loans only. But England secured considerable amounts in invisible loans as well, by selling abroad parts of her considerable blocks of foreign shares, bonds, assets and the like. One must also consider that America's debt to England which was quite considerable before the war was completely paid up in the course of the World War by the United States redeeming her English obligations on the London stock market. This alone amounted to £500 million."

"Summarizing all the income the English state collected from taxes and loans during the war years . . . the total amount of increase above the last peace-year of 1913 was:

	Billion £
In the fiscal year of 1914	0.5
In the fiscal year of 1915	1.2
In the fiscal year of 1916	2.2
In the fiscal year of 1917	2.3
In the fiscal year of 1918	2.2."

Dr. Barbarino here again computes the English war costs to the pound's purchasing power in 1913, and relates it to the English national income. According to these figures, to cover the costs of war the English state appropriated from the national income

In the fiscal year of 1914	22%
In the fiscal year of 1915	40%
In the fiscal year of 1916	58%
In the fiscal year of 1917	42%
In the fiscal year of 1918	42%

"Even though the methods employed to finance the war were widely different in the two countries, the actual sums of the increased receipts attained by England during the war and especially the corresponding percentage as related to the English national income bear similarities to those of Germany. The only difference is in the time at which these sums reached their peak. While Germany's revenue income did not reach its height until the last year of the War, Great Britain's greatest financial strain came in the third year of the war. The easing of the British financial burden thereafter is attributable chiefly to America's entrance into the war at that time with the result that American military, economic and financial support began to show actual effectiveness."

The following two diagrams show the extent of the state's sector in England's national income in the last pre-war year and again in the last year of the war.

Dr. Barbarino's careful study shows that the burden of the World War carried by England was somewhat less than its burden to Germany, the latter being forced to use two-thirds of her total production for the purposes of war in the final year of the World War.

The State's Sector in Germany and in England Today

Has this rather comprehensive study of the financing of the World War only academic importance? No—on the contrary! Today, such a study is as of great practical use in surveying the economics of war preparations as the actual conduct of a war to come. In concluding his sec-

ond article, Dr. Barbarino states: "The financial record of the World War must be considered as a starting point rather than an average norm. . . . . It would indeed constitute the limit of what is altogether attainable if the public treasury's share in the national income were to reach two-thirds of its total in the first year of the coming war."

According to this statement, therefore, *two-thirds taken from the national income for the purposes of war-economy represents the maximum attainable figure.* Such is the final conclusion of the German expert economist.

While he thus reveals the maximum of the state's attainable share in the national income, he fails to disclose the German state's present take, which is the inroad made on the national income during a time of preparation for war; he simply takes for granted that his readers are aware of this figure.

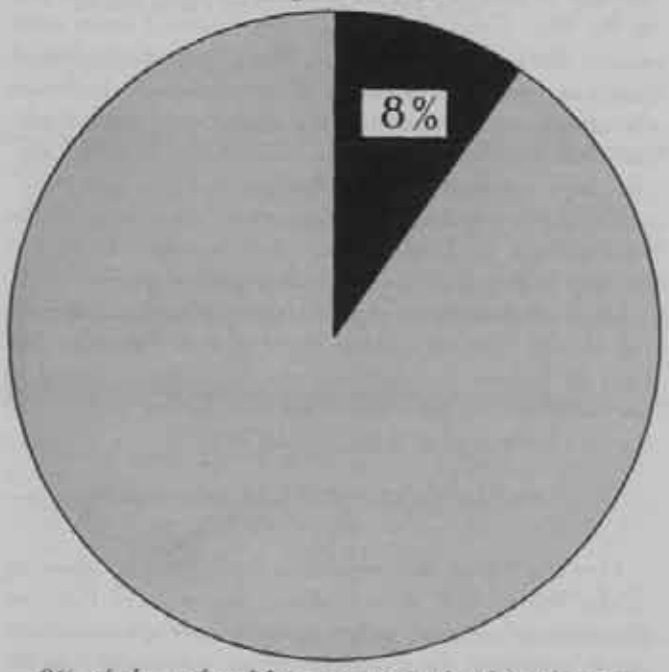
Therefore, let us examine the state's share in the national income today. *Der Wirtschaftsring*, a German periodical reflecting the spirit of those conservative circles which are gathered in Herr von Papen's *Herrenklub*, recently published an article dealing with "the changed structure of the public household." The writer of that piece correctly states that "the present turnover of the tax-burden is much greater than it was previous to the world economic crisis." And in the summary of his detailed analysis he states: "In the fiscal year of 1937-38, the total amount of taxes and duties, of social and other contributions to various public agencies reached the sum of 26 billion marks. Since, according to tentative estimates, the sum total of the National income in 1937 was 68.5 billion marks, the treasury claimed in taxes and other contributions about 38% of the national income."

A comparison between these figures and the figures of the pre-war period mentioned earlier is striking indeed. While in 1913 the German state appropriated only a little more than 10% of the entire total of the national income, today it takes nearly 40%. But even this figure is far from being comprehensive. It represents merely the Reich's *regular* budget, with none of the *extraordinary* expenditures included. It is well known that despite the huge increase in Reich tax revenue, calculated to cover the cost of its tremendous re-armament program, the Government is unable to meet expenditures with revenue. Unlike the Democratic states, unlike the Hohenzollerns' Reich or the Germany of Stresemann and Brüning, the Nazis fail to publish their complete budget. This is by no means accidental. It is due, indeed, to the fact that they are reluctant to admit that to cover expenditures untold billions in loans were collected and that their indebtedness on short term promisory notes has increased to a tremendous extent. The German press estimates the combined circulation of such notes at 20 billion marks. Of course, a certain proportion of these are genuine commercial paper. The article of *Der Wirtschaftsring* presumes, however, that "more than half of the above mentioned circulation of bills falls into the category of public liabilities."

It is impossible to say whether these estimates in the German press are right or wrong. It is probable, however, that the short term indebtedness occasioned by re-armament is even greater. In any case, the figures represent the *floor* rather than the ceiling of this heavy indebtedness.

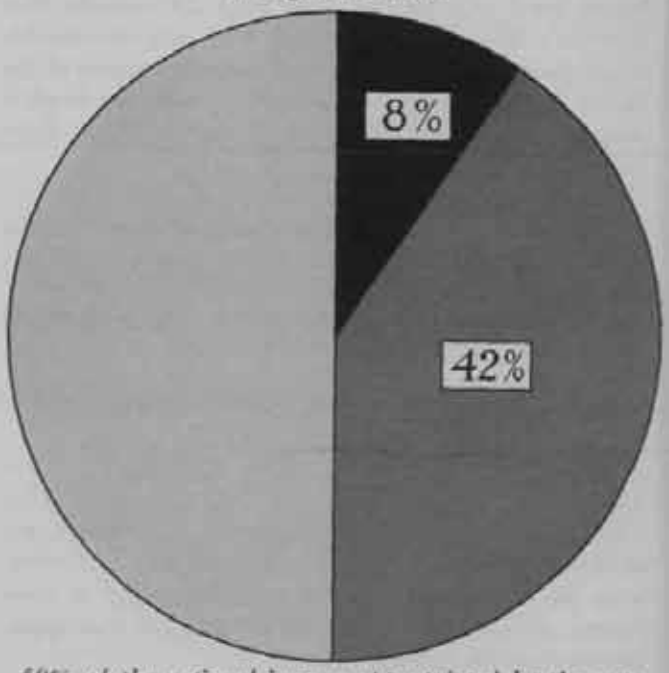
We have already mentioned that today the German state controls two-fifths of the national income by way of taxation, duties, social contributions, etc. Beyond that, the state controls an additional portion which is taken off by means of public loans and short term notes. In this connection *Der Wirtschaftsring* remarks: "If to these expenditures are added the cost of social insurance as well as the

4. England in 1913



8% of the national income appropriated by the state

5. England in 1918



50% of the national income appropriated by the state

expenses of all other public agencies which fulfill political, social and economic duties; and which satisfy collective needs; and then municipalities and the provinces which, like the Reich, constitute the administration in the broadest sense, expenditures during the past fiscal year amount to 35-40 billion marks. This indicates that the financial needs of Germany's public administration required more *than half* of the national income of 1937-38."

But even this does not exhaust the state's direct control over the German national income. This figure still fails to account for the accumulated expenditures of the German public industries. *Der Wirtschaftsring's* estimate of 8 billion marks for these latter expenditures can be considered as accurate. What is then the sum total? "By their inclusion," *Der Wirtschaftsring* states, "the public expenditure in the broadest sense amounts to a sum which can be estimated at 45 billion marks during the last fiscal year. This figure reveals that in 1937-38 the public treasury was able to control about two-thirds of Germany's total national income."

These statements of a German paper are *by no means private* estimates. Dr. Brinkmann, formerly Secretary of State in the German Ministry of Economics, offered the following figures concerning national income, and revenue from taxes, duties and social contributions:[4]

	National income	Taxes, duties and social contributions	
	In billion marks	*In billion marks*	*In % of the national income*
1913	45.69	5.14	11.3
1925	59.98	13.31	22.2
1937	70.97	23.79	33.5

The state's control over the national income is, of course, much larger. Immediately following the above statistics, Brinkmann wrote: "Figuring the financial needs of all public agencies which fulfill politico-social duties, the figure of 35-40 billion marks is reached, or more than half of the national income. The expenditures of public industries included, the public hand controls about *45 billion marks, or two-thirds of the German income.*"

A responsible German source thus confirms that the German state has already today financial needs which force it to seize more than half and to control altogether two-thirds of the national income.

In this connection it is important to point to a situation in the Reich which consists of the fact that already before a war the forced expansion of the state's sector in the national income has resulted in not inconsiderable tension between the State on the one side, and the private enterprise on the other side. In this connection Secretary Brinkmann makes quite frank statements. "Each of the two entities, economy and state, has its particular institutions and functionaries. The state acts through its departments and officials—economy through businessmen. . . . *Still the relationship between officials and businessmen is unfortunately often similar to that between the infantry and artillery at the beginning of the war.* The infantry then saw, owing to a few genuine or suspected short-shoots, the more dangerous of two foes in its own artillery, while the artillery believed that the infantry maliciously furnished them cover far too weak."

German enterprise perceives that already today it is falling into the clutches of war economy and from time to time there is a slight opposition. In a long article the *Frankfurter Zeitung* asks: "Where is progress?" It reports a lecture delivered by Colonel von Schell, Field Marshal Goering's supervisor-general of the German automobile economy before representatives of the Rhine-Main group of businessmen. Particular emphasis is laid on the statement of Colonel von Schell that the whole of German trucking industry must be re-organized. German trucks must "be produced in only four sizes and there must be but one type in each size-group."

To this the *Frankfurter Zeitung* adds: "German motor-car industry must thus study a new art of thinking. If so far construction methods of cars in process of development were kept secret, and it was considered improper for engineers to change employers in the same branch of business, then this year the shifting of types will demand that all plants place their experience, part of their machinery and groups of their engineers and foremen at the disposal of other plants which have no experience with the approved type." It is then added: "In each one of such plans and plannings the question is brought up: 'Where is progress?' If manufacturers are instructed what they may or may not produce, will the incentive to develop technique further remain?"

German enterprise thus feels the ever increasing influence of the state. If Secretary Brinkmann said that entrepreneurs perceive in the state "the more dangerous of the two foes," the last few months has served only to intensify this feeling.

As the German state already controls two-thirds of the national income, similar *tendencies* are apparent in the economy of the Western-European powers though decisive differences in quantity are as yet difficult to perceive. For England and France, Secretary Brinkmann publishes the following figures:

	1913	1929	1935
Great Britain	12%	28%	28%
France	17%	31%	34%

England's share in 1935 is assumed by Secretary Brinkmann to be 28%, having increased considerably through the growth of her armament expenditures. A conservative estimate brings the state's share in the English national income up to 33% at the present time. Here are a few diagrams which show Germany's share in the national income today and in a probable war of the future; and also the position of Great Britain today and in a war to come. (See diagrams 6, 7, 8 and 9.)

These diagrams suggest the following conclusions:

(1) The state's share in Germany has increased so tre-

[4] "State and Economy," by Dr. Rudolph Brinkmann, Secretary of State in the Ministry of Economy. A lecture, published as a brochure by von Kuhlhammer.

mendously already now in preparation for war that a further increase is possible only to a very limited extent:

(2) In England, too, the state's sector has increased far above the increase of 1914, yet a further increase during a future war is still possible to a large extent.

This increase means exceptionally difficult problems for Germany. It seems to be very significant that in the same *Deutscher Volkswirt*, which we have quoted so extensively, this problem is discussed even though only between the lines. Its editors stated in an introduction to an article by Dr. W. Tormberg, on May 26th, 1939:

"After Dr. O. Barbarino in his article 'The productive capacity of German economics during the World War,' published in the last issue of this paper, examined the real value of war-costs of the two countries and appraised their share in the national income, the present article brings goods and production into the foreground. These are to be ascertained with the help of various financing methods and are to be divided between the needs of the military leadership and the civilian population."

The article makes no mention of Germany. All statements are quite general. Yet, the two preceding articles referred to in the introductory notes, make it obvious that the conclusions concern Germany. Dr. Tormberg points out that war-needs can be covered in four fashions:

"(1) By the transposition of enterprises working for private consumption to war production, or by its equivalent: the extreme limitation of all civilian demands in favor of war-economy needs;

(2) Through renunciation of all investments outside of war economy;

(3) By using up reserve stocks hoarded in peace;

(4) By imports which, however, represent a real supplement only if they can be financed with gold and foreign exchange, foreign assets and credits instead of by exports." (This fourth possibility is—as we have shown—more or less ruled out in today's Germany.)

Dr. Tormberg establishes that today war finances and the politics of war economics are inseparably tied together. And then he examines the favorable conditions for a total transposition from a Peace-Economy to a War-Economy, and writes: "The success of such a transposition of the entire economy from civilian to military demands by means of war financing, e.g. the placing at the disposal of the military leadership the largest possible quantity of goods depends on two very important conditions, both falling into the sphere of production:

(1) The volume of disposable goods must be as large as possible;

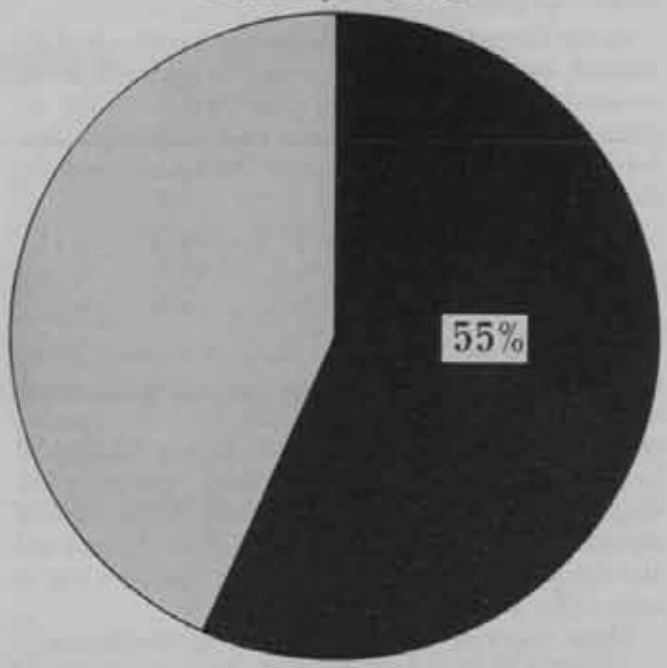
(2) At the moment of the outbreak of war the civilian sector sharing in the distribution of goods as much as possible."

Yet in the preceding analysis it was admitted that the German national income today is hardly above that of 1913, and that the civilian sector in Germany is insignificant, the state already controlling two-thirds of the national income. Dr. Tormberg reiterates his theory. And since this question is of decisive importance in the world situation, we quote him rather extensively.

He writes in one of his articles: "The transposition of the productive capacity from the civilian sector to the sector of war economy will be better possible and easier . . . the less the tax and capital market reserves of the states are burdened.

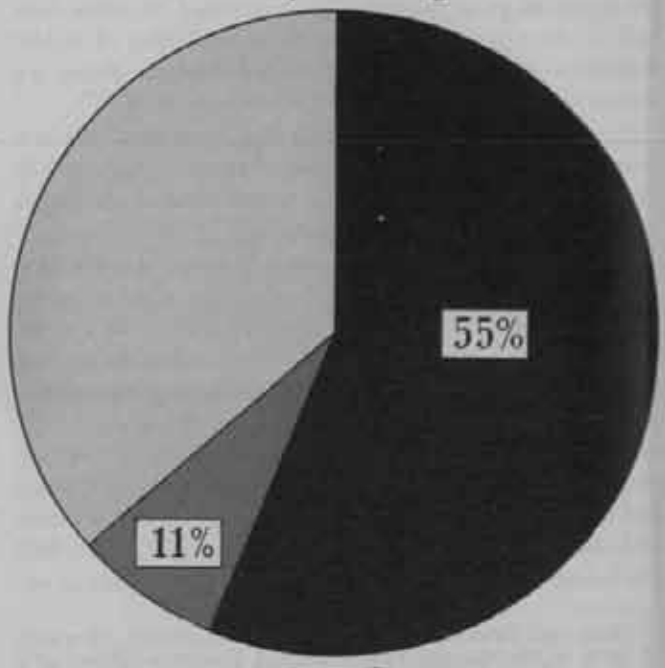
"To raise the largest possible part of war expenditures by taxation in case of war is more difficult today than it was in the World War because in almost all countries the tax-burden is far greater today than it was before the war.

6. Germany in 1938-39



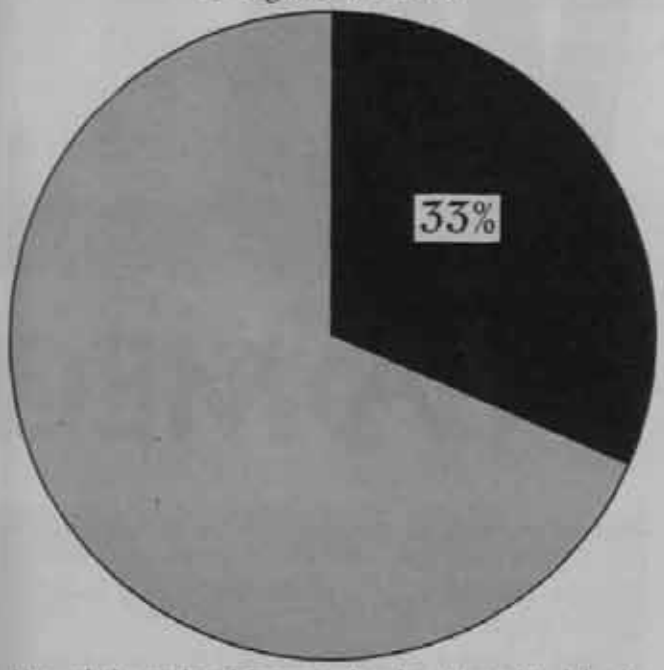
55% of national income already appropriated by the state

7. Germany in a coming war



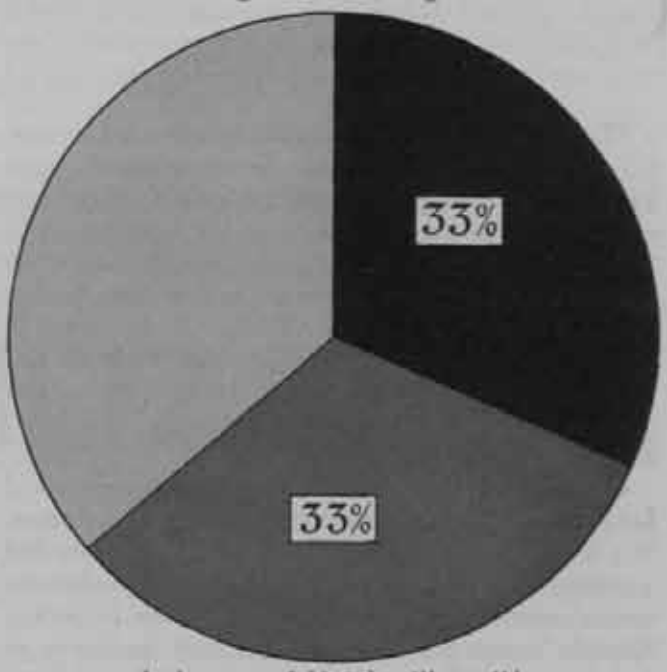
Only an increase of 11% possible in case of future war

8. England in 1938-39



33% of the national income already appropriated by the state

9. England in a coming war



An increase of 33% is still possible

"In almost all countries the national indebtedness has increased steadily. In former years the most decisive reason for such a development was to cover the state's expenditure for supporting and priming industry in times of economic crises. Since at the beginning of the wave of rearmament the already heavily burdened taxation could not be increased to any considerable extent, the financing had to be done by intensified borrowing which increases from year to year. Due to the continuous progress in the types and manufacture in the implements of war this borrowing becomes the source of continuous new big financial demands. This development means, of course, a serious advance burden for the future and raises problems concerning the possibility of financing a future war. In England, for instance, the finance-political discussions show the worries which prevail in connection with the coverage of armament expenditures through taxes and loans. These expenditures strain the saving power of the English people.

"The process of the financial end of economy corresponds to a similar process on a production end of it. The states' growing demand for the purpose of armament, regardless of whether it is satisfied by taxes or by loans, results in repressing the needs of civilians, since state and populace share the national income with each other. This can be relative as well as absolute, especially if economy is already at work to its fullest extent and a further rapid expansion of production appears impossible. Such shifting in favor of the needs of armament of course reduces the reserves in goods stocked to cover military needs. They can, at the same time, mean the weakening of the state's economical efficiency which, being the final source of its financial strength, secures its competitive capacity with foreign lands and thus guarantees the supply of foreign products.

"This study shows clearly the problems which, owing to the extensive limitation of the civilian sector already in peacetime, arise for the war. This exhaustion of the tax and capital reserves at the beginning of a war, which corresponds with the repression of civilian needs in favor of economically unproductive needs of the state at the end of its productive capacity, is *already today a war-economical problem of the first magnitude.*"

These statements are as clear as they can be under present German censorship. German experts realize that never before was the civilian sector in peace restricted to the extent it is in today's Germany; further they realize that tax and capital reserves were never before so exhausted as they are today. They know that accordingly a further increase in wartime appears possible only to a very limited extent and see therefore, to repeat the definition of Dr. Tormberg, "a war-economical problem of the first magnitude." Here in the light of exact researches and investigations it is stated by German experts that in case of war *Germany would have at her disposition considerably less economic reserves than would the Western Powers.*

The conclusion is that should Germany fail to gain decisive victories during the first six months of a war, its position would seriously deteriorate to the advantage of the Western powers. This is a conclusion often drawn by various quarters. *Yet it is of extraordinary importance that this conclusion can now be confirmed by analyses of German experts, published in German periodicals.* And it is further significant that these articles are published at a time when the question of War or Peace has gone beyond the stage of academic discussion, and has become the most vital question of our day.

WAR

IN A MEC

The times are uneasy. Only lately war's red shadow fell straight across Europe while the whole world caught its breath expecting the entire continent to blaze into war—a war that might mark the end of European civilization. A sigh came when the crisis passed; but the relief was only temporary. For we are far from the placidity of the Nineteenth Century. Today all the world is feverishly arming; powers have grouped, oriented, and aligned themselves, developed converging policies, and are pushing on to the day of final reckoning. War is not so far away.

On this future day, unless a miracle intervenes, naked force will be unleashed, and the end no one can foresee. We in the United States are like a people who have had warnings of a hurricane. It may not strike us, but we cannot wait until the last moment before preparing. Recently Europe gave us a grim lesson of the futility of such a policy. Money will not bring immediate delivery of the mechanisms of war or the trained soldiery to manipulate them. Without these things a nation, no matter what its wealth, is impotent in a harsh world.

But what is this army that will fight the future war, one may ask? That is not possible to say precisely, for a modern army has no prototype. It is unique. It is an outgrowth of the people, stamped with the ideology of the times. The mechanistic world of which it is a part roars along engulfing the professional soldier under a cataract of machines that he strives to convert to war. Never in all the world's history has the like of the present culture developed, never has the soldier a more complex or perplexing task. He must look at the present and strive to penetrate the future. The study of the distant past is futile; the answer is not there. Nothing is surer than the army of tomorrow will differ vastly from the army of yesterday—or today.

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By Major J. Halpin Connolly

Illustrated by Hobart Britton

Once wars were won by defeating an army; the next war may be won by destroying a people

Today, we do not know what new weapon or device our high-speed industrial society will evolve that can be converted into a potent instrument of war. In 1900 who could ever predict the modern radio, the automobile, the tank, the warplane? Even now, so rapid has been their development, we cannot state with finality their position in war. The war use of radio broadcasting, for instance, is a subject that needs deep study. Judging from the hysterical reception given recently to a realistic radio program of war, one can easily see that radio is a powerful offensive weapon. Its use for interior communication for military operations is relatively a small problem, yet so rapid are modern developments, one cannot lay down with finality how radio will be used even there. Everything seems to be in a state of flux.

History cannot give us the answer. Study of the times and its material and spiritual trends, is our only hope. True, history can give us a picture of man and his natural reactions, but it cannot give us an accurate indication even of his reaction to future war. For past wars are feeble things compared to the catastrophic character foreshadowed for the next war; we do not know precisely how this modern war will be waged, nor the fury it will unleash, nor the people it will crush.

In the past, armies were composed of a professional corps which formed but a small proportion of the total population. These long-service armies under rigid discipline moved back and forth sedately as the generals fenced and side-stepped. Strategy and tactics became almost a formal military courtesy. But then came Napoleon leading the nation in arms, and soon he smashed this almost ritualistic method of waging war. The impact of his personality rocked all Europe. There was great genius in the man not understood completely even today.

The part that this mental captivation of humans played in Napoleon's actual game of war has been almost completely overlooked or misunderstood. For instance, Na-

poleon's first Italian campaign is a military classic. It shows clearly his military astuteness, but fundamentally what won the victories was his skill in arousing a supine army, inflaming it with fanatic zeal, and leading it blazing across North Italy. The geometry of the campaign means little without this background. Unfortunately, the military writers—Clausewitz and the test—all but ignore this emotional power of war. They act as if wars were fought in test-tubes, or a battle had a formula of the benzine-ring type. In a huge, modern war-army the emotional factor is greater than in the days of small

NISTIC CIVILIZATION

armies of skilled soldiers. War was a trade then and so practiced. Now it is an emotion—often hysterical—and participated in by whole peoples. It is here the sociologist and the soldier err grievously, for let a rabble rouser with great military skill and an iron will emerge, and the prophecies of Spengler may come true. The military opportunist may dominate the modern state—or even world.

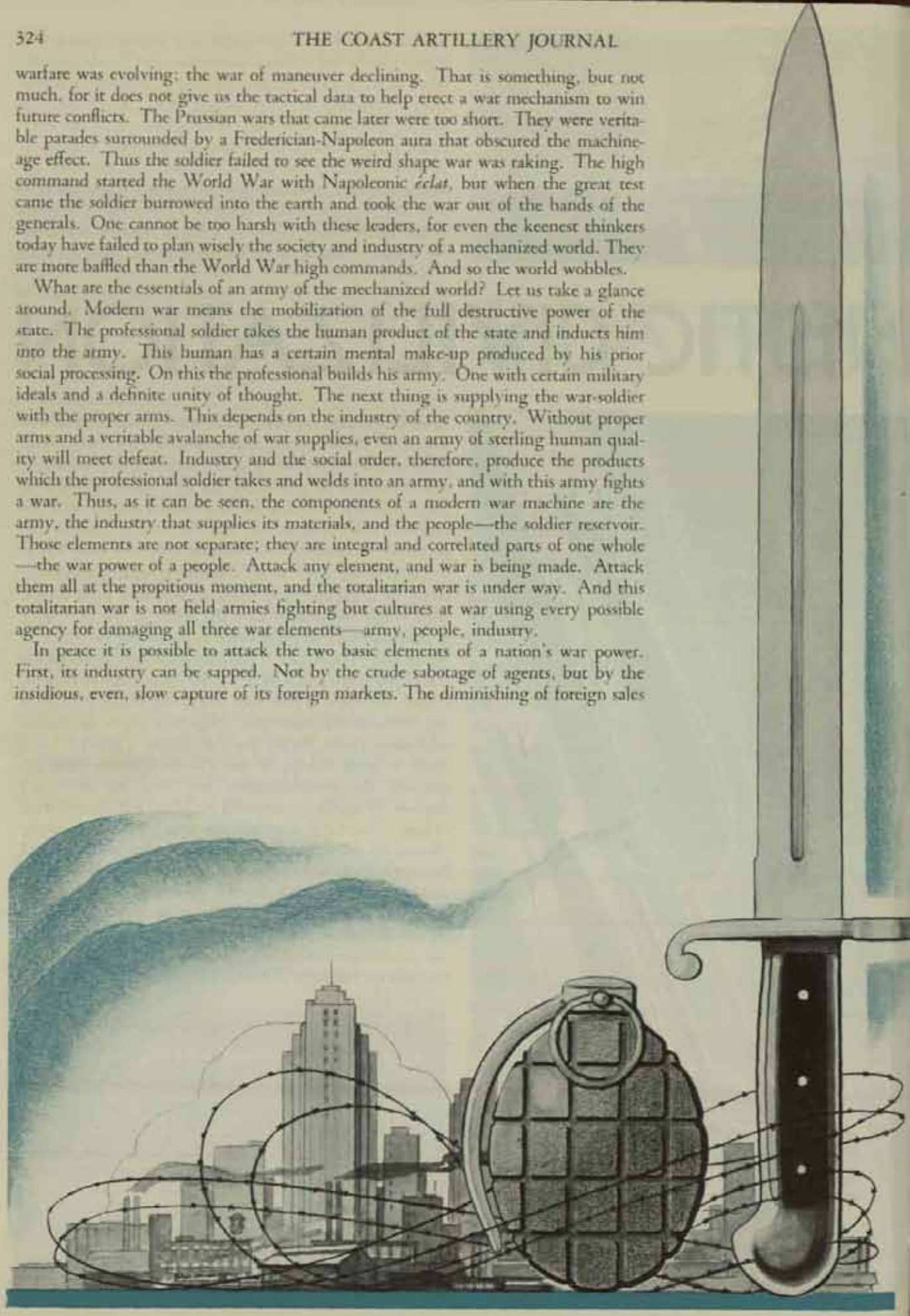
Today a war army is not a relatively small professional corps. It is gigantic and needs an inspiring mass leader. That is the first reason why the study of the technique of past wars is of no great value in predicting the shape of future war. The second is the Industrial Revolution which is still going on, and which, by the mechanism it spawns, renders the chain of past wars practically sterile in predicting the tactics of future war. Napoleon might be studied with some profit, for he was not simply a general but a leader of great masses; he was a Great Captain—the last one—of the pre-mechanistic era. But his tools, his method of warfare, compared to what will come, were archaic. Our Civil War was the first great war strongly affected by the mechanistic civilization that the Industrial Revolution was building and is still building. The European soldiers could not see the great significance of this war. Only lately are some waking up, but only to the skill of the generals, not the type of the war. They have not yet comprehended the Civil War or World War, for the military formulas of a pre-mechanistic civilization will not fit either.

In the Civil War the American people tentatively, but with much ingenuity, fitted the products of a young machine age to war—railroads, telegraph, breech-loaders, ironclads, steam. Here occurred the first meshing of the gears of a mechanistic culture to an army, and this is one of the great lessons of all time—and least understood. On the tactical side one stark fact stands out: The human would submit to only a certain amount of the modern fire-power before he would take to the earth like a badger. Consequently, as fire-power and human masses were increased, we could expect a war of trenches. This lesson was there in the Civil War for anyone to see if not blinded by previous wars of history—but they were. Position

warfare was evolving; the war of maneuver declining. That is something, but not much, for it does not give us the tactical data to help erect a war mechanism to win future conflicts. The Prussian wars that came later were too short. They were veritable parades surrounded by a Frederician-Napoleon aura that obscured the machine-age effect. Thus the soldier failed to see the weird shape war was taking. The high command started the World War with Napoleonic *éclat*, but when the great test came the soldier burrowed into the earth and took the war out of the hands of the generals. One cannot be too harsh with these leaders, for even the keenest thinkers today have failed to plan wisely the society and industry of a mechanized world. They are more baffled than the World War high commands. And so the world wobbles.

What are the essentials of an army of the mechanized world? Let us take a glance around. Modern war means the mobilization of the full destructive power of the state. The professional soldier takes the human product of the state and inducts him into the army. This human has a certain mental make-up produced by his prior social processing. On this the professional builds his army. One with certain military ideals and a definite unity of thought. The next thing is supplying the war-soldier with the proper arms. This depends on the industry of the country. Without proper arms and a veritable avalanche of war supplies, even an army of sterling human quality will meet defeat. Industry and the social order, therefore, produce the products which the professional soldier takes and welds into an army, and with this army fights a war. Thus, as it can be seen, the components of a modern war machine are the army, the industry that supplies its materials, and the people—the soldier reservoir. Those elements are not separate; they are integral and correlated parts of one whole —the war power of a people. Attack any element, and war is being made. Attack them all at the propitious moment, and the totalitarian war is under way. And this totalitarian war is not field armies fighting but cultures at war using every possible agency for damaging all three war elements—army, people, industry.

In peace it is possible to attack the two basic elements of a nation's war power. First, its industry can be sapped. Not by the crude sabotage of agents, but by the insidious, even, slow capture of its foreign markets. The diminishing of foreign sales



means the gradual withering of producing agencies. These agencies in an industrial state are vitally necessary for life and war. They prepare matériel and keep up the population. It is even possible for one nation, by making direct war on another nation, to cripple seriously a rival third nation. For in the war it can bar a huge market to the goods of this third nation. This is going on today if one cares to look about.

The second peacetime method of diminishing an enemy's power is to attack the people's ideology, thus splitting the mental unity of the enemy nation. For instance, insidious propaganda against democracy can be and is preached daily in our towns. There is much cry about Communist activity in the United States, yet it is doubtful if this doctrine has as many believers as a shadowy type of Fascism, which is ready to coalesce into something menacing. In any event, there is an effort to establish such quasi-religions—they are no more than that—in this country. The roots have not spread widely, but the plants are there. Racialism is another disintegrating dogma—particularly for this country—that is rearing its ugly head. This much is fundamental: A nation cannot build an army from elements part Communistic, part Fascistic, part Democratic. The soldiers must have a unity of mental background. Thus, part of our war preparation is the inculcation of democracy—a flexible one if you will, but democracy. We may have to inculcate a religious fervor in its proponents for one cannot fight the religion of "isms" by reason. The direction of war requires reason; the waging of it not.

As noted, of the three engines of war—army, people, industry—two are always under subtle attack in peace—an attack in many cases controlled and directed by a state. But the most serious danger in a democracy such as ours is not outside attack, but the facile half-thinker who with eloquent words promotes pet phobias which can and do lead to national weakness, by affecting the thinking of the people. For instance, war is a dreadful thing, to be sure, but the preaching of pacifism does not prevent its steady approach. Truly, the preacher of pacifism may change his mind, as many have today, but the converts who have been indoctrinated do not change so easily and will live on as a source of weakness to the nation. Flatly, let it be stated: In a modern world nations exist by force, and pacifism only prepares a state for utter destruction. As a consequence, the democracies of the world must develop a type of human that can be turned into a war-soldier, stand up in battle, and return to civil life. That is not a soldier's job but the task of the statesman and scholar. If democracies cannot see this, or seeing it, cannot or will not do it, they are all doomed. Democracy's era in history will be brief. Our liberals should recognize this and prepare the liberal democracy for survival in a world of strife, not a Golden Age. The future is dark—and red with war.

The coming wars will be immense in scope; the army will be only the cutting edge of the nation. Matériel will be consumed in vast quantities. It will flow from the factories to the front in a swirling torrent. In the factories

women and even children will be producing the war supplies. If this flow of matériel is reduced to a trickle, the fighting front will be in a precarious condition. In our Civil War the North used Sherman to destroy the industrial organization of the South. They could not defeat Lee on the battlefield, but they destroyed the industry and supply behind him and the army fell. This is but a shadow of what may be expected in the future.

The air bombing of any industrial plant will appear highly desirable if we cannot reach and crush the army readily. And, as will be seen later, we cannot. The killing of noncombatants may be expected in wholesale lots. To the materialists this can be easily justified. Furthermore, the fewer of the enemy left after the war, the easier it is for the victor to reorganize his world.

Here we encounter a strange thing produced by our machine civilization. Once wars were waged to win battles, but not to slaughter entire peoples—if we except the Mongol method. Why? Because land was the object of war and one needed serfs to cultivate it. Why kill them? Silly, to be sure. And so the Saxons lived. Today this does not apply. Machines take the place of men. So enemy masses are only in the way. The more that are eliminated by war, the less are left to starve to death after war. Certain powerful nations today cannot exist without foreign trade. That trade they will not retain after a losing war. For, never fear, the winner will seize all markets and in many cases will monopolize the domestic market of the defeated. It is being done this day. It is not pleasant to figure what will happen when an industrial nation of forty million is forced to subsist by agriculture in land that will support but fifteen million or so.

Once wars were won by defeating an army. The next war may be won by destroying the people that furnish the army. The war will come directly against the people, not its engine of war, for this engine of war may be too difficult to reach. This will bear a little study.

Think of an army in trenches of steel and concrete, living in manufactured caverns and able to cover its front with obstacles of concrete and belts of thick, barbed wire. A recent German test proved that it took a mortar battery a half day to disable one located pillbox. A clean break through a Maginot-type zone would mean the quickest destruction of thousands of unlocated pillboxes—a gigantic task. Tanks will not do it. They too face barriers. Think of this deep fortified front covered within and without with interlacing, interlocking fires. An army in such a position is formidable—and safe. Nations facing a probable war have just such lines backed by a web of mechanistic communications. Then consider the war matériel that must be manufactured in the rear in open cities, the people that rear the soldiers for the army also in open places, and remember the agile aircraft that can leap the fortified zone. Surely the enemy will strike not the fortified position but the basis of the whole army—industry and the people. It is sound tactics to strike weakness, not strength, and now nations, cultures, make war, not armies alone. Therefore, it is not the weakness of the army that will be assiduously sought and struck, but the weakness of the nation.

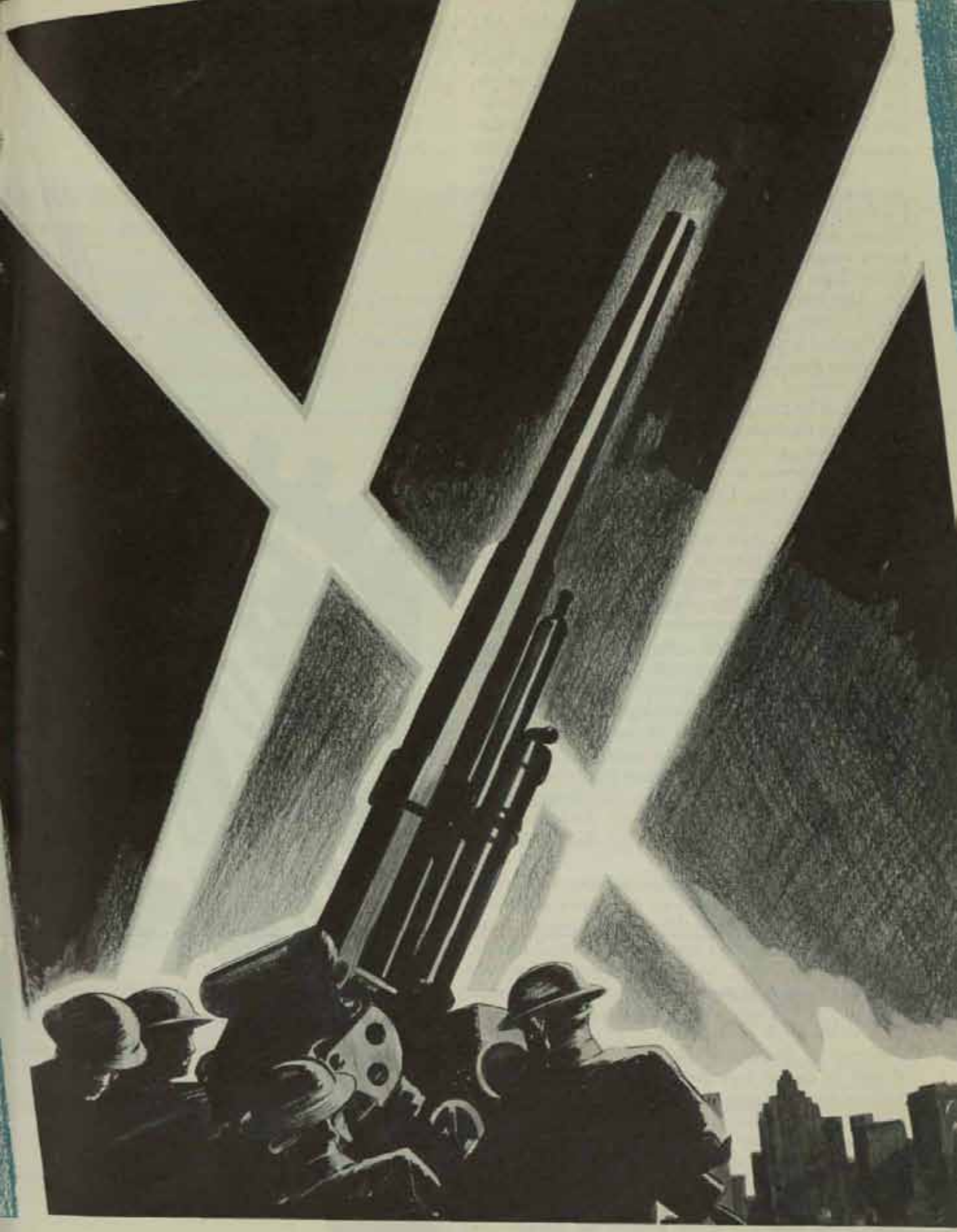
Each side, with aircraft, will pound and batter the targets within reach in hopes that the destruction will be so great that it will be possible to deprive the enemy army of munitions and morale, lead to a weakness of the fortified zone, and the eventual cracking of the line through which will pour the foot soldiers. For let the air soldier say what he will, nothing is won until the ground soldier places his foot on it.

True, the air attacks may only lead to a mutual attrition of industry and man-power for it is far easier to strike mass installations than massed air forces. They may destroy great cities and disrupt the country of each contestant without leading to a decision. For a decision is only obtained when a way is opened for the infantry. It may eventuate in a clean smash-up of both contestants, yet with a preponderance of air-power, one side will take the chance and may eventually win through. Who knows? But in any event, no military man will throw an army against an intact Maginot-type line. He will but commit suicide. And since both contestants have a fortified zone, what can one expect? It is a stalemate except for the air arm, a new and untried tool. The air arm has not proved it can do much to the fortified line, but its bombs can wreak havoc with the people and the factories. No doubt of that.

It is idle to be appalled by thought of the dreadful scenes of carnage in the rear. We can expect a pitiless war against a nation not against an army alone. It will very likely come in our time—the dress rehearsal is now going on. The user of air-power who primarily directs his energy against industry and the people may make a great mistake. Who can tell? But this much is sure: The air force will get a thorough tryout in the next war, and its war function will be finally decided. Douhet's Theory that an air force could decide wars by breaking enemy civilian morale, has received little modern proof. But its full power to annihilate people and destroy industry and thus lead to winning a war, has yet to be tested. It will be.

It is more than useless to decry the terrible casualties that aircraft will cause among noncombatants. That feeling comes from the day when warfare had a certain honor, even dignity. Today it has little: tomorrow none. Honor and chivalry is leaving war as science enters. What is a combatant? To the logical person of the mechanistic world, it is anyone who can help his opponent—men who make munitions, women who toil for them, children who will grow up into soldiers, all have a combat function. Signed treaties preventing wars are openly, cynically flaunted, and the long, lost custom of sacking cities has returned. Consequently, our future conflicts will likely be wars of extermination. Nothing in our crass modern philosophy would seem to prevent it.

All this may to some appear overdrawn, but let us look around a bit. Today, an army in a modern Maginot Line is relatively secure from anything less than a volcanic eruption. But for a thousand miles behind the line all is



"It is more than useless to decry the terrible casualties that aircraft will cause among noncombatants."

open to the aircraft. In agricultural China and in Spain the air war produced little moral result on the people. But what would happen to a highly industrialized nation when faced by overwhelming air-power? Great industrialization means a clustering of humans and establishments into compact areas that furnish admirable air targets if one does not worry about killing noncombatants. Judging from what befell Czechoslovakia, the conclusion is pretty definite that industrial nations fear air attack and expect noncombatants to be slaughtered in the effort to destroy basic war industry. But there is a darker picture yet. Gas bombs can have little effect on materiel or establishments. Gas is a weapon for destroying personnel. Yet England is manufacturing forty million gas masks for its civilian population.

Is it expected that the civilian will be sprayed with gas? Can it be that a modern nation at war will immediately attack the basis of the enemy army—the people—and endeavor to destroy it? Who knows, or can guess? But the equipment of an entire people with gas masks is an ominous sign. Logic says if the army cannot be crushed quickly, smash the people who furnish it. A brutal conclusion, to be sure, but we are living in a brutal age; we are the inheritors of a materialistic culture. There is too much selfishness, too little idealism; too little sentiment, too much sentimentality; too little high religious sentiment, too much hedonistic thinking. In fact, we are living in an age of scientific pragmatism which sees man only as a fairly high-type animal and little else. We slaughter animals for the good to society or for sport. Why not men? It is but a short logical step to reach the conclusion that the slaughter of great groups of men, women, and children may be necessary when such groups oppose us. Frankly, in many places in the world today, when a group differs from the ideology of the mass, it is being promptly liquidated. Look about and see it! In war, the outlanders will get short shrift from such a mass mentality.

To some this all may seem sheer nonsense. But they are but wishful thinkers. How can the speech of Premier Hiranuma in the Japanese Diet on January 21, 1939, be explained? "Persistent opponents of Japan," he says, "will be exterminated." So speaks one great nation in its legislative halls. And one should note that a nation picks its enemy and defines what are "persistent opponents." That means much to the realist.

It may be stated that the war of the future, even though its tactical type cannot be predicted, will be a totalitarian war, quite similar to the wars waged by primitive savages except that modern science will make the war more savage, more ruthless. Popular philosophy will furnish logical reasons, entirely convincing to the true modern, as to why the war of annihilation is necessary, and modern inventions will disseminate the ideas. Perhaps the radio will be the modern war drum.

Smugly satisfied and ensconced behind two broad oceans, the American thinks he is safe from the flaming wars that will arise between older countries. He forgets the

speed of the Industrial Revolution. With great rapidity both oceans—in a military sense—are shrinking. Within a decade a plane will be produced that can cross the Atlantic with a bomb payload and return. For all we know, that very plane may be on the drafting board today.

We may do our best to remain aloof but it will be of no avail. No one can build a Chinese Wall around this country that ideas or an airplane cannot leap. No question about it: We are in the swirling current of world affairs with certain countries coyly—and selfishly—angling for our support, while others are consolidating their attack position. Already we are under attack in our foreign markets. In some cases it may be noted that this attack is wholly state-directed. The solid democratic ideology possessed by the American people is also under steady pressure. Thus, of the three elements of a nation's power, two are undergoing an offensive and a vicious one at that. Only the armed forces have been left undisturbed. Their time has not yet come.

We need not expect to keep out of the war that is now brewing—a war between ideologies that will shake all civilization to its foundations—or, it may be, the first of a series of wars that will do much to shatter civilization completely. Unless revolutions abroad stop these wars for the time, we must face the matter squarely. It is not a pretty picture, to be sure, but it needs studying. For while nobody will win such a gigantic war, the loser will face extinction or at the best, become an industrial peon.

Science has produced the lethal tools of war; modern philosophy, the ideologies which are slowly driving peoples against each other. It is not a pretty result that emanates from centuries of science and education, but the people who have had charge of these two fields must take the blame. To the philosopher who shrieks that it is not *his philosophy* that is causing all this, the plain answer is that he has not evolved a modern code that people believe in—that guides their lives. Rudderless, unsatisfied, they are easy victims for demagogues with a satisfying even if bloody code of life. It is silly to blame the professional soldier for wars. He only wages them.

Once different interpretations of the Bible caused a long series of frightful and devastating wars. Today we are face to face with a like situation, but a far more serious one. For the human has at hand weapons of immense destructive power; no philosophy or decency to stop him from using them; no feeling of honor that the advocates of advanced ideologies will not uproot ruthlessly; no brotherly feeling that might ameliorate war's harsh conditions. Rather, he has—or will have—a logical, scientific attitude and a definite knowledge that the fewer of the enemy left, the better it will be for industry and his job. One could wage a very popular—and frightful—war on that slogan. Concealed by modern hypocritical sublimations, such a war is now being fought. From the news that trickles by the censors, the modern human would be far better off under the heel of a Napoleonic army than confronting a modern one.

Today armies are not the only implement of war; they are but the final one. A whole people is the tool and target of war. A few months of war service does not make a soldier. It needs a lifetime of spiritual training—not military training—before the professional soldier receives sound material for a soldier or before a people can withstand the tremendous impact of modern war. Our industry can flood us with a veritable torrent of machines, but our social organization may, if we do not watch out, furnish us only with defective material.

The human is the product of the civil schools. Unquestionably, then, the schools are a statecraft problem, not a problem for schoolmen who are mainly technicians. The fact that they have a philosophy of their own does not necessarily mean that such philosophy is adequate. Measured by their philosophy they may turn out a satisfactory product, but if such a product cannot help a state to exist in this hostile world, it is worthless. The schoolmasters need guidance. Permitting them to determine the type of product they will turn out and the method for doing it is putting more power in one group's hands than any democracy can permit. The folly of this can be seen when the latest study of the Julius Rosenwald Fund flatly states that the educators as a group lack brains and distinction. It is high time for the statesman to look into his schools. They produce the people that must withstand tomorrow's wars and produce tomorrow's army.

The war of the mechanistic age will strike with a terrific impact; nothing, no one, will be spared the shock. We must regard it as an eventuality even though we strive adroitly to avoid it as long as possible. We must build physically and mentally for it; there is no escaping its coming. It will take human sturdiness for a nation to win through the era of mechanistic wars that faces this and succeeding generations.

Or perhaps we should place our trust in treaties—unbacked by bayonets—and go through the same agony but end in oblivion. Take your choice.

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MUTINY OR A BOUNTY

When a war—however righteous—is protracted for more than the customary four years, it rapidly begins to lose, for the participants, its character of high adventure. The nap wears off the glamour, leaving only the shabby and ignoble verities eternally in view, winter's bitter cold, summer's exhausting heat, hunger, filth, blood, and death. To the man in the ranks, to the officers who command, even to the generals who make the headlines, the whole business becomes a bore, a disgusting and tedious chore in which everything seems to be marvelously mismanaged to the end that the longed-for return to homes and families and resumption of normal peacetime existence is no more than a tantalizing mirage.

So thought the Army of the United States in the autumn of the year 1782, herded miserably in rude cantonments among the hills along the Hudson River in the neighborhood of Newburgh. Seven weary years had dragged themselves out since the "embattled farmers" had chased Lord Percy and his redcoated brigade from Lexington to the safety of Boston town. The eighteen year old boys who filled the trenches on Breed's Hill were now men of twenty-five, veterans of a score of battlefields, who had tasted both victory and defeat until the first had lost its savor and the latter—so often experienced—could no longer bring humiliation. Six months before, Yorktown and Lord Cornwallis had surrendered; the war was over and independence a fact. In London valiant old John Adams was sparring for a treaty of peace. In New York Sir Guy Carleton still held his regiments in barracks, a sullen and menacing garrison.

At Newburgh the Continental line settled down to wait for demobilization. Winter came early that year and life in the chilly camps was deadly dull. For eight months the paymaster had failed to put in an appearance; the quartermaster storehouses were empty of clothing, subsistence and supplies. The soldiers were in rags, an army of gaunt scarecrows interested in only one topic: When

do we get paid off and go home? No commanding officer ventured to prescribe drills or marches lest the tattered shoes of his men fall apart and leave them barefoot to the snow and ice. The officers were in little better case. Their pay was long in arrears, most of them were deeply in debt, and the prospect of any substantial remuneration for their years of sacrifice and service was gloomy indeed. Across the river lay the French Allies, warmly clothed, regularly paid and amply supplied with provisions by their quartermasters, whose kegs of good *louis d'or* came up from the fleet. More than one American captain or major, invited to dine sumptuously at a French officers' mess, was shamed to think that he could offer nothing in return hospitality but "whiskey hot from the still, and not always that, and a bit of beef without vegetables." Their situation, declared General Washington, "merited the attention of every grateful mind." As commissioned officers, he reminded the government, "they have been obliged to dress and appear in character, to effect which they have been obliged to anticipate their pay or draw from their estates. By the former, debts have been contracted, by the latter their patrimony injured."

Down in Philadelphia the Continental Congress was wrangling over the endless problem of finances. They had promised the Army that before being disbanded, it would at least be paid off. In October, 1780, when desperate attempts were being made to hold the troops together, Washington had suggested that a life pension of half-pay be granted to every officer and soldier who remained in service until the end of the war. Not without opposition, the act had been drafted and passed. After Yorktown, when it began to look as though this glittering "adjusted compensation" would have to be paid, Congress heard from the people. A roar of indignant protest, especially vociferous in New England, whence most of the troops had come, went up from the civil population. What! Burden the taxpayers with a charge of millions to support in idleness for the rest of their lives those tatterdemalions at Newburgh! Create an aristocracy of wealth in this republican nation? No! A thousand times No! Let them go home and get back to work like the rest of us!

The cantonments boiled with helpless rage. The Army was certainly going to be reduced, probably disbanded entirely. Once scattered to their homes, what chance would the troops have of ever collecting that back pay? What certainty that Congress would fulfill its promises of half-pay for life—or any lesser period? And anyhow, where was the money coming from? The central government had few sources of income; it was entirely dependent upon the fiercely jealous States to raise money by taxation and had no means of compelling them to do so.

> *"Express your utmost detestation of the man who wishes, under any specious pretences, to open the floodgates of civil discord and deluge our rising empire in blood."* WASHINGTON

Robert Morris, the harassed Superintendent of Finance, had already borrowed far beyond the limits of sound credit and was at his wits end to provide enough cash so that Colonel Pickering, the Quartermaster-General, could buy food for the troops from day to day. When he did manage to supply that unhappy gentleman with a little specie, Pickering was under the necessity of shamefacedly begging for the necessary apparatus with which to clip the coin. He thought it a disgraceful business and one that he could not fairly be expected to carry on. Needs must when the devil drove, however, and he urged Morris to send him "a couple of punches, a pair of good shears and a leaden anvil." Shearing the edges from the Spanish milled dollars, Dutch guilders and English guineas would provide an extra beef or two for the ravenous troops.

The Massachusetts Legislature voiced the opinion of that commonwealth when it passed a resolution declaring that half-pay for life would be more than an adequate reward for soldiers whose services were no longer needed. Such senseless extravagance would "tend to exalt some citizens in wealth and grandeur to the injury and oppression of others." The well-to-do burghers of Boston, who had stayed warm and comfortable in their red brick homes winter after winter, were not minded to be taxed that a "licentious soldiery" should milk the treasury for the rest of their natural lives.

The Army had some friends in Congress. Alexander Hamilton, Chairman of the Military Committee, had served long on Washington's staff and knew well enough what the sufferings and toils of the troops had been. He was disgusted at the disposition of the people to turn out his former comrades unrewarded, now that the need for their bayonets was no longer felt. Moreover, he had in mind some very devious and startling plans to strengthen the financial posi-

By Major Charles Winslow Elliott
United States Army, Retired

tion of the government and he thought that the discontent of the Army could well be employed in furthering his schemes. "I have an indifferent opinion of the honesty of this country," he wrote to his old chief, and he hinted that the military, goaded beyond endurance by injustice and neglect, might initiate some action which would lead them "beyond the confines of duty." It would be highly advisable, he urged, that the Commander-in-Chief "take the direction of their discontents." Republican jealousy, he added, "has in it a principle of hostility to an army, whatever be their merits, whatever be their claims to the gratitude of the country." More and more it began to appear that unless pressure of some sort was brought to bear on the proper quarters, the Army was going to find itself distinctly out of luck.

All winter Washington worked faithfully to persuade Congress that favorable action on the claims of the troops for recompense and settlement should be taken. He warned the legislators that "very serious and distressing evils" would follow unless something was done. "No one I have seen or heard of," he wrote, "appears opposed to the principle of reducing the army as circumstances may require; yet I cannot help fearing the result of the measure in contemplation . . . when I see a number of men, goaded by a thousand stings of reflection on the past, and of anticipation of the future, about to be turned into the world, soured by penury, and what they call the ingratitude of the public, involved in debts, without one farthing of money to carry them home, after having spent the flower of their days, and many of them their patrimonies, in establishing the freedom and independence of the country, and suffered everything that human nature is capable of enduring this side of death . . . without one thing to soothe their feelings or dispel the gloomy prospects. . . ." In reply to Hamilton's broad hints that the Army might take matters into their own hands, he wrote that the idea of redress by force was too chimerical to have a place in the imagination of any serious mind in the army, but he admitted that there was no telling what unhappy disturbances might result if the troops were demobilized without their accounts being liquidated.

For a time the officers and soldiers at Newburgh waited uneasily. They had plenty of leisure in which to reflect on their wrongs—nothing to amuse or divert them from their single pastime of grousing at the ingratitude of the country they had saved from British tyranny. Heavy snow and icy wind kept them huddled about the fires. With mounting anger they discussed ceaselessly the one topic of interest—"When do we get paid and go home—if ever?" And if ever there was an army that stood in need of those attentions to be provided a century and a half later by that admirable organization the Y.M.C.A., this was it.

As Congress continued to talk, the States to refuse contributions, and the paymaster to visit the camps, the tide of indignation and rancor crept higher. The officers elected a committee, and with the approval of Washington drew up a respectful memorial explaining their grievances and humbly begging for early redress. To carry it to Philadelphia and to explain the situation verbally to Congress, Major General Alexander McDougall, Colonel Matthias Ogden of the 1st New Jersey, and Colonel John Brooks, the Assistant Adjutant General were named. General McDougall had been a member of Congress himself and would know how to talk to those evasive lawyers. The memorial was drafted with great care:

> To the United States in congress assembled: We, the officers of the army of the United States, in behalf of ourselves and our brethren the soldiers, beg leave freely to state to the supreme power, our head and sovereign, the great distress under which we labor. Our embarrassments thicken so fast that many of us are unable to go farther. . . . We have borne all that man can bear. Our property is expended; our private resources are at an end. We therefore beg that a supply of money be forwarded to the army as soon as possible.

The uneasiness of the army for want of pay, the memorial went on, was great and dangerous. There was a balance due for retained rations, forage, and arrearages for clothing allowances. Although the army saw with chagrin that the States were reluctant to approve the bill placing the veterans on half-pay for life, it hoped, "for the honor of human nature that none are so hardened in the sin of ingratitude as to deny the justice of the award." It was willing, however, in order to avoid altercations, to accept a commutation of the promised life pay for either full pay for a number of years, or a gross sum. Attention was called to the fact that general dissatisfaction was gaining ground in the army. Congress was entreated to convince the world that the independence of America would not be grounded on the ruin of the very men who had achieved it.

General McDougall and his two coadjutors went off to Philadelphia, where they put in a week of arduous spadework among the members before presenting the memorial, "lest the want of information should retard a favorable resolution of it." They had a long conference with Robert Morris, the Superintendent of Finance. He told them regretfully that he could not give them a shilling, because he had none to give, and that it would be foolish for him to even pretend that there were hopes of future payment until he had some idea where the funds were to come from. His strong box was empty; his accounts in Europe long since overdrawn.

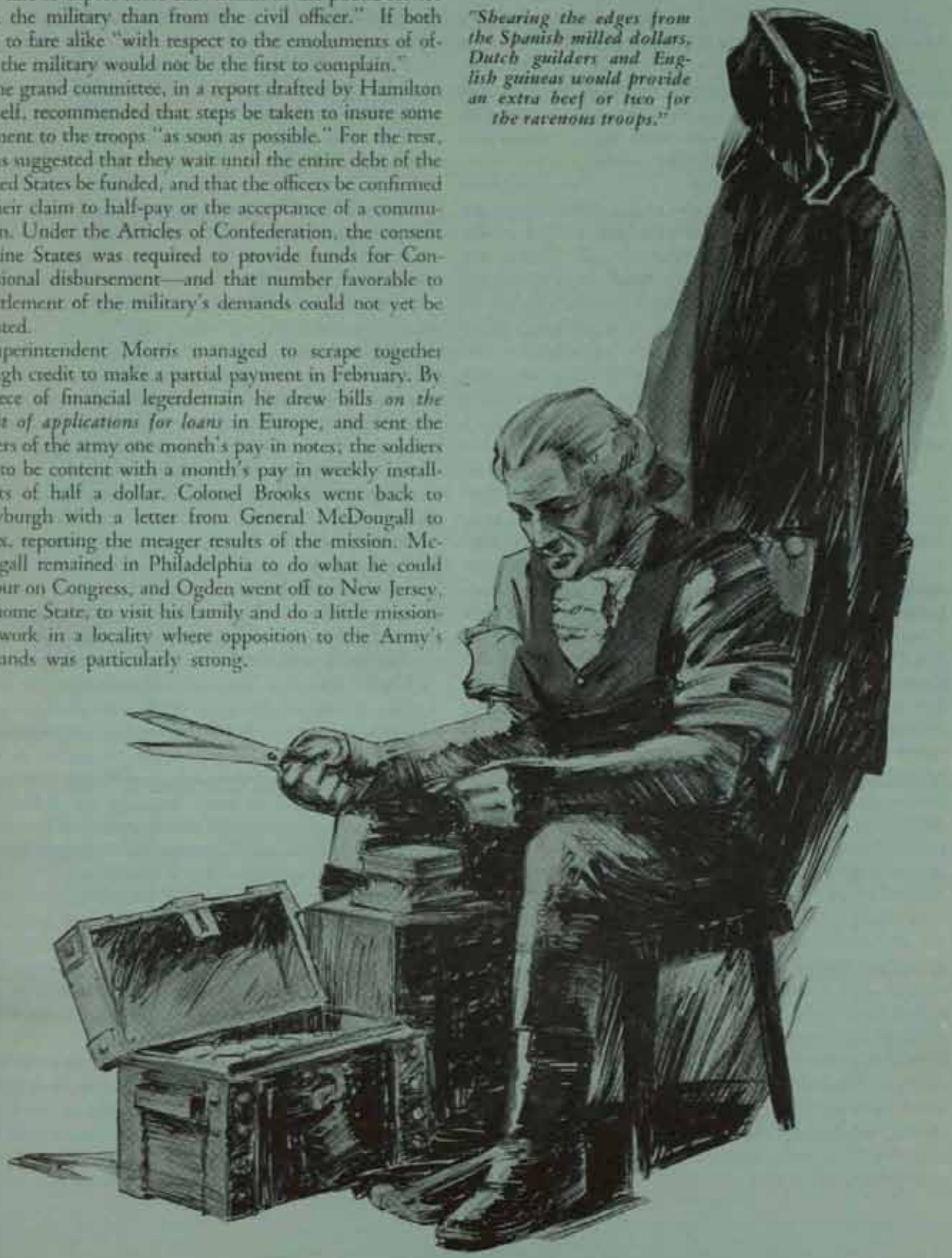
The deputation then appeared before the "grand committee of Congress," one member from each State. To an unsympathetic audience they explained that unless an immediate payment of some nature could be arranged, there was no telling what might happen at Newburgh. Very cautiously they hinted that a mutiny was not outside the bounds of possibility. Were they expected, in such an unfortunate event, to punish the soldiers for breaking faith with the people, when the people had so many times flagrantly broken faith with them? "The Army," observed General McDougall ominously, "is verging to that state which, we are told, will make a wise man mad." They had not failed to note the fact that Congress itself never adjourned until its own pay accounts had been

meticulously made up and settled. More than one penniless second lieutenant on the Hudson had suggested that for a change some of those Congressional pay-checks ought to be passed up, and the money they represented paid to the military who made possible the existence of a legislature. General Washington himself had already told Mr. Jones, the Congressman from Virginia, that it was "idle to expect more enthusiasm in the public service from the military than from the civil officer." If both were to fare alike "with respect to the emoluments of office, the military would not be the first to complain."

The grand committee, in a report drafted by Hamilton himself, recommended that steps be taken to insure some payment to the troops "as soon as possible." For the rest, it was suggested that they wait until the entire debt of the United States be funded, and that the officers be confirmed in their claim to half-pay or the acceptance of a commutation. Under the Articles of Confederation, the consent of nine States was required to provide funds for Congressional disbursement—and that number favorable to a settlement of the military's demands could not yet be counted.

Superintendent Morris managed to scrape together enough credit to make a partial payment in February. By a piece of financial legerdemain he drew bills *on the credit of applications for loans* in Europe, and sent the officers of the army one month's pay in notes; the soldiers had to be content with a month's pay in weekly installments of half a dollar. Colonel Brooks went back to Newburgh with a letter from General McDougall to Knox, reporting the meager results of the mission. McDougall remained in Philadelphia to do what he could to spur on Congress, and Ogden went off to New Jersey, his home State, to visit his family and do a little missionary work in a locality where opposition to the Army's demands was particularly strong.

Meanwhile, the proponents of an improved financial policy in general were at work perfecting a plan under which the creditors of the government would unite their efforts to strengthen the position of Congress and compel the States to furnish it with funds. If the holders of Continental obligations could enlist the coöperation of the Army—the second largest creditor—they might be able



"Shearing the edges from the Spanish milled dollars, Dutch guilders and English guineas would provide an extra beef or two for the ravenous troops."

to exact from the States contributions in taxes sufficient to liquidate all claims. Some quiet and rather mysterious visiting took place in the camps. Conferences were held behind locked doors and blanketed windows. Gouverneur Morris, Assistant to the Superintendent of Finance but no relative, made an unheralded trip to Newburgh and did some unostentatious calling on a good many of the higher ranks. He was, like his chief and Mr. Hamilton, convinced that the feeble confederate government of the loosely linked States was a hopeless failure; that a strong central power would have to be set up, and that this could never be done without the assistance of the armed forces. Already he had written privately to General Greene, commanding the southern army, telling that solid Quaker soldier that there was no hope of the union subsisting "except in the form of an absolute monarchy," but admitting the conviction that such a government "did not seem to consist with the taste and temper of the people." To John Jay, over in Paris with Adams and Franklin, laboring to get a peace treaty out of the stubborn English, Morris betrayed his foreknowledge of the slowly maturing plot. "The army," he declared, "have swords in their hands. Good will arise from the situation to which we are hastening; much of convulsion will probably ensue, yet it must terminate in giving to government that power without which government is but a name."

At Newburgh Morris discovered that the troops were firmly determined not to forego easily their rights and expectations. Their murmuring, he found, though not loud, was general and deep. Knowing that the unconstitutional designs of the group he represented could expect no sympathy from Washington, he did not venture to approach the Commander-in-Chief. But to Knox he intimated that the Army ought to coöperate in bringing about a closer union of the bickering States and the emasculated central government. From the chief of artillery he got slight satisfaction. All that the phlegmatic Knox could suggest was that "you great men," as he called Morris and his friends, should get together and tell the nation frankly that the constitution was defective and ought to be rehabilitated. The Army, said Knox, were good patriots and would do what they could to forward plans for a sound union, but as yet they had no idea how their influence could be employed. Morris was more than willing to instruct them.

Washington was deeply disturbed by the critical situation. He had intended to go down to Mount Vernon for the winter, but while the camps seethed with rumors, discontent, and possible disaffection, he would not take the risk of leaving the troops. The untrustworthy Gates was present, and Hamilton, who had no desire that a confirmed bungler should direct the interposition of the Army in forwarding a revolutionary movement, was discreetly warning His Excellency that some unlawful proceeding might take place unless the "conductor of the army in their plans for redress" should be the Commander-in-Chief himself.

As a matter of fact, Major General Horatio Gates was already busy at his old trade of army intrigue. He had come up from the South after his defeat at Camden, had been exonerated by Congress, and was now indulging in day-dreams in which he saw himself supplanting Washington in the leadership of the Army. These resuscitated ambitions were clearly perceived by his chief. The "old leaven," Washington wrote to Hamilton, "is again beginning to work, under a mask of the most perfect dissimulation and apparent cordiality." Colonel Brooks had scarcely returned to camp with the unpalatable congressional reply to the memorial, and Knox had not yet formally transmitted this to the Army, when there appeared on the scene another rather unaccountable visitor. This was Colonel Walter Stewart, a retired officer who let it be known that he represented, somewhat vaguely, the "friends of the Army in Congress." He had been one of Gates' aides in '77, had commanded a New Jersey regiment, and had enjoyed the reputation of being "the handsomest man in the Revolutionary Army." More conferences behind closed doors, in which he was seen to participate, immediately let loose a flood of exciting rumors among the officers and men. At the mess tables and around the camp fires it was declared that in high quarters the expectation was held that demobilization must not be accepted until justice had been done. All who held the obligations of the Continental government looked to the Army to help them collect—and would even join them in the field if it became necessary to coerce the delinquent States.

At General Gates' headquarters the seeds brought from Philadelphia and subtly implanted by Morris, Stewart, and others, took root and flowered before the cultivation of the ground was sufficiently advanced. It is improbable that either Morris or Hamilton desired that action by the Army should be controlled or initiated by Gates. But the opportunity was one that suited that arch-plotter to perfection. In company with his staff, he formulated a plan to bring matters to a head. Profound secrecy surrounded their deliberations, and the general scramble, after the event, to disclaim any connection with their scheme, has made it impossible to name definitely the chief collaborators. An anonymous call for a meeting of "a commissioned officer from each company and a delegate from the medical staff" was prepared for circulation. The assemblage was requested for Tuesday, March 10, 1783, at the Public Building in Newburgh, at eleven o'clock. "The object of this convention"—so ran the notice—"is to consider the late letter of our representatives in Philadelphia, and what measures, if any, should be adopted to obtain the redress of grievances which they seem to have solicitated in vain."

At the same time it was determined to circulate an elaborate and moving address to the Army, setting forth in detail its wrongs and injuries, warning against further display of patience, and urging that direct action of some sort be discussed and initiated. Looking about him for a facile and trenchant pen to indite such an appeal, the eye

of Gates fell upon his twenty-six year old aide, Major John Armstrong, Jr. This young field officer was a Pennsylvanian, the eldest son of that doughty old Irish major general from Carlisle who had fought so gallantly in the French and Indian War and commanded a brigade and division throughout the Revolution. Young Armstrong had begun his education at Princeton, deserting his classrooms in '76 to enlist in Potter's Pennsylvania Regiment. Until Mercer's death at Princeton, he had served on his staff. Later he had joined Gates as an aide and had been with him almost constantly since Saratoga. He was a past master in the use of the orotund and sententious style that marks the public papers of his day, and the address, when completed by him, was nothing less than a masterpiece among its kind.

The originals of the two papers, the address and the call for the meeting, were taken to the office of the Adjutant General where they were presented for the inspection of the brigade majors, regimental adjutants, and aides-de-camp who were accustomed to assemble there each morning. Most of them took copies, and, returning to their commands, promptly put them in circulation. By noon they were being eagerly perused and applauded in every section of the camp. The adjutant of General Washington's bodyguard hurried with his copy to the quarters of His Excellency, the Commander-in-Chief.

Armstrong's address was composed with consummate skill. As one historian observes, "It was calculated to make a deep impression on the minds of the malcontents." Washington himself admitted that the writer's art had rarely been equalled in the English language, a compliment which must have swelled with pride the breast of the ex-Princeton freshman. The General, however, was far wrong in his guess as to the authorship of the document. He strongly suspected that Gouverneur Morris was its composer and there is reason to believe that the Assistant Superintendent of Finance actually had a hand in suggesting its general tenor.

"My friends!" the anonymous trumpeter sounded off, "after seven long years your suffering courage has conducted the United States of America through a doubtful and bloody war; and peace returns to bless—whom? A country willing to redress your wrongs, cherish your worth, and reward your services? Or is it rather a country that tramples upon your rights, disdains your cries, and insults your distresses? Have you not lately, in the meek language of humble petitioners, begged from the justice of Congress what you could no longer expect from their favor? How have you been answered? Let the letter that you are called to consider tomorrow make reply!"

What would they have to expect, the appeal continued, when the swords in their hands, "the instruments and companions of their glory," should be taken from their sides when demobilization began? It would be well to awake now, and discover sufficient spirit to oppose tyranny. If the present moment be lost, later threats would be as empty as entreaties were now. Let them appeal from the justice to the fears of the government, and "suspect the motives of the man who counsels further forbearance!"

The obvious advice followed. The Army was urged in stirring words to come to some final opinion on what it would bear and suffer. It was plainly told that now was the time to change the "milk-and-water style of the last memorial" and assume a bolder tone. Let them tell Congress in unmistakable terms that the slightest mark of indignity thereafter would operate to part the army and the civil government forever. The Army had its alternatives, and they were peace or war. As a last resort, if Congress chose war rather than peace, the military were advised to court the auspices and invite the leadership of their illustrious General, and "retire to some unsettled country, there to smile in their turn."

The unsigned call for the meeting was, of course, insubordinate and irregular; the address itself was manifestly inflammatory and subversive of discipline; a plain and seditious appeal to the passions of the troops, already seared by months of neglect, injustice, and bitter suffering. Probably not more than a score of the officers and a handful of the men but heartily approved the incendiary advice and welcomed the, as yet, anonymous leadership that suggested it. Here in good round terms were expressed the very thoughts that were milling in the minds of the inarticulate soldiery. We have fought, bled, and died for our country, they growled, for nearly eight years, and what has it got for us? Congress sits comfortably in Philadelphia and draws its salary; the members ride about in carriages and give parties costing thousands of pounds, and what do we do? Sit here in the cold and shiver, half clothed, hungry, unpaid for months, and about to be sent home to beg for a living! After all, we have swords in our hands, why not talk to them in a language they can understand?

But the movers of the scheme had failed to count on the good sense, the firmness, the far-seeing patriotism, and the almost God-like influence of the much tried Commander-in-Chief. On the morning of the 10th, when his adjutant returned to his quarters with a copy of the call and address, Washington swung at once into action. He saw clearly the appalling consequences which would attend a general attempt by the Army to coerce Congress and the nation. It required no extraordinary perspicacity to guess that what he called "the old leaven" was at work, and that the disloyalty and intriguing propensities of Horatio Gates might bring down in ruins the whole structure of American independence.

A General Order issued from camp headquarters the next morning—on the very day that the meeting was to take place. In it Washington characterized the proposed assemblage as "irregular" and "disorderly," but he was too wise to forbid it. He merely sparred for time by himself postponing it from Tuesday until Saturday. At that time, he directed, all the generals and field officers, with one officer from each company and representatives of the staff, would meet at the New Building and listen to the report of their delegation to Congress. To preside over this meeting, he selected (masterly stroke!) the senior gen-

"In profound silence the Commander-in-Chief began his address. No man stirred in his place."

eral present—who was none other than Major General Gates! Occupying the chair, the Hero of Saratoga could not join in the debate; as president of the meeting and charged with the duty of reporting its deliberations to the Commander-in-Chief he could hardly with good grace attempt to influence its decisions.

On Wednesday, Thursday, and Friday Washington took counsel with the faithful: men like Knox, old Israel Putnam, and honest Phil Schuyler, who could be depended on to see the light and labor to avert a catastrophe.

Temporarily checked, the group behind the address were not yet stopped. On Tuesday night, Armstrong with Gates looking over his shoulder, composed another anonymous manifesto which was circulated throughout the cantonments by early morning. The tone adopted was much less belligerent than that of the first appeal. Cleverly the postponement of the meeting by Washington was accepted as a tacit approval of the general principles enunciated in the first address, and as authorizing, or "sanctifying" the summons to a meeting. For three days the camps seethed with discussion, argument, denunciation, and persuasion.

On Saturday, at noon, a crowd of officers jampacked the large hall of the New Building. There was no need of a roll-call; they were all there. Most of them were prepared to accept with enthusiasm the seditious advice tendered them by the first of the unsigned addresses. The atmosphere was distinctly hostile to any spirit of moderation or compromise. The popularity of Washington, which had at times approximated a religious devotion, had declined to a nadir. That he should wish to block them in their endeavor to secure their rights, elicited only a passionate resentment. As he rose to speak he faced a sea of eyes in which he was accustomed to read affection and loyalty; today those eyes were hard and icily respectful.

In profound silence the Commander-in-Chief began his address. No man stirred in his place as the high-pitched, rather halting voice broke the hush. In dignified and resolute terms the General told them that the attempt to convene them by an anonymous call was inconsistent with the rules of propriety, and unmilitary and subversive of all discipline; how much so he would let the good sense of the Army decide. He complimented the unknown author of Tuesday's address on the excellence of his pen; he wished he could grant as much for the rectitude of his heart. But he thought that the nameless agitator should have shown more charity than to mark for suspicion the man who recommended moderation and longer forbearance. He took that imputation to himself, and proceeded to demolish it.

"If my conduct heretofore has not evinced to you that I have been a faithful friend of the army, my declaration of it at this time would be equally unavailing and improper. . . . But as I was among the first to embark on the cause of our common country; as I have never left your side one moment but when called from you on public duty; as I have been the constant companion and witness of your distresses, and not among the last to feel and acknowledge your merits . . . it can scarcely be supposed, at this stage of the war, that I am indifferent to your interests. But how are they to be promoted?"

For the attainment of complete justice, and the gratification of their every wish, so far as they might be sought consistently with duty he owed to his country and the civil power they were bound to respect, he pledged his services to the utmost extent of his abilities. The foolish suggestion that they threaten to abandon the country and "retire to some unsettled wilderness," he dismissed as impracticable and cowardly. Let them rely on the plighted faith of their country, and place full confidence in the purity of the intentions of Congress.

"And let me conjure you, in the name of our common country, as you value your own sacred honor, as you respect the rights of humanity, and as you regard the military and national character of America, to express your utmost horror and detestation of the man who wishes, under any specious pretences, to overturn the liberties of our country . . . open the floodgates of civil discord, and deluge our rising empire in blood."

He begged them for one more "distinguished proof of unexampled patriotism and patient virtue, rising superior to the pressure of the most complicated sufferings."

As he laid on the table the last sheet of his written address, he took from his pocket a letter. He had recently received it from a Member of Congress, and as it touched on the subject of that honorable body's sympathy and concern for their grievances, he asked permission to read to them certain passages. The handwriting of Joseph Jones of Virginia was perhaps a bit difficult to decipher, and with a friendly and humorous smile the General fitted on his nose a pair of new spectacles, just received from their maker, David Rittenhouse of Philadelphia. It was the first time he had worn them in public.

"You see, gentlemen," he remarked, "that I have grown gray in your service—it now appears that I am fast growing blind as well."

That quiet observation, so simply expressed, had in it a terrific impact. Quick tears welled to the eyes of every man in the room; shabby veterans to whom the tired old soldier had represented for years their ideal of military perfection, integrity, and purity of purpose, felt their throats constrict as they heard that good-humored little jest.

He read to them Mr. Jones' assurance that Congress was minded to do all in its power to render them justice; that they were not forgotten, and that they might have confidence in an ultimate fair adjustment of their case. Calmly folding the letter, the General bowed to them in formal fashion and withdrew with his aides. Gates assumed the chair and the discussion began. It proceeded, says one of the officers present, "with order, moderation, and decency." Dispelled by the magic of their revered leader's words and mien, the spirit of recalcitrance was gone. Mutineers no longer, they were eager to reassert their patriotism. Men who came to the meeting ready to

abandon the chief they had followed from Cambridge to Yorktown were now back in the ranks.

Five resolutions were drafted and put to the meeting. Five times the vote was unanimous for action following Washington's recommendations. Armstrong himself, with the rest of Gates' coterie, voted aye when the chairman put the most terrific of the resolutions:

> That the officers of the American Army view with abhorrence and reject with disdain the infamous propositions contained in a late anonymous address to the officers of the Army, and resent with indignation the secret attempts of some unknown persons to collect the officers together in a manner totally subversive of all discipline and military order.

It was, perhaps, the greatest triumph of Washington's fabulous career. Had he failed to sway the decision of those embittered soldiers; had they allowed themselves to be carried away by their resentments, and "with swords in their hands," asserted the physical power of the military over the civil government, the whole history of the early Republic might have been altered and the solid foundations of democracy, so soon to be constructed, delayed indefinitely or cemented in accordance with a formula totally at variance with that employed by the Founders. "He spoke—every doubt was dispelled, and the tide of patriotism rolled again in its wonted course. Illustrious man!"

General Gates, perhaps with some understandable embarrassment, reported the action of the meeting to His Excellency the next day. Washington at once transmitted all the papers to Congress, informing them that the result of the proceedings could be "considered as the last glorious proof of patriotism which could have been given by men who aspired to the distinction of a patriot army." It would not only "confirm their claim to the justice, but increase their title to the gratitude of the country."

Congress saw the light: the subject of compensation for the troops was taken up again and soon the necessary nine States concurred in a resolution commuting the half-pay promised, into a sum equal to five years full pay. The grant was discharged by the issuance of certificates bearing interest at six per cent. Money borrowed by Morris in Holland made good the certificates. Only New Hampshire and New Jersey voted in the negative.

Who actually wrote the Newburgh Addresses was for half a century a matter of doubt and speculation. Cobb, Washington's aide, was certain that at the time, no suspicion at headquarters had fallen on Armstrong. His chief, he says, thought that Gouverneur Morris was responsible. But in 1825, in an article published in the *United States Gazette*, Armstrong himself declared that they had come from his pen, asserted that his motives were patriotic, and displayed a letter from Washington in which the Commander-in-Chief assured him that he had, since the event "sufficient reason for believing that the object of the author was just, honorable and friendly to the country, though the means suggested by him were certainly liable to much misunderstanding and abuse."

In the whole history of the United States Army, the meeting at Newburgh on March 15, 1783, supplies the sole instance of a suggested attempt by the men "with swords in their hands" to dictate to the constitutional powers of the state. It was a suggestion born of intolerable injustice, but it was rendered ineffective and abortive by the genius and compelling patriotism of George Washington alone.

Antiaircraft Preparedness

By Captain John R. Lovell, Coast Artillery Corps

The seaward defense of the United States consists of a powerful navy backed by a well organized system of fortifications which protect the important harbors and establishments along our shores. The Navy, popularly called the first line of defense, relies on the Coast Artillery which mans the coastal forts for the second line of defense.

The condition of the Navy and of our seacoast defenses has fluctuated during our history and has depended largely on our relations with other powers and on international relations in general. Our isolation and friendly relations with our neighbors heretofore have made it possible for the United States to delay large-scale preparation for defense until an emergency actually arose. But the invention of the airplane and the advances made in other forms of transportation have changed the picture. The United States does not now enjoy the isolation upon which it once depended. Our defense must change with the times.

After the War of 1812 and the burning of Washington, the United States built the strongest fortifications in the world on its east coast. These have been repeatedly modernized and in some instances are still a part of the close-in defenses of some of our important harbors. It is significant that this excellent system of defenses was constructed during the administration of Thomas Jefferson, an ardent pacifist.

The Endicott Board of 1885 gave us the first principles which were to govern the design, construction, and maintenance of our modern harbor defense system. The provisions of this board were later modified in minor technical details by the Taft Board of 1906. As a result, our system of fortifications was the most efficient in the world at the time we entered the World War.

Since 1920 the armament of our harbor defenses has been augmented by fixed long-range batteries and the addition of tractor-drawn and railway units. A few fixed antiaircraft gun batteries have also been installed. Communications have been improved and action has been taken to improve the fire control system so as to facilitate fire against modern high-speed naval targets. During the past few years money has been appropriated by the Congress to start rehabilitation of the seacoast defenses after a long period of neglect.

Such in brief, is the situation of our seacoast defenses.

The great weakness in the United States defense system is that an entirely new frontier of attack has been opened for which we have only limited defense. The advance of aviation has been so rapid in the last decade that many of our people do not yet appreciate its full significance.

A proper defense for this country consists of a first class Navy, second to none in the Western Hemisphere; a system of seaward defense so strong that no enemy naval force would dare to attack it; an Air Corps capable of destroying any advanced bases established by a hostile power within striking distance of the American continent; and finally, an antiaircraft artillery force capable of providing an adequate defense against enemy aerial attacks. The Navy is still the first line of defense—the seacoast artillery, the Air Corps, and the antiaircraft artillery are the stout bulwarks of the second line.

This paper will discuss the antiaircraft artillery situation in detail, and will submit proposals designed to provide an adequate defense for the continental United States against all forms of aerial attack.

Mission

As is commonly known, the antiaircraft artillery's mission is to give day and night protection to ground forces, aircraft at rest, and important establishments. The object of antiaircraft weapons is to attack all enemy airplanes within range, to destroy them, to cause them to abandon their missions, or to decrease the effectiveness of their operations. The particular mission of the heavier caliber antiaircraft guns is to fight bombardment aviation, especially that flying at high altitudes. The particular mission of intermediate caliber cannon (37-mm.) is to fight observation craft operating over forward areas, and all aviation at altitudes from 6,000 to 10,000 feet. The particular mission of light caliber cannon (20-mm.) is to fight low-flying planes—the hedgehopper.

The nature of the antiaircraft artillery mission is primarily defensive.

The function of the antiaircraft artillery may be better illustrated by a comparison with the seacoast artillery. Elements of the latter are emplaced at strategic locations along the coasts to protect important areas which contain vital establishments. The seacoast artillery insures freedom of movement in the harbors it defends; it protects harbor facilities, installations, and friendly ships from enemy naval gun and torpedo fire; it denies entrance to these harbors; it furnishes artillery support to the ground forces against land attacks. This mission makes possible the concentration of the naval forces for offensive action. The seacoast artillery relieves the navy of defensive as-

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signments and gives it freedom of action and maneuver.

The antiaircraft artillery should perform the same function for the Air Corps. It should release our aviation from defensive missions and enable it to concentrate for offensive action.

Organization

The basic organization in the antiaircraft artillery is the regiment, a unit which was originally intended to operate with a corps and was primarily designed for the purpose of accomplishing forward area missions.

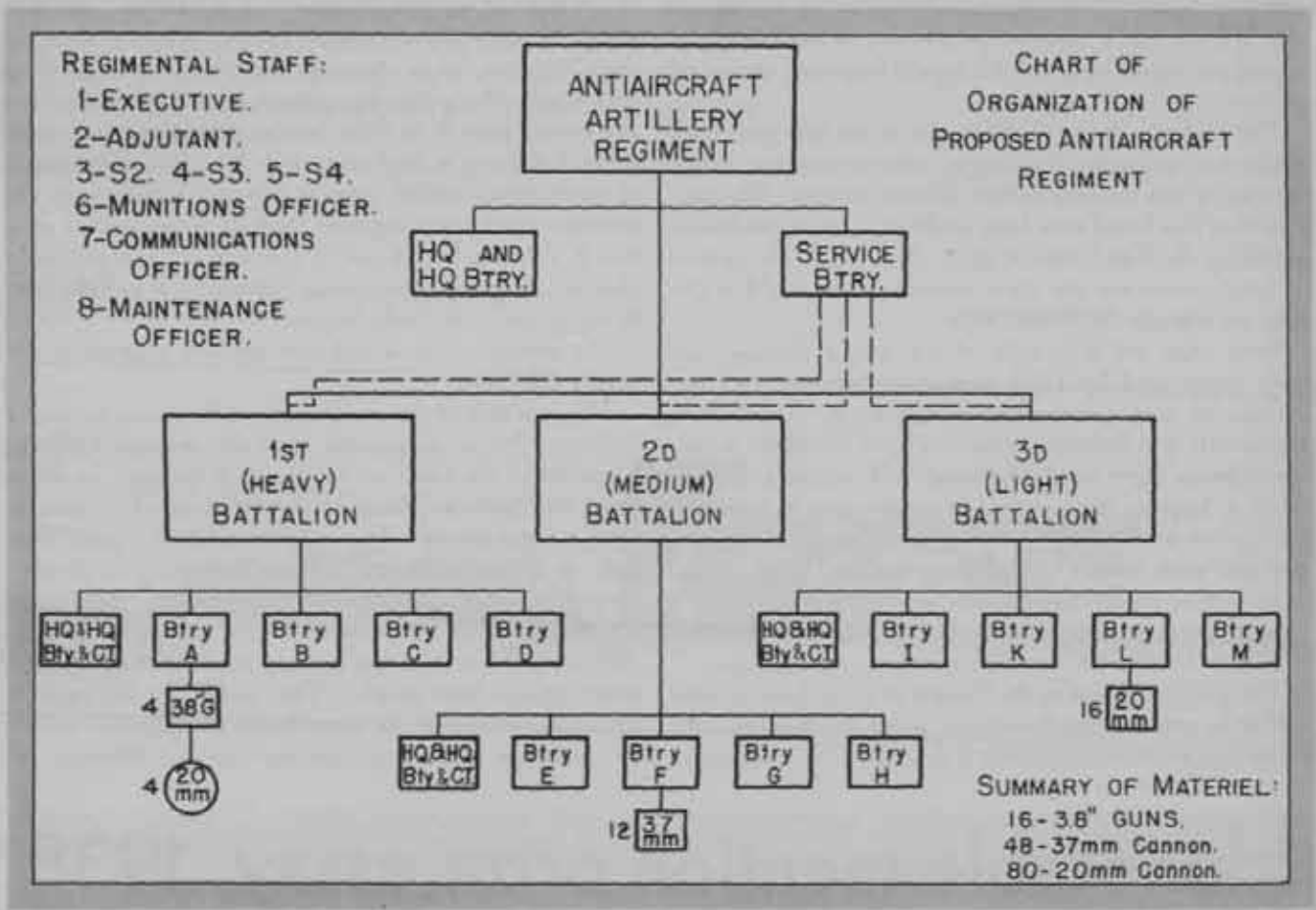
With the increasing importance of military aviation and the realization in recent years of its much wider scope of operations, the present organization of the antiaircraft artillery regiment has become quite obsolescent. From time to time studies of proposed changes in organization have been made but due to the uncertain trend in development, and the lack of adequate antiaircraft weapons, positive action has been delayed.

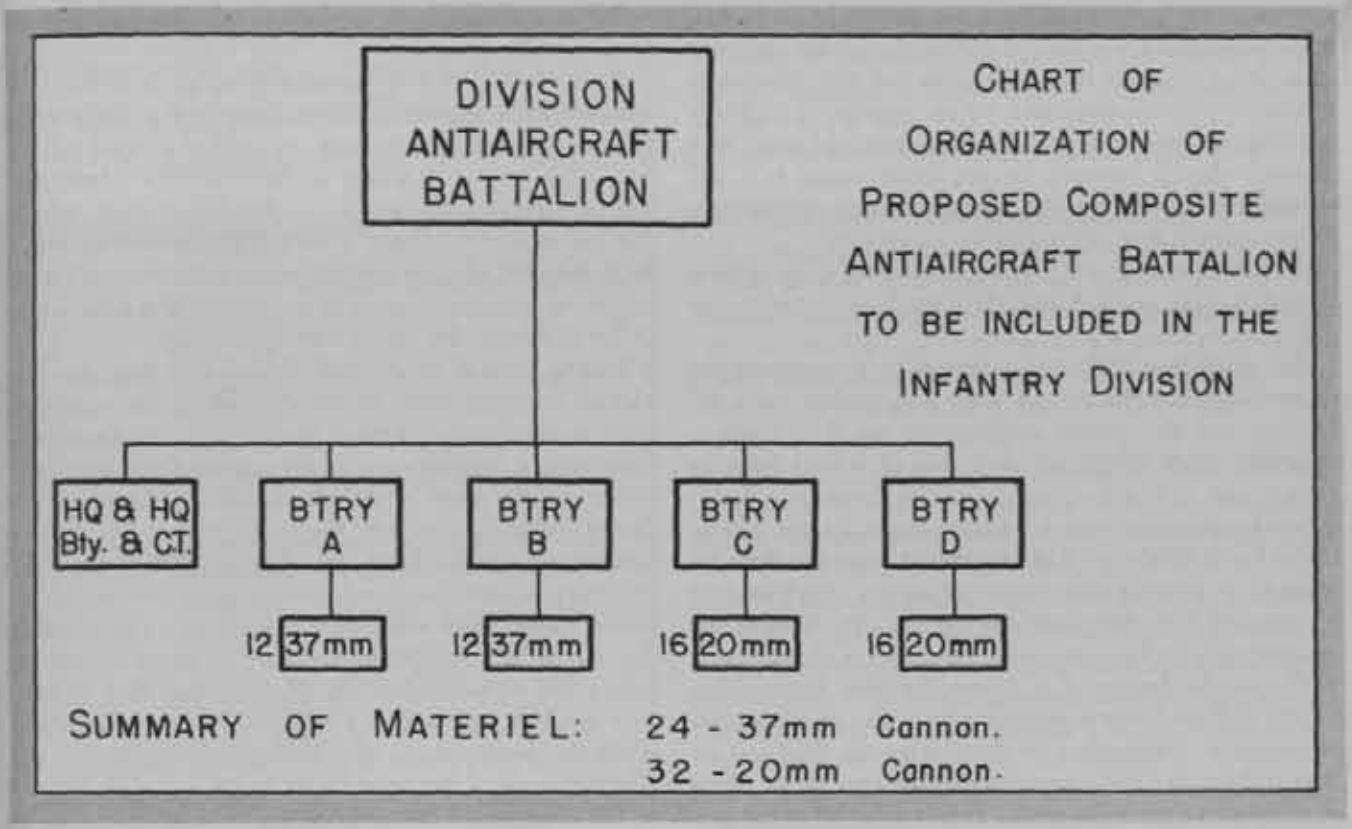
The reorganization of the antiaircraft regiment is at present one of our most pressing needs. The new regiment should be designed to fulfill rear area assignments; for the bulk of the antiaircraft artillery will be assigned that important duty in future wars. Antiaircraft forces in the forward areas should be kept to the minimum; and the personnel of the arms occupying the forward areas should utilize small arms fire and be held responsible for their own protection.

The increasing effectiveness of attack aviation against personnel, lines of communications, and supply establishments makes it advisable to include an antiaircraft battalion as an organic part of the division. Antiaircraft protection for troops, their equipment, transportation, and supplies is needed at all times—in the front line, in movement, or in bivouac. The addition of an AA battalion will give the division commander an officer for his special staff who is trained to combine all the antiaircraft defense of the division into a coördinated whole.

The mission of this proposed divisional antiaircraft battalion will be to combat all enemy aircraft within range in the forward areas, especially observation aviation. When enough medium caliber automatic cannon (37-mm.) to prevent enemy observation aviation from operating and when enough light caliber automatic cannon to deal with low-flying aircraft are available in the forward area, the antiaircraft regiment, an organic part of the Corps, may be released from forward area assignment. It can then be used to provide adequate defense for important rear area establishments.

Last spring the members of the advanced technical class at the Coast Artillery School made a thorough study of the reorganization of the antiaircraft regiment. It was the consensus that the proposed regiment, designed primarily for rear area defense, should be a unit equipped with all types of antiaircraft weapons. Moreover, it was contended that this regiment should be capable of providing an adequate and effective defense of a circular area a mile in





diameter against all types of military aviation. This area was chosen because many of the objectives which would normally be protected by an antiaircraft regiment are approximately of this size or smaller.

The accompanying schematic diagrams show the proposed antiaircraft regiment and battalion based on the considerations and assumptions already mentioned.

Training

The need for well trained personnel is mandatory. Because of the great amount of complex technical equipment, the involved system of maintenance, and the high degree of coördination required for the efficient functioning of the antiaircraft team, a long period of time and excellent supervision are required to train the personnel.

One of the principal shortcomings of antiaircraft artillery in Spain and China was lack of suitable training. The Germans released one battery of modern antiaircraft matériel to Spanish troops but they lacked training and experience and so misused and abused the equipment that the Germans reclaimed the weapons.

Our system of antiaircraft training is basically sound. The state of training of the regular units is satisfactory in spite of the shortage of modern aircraft and latest type antiaircraft equipment for training purposes. Many of the seacoast artillery batteries, most of which have alternate antiaircraft training assignments in addition to their primary heavy artillery missions, have obtained very satisfactory results when firing antiaircraft batteries and their target practice records speak for themselves. Training of seacoast artillery personnel in the handling of antiaircraft equipment has created a large reserve of trained antiaircraft personnel which should be invaluable in war. When the National Guard harbor defense organizations take over the seacoast armament to which they are assigned in event of war, Regular Army personnel will be released to form the nucleus for expansion.

Much of the tactical training of any antiaircraft command will have to be accomplished by prior indoctrination. In the few seconds of time available after an aircraft warning is received, it is impossible to employ any system of fire commands such as is used in seacoast artillery.

The theory governing the operation of the officers' troop schools is excellent but in practice the system has not produced the results it should. Because of the pressure of other duties, the instruction is sometimes perfunctory and the repetition of the same instruction year in and year out naturally results in lack of interest. The applicatory method should be the basis of all instruction. More advanced work, especially in tactics should be provided for the senior officers. Extension course work supplemented by lectures, conferences, and practical exercises conducted under the supervision of the plans and training officer is a suggested solution. For the junior officers, a course of instruction similar to that prescribed for the officers serving one year of active duty under the Thomason Act would result in a higher standard of technical education which would make possible more advanced instruction in the regular class at the Coast Artillery School.

As to the training of the enlisted specialists, two general methods are recommended. The first is to send selected students to the Coast Artillery School for a course of instruction. The merits of that method are too well known to warrant discussion. The second method is to

send selected students to factories where equipment is manufactured for a course of instruction under the joint supervision of plant technical personnel and permanent military personnel detailed for that purpose. The Navy uses this method and finds it satisfactory. In war, both methods should be used. In any event, there is a real necessity for a much broader system of technical education for the enlisted men of the antiaircraft artillery.

A field officers' course, lasting from four to six weeks, should be held at the Coast Artillery School during the spring or summer season.

The purpose of this course should be to acquaint the senior officers of the various arms and services with the mission and the proper employment of AA artillery, especially when it operates as a part of a field force in conjunction with the other arms. This course could also be used economically, as a refresher course for the officers of the Coast Artillery. The curriculum should include instruction in aviation and antiaircraft tactics, supplemented by practical demonstrations and exercises to acquaint the student with the functions and limitations of the matériel.

The establishment of a Coast Artillery Information Center at Fort Monroe would facilitate the dissemination of technical information to those who can best use it. Many of the fine texts, pamphlets, and other instructional material never reach the service except as a part of the personal papers of a recent graduate. The eventual economy of this bureau would make itself evident in better maintenance of matériel and a higher standard of technical efficiency.

Matériel

Many of the modern soldier's tools are of diversified types and are complicated in design. Their characteristics have a marked influence on the organization, mobility, tactical doctrines, and the technique of training of an army.

Largely in the interest of economy, the matériel policy in the United States Army has been one of continuous experiment and development of a series of pilot models of various weapons and pieces of equipment. The keynote of our program has stressed quality rather than quantity.

During a war the rate of development of weapons is much faster than at any other time. The Italo-Ethiopian and Spanish wars have resulted in a tremendous acceleration in the development of antiaircraft equipment. For the first time since the World War we have a definite indication of trends and it is now possible to determine an armament policy which will provide the antiaircraft artillery with weapons that will enable it to accomplish its mission for a number of years to come.

The present standard antiaircraft matériel consists of the 3-inch gun, the 60-inch searchlight with the sound locator, the 37-mm. gun and the caliber .50 machine gun. Some of this matériel is rapidly approaching obsolescence and will have to be replaced by more modern matériel within the next few years.

It has long been recognized that the searchlight and sound locator unit is the weakest link in our combination of antiaircraft matériel.

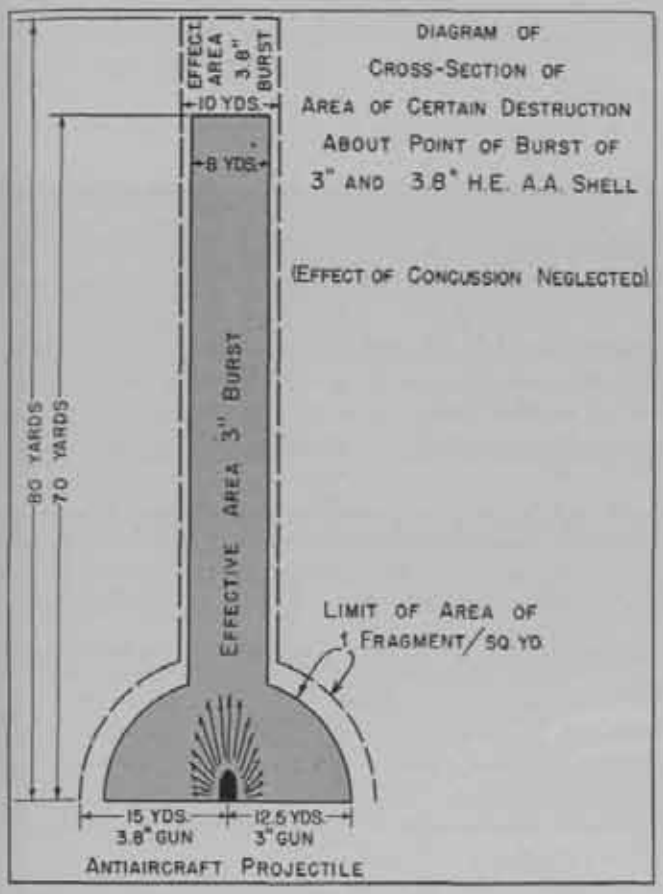
The 3-inch gun is a splendid weapon. It is the best antiaircraft equipment that is standardized at the present time. Rugged and mobile, it can deliver a rapid rate of fire and is easy to maintain in the field. The 3-inch gun can be rapidly manufactured in large quantities, and is not too expensive. There is no question but that it will be a valuable weapon for five more years. It can fire at targets at altitudes in excess of 20,000 feet and it has a rate of fire of twenty-five aimed shots per minute.

During several of its staff studies last year the advanced technical class found that along our seashores there is developing a serious weakness in antiaircraft defense against high-flying aviation—particularly bombardment. As the speed of the plane and the altitude of effective bombing increases, the bomb release line recedes farther and farther from the objective. Obviously, the only way to meet this threat is to use guns with longer effective ranges. The situation is so acute in some instances that our present equipment can fire on enemy aircraft for only a few seconds before the planes release their bombs. It is probable that within a few years enemy planes will reach the bomb release line without coming within the effective range of our present 3-inch gun.

The Germans have adopted an 88-mm. AA gun as standard. Reports from Spain indicate this to be a very effective weapon, probably the best in the world. That the United States Army needs a weapon of this type becomes more evident daily. Such a weapon can have a gross road weight up to fifteen tons and still be mobile. It must be of such a caliber that it can be operated by hand with fixed loading ammunition and still maintain a high rate of aimed fire. A gun with a caliber of about 3.7 or 3.8 inches should satisfy the need for a larger piece.

The increase in the effective bursting radius of shell of the larger gun over the 3-inch weapon is negligible. One method of analyzing the burst of a high-explosive projectile assumes that the fragments are projected uniformly from the point of burst through a space the shape of a hemisphere. A cylinder, whose axis coincides with the axis of the shell, projects from the center of the hemisphere. The accompanying diagram illustrates this theory. Assuming that one shell fragment per square yard will disable a plane, the effective bursting radius of the hemisphere for the 3-inch gun is roughly only 12.5 yards. The length of the projecting cylinder is about seventy yards with a diameter of about eight yards. A larger gun increases the effective bursting radius of the hemisphere to about fifteen yards. This increase depends solely on the enlargement in the side wall area of the shell case. Although a controversial point, the effect of concussion has been discounted because of the rugged metal construction of the modern plane. The major and vital advantage of a larger caliber gun is obviously the increase in its effective range.

Since an increase in the effective range is so important it is believed that an appreciable increase could be made in



the muzzle velocity without materially affecting the life of the tube. An increase from 2,800 to 3,500 or 4,000 feet per second would produce the needed increase in range, decrease the prediction interval and probably result in more accurate fire.

Since antiaircraft artillery guns must rely to a large extent on mobility for protection, the present policy of discontinuing the manufacture of fixed weapons is sound. The only way an antiaircraft defense may be altered to meet a change in the tactics of enemy aviation is to change the location of the mobile antiaircraft matériel.

Aviation pilots frequently report that gun flashes disclose battery positions by day as well as by night. A flashless powder should be developed to cope with this situation.

The M-4 director is the latest fire control computer to be standardized by our service. A very fine instrument, it represents a great advance over previous models. Its most noteworthy improvement is the ability to predict in three dimensions. Operated entirely by electricity, it can be handled in action by as few as six men. It has been noted that a much higher degree of training is required to operate this instrument than the other types which have been used. This compact mechanism gives a theoretically accurate solution of the antiaircraft problem, and it has been found generally satisfactory.

The greatest disadvantage of the M-4 is its extreme sensitivity. Unsteadiness in tracking or operating the fire control computing handwheels causes a marked fluctuation of the electrical pointers on the data dials at the guns. Unless the range section is exceedingly well-trained and steady in its operation the pointers on the dials may oscillate through arcs as great as sixty degrees. The pointer matchers at the guns report that they are able to keep the pointers matched only with great difficulty. It has been observed that as newer directors are developed they become more sensitive and complicated.

A manually operated director is feasible and would be a great advance in director design. One of the foremost AA fire control engineers in the country acknowledges that the idea has merit and he has gone so far as to complete a tentative schematic diagram of such an instrument. This type of director would cause a smoother flow of firing data to the guns; it would result in more accurate and uniform fire; it would facilitate the application of accurate corrections; it would not require such a high standard of training and operation; it would be more rugged and easier to maintain; and it would not depend on an outside power source for operation. There are many in our service who believe that the M1A1 (Vickers) director, which is manually operated, is the most efficient and reliable computer in use. The results obtained by the firing sections composed of members of last year's officers' classes at the Coast Artillery School verify this opinion.

The value of the offset feature of our fire control directors must not be underestimated. This arrangement permits the fire control instruments to be offset a considerable distance from the guns so that they may take advantage of more commanding terrain. This results in better observation, the guns get on the target sooner and have firing data when the target comes in range. The directors are out of the attack zone if the gun battery is assaulted, and can still furnish firing data to the guns should the enemy blanket the firing battery with smoke. Several firings utilizing the offset feature were conducted at the Coast Artillery School during May, 1938, and the results were quite satisfactory.

Until recently, it was felt that the data computer, M-1917, might serve as a wartime emergency fire control instrument. This has definitely been disproved and these instruments are acknowledged to be obsolete. The principal reason these instruments have been discarded is because the assumed errors in the computing cycle greatly exceed any allowable limit. It is possible to redesign the instrument to give a more accurate solution, but the finished product would not satisfy a sufficient number of the necessary specifications for a standard fire control director and the excessive cost of the modernization would not be justified. Modern directors can be produced as fast as guns are manufactured so there is no real need to retain these obsolete computers.

During the fall of 1937, a series of tests were conducted with several emergency fire control systems that would be suitable for use with antiaircraft guns. The systems were built around two instruments, a lead computer and a tracker. The altitude was furnished by a height finder. In the future the altitude may be supplied by a logarithmic device. Two types of computers were tested—

a telescopic computer and a simplified computer—and the former was recommended for standardization after further development. The results of the tests were generally satisfactory, the firing data obtained having an accuracy of about one-sixth that of the standard fire control directors. It was believed that after the system is perfected that an accuracy of about one-third that of the standard director may be obtained. The outstanding feature of the proposed emergency fire control system is that it is simple, inexpensive, and easy to manufacture.

Better optical instruments are needed so our observers can spot airplanes more easily, especially at the higher altitudes and under unfavorable weather conditions. Each director should be equipped with several external trackers stationed at different points to watch for the approach of hostile targets. This arrangement would allow the director to be kept under cover and would increase the chances of detecting and tracking enemy planes.

The rate of production of stereoscopic height finders will cause some difficulty in wartime. These instruments require a large amount of hand work in manufacture and at best the rate of production is slow. They are expensive and the training of the stereoscopic observers to man them requires expert supervision which will be very scarce in a great antiaircraft expansion.

The use of a circular logarithmic computer, similar to a circular slide rule and operated on the same principle, has been suggested in order to find a simpler means of determining the altitude or the slant range to the target. This idea has considerable merit and gives promise of either displacing the height finder entirely, or serving in an emergency capacity. The experimental logarithmic computer consists of a round metallic base about two feet in diameter with a number of concentric circular scales on its face. Two movable arms, a long one and a short one, are set by data obtained by two instruments at the extremities of a short baseline of known length. A series of triangles are simply and accurately solved and the altitude or slant range, whichever is desired, may be obtained in about five seconds. Since the error of the computer is less than one-tenth of one per cent, the accuracy of the results are dependent mainly on the amount of the observers' errors at the two base end instruments.

There has been no system of fire control devised for antiaircraft machine guns which meets the specifications for speed, accuracy, simplicity, and economy. Some of our most able technicians have done some fine work, but the problem is still unsolved.

Assuming that an efficient system of fire control was perfected, the machine gun's suitability as an antiaircraft weapon is still seriously questioned. During the Ethiopian War, only one in every thirty-three planes struck by small arms fire was brought down. In Spain, planes have been frequently hit and on several occasions have been struck as many as several hundred times and have still managed to return to their airdromes. It is clear that a weapon with a more effective bullet must be used.

It has been repeatedly pointed out by military observers in Spain that the outstanding matériel development of the Civil War has been the medium-caliber rapid-firing automatic AA cannon. Everyone has been impressed by the efficiency of this type of weapon, especially the German 20-mm. and 38-mm. cannon.

It seems inevitable that the rapid-firing automatic AA cannon with a supersensitively fused self-destroying high explosive projectile will replace the AA machine gun. It is also apparent that two calibers will be required—a medium caliber (37-mm.) designed for use against observation aviation in forward areas, and a light caliber (20-mm.) designed to fight off low-flying planes. The medium caliber gun, with an effective vertical range up to 10,000 feet, is needed to keep observation aviation above the maximum observing altitude of about 8,000 feet. The light caliber gun, with an effective vertical range up to 6,000 feet, is needed so that more guns will be available to provide more uniform coverage over a defended area thus giving a faster rate of fire and increasing the probability of hits.

An exhaustive analysis indicates that the best combination of weapons to provide the most adequate defense with the greatest economy in matériel, personnel, and money, is a heavy caliber of about 3.7 or 3.8 inches, a medium caliber of about 37-mm. and a light caliber of approximately 20-mm. The standardization of these weapons will justify a more elaborate system of fire control than is now practicable for the antiaircraft machine gun. The effective ranges of the proposed matériel would overlap to such an extent that accurate fire could be directed at aircraft operating at all altitudes below 30,000 feet.

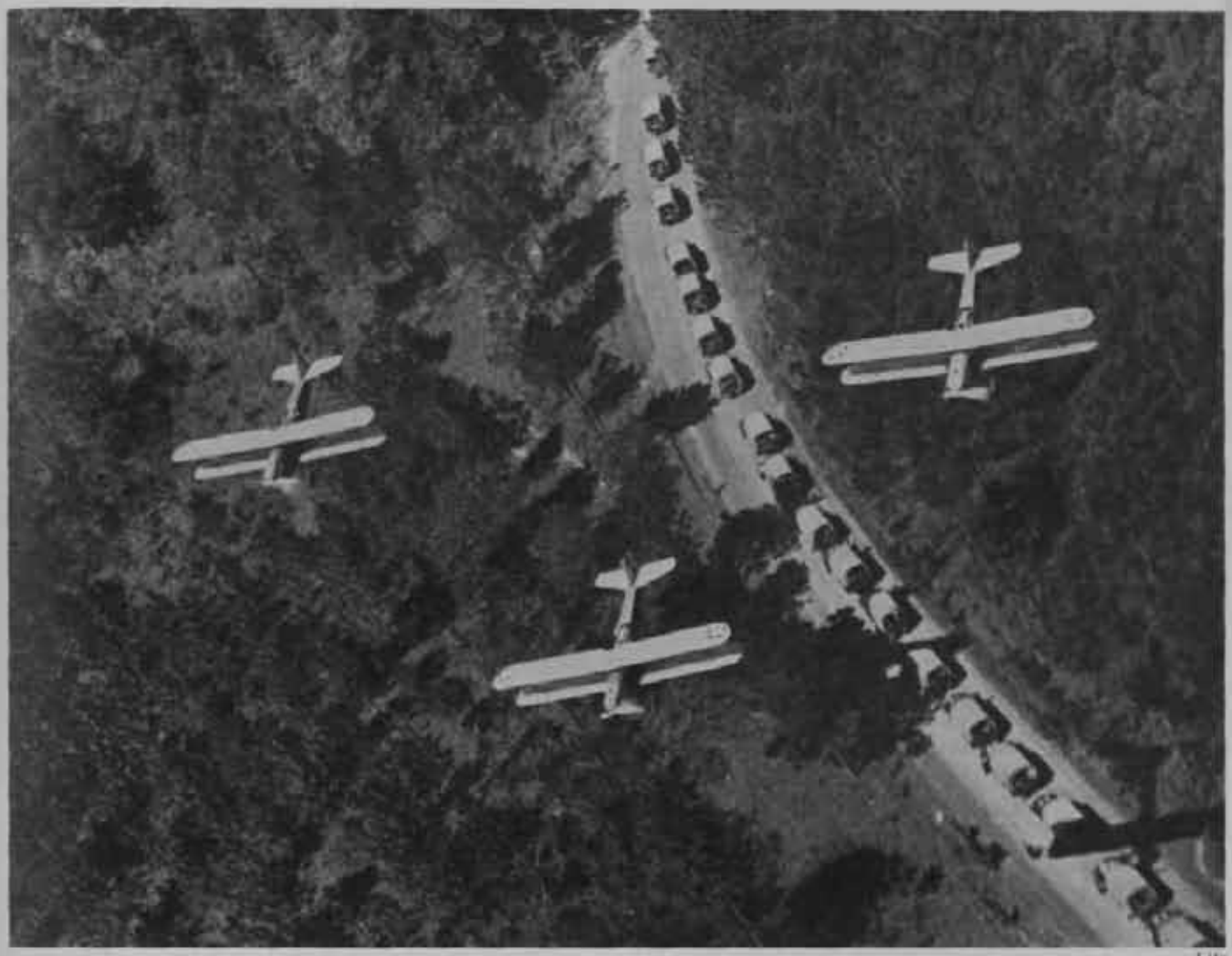
Specially designed vehicles are needed to transport and to provide stable mounts for the light-caliber rapid-firing automatic cannon. The special vehicles are needed to accompany convoys so that the weapons can go in action in a minimum time. This will permit rapid changes in the antiaircraft dispositions so that the same matériel can be used to protect different establishments at critical times. These vehicles should be designed as mobile fortresses with great fire power.

All antiaircraft matériel must be designed solely for employment against aircraft targets. There should be no dual-purpose design for this is bound to diminish the effectiveness of the weapons against their primary targets. This statement is made with particular reference to the proposed use of antiaircraft weapons for protection against the attacks of mechanized forces. If antiaircraft weapons are to be used against mechanized vehicles, this fact is certain to affect not only the design of the weapon but also its tactical employment. The efficiency of the weapon will decrease.

In concluding the section on matériel the following recommendations for the establishment of a stable antiaircraft armament policy are submitted:

(1) Develop and standardize a detection system not dependent on vision.

(2) Discard the searchlight and sound locator unit.



Life

The 105th Observation Squadron wings its way above a motor column.

(3) Develop a heavier antiaircraft gun with a caliber of about 3.7 or 3.8 inches using the present standard 3-inch gun to reinforce the fires of the larger weapons.
(4) Develop a mechanically-operated fire control director.
(5) Discard the machine gun as primary armament for antiaircraft artillery troops.
(6) Develop a light-caliber cannon (20-mm.) to replace the machine gun for antiaircraft artillery troops.
(7) Develop special vehicles (mobile fortresses) to transport the lighter caliber cannon for convoy and special objective protection.
(8) Permit no dual purpose design.
(9) Place the development of a fire control system for the automatic cannon in the highest priority.

Maintenance

It is essential that antiaircraft artillery always be ready for action on a few seconds notice. This means that its matériel must be in first-class condition. The introduction of new and modern equipment has brought new and difficult maintenance problems that require highly efficient facilities for supply, repair, and replacement.

The detail of a maintenance officer on an AA artillery regimental staff with functions comparable to those of the artillery-engineer in the harbor defense command appears advisable. He should advise on all technical matters; supervise the test of equipment; establish a system of maintenance with special emphasis on preventive maintenance; institute a channel for the transmission of technical communications for the dissemination of instruction and maintenance papers to the technical assistants in the command; and, finally, he should relieve all commanders of the necessity of dealing with a mass of technical impedimenta so they could devote more of their time and energy to tactical needs.

Communications

The present system of communications for the use of the antiaircraft artillery needs a general overhaul. This is especially true because virtually an entirely new combination of matériel will eventually be standardized. Considering the greatly increased speed of aircraft special emphasis must be placed on the importance of the time element.

The first reaction in modernizing a communication system is to use radio wherever possible. This is unsound because the ether would soon be filled with a confused mass of noise over a wide band of wave lengths and this would actually make efficient radio communication practically impossible. Communication experts doubt that the number of radio sets already authorized can operate efficiently. Wire communication should be used wherever possible, especially by the more stabilized slower moving units. Radio should be reserved for the use of highly mobile elements.

In the new antiaircraft regiment telephone communications should be used within the regiment; telegraph communications for the antiaircraft artillery information service (AAAIS); and telephone, telegraph, and radio for the aircraft warning service (AWS), depending on the local situation in each case.

The telegraph is at least twice as efficient as the telephone. By arranging a number of the AAAIS stations in a loop, much less wire will be required. Training can be facilitated by the use of a simplified code or, in more elaborate defenses, by a teletype service.

A combination aural and electrical buzzer or bell alarm system should be used to alert the numerous automatic cannon fire units because a telephone service to each position would mean a return to the evil of loading down the defense under a heavy communications burden.

The need for a workable short wave radio set for convoy control is urgent.

Commercial radio facilities should be utilized wherever possible. Tests utilizing commercial radio stations have been very successful and many of the antiaircraft fire units of the other arms not in the regular communications net have also received timely warning of the approach of enemy aircraft.

Special development is very expensive, causes much delay, and the results are not always satisfactory. Commercial radio sets should be used.

The advance in commercial television should be carefully watched and this means of communication should be developed to a point where it will be of practical military use.

Tactics

The tactics of the antiaircraft artillery are about as well advanced and as sound as can be expected without actual war experience. The subject has received a great deal of consideration by the best minds in the Corps and the majority of the differences have been reconciled.

In scanning the reports from various war fronts, some may believe that our conception of antiaircraft tactics is faulty, but a thorough analysis of the situation does not support this point of view. More often than not, these impressions have been gained in cases where aviation has not been properly or most effectively employed.

In the teaching of antiaircraft tactics at the Coast Artillery School, two cardinal principles have been stressed. The first is that the tactics of antiaircraft artillery are based on the tactics of aviation. Second that there are no fixed rules for the tactical employment of antiaircraft artillery. All AA officers must be prepared to make careful antiaircraft defense studies, evaluate all of the considerations in each particular case, determine a list of priorities of objectives to be defended, and be able to recommend to the force commander the best method for the use of all of the means available in order to provide the best possible defense of the force or objective as a whole.

The problem of protecting troops on the march has received much consideration especially in view of the Italian debacle at Guadalajara in March, 1937. Here the full effectiveness of aviation against ground troops was demonstrated. Some experts believe that aviation has stopped the foot movement of troops off the battlefield. Troop movements in the daytime must be made in single trucks or small groups of trucks where the principal protection will be the dispersion of the vehicles.

Large bodies of troops must be moved under the cover of darkness. Where this is impracticable the movement should be covered by pursuit aviation and antiaircraft artillery moving along the column by bounds. Special protection must be provided at defiles and bottlenecks.

Too much stress cannot be placed upon the importance of the use of concealment, camouflage, and deception as effective defense means. Recent developments in aerial photography require great skill in concealing units. Positions must be changed frequently and dummy installations should be erected in the vacated positions to draw enemy fire. The Chinese had considerable success in causing Japanese airmen to drop bombs in localities where dummy planes and other targets had been constructed.

A treatise covering the tactical employment of the antiaircraft artillery with the other arms has recently been completed. As new lessons are learned it is necessary to revise the tactical methods for the employment of the matériel. Already, a closer liaison between the Coast Artillery School and the other schools in the service—particularly the Command and General Staff School—has been noted.

Chemical Agents

There is no practical use for the employment of chemical agents offensively against enemy aviation. Even the most powerful incendiary chemicals are comparatively impotent unless a direct hit is scored.

The antiaircraft artillery is concerned with the defense against enemy aereo-chemical warfare. The extent to which antiaircraft batteries will be attacked by chemical agents will depend almost entirely on their effectiveness against enemy aviation. In Spain, antiaircraft gun batteries were so effective at one time that even bombardment aviation was used against the gun positions. It has been repeatedly proved over a number of years that persistent vesicants and incendiary casualty agents are more effective than high explosive in counterbattery. It is quite probable that in any major war chemical agents will be used against antiaircraft batteries.

Until recently, it had been thought that chemical agents

This is a night view of an antiaircraft position partially hidden by smoke. The picture was taken from an altitude of 3,000 feet. The illumination was furnished by a new flash bomb of high intensity.

would be released by low-flying planes, but because of the vulnerability of this type of aviation to fire of ground forces, it is expected that chemical agents will be sprayed from pressure tanks from higher altitudes up to 6,000 feet.

In a future major war where chemical agents are being used, it will be necessary for a chemical defense squad to be organized in each antiaircraft unit, especially the larger caliber gun batteries. Persistent casualty agents, such as mustard and Lewisite, are potent weapons and especially trained personnel are required to decontaminate exposed matériel quickly. A number of chemical solutions have been produced which can be used to disinfect the exposed parts in a short time. If an antiaircraft gun has been well sprayed, it will require a well trained chemical unit of three men, equipped with the necessary apparatus, at least twelve minutes to decontaminate the piece.

Since an aero-chemical attack may be launched in conjunction with other enemy air operations, gas masks especially designed for use with instruments should be worn when the battery is in action.

The use of collective protective shelter is impracticable because of the great mobility of antiaircraft artillery. Individual protective devices will have to be used almost entirely.

The employment of smoke is a debatable subject. Its effectiveness depends on the wind which is unreliable. It is probable that smoke will not be used in attempts to blanket the fire of antiaircraft batteries. There will be few opportunities for screening the gun positions for defense because of the lack of time necessary to establish a smoke cloud.

Protection against enemy aero-chemical attack is important and training in this phase of military activity must be part of the basic training of every soldier. The Chemical Warfare Service has done fine work in developing chemical protective devices. The present standard gas mask is a good one and provides adequate protection against all agents likely to be met on the battlefield.

Civilian Preparedness

The protection of the citizen population against aerial attack causes the nations of the world grave concern, especially in Europe where the flying distances are relatively small. Some knowledge has been gained from the attacks on the cities of Madrid, Barcelona, Shanghai, and Canton but because the more effective chemical agents were not employed we may look for worse conditions in the future. The subject of civilian preparedness is mentioned briefly in order to outline its relation to antiaircraft artillery in general.

The protection of the civilian population in any community must be a function of the local civil government. The protection against enemy aircraft can be handled by special agencies similar to the police force and the fire department. It would obviously be impossible for the armed forces to protect all of the population centers of the nation. There would be no army left to conduct an active defense.

It is believed that the mayors of all large communities should take the necessary action, in time of peace, to form-

Life

These infantrymen are using a heavy caliber machine gun as an antiaircraft weapon.

ulate plans for the coördination of all the civil agencies and for the designation and training of all of the volunteer officials and reorganizations needed to organize a defense against air attack.

The help of veterans organizations, such as the American Legion, will be invaluable. Corps area commanders should loan the services of staff officers to assist the mayors' committees. These officer groups should include representatives from the Coast Artillery Corps, the Air Corps, the Chemical Warfare Service, and the Medical Department.

The most practicable defense for a civil community is to utilize all means of passive defense possible. Many aerial attacks will probably come at night and here the blackout is the best possible answer.

Conclusion

In time of war the antiaircraft artillery must be ready to protect at once vital industrial and transportation centers. Moreover, it must be prepared to handle mobilization tasks to enable it to expand quickly to full war strength.

The Regular Army has six antiaircraft regiments of various assorted sizes, five of which are skeletonized and under strength. These units are equipped with matériel left over from a long series of experimentation and test. The Regular antiaircraft artillery units stationed east of the Mississippi are not enough to protect a circular area a mile in diameter, and the same holds true in the other half of the United States.

National Guard conditions are but little better, for there are only ten regiments in that component. The equipment in these organizations is in most instances not of late types and its battle efficiency is doubtful.

To protect the United States against sudden air attack, the Regular antiaircraft artillery force should be so well trained that it can move at once to protect the objectives most liable to attack. The National Guard antiaircraft artillery must be expanded in a short time to complete the defensive force behind which the citizen army can be mobilized. It remains for trained professional personnel manning the harbor defenses and the members of the antiaircraft section of the Reserve Corps to form the nucleus for a great antiaircraft expansion. The National Guard harbor defense units will play an important part in this expansion by replacing such Regular Army seacoast artillery units which are trained for service with antiaircraft artillery matériel.

The need for a coördinated antiaircraft defense program is so urgent that an investigation by a special board is merited. In this way, the local governments can be informed of their new responsibilities in war, and the Congress can enact a law for the progressive expansion of the antiaircraft artillery, for the development and production of modern equipment, and for the judicious appropriation of public funds to provide a reasonable defense against aerial attack.

If the antiaircraft artillery is to take its rightful place on an equal basis with the Air Corps and the seacoast artillery in forming the second line of defense, it must be kept to the proper operating strength, provided with modern matériel and equipment, and trained to the peak of efficiency so that it may function with full effectiveness on short notice.

Here are some recommendations to increase the efficiency of the antiaircraft artillery and bring it up to the minimum strength consistent with national safety and economy:

(1) Adopt a definite antiaircraft armament program and direct all development effort towards its realization.

(2) Reorganize the present antiaircraft artillery regiment.

(3) Include composite antiaircraft battalions armed with medium and light caliber automatic cannon in the organization of the divisions.

(4) Increase the strength of the Regular Army antiaircraft artillery to twelve full regiments in the continental United States, and increase the strength of the National Guard antiaircraft artillery to twenty-four full regiments so that there will be available on outbreak of war thirty-six war strength regiments of antiaircraft artillery.

(5) Furnish all antiaircraft units—Regular Army and National Guard—with modern equipment.

(6) Insure a supply of modern equipment for sixty-four additional regiments within ninety days after M-Day.

(7) Assign the officers of the Coast Artillery Corps Reserve to seacoast or antiaircraft artillery to insure that there are enough officers available for detail to antiaircraft artillery to man sixty-four regiments.

(8) Revise the system of communications for the antiaircraft artillery.

(9) Remodel the system of antiaircraft instruction to:
   a. Permit more centrally coördinated and more intensified instruction in the troop schools.
   b. Provide a field officers' course of from four to six weeks' duration annually at the Coast Artillery School.
   c. Permit more opportunity for instruction for the personnel in the antiaircraft section of the Coast Artillery Corps Reserve.
   d. Allow the National Guard to take part in the field tests and exercises.
   e. Provide an increase in the number of Reserve officers who are detailed for one year of active duty under the terms of the Thomason Act.

(10) Establish a Coast Artillery Information Service at Fort Monroe.

(11) Conduct field exercises and tests to perfect the modernization changes recommended by this and other antiaircraft artillery studies.

(12) In making the much needed improvements in the seacoast fortification system, install modern fixed guns in air conditioned turret mounts with complete bomb proof subterranean facilities so the harbor defense batteries will be impregnable against all types of enemy attack.

ITALIAN ARMY

This pair of high-stepping Italian soldiers demonstrates the passo Roma, an Italian rendition of the German Paradeschritt or goosestep

Italian "volunteers" pass in review before Franco during the recent Victory Parade in Madrid

The Italian colonial forces include a camel corps. The picture shows a mountain battery on the march in Africa

These are Askaris, Italian colonial troops native to Eritrea

Payday gets a smile from this "Zaptie," a member of the corps d'elite of the Italian native Libyan forces

↑ *The Italian army utilizes motorcycles for transport of radio communications equipment*

King Victor Emmanuel inspects a motorcycle radio unit during recent ceremonies in Rome ↓

Gas-masked artillerymen serve a motorized field piece during recent maneuvers ↑

↓ *The ancient Coliseum looks down on massed ranks of tanks, howitzers, and antiaircraft guns*

↑ *This experimental military road, recently tested near Rome is designed to permit a truck to tow a string of trailers*

↓ *This squad of Italian infantry is engaged in combat practice high in the Alps*

Il Duce inspects a motorized unit of dual purpose — antiaircraft-antitank — guns

Il Duce is photographed at the sights of trench mortar

New French Coast Defense Gun

By GENERAL F. CULMANN, French Army

This new 240-mm. gun with all-around traverse, manufactured by the French firm of Schneider et Cie., has been designed to furnish the power, rate of fire, and service facilities indispensable to a coast defense gun mounted on a railway car.

The gun's most important characteristics are as follows:

Caliber: 240-mm.

Weight of projectile: 165 kg; weight of bursting charge: 13.3 kg.

Ratio of weight of bursting charge to total weight of shell: 1/12.

Propelling charge is divided into two sections, each weighing 45 kg.

Muzzle velocity: 1,065 meters per second.

Range: 52.6 km.

Ratio of range in km. to caliber in cm: 2.2/1.

Length of tube: 51 times the caliber.

Aiming limits { in elevation: from 0 to 50 deg.
in azimuth 360 deg.

Total weight of gun on two bogies each having 4 axles: 143.5 tons (standard gauge track).

Weight of:
- Projectile car:
  - empty: 18,420 kg.
  - with 80 projectiles: 31,620 kg.
- Powder (cartridge) car:
  - empty: 23,090 kg.
  - with 160 half-charges: 30,290 kg.

Organization of the Matériel and Fire in Azimuth

The railway mount's advantages are well known. These are, *great strategic mobility*, due to the high speed (30.km per hour or more): *rapid emplacement*, favoring the delivery of surprise fire; *instantaneous preparation for march order*, which makes it possible to rapidly remove the piece upon completion of a fire mission.

This gun finds useful employment in positions that are difficult to locate. It can also be used to reinforce fixed installations that are protected by concrete works and armor.

The Schneider 240-mm. gun has a *differential recoil* carriage mounted on a rotating chasis whose circular roller path is supported by a bridgelike platform consisting of two braced metal girders, both ends of which rest on the bogies. The bogy wheels are equipped with a compressed-air brake and a hand brake.

The track used may be of standard gauge, in which case the bogies have four axles, or it may have a 1-meter gauge, in which case the bogies have five axles.

When in march order, the matériel meets international overhead and side clearance requirements.

Despite its power, the piece fires at right angles to the track without damaging it. This is an essential requirement for firing with all around traverse, but which during the World War strictly limited the range and caliber of "all around traverse" matériel. Then, the 16-cm. gun could fire a 50-kg. shell a distance of only eighteen km; the 19-cm. gun could fire an 80-kg. shell only fifteen km; and the 24-cm. gun was capable of firing a 160-kg. shell a distance no greater than sixteen km.

The great process effected in the Schneider 240-mm. gun is due to improvements in the elements comprising the recoil system. Specifically, the recoil system's weight was so changed that it became possible to decrease the length of the gun's recoil by means of a relatively weak final resistance. The tube, weighing thirty-five tons with breech mechanism and friction slides, is supported by the small cradle with brake and recuperator, which itself recoils on a top carriage that inclines slightly forward. This ensemble, which revolves about a vertical axis, turns on the bridgelike platform.

In order to insure proper stability during transverse fire, it will suffice, owing to the differential recoil process, to let down from the girders forming the bridgelike platform four articulated props (two on each side) which can be adjusted by means of screw jacks and are supported on

floats anchored in the ballast. The wheels of the bogies are fixed in place by wedges.

In the selected battery emplacements it is advantageous to install in advance on each side of the track masses of concrete in which are embedded wooden cross beams bearing the fastenings for the props. These fixed installations facilitate speed up the emplacement of the guns.

Pointing

Pointing is achieved electrically or manually.

Pointing in azimuth is effected by a panoramic sight with a device which corrects for the inclination of the trunnions. The mechanism for laying elevation comprises a graduated sector with level, fastened to the cradle.

The electric current is generated by a small locomotive ("locotractor"), which also can be used in moving the matériel at low speeds.

Loading the gun

Loading is effected by hand, with the barrel in the horizontal position, by means of a tray which can be lowered and a rammer.

Folding loading trays, ammunition hoists operated electrically or manually, and trucks on circular tracks, make it possible to load for continuous fire.

The Replenishment of Ammunition and Ammunition Cars

When in firing position the matériel comprises a projectile car and a powder car, which follow the railway mount. These cars, each of which contains a closed compartment with side doors, are alike in type, with bogies each having two axles.

The body of the projectile car, which holds eighty shells, is of special steel. Two trolley hoists carry the projectiles to the circular tracks feeding the piece.

The body of the powder car, which holds eighty charges, divided into half-charges weighing 45 kg. each, is also of special steel. The inside of the car is lined with corkboard and oak paneling. The bags of powder are carried to the circular tracks through the projectile car on trays provided with rollers.

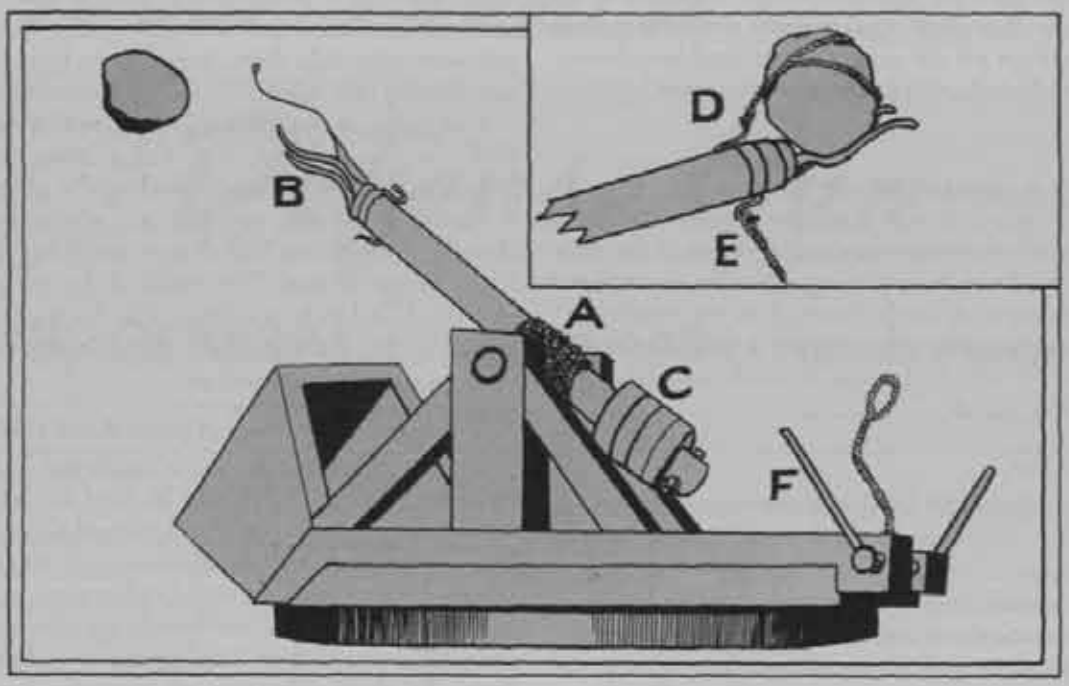
Employment of the Gun Against Land Objectives.

In coast defense, the gun is employed in firing upon the enemy's fleet. It can also be used for counterbattery against distant land targets and particularly in interdiction fire against rear area installations such as ports, parks, depots, landing-fields, general headquarters, reserve assembly points and so on. These hostile agencies are sometimes as much as two or three days' march away from the front-lines. As these objectives are normally located in the most widely scattered directions, the flexibility of fire of the "all around traverse" 240-mm. gun will be particularly valuable.

But when the guns are to be employed in this manner, it would be best to have recourse, at least for medium ranges, to shells containing a heavier bursting charge and also to shrapnel provided with mechanical time fuzes, which are more certain to function than the powder-train fuzes. When projectiles of these two kinds are used, special firing tables should be prepared in advance.

The new Schneider 240-mm. Railway Gun.

The Story of Artillery Through the Ages



Chapter 3: THE ENGINES OF ARCHIMEDES

By W. A. WINDAS

When the Romans under Marcellus laid siege to Syracuse, Archimedes the defenders' great mathematician (287-212 BC), prolonged the siege for three years by his inventions, but at length the city fell. This historic siege is of special interest to Coast Artillerymen, for much of the fighting was amphibious, and many of Archimedes' machines were designed and employed as "coast guns."

Of all his engines, the "death ray" was perhaps the simplest. It consisted of a series of small (6 x 8-inch) mirrors, worked into a single large (50-ft. square) mirror. Ancient accounts tell of a Roman fleet set ablaze by this mirror, which reflected the sun's rays upon the ships. As modern replicas show, the "ray" could melt lead at about 150 feet; ignite wood at 200 feet.

To deal with ships if they reached the city wall, Archimedes invented a huge caliper-like grappling hook. It could catch a ship by the bow, lift her as high as possible, then let go. The ship either swamped or capsized. As many of the Roman ships displaced upwards of 200 tons, the feat speaks well for the mechanics of the grapnel.

The ballistæ mounted in defense of Syracuse were mostly 50-pounders and 100-pounders. These were not the largest known to the times, but seem to be larger than any that Marcellus had with him. Moreover, since Archimedes had initiated aiming by triangulation, the effective range of the ballista was greatly increased.

As shown in the illustration, traverse was provided by the turntable mount. Elevation could be secured by wedges or blocks. The engine is of the torsion type, a twisted skein at A supplying power. The forked rest at B carries the projectile, which was released as shown in the inset. The small hook at D is curved just enough to hold the rope containing the stone. The hook E is for "cocking" the machine, accomplished by turning the levers at F. When the rope was released from the E-hook, the arm sprang upward like a sling; the rope holding the stone in place would be flung off the D-hook by centrifugal force. The discs at C are leaden counter-weights, intended to assist in breaking inertia when the arm was loosed.

The Romans attacked with all the skill and determination for which they were famous, but their fleet was repulsed with heavy loss. The "coast artillerymen" of Syracuse scored hits at impossible ranges. About 800 yards was the maximum range of the machine shown; effective ranges were, of course, less. As the ships drew closer, the "death ray" was turned upon them. Some ships drove through and pulled into the wall, scaling ladders ready—only to be seized and capsized by the giant grapnel.

But in spite of all setbacks Marcellus refused to slacken his grip on the city. He blockaded with his fleet, and confined large attacks to the land forces. These were sound tactics then as now; he captured the city from the shore side.

Marcellus had given orders that whatever else happened Archimedes' life was to be spared, but unfortunately the great scientist was killed in the confusion when the city was stormed.

Coast Artillery Board Notes

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

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TEST OF AUTOGIRO (PROJECT 1135). *a.* Extended service test of an autogiro, in accordance with the program published in the September-October, 1938 issue of the JOURNAL, was completed in May, 1939. The test covered a period of approximately eight months during which the airplane was flown more than 260 hours. Two Air Corps autogiro pilots were detailed for the test.

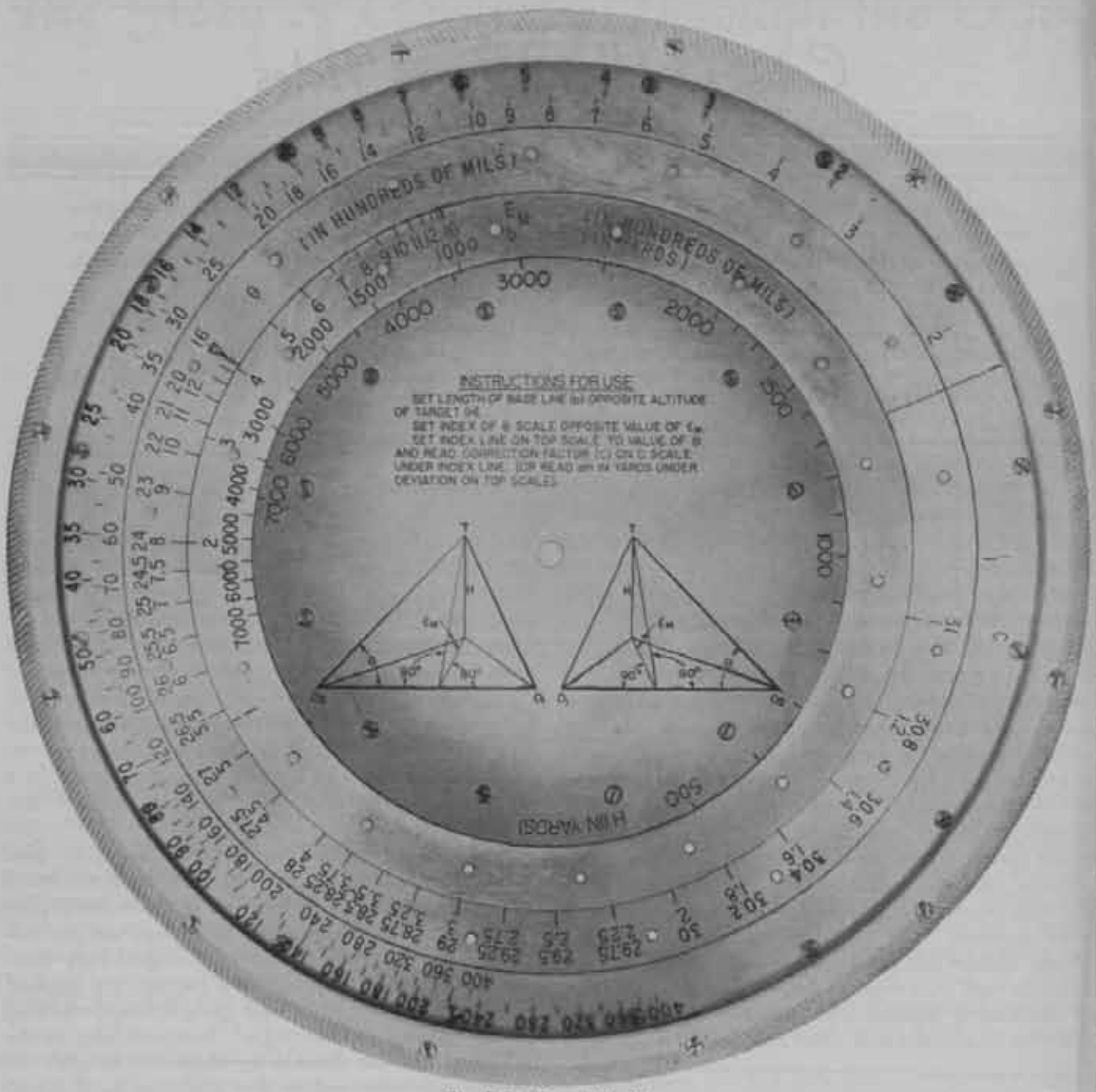
b. The greater portion of the missions by the autogiro were devoted to aerial position finding, as this airplane was thought to have special adaptability to such use. Tests included tracking the autogiro with radio direction finders of a recently developed type. On account of its slow speed and hovering capabilities, the autogiro was found advantageous for use with these radio direction finders, which operate on the "null" principle. Results obtained with the autogiro in other features of aerial position finding were somewhat comparable to those experienced with other airplanes. The hovering feature was found of limited usefulness in aerial position finding because of the relatively high wind required (30 mph) and the difficulty of maintaining position with sufficient accuracy. The autogiro, in common with other airplanes, is not adapted to the use of optical observing instruments, including field glasses of the usual power.

The autogiro

c. Seacoast firings utilized for spotting tests included one practice in which aerial position finding methods were employed, and various firings including a battle practice held in connection with the regular course at the Coast Artillery School. "Clockface spots," magnitude spots based on the gun-target line, or sensings of over or short, were reported at times by the aerial observer. The autogiro was found convenient for spotting because of the superior visibility afforded for both pilot and observer, and the ease with which the airplane can remain in a favorable position for spotting without excessive maneuver.

d. Interesting possibilities in communication were brought out during the tests. For example, it was found practicable to shout short messages from the autogiro to personnel on the ground when the airplane was proceeding at very slow speed or hovering. Signal lamp communication, ground to plane, was had up to a range of two miles in daylight, the slow speed feature permitting continuous accurate pointing of the signal lamp at the autogiro. The low altitudes to which the autogiro can descend with safety and its slow minimum speed permit dropping and picking up messages from more restricted areas than is possible with the conventional airplane. The tests indicated the practicability of dropping messages on vessels, such as those of the inshore patrol, in emergency. Attempts to establish wire telephone communication between the hovering autogiro and the ground were not successful.

e. The feature thought of greatest potential value to the Coast Artillery Corps is the ability of the autogiro to operate from comparatively small ground areas. Although only one area within the military reservation in the Harbor Defenses of Chesapeake Bay was considered practicable in its present state for use as a landing field, several areas in the near vicinity were found to require relatively little preparation for utilization by the autogiro. Such areas are thought to exist in or near most harbor defenses, and would permit basing the autogiro for opera-



Flank Spotting Rule T1

tion in closer proximity to harbor defense command posts than is possible usually with present types of observation airplanes. Advantages in having the operating area close at hand were apparent during the aerial position finding tests, when the autogiro landed on numerous occasions to conserve fuel during delays, or for conferences between air and ground personnel, and thereafter was available immediately when it was desired to resume the tests. The autogiro descends almost vertically and lands with little or no forward run. Take-off with full load and no wind requires a 250-foot run, and a clear space considerably larger is needed when obstacles are nearby. The manufacturers are understood to be experimenting with a "jump take-off" feature to enable reduction in the space required for take-off.

f. Although considered of limited application to Coast Artillery use, the detailed reconnaissance capabilities of the autogiro were investigated during the tests. On one occasion the suitability of antiaircraft gun positions tentatively selected from a map was verified by means of a reconnaissance in the autogiro at slow speed and low altitude. The observer also examined the condition of roads and selected routes into positions. On another reconnaissance, islands off Cape Charles which are accessible only by small boat were examined as to their suitability as sites for seacoast artillery observation stations. The slow speed and low flying features of the autogiro were found to permit rapid reconnaissance, with detail somewhat comparable to that obtainable by terrestrial methods.

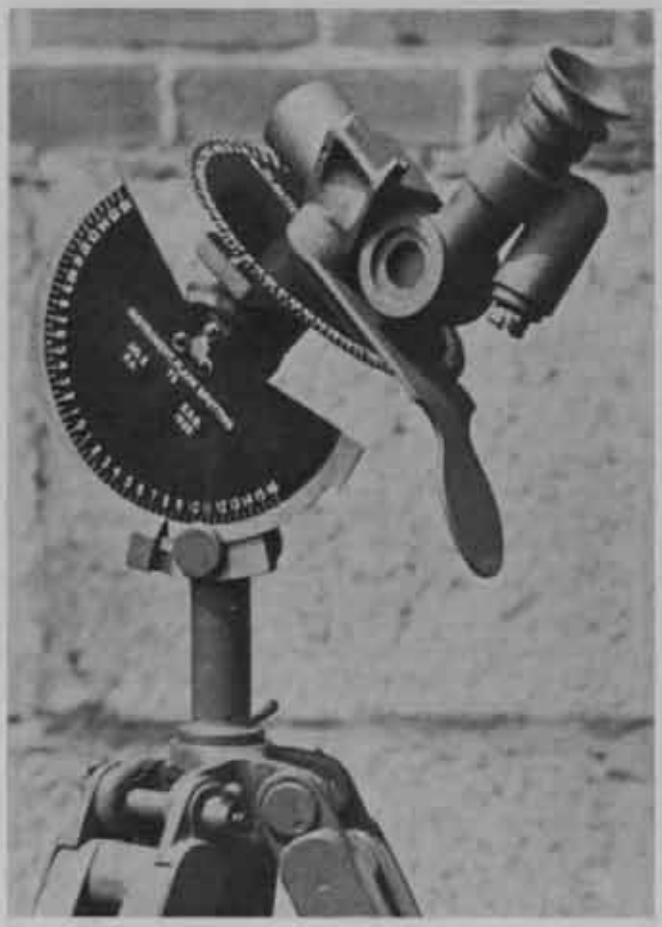
g. The autogiro tested is capable of carrying a com-

paratively small normal useful load, 655 pounds, and was found sensitive to load increases. This characteristic was most noticeable in connection with endurance, which is a maximum of two hours and is considered somewhat short for reconnaissance, surveillance, or even fire control use by the Coast Artillery Corps. The limited load capacity also precludes the installation of desirable accessories, such as flotation equipment as a safety feature for flights over water, pyrotechnic signalling apparatus, reconnaissance flares, and possibly a defensive machine gun.

h. Routine maintenance requirements for the autogiro were found to present no special difficulties except possibly in regard to the rotor. The three blades must be carefully matched in order to eliminate vibration or prevent dangerous stresses in the rotor system. This usually requires replacement of all blades in case of damage to one. On account of the rotor, the autogiro is thought to be somewhat less rugged than the fixed wing type airplane, and more susceptible to heavy damage from minor accidents in service.

i. The Coast Artillery Board recommended continuation of development of the autogiro, particularly with a view to increasing its weight carrying capacity. The Board recommended also that a fixed wing type observation airplane with slow minimum speed and short landing and take-off run characteristics be developed, in order to enable comparative test of the two types.

Flank Spotting Instrument for Antiaircraft Gun Batteries. A new type of flank spotting device for antiaircraft guns was recently tested by the Board (see report on Project 1105, Coast Artillery Journal, January-February, 1939) and recommended for standardization. This action received the approval of the Chief of Coast Artillery, who then requested the Chief of Ordnance to proceed with manufacture of a pilot model. This pilot model has now been completed and shipped to Fort Monroe for final inspection and test by the Board. The device includes the Flank Spotting Instrument T5 and the Flank Spotting Rule T1. Together they provide a means for reading deviations in the slant plane containing the target and



Flank Spotting instrument T5

spotting base line, and for readily converting these deviations into corrections in terms of yards altitude. Tables of basic allowances provide for three spotting instruments and one spotting rule per antiaircraft gun battery. It is expected that the instruments will be tested during the month of July. An early report will be rendered covering such changes, if any, as may be found desirable. Manufacture of a considerable number of instruments will be started as soon as practicable after receipt of the Board's report.

The United States Coast Artillery Association

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

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The Coast Artillery Journal

MAJOR AARON BRADSHAW, JR., Editor

The JOURNAL prints articles on subjects of professional and general interest to officers of all the components of the Coast Artillery Corps in order to stimulate thought and provoke discussion. However, opinions expressed and conclusions drawn in articles are in no sense official. They do not reflect the opinions or conclusions of the Chief of Coast Artillery or any other official or branch of the War Department.

The JOURNAL does not carry paid advertising. The JOURNAL pays for original articles upon publication. Manuscripts should be addressed to the Editor. The JOURNAL is not responsible for manuscripts unaccompanied by return postage.

News and Comment

The Convention

As all Coast Artillerymen know, the annual National Convention of the United States Coast Artillery Association will be held in New York on Friday, Saturday, and Sunday, October 13, 14, and 15, 1939. A more than full schedule of meetings and amusements has been worked out by an industrious committee. This schedule begins late Friday afternoon with a taste of New York National Guard hospitality at the historic 9th Coast Defense Armory, now the home of the 244th Coast Artillery (AA), New York National Guard. The festivities end Sunday night with a blackout of the World's Fair, accompanied by a simulated air attack—and repulse. All these and other high points have been worked out by a committee of the New York Chapter of the Association under the direction of Colonel Charles S. Gleim, new Chapter President, and Lieutenant Colonel Charles I. Clark, Secretary-Treasurer.

Sunday, October 15, has been officially designated "Coast Artillery Day" at the World's Fair, with special events scheduled in honor of the Association.

The full program for the Convention is guaranteed to make this trip to New York a memorable event for Coast Artillerymen and their families. Not only are arrangements being made for a record attendance of officers from New York and vicinity but also from all over the country. No detail which may add to the comfort and enjoyment of visitors has been overlooked. In selecting the Convention dates it was rightly felt that many members would appreciate the opportunity to spend more than just a day seeing the sights of the World of Tomorrow and of New York. Therefore Convention headquarters will open on Columbus Day—Thursday, October 12—but no events will be scheduled either that day nor on Friday until evening.

After the reception and party at 5:30 PM on Friday (the 13th!) the night is left free for informal entertainment of which a substantial quantity will be available. Registration of visitors starts Friday afternoon and continues at Fort Totten on Saturday morning.

At a convenient hour on Saturday morning a business meeting, which will include an interesting program, will be held at Fort Totten located at Bayside, Long Island, within the New York City limits. This meeting will be followed by a reception for General Sunderland, Chief of Coast Artillery, and a luncheon served (expansively but not expensively) by the Officers' Club of the post under the auspices of the 62d Coast Artillery (AA). During the afternoon a display of antiaircraft

matériel will be staged on the post parade ground and there will also be an opportunity for a tour of the grounds and old fortifications of historic Fort Totten. Then there will be an interlude to allow enough time for return to New York for the high-spot of the Convention—a formal dinner-dance at a Park Avenue address. The dinner will be preceded by a series of receptions, perhaps served progressively, by Reserve and National Guard units of the metropolitan area. There is no doubt that this function will be the largest Coast Artillery social event of many years.

Sunday, "Coast Artillery Day," will see the Convention move to the World's Fair grounds. New Convention headquarters, placed at our disposal by the Fair management, will then open at the World of Tomorrow. New and complete antiaircraft equipment will be in position at Camp George Washington, the Fair's army post. The officers and men of the 212th Coast Artillery (AA), New York National Guard, through the courtesy and coöperation of Colonel Edward E. Gauche, commanding, will display the equipment during the day. An evening parade of the troops of the Army, Navy, and Marine Corps, stationed at Camp George Washington will be held at 5:00 PM in honor of the Association. An impressive roster of distinguished guests will be present.

After nightfall, a most striking and realistic aerial attack on the Fair can be expected from planes coming from metropolitan fields. The air-raid alarm will be sounded and will be followed by a complete short blackout of the brilliant Fair lighting system. The blackout will be broken by the lights of antiaircraft searchlights going into action. Then there will be firing by 3-inch guns of latest type as well as by quick-firers and machine guns under floodlights to be dropped by the attacking planes. This demonstration, the ground events of which will be staged by the 212th Coast Artillery (AA), New York National Guard, promises to be quite complete and will have full coöperation from the civilian and military authorities. It will be broadcast by radio.

The new Executive Committee of the New York Chapter of the Association, in whose capable hands rest the plans for the Convention, consists of—

Captain Leo Schisgall, 212th CA (AA), NYNG, chairman
Captain James J. Griffin, 245th CA (AA), NYNG, secretary
Captain Frank Coleman, 245th CA (AA) NYNG
Captain Weber deVore, 502nd CA (AA) RAI
Captain Edward Lauder, 244th CA (AA) NYNG
Captain John Paulding, 212th CA (AA) NYNG
1st Lieutenant Truman Forbes, 910th CA (AA) RAI
1st Lieutenant E. D. Herr, 244th CA (AA) NYNG
1st Lieutenant Leonard Allen 530th CA
1st Lieutenant M. Geminiani, 244th CA (AA) NYNG
1st Lieutenant Joseph Tierney, 607th CA
1st Lieutenant P. V. Doyle, 62d CA (AA) RA
2d Lieutenant H. J. Willis, 620th CA-Res.
2d Lieutenant Mercandino, 212th CA (AA) NYNG

For complete information on train and hotel accommodations, and for answers to questions of all kinds relating to New York, sightseeing, amusements, transportation, maps, Fair itineraries, oases, and so on to include "baby minding" — address Captain Frank Coleman, Chairman of the Hospitality Committee. His address is 7040 Colonial Road, Brooklyn, New York.

Now you know enough of the plans for the convention to immediately decide to attend. We shall look for you. But please signify your intentions—if only tentatively—by filling out and mailing the coupon printed on page 381.

Honor Roll

1st Coast Artillery—Fort Randolph, Panama.
3d Coast Artillery—Fort Rosecrans, Cal.
5th Coast Artillery—Fort Hamilton, N. Y.
7th Coast Artillery—Fort Dupont, Del.
8th Coast Artillery—Fort Preble, Me.
9th Coast Artillery—Fort Banks, Mass.
11th Coast Artillery—Fort H. G. Wright, N. Y.
13th Coast Artillery—Key West Barracks, Florida.
59th Coast Artillery—Fort Mills, P. I.
60th Coast Artillery—Fort Mills, P. I.
63d Coast Artillery—Fort MacArthur, Cal.
64th Coast Artillery—Fort Shafter, T. H.
91st Coast Artillery—Fort Mills, P. I.
202d Coast Artillery—Illinois National Guard.
206th Coast Artillery—Arkansas National Guard.
213th Coast Artillery—Pennsylvania National Guard.
242d Coast Artillery—Connecticut National Guard.
243d Coast Artillery—Rhode Island National Guard.
245th Coast Artillery—New York National Guard.
248th Coast Artillery—Washington National Guard.
249th Coast Artillery—Oregon National Guard.
250th Coast Artillery—California National Guard.
260th Coast Artillery—District of Columbia National Guard.
Senior ROTC, University of Los Angeles.
Senior ROTC, University of Delaware.
Senior ROTC, University of Alabama.

The Honor Roll starts the summer season with a gain of three members—the 249th Coast Artillery (HD), Oregon National Guard; the 59th Coast Artillery (HD), Fort Mills, Philippine Islands, and the 63d Coast Artillery (AA), Fort MacArthur, California. Meanwhile our workers in the field inform us that before fall comes the Honor Roll will be augmented by many additional names.

The 249th Coast Artillery, commanded by Colonel Clifton M. Irwin, is hardly unknown to readers of The JOURNAL. For in our March-April, 1939, number we announced that this regiment had won the United States Coast Artillery Association Trophy for 1938, having been judged the highest unit in general proficiency for the training year.

The 249th's record has been little short of remarkable. In 1932 it took fifth place in the national rankings. Coming to the front in 1933, it won the national award. Second place was taken in both 1934 and 1936; third place in 1937; and fifth in 1935. It can be seen that these gunners are accustomed to placing high in competitions. Therefore it is a keen source of pleasure to The JOURNAL staff to announce this new laurel: A place of honor with the Coast Artilleryman's magazine.

We felicitate Colonel Irwin on the command of a sterling regiment and congratulate Major Kenneth Rowntree, unit instructor, on being fortunate in his assignment to a winning outfit.

The 59th Coast Artillery brings to the Honor Roll a long and distinguished history that begins with battle honors won at Gettysburg and culminates with three major World War engagements: Lorraine, St. Mihiel and Meuse-Argonne. The regiment's arrival on the Honor Roll puts us well within reach of our ambition to number every Coast Artillery officer in the Philippine Islands on our roster. We extend our thanks to Colonel George Ruhlen, who commands the 59th and wish him and his regiment a successful training year.

First organized as a battalion in 1921, the 63d Coast Artillery attained regimental stature in 1924. For many years there have been few military activities of any consequence on the Pacific coast that did not find the 63d taking an active part. The JOURNAL salutes not only the commander of a successful regiment, Colonel E. A. Stockton, Jr., but also the able assistant, Major Linton Y. Hartman, who sent us the ever-welcome check.

To digress for the moment from the affairs of the Honor Roll we want to announce that a Reserve regiment has found that The JOURNAL makes an ideal gift and is a certain stimulus to greater effort. The 607th Coast Artillery (TD) of New York annually awards a subscription to The JOURNAL to that officer who demonstrates outstanding qualities of character and military excellence during the year. If he is already a subscriber—as any officer in that category naturally would be—his subscription is extended one year. For 1939 the award goes to Lieutenant Vincent Macdonald. We are glad to welcome him to the ever-growing list of JOURNAL readers.

If you have already started to think about your Christmas list, remember that The JOURNAL makes a grand gift. The recipient has cause to remember you the year round and you don't have to worry about wrapping and mailing. Let us hear from you.

Military-Naval Joint Operations

At the same time that the German Army is rapidly approaching its pre-World War state—some authorities even claim that it has surpassed its 1914 figures, at least in strength—the Reich Navy is also undergoing a renaissance. According to present accounts the Reich plans to have within four years: five capital ships, three pocket battleships, fourteen cruisers, two aircraft carriers, forty destroyers and torpedo boats, plus submarines to a number that no one is sure of definitely.

The foregoing facts give rise to interesting speculation as to whether the new-born German Army and Navy will be able to achieve the degree of coöperation necessary to successful joint operations in a future war. This question is discussed at some length in a stimulating paper by Lieutenant Commander Roland E. Krause, U.S.N., contained in the current number of our contemporary, *The U. S. Naval Institute Proceedings*.

Commander Krause points out that the military-naval operations incident to the capture of the Baltic Islands in 1917 were marked by a degree of coöperation that was outstanding. But, he observes that the "mutual sympathy, intelligent understanding, correct command organization, division of duties, and zeal" that characterized the German joint effort did not spring full blown. Rather it was the result of three years of trial and effort on the part of the army and navy authorities to find a common meeting ground for the planning of joint operations.

These three years were usually marked by failure to obtain coöperation between the sister services, due in part to misunderstanding of each other's rôle and partly to the excessive secrecy regarding plans maintained by the water and land High Commands.

For example, Admiral von Tirpitz remarked that the operation plan of the Navy (which he claims was unknown even to himself) had not been made in conjunction with the war plans of the Army. Each service went off to war with little thought of the other. This naturally resulted in the fiasco that attended a belated naval effort to assist in capturing the channel ports during the "race to the sea" and the earlier effort—or lack of effort—to interfere with British troop movements to France.

A second failure to bind the sister services in a land-sea operation occurred during the operations around Memel in March, 1915. The German land forces were about to begin operations looking toward the recapture of Memel, recently taken by the Russians, and it was hoped that an attack from the sea would materially assist the army. After a deal of backing and filling on the part of both land and sea forces the upshot of the matter was that the naval vessels fired upon their own troops before being warned off. In the meantime the Russians had evacuated Memel and little remained to be done from the seaward side.

As Commander Krause so ably points out, these lessons were not lost upon the Germans. Their later joint operations were built upon the lessons of past failures "and thus through the trial of these war years there was developed that smooth coöperation that featured the capture of the Baltic Islands."

As to the future relations between the German naval-military leaders, Commander Krause has this to say: "There is no basis for friction and it is to be expected that the lessons in coöperation taught them in four hard years of war have not been lost on them. United in their aims and united in a common knowledge of coöperation, the

Army and Navy of Germany are certain to be found working hand in hand should the need arise."

New British AA Gun

A recent issue of the *Journal of the Royal United Service Institution* contains a complete description of the new British 3.7-inch antiaircraft gun and the details of its construction. This weapon, which has been many years in development, has now been approved for large-scale manufacture.

Here are some of the characteristics of this weapon, which is designed for use against high-speed and high-flying aircraft:

Shell:	28 pounds
Range:	40,000 feet
Rate of Fire:	15 rounds per minute (maximum)
Fuze-setter:	Automatic
Loading:	Semi-automatic
Carriage:	Travels on 4 pneumatic tires
Towing Vehicle:	Scammel tractor
Speed:	Up to 30 m.p.h. (on level roads)
Barrel:	Loose liner, held in jacket by 3 keys at muzzle end and by screws at breech end.

United States Small Arms

Captain James E. Hicks informs us that in early fall he will publish *Notes on United States Ordnance, 1776-1938, Volume One—Small Arms* ($4.50). This will be a tall 8 vo. cloth-bound book with hundreds of illustrations showing all types of arms. The arms illustrated are to be shown sectionalized so that the student may see the component parts of each piece.

In addition the book will contain reproductions of many of the original letters which bear on small arms, including the original sheets listing the contractors of 1798 with notations made later as to the delivery of each parcel of arms. One of the original contracts of 1798 will be reproduced together with a receipt for the pattern musket given at the consumation of the contract.

Captain Hicks will be recalled for his *Notes on French Ordnance* published last year. If his forthcoming book meets the high standard set by his other work it will be a notable contribution to the American history of small arms. Upon publication, *Notes on United States Ordnance* will be reviewed in these columns.

AA Defense of Important Areas

The current issue of the British *Journal of the Royal Artillery* carries an excellent article dealing with antiaircraft layouts for the defense of vulnerable areas, by Colonel W. R. Shilstone, M.B.E.

To begin with, Colonel Shilstone takes issue with the British *Manual of Antiaircraft Defense, 1937,* which declares that "observation must begin at a range of about 11,000 yards." According to Colonel Shilstone, "there is no justification in assuming that observation can begin" at this range under service conditions. Therefore, because lack of timely warning of the approach of aircraft will be the usual thing, he maintains that there should be a local warning system for the purpose of giving the gun sections the necessary information.

The article then discusses various technical aspects of the problem of antiaircraft layouts, the communications methods to be used, and an analysis of the time factors involved.

Colonel Shilstone's conclusions should be interesting to all antiaircraft gunners. Briefly summarized, these conclusions are as follows:

(1) When planes travel at 200 mph at altitudes of 15,000 feet in clear weather it will not be usual to spot the target at ground ranges of over 3,000 yards, if a system of forward observers is not used.

(2) But, with a trained crew and system of forward observers, it should be possible to pick up approaching aircraft by the time it is within about 7,000 yards.

(3) A local warning system should send information as to location of approaching aircraft (including altitude and range) to a pre-arranged set-up of gun-sections, approximately three in number.

(4) In designing antiaircraft defense layouts, Colonel Shilstone believes that the line of guns should be placed at least 4,000 to 5,000 yards in advance of the vulnerable area. He remarks, parenthetically, that if the line of gun sites is close to or on the edge of the defended area that the target cannot be engaged before it reaches the bomb release line.

(5) There should be a line of forward observation posts 18,000 yards in advance of the defended area—that is, 13,000 yards in front of the line of guns.

(6) The outer line of searchlights must be at least 14,000 yards in advance of the defended area.

In closing, Colonel Shilstone says that notwithstanding future improvement of instruments and methods that there will be little change in the distance of pickups of approaching aircraft, and that the pickup distance must govern the location of the outer line of guns.

Antiaircraft Merchant Ships

From foreign press reports it appears that the British admiralty looks forward to arming and equipping merchant ships with antiaircraft matériel. Lord Stanhope, First Lord of the Admiralty, recently stated that the Royal Dockyards were busy "in strengthening the decks of ships in the Mercantile Marine so that they could take anti-submarine, and ultimately antiaircraft, guns."

By the end of the year, it was Lord Stanhope's expectation, 1,000 merchant ships would have been converted. The *United Services Review* sees in these antiaircraft armed merchantmen a new threat to the airman bent on the at-

tack of vessels. The British periodical sums up: "The collective antiaircraft fire of the mercantile ships of even a small convoy should prove a very unpleasant addition to the barrage from the escorting warships."

Some Lessons of the Spanish War

The following extracts from the personal observations of Vincent Usera, formerly Captain, Spanish Loyalist Infantry are of interest. These observations are contained in his article which appears in a recent *United States Naval Institute Proceedings:*

"The effect of aerial attacks on ground troops is a question which troubles every officer nowadays. During my service in Spain I personally witnessed many aerial attacks. It is still my firm conviction that even a poorly entrenched unit, if it possesses any firmness, cannot be driven out by planes alone even if its antiaircraft guns are inadequate. It is true that I have seen undisciplined or demoralized troops leave their positions under aerial bombardment and strafing but invariably these were exceptions traceable directly to lack of morale. I have seen many more attempts to dislodge infantry through the fire power and moral effect of aircraft fail miserably.

"At Azuara our battalion of green men was attacked sixteen times in one day, each time by 120 planes which bombed and strafed us at ridiculously close range since they soon discovered we had no antiaircraft guns. Our casualties from the aerial attack were eleven men in the entire battalion—and we had only had time to dig shallow foxholes.

"Let none think that I wish to belittle the part aviation takes in modern combat. I only wish to emphasize the fact that aviation has not proved capable of radically changing ordinary tactics despite exorbitant claims made for it by enthusiasts. On the whole aviation was improperly used by both sides in Spain; this, of course, is an opinion based on my own observation. For example, I take the case above mentioned. During the aerial attacks, I observed the same phenomena which occurred in all such attacks. As soon as aircraft come overhead, there is a complete cessation of fire on *both* sides as though everyone were a mere spectator in the drama to follow. This might be excusable in the force being attacked but scarcely necessary on the part of the troops whose planes were attacking. Not once did I see troops take advantage of this lull in the fire to close within nearly assaulting distance so that when the planes ceased strafing, they could use those precious moments of temporary shock and demoralization to assault with every chance of success.

"The plane, despite its definite limitations and lack of accuracy, is still new enough to be terrifying to even the most seasoned soldier. Men can be forced to continue firing even under heavy artillery fire, especially since that arm is usually present on both sides at the same time, but let planes attack and one's fire power is virtually nullified. It is well to remember that it is usual for only one air force to be in the air at any one point at the same instant so that at that moment planes can unquestionably establish fire superiority for their side. It is then that a vigorous assault should be effective."

Germany's Antiaircraft Guns

The five inch or the 5.4 inch antiaircraft guns which appeared so surprisingly before the German public in the course of Hitler's birthday celebrations are truly an alarming proposition provided they can serve their purpose well. In the South African War the last thing in mobile artillery was the "cow-gun," pulled about by twelve span of oxen and regarded as the saviour of Ladysmith.

These guns were only of 4.7 inch calibre, though thought of, for land warfare, as the wonders of the world, and now much bigger weapons are to be utilized for throwing projectiles at aircraft, implying that they can be elevated, traversed, and in general handled with all the celerity demanded for such a purpose. It is claimed however, that they will be too clumsy for effective use, thereby defeating the object for which they were contrived. In any case the Nazi citizen should keep his head well under when these guns go off and the metal fragments fall back again to earth. London has had a full experience of casualties from such a cause.

United Services Review.

Coast Artillery Activities

OFFICE OF CHIEF OF COAST ARTILLERY

Chief of Coast Artillery
MAJOR GENERAL A. H. SUNDERLAND

Executive
COLONEL JOSEPH A. GREEN

Matériel and Finance Section
LIEUTENANT COLONEL H. B. HOLMES, JR.
MAJOR J. T. LEWIS
MAJOR S. L. MCCROSKEY

Plans and Projects Section
LIEUTENANT COLONEL A. G. STRONG

Organization and Training Section
LIEUTENANT COLONEL D. D. HINMAN
MAJOR AARON BRADSHAW, JR.
CAPTAIN J. E. HARRIMAN

Personnel
LIEUTENANT COLONEL K. T. BLOOD

☆ ☆

Hawaiian Separate Coast Artillery Brigade

BRIGADIER GENERAL FULTON Q. C. GARDNER, *Commanding*
LIEUTENANT COLONEL C. M. S. SKENE, *Chief of Staff*
MAJOR F. A. MACON, *Adjutant General & S-1*

CAPTAIN W. H. DUNHAM, *S-2 & Gunnery*
LIEUTENANT COLONEL J. H. LINDT, *S-3*
MAJOR H. R. BEHRENS, *S-4 & War Plans*

CAPTAIN I. H. RITCHIE
Com. and Engineer Officer

CAPTAIN W. H. KENDALL
Sec. Ath. Officer

CAPTAIN S. E. WHITESIDES, JR.
Chemical Warfare Officer

LIEUTENANT W. A. CALL
Ordnance Officer

COLONEL H. C. MERRIAM
Commanding Harbor Defenses of Pearl Harbor

LIEUTENANT COLONEL F. F. GALLAGHER
Commanding 64th Coast Artillery (AA)

COLONEL W. D. FRAZER
Commanding Harbor Defenses of Honolulu

By Lieutenant Milan G. Weber

MANEUVERS

The brigade has been occupied with maneuvers and preparation therefor during the major part of the past two months. The maneuvers were divided into four phases: the deployment phase; the joint Coast Artillery-Navy Exercise; the joint Antiaircraft-Air Corps Exercise; and the department phase.

During the deployment phase, ration and ammunition supply took precedence over all other movements. As a result, actual figures are now available regarding the adequacy of transportation and the time consumed by such supply work.

JOINT COAST ARTILLERY-NAVY EXERCISE

A joint Coast Artillery-Navy Exercise was held in conjunction with the maneuvers. In addition to tracking the usual destroyer targets, special stress was laid on tracking targets behind smoke screens. Excellent opportunities in changing observation stations and baselines were afforded in this phase. Some very fine training in tracking suddenly emerging submarines was secured by all rapid-fire batteries during another phase.

JOINT ANTIAIRCRAFT-AIR CORPS EXERCISE

In this exercise, units of the Air Corps occupied landing fields on other islands of the Hawaiian group and simulated enemy attacks on Oahu by all types of aircraft. Since no units of the defense knew of the time or direction of attacks, this phase was actually a test of all antiaircraft elements of the defense of the island.

BLACKOUT

The joint Antiaircraft Artillery-Air Corps Exercise culminated in a blackout of the entire Island of Oahu for

about twenty minutes on the night of May 18th. Like the Fort Bragg blackout, this was accomplished entirely through civilian coöperation. Crowds flocked to Punch Bowl and other high points to witness the unusual sight of a well-lighted city of over 200,000 suddenly going into complete darkness.

The organization of the blackout was under the direction of the Hawaiian Department, the procedure conforming very closely to that developed in the Joint Antiaircraft-Air Corps Exercises at Fort Bragg.

Publicity, an essential element in preparation for a blackout, was liberally given by all agencies. For several weeks before the event, the word BLACKOUT was printed in boldface type each time it appeared in the Honolulu *Star Bulletin*. The radio stations ran several interesting half-hour programs during which Generals Herron, Gardner, and Frank gave talks on the blackout. On the night of the blackout, the department commander saw the event from the air and pronounced it successful. A national radio hookup broadcast a program during the period. The 64th Coast Artillery took a prominent part in this program and secured some excellent publicity for antiaircraft artillery.

Department Phase

During the department phase of the maneuvers, all troops of the department went into action against an enemy landing in force. The movements demanded by the situation were actually made whenever possible. Usually there was no prior warning for these movements and they were made with normal traffic on the roads. All personnel gained much experience and many time-and-space theories became established facts. The enemy's main forces were counter-attacked by troops of the Hawaiian Division on the Ewa plain. The artillery support rendered by Coast Artillery units in this counter-attack was unique. Three 155-mm. batteries, one 8-inch railway battery and one 3-inch antiaircraft battery supported the infantry counter-attack with prepared fires.

Target Practices

During the past two months, only two target practices were held. These were additional assignment machine-gun practices of Battery B, 41st Coast Artillery and D, 55th Coast Artillery, held at Fort DeRussy. While scores were not high, excellent training was afforded all participants.

Lei Day

On May 1st, the Territory of Hawaii celebrated colorful Lei Day. This day, originated by Don Blanding, was set aside for the purpose of keeping leis constantly before the public mind. Many army officers went down to Thomas Square to see the hundreds of beautiful leis of all description on exhibit, representing thousands of hours of handiwork. The pageant which followed is one of the "musts" to be seen during a tour in beautiful Hawaii. The slogan for the day was "Make a lei, buy a lei, wear a lei."

Harbor Defenses of Puget Sound

Colonel James H. Cunningham, Commanding

Although we have not broken into print for a long time we do not want to remain "The Forgotten Harbor Defense." During May, General Burgin paid us a four-day visit during which time he conducted the annual tactical inspection, which culminated in a minor joint Army-Navy exercise. A few days later, General Bowley, corps area commander, witnessed a review, inspected Fort Worden, and after lunch with the commanding officer returned to Seattle.

We are now in the midst of the National Guard camp period. The 248th Coast Artillery, Washington National Guard, commanded by Major Dohm, arrived on June 10 for a two-weeks' tour.

The annual C.M.T. Camp begins July 1. A special feature this year will be the inclusion of antiaircraft drill and firing, in addition to seacoast drill and firing. This additional training is not only for the purpose of making the instruction more interesting, but also for the benefit of the 509th Coast Artillery (AA) which is conducting the camp. Colonel Walter Pollitz who commands the 509th, is an old resident of Fort Worden, having been stationed here during the World War as executive officer, when over 5,000 men were here. He likes to tell the story of the only shot fired here during the war, at a German submarine represented by a log with four seagulls on it.

Colonel and Mrs. Peace left the post on leave preparatory to retirement, on May 2d, turning over command to Colonel Cunningham, who arrived at Fort Worden after a tour in the Philippines. Although Colonel and Mrs. Peace had to start at 5:00 AM in order to catch the Victoria boat, all the officers, the band, and over 200 men voluntarily turned out. Colonel Peace ends a long and unusually brilliant military career, during which he has held many important commands. His departure is a great loss to the entire post. They were presented with two beautiful gifts, one from the officers and ladies of the post, the other from the residents of Port Townsend.

Isolated as we are, special efforts are made to have a full athletic schedule. Our post has carried off a number of places in the Northwest International Bowling Congress in Spokane. The baseball diamond has been placed in excellent condition, an improved sprinkler system installed, and the inter-battery league is in full swing. Later, a post team will be formed. The nine-hole golf course, unused for a long time, has been renovated, and is a valuable means of recreation.

Fort Monroe

BRIGADIER GENERAL F. H. SMITH, *Commanding*

LIEUTENANT COLONEL PAUL H. FRENCH
Commanding 2d Coast Artillery (HD)

COLONEL F. P. HARDAWAY
Commanding Harbor Defenses of Chesapeake Bay and 51st Coast Artillery (TD)

Captain A. B. Nicholson
Commanding 52d Coast Artillery (Ry)

By Major L. W. Goeppert and Lieutenant J. DuV. Stevens

With the arrival of summer, activity of every kind at Fort Monroe goes into high gear. It is the season of graduation for the Coast Artillery School, opening of summer training camps, preparation and departure for First Army maneuvers by organizations of the post, the close of the post athletic trophy race, and a time of farewells to departing officers and families, and of welcome to new arrivals. The beach club is the mecca for social and recreational activities, affording a welcome relaxation to all, after the day's work.

On June 20th, forty-six officers of the regular class, six officers of the advanced technical class and seventy enlisted men of the enlisted specialists' department were graduated from the Coast Artillery School. The principal address, delivered by Major General A. H. Sunderland, Chief of Coast Artillery, was replete with timely and cogent remarks.

During the summer the following units, comprising a total of 1,534 commissioned and enlisted personnel, are engaged in intensive training throughout the Harbor Defenses of Chesapeake Bay:

The ROTC Camp is under supervision of Colonel E. K. Smith, camp executive. The CMTC is under the supervision of Lieutenant Colonel R. S. Atwood. CMTC training is conducted by the 622d and 913th Coast Artillery. Colonel J. B. Bentley, 622d Coast Artillery, Lieutenant Colonel R. R. Hendon, 913th Coast Artillery, and Lieutenant Colonel W. W. Nairn, Jr., 622d Coast Artillery are CMT Camp Commanders, in turn.

The following Organized Reserve units are engaged in training at the post: The 42d, 43d, and 52d Coast Artillery, Major W. J. Darmody, commanding; the 917th Coast Artillery (AA), Colonel H. P. Newton, commanding; 503d Coast Artillery (AA), Colonel E. A. Zeigler, commanding; and the 523d Coast Artillery (AA), Colonel C. M. Deakin, commanding.

The 246th Coast Artillery (HD) Virginia National Guard, Colonel A. E. Wood, commanding, is encamped at Fort Story for training.

Fort Monroe is furnishing thirteen officers and 338 men to III Corps Special Troops during the First Army Maneuvers to be held in the vicinity of Manassas, Virginia. Three local contingents have already departed and all participating units from the post will be in the field by August 2d. Major N. E. Hartman will be Headquarters Commandant, III Corps Special Troops.

With all events except baseball completed, Headquarters Battery, 2d Coast Artillery is leading Headquarters Battery, 51st Coast Artillery by one-half point for the annual athletic supremacy trophy; Battery "F," 52d Coast Artillery is in 3d place, 6½ points behind the leader. Headquarters Battery, 51st, assumed its challenging position by annexing the post track and field meet. At the end of June, Battery F, 52d, is tied for first place in baseball with Headquarters Battery, 2d, and it appears that the championship in this sport will decide the award of the supremacy trophy.

Early in June, Battery B, 2d Coast Artillery, commanded by Captain C. F. Tischbein, returned from a trip to Baltimore, where it had provided searchlight illumination at the National Shriners' Convention. Battery B also set up its lights for the night regatta of the Hampton Yacht Club during the Independence Day celebrations.

The social highlight of the season was occasioned by the arrival in Hampton Roads of HMS *Exeter*, commanded by Commodore Harwood, R.N. A reception at the Officers' Beach Club was held for officers of the *Exeter*, while the NCSO Club entertained the petty officers. Numerous social invitations were extended the British officers by individuals of the garrison. The cordial relations were further cemented by a delightful party held on board the *Exeter*, which was highly enjoyed by officers and ladies of the post.

On June 23d, Major General Pedro Aurelio de Goes Monteiro, Chief of Staff, Brazilian Army, visited Fort Monroe accompanied by his staff. After the rendition of appropriate honors and an inspection tour of the post, General Monteiro and his party were entertained at the quarters of the commanding general, Brigadier General F. H. Smith.

Members of the garrison have recently extended congratulations to five of the past year's Thomason Act officers, recently named for permanent commissions as second lieutenants, by the War Department. The garrison is proud of the fine record made by these officers, there being only eight such commissions awarded throughout the Coast Artillery Corps. Lieutenants B. R. Luczak, W. J. A. Hussey, O. K. Marshall, Jr., J. E. Wood, and C. W. Reeves, the recipients of commissions, have been ordered to Fort Monroe, for duty.

Sixteen new Thomason Act officers have reported for duty at Fort Monroe. They are: Second Lieutenants N. Oncha, A. K. Adkinson, G. Bazaco, A. L. Cox, G. K. Miller, E. J. Wallace, Jr., C. I. Olsen, W. H. Neill, J. M. Edmunds, W. H. Ewatt, Jr., C. M. Gilbert, W. J. Logan, W. Y. McCachern, W. R. Rainey, W. J. Williams, and W. F. Williams.

First Coast Artillery District

Colonel Rodney H. Smith, *Commanding*

Major Robert T. Chaplin, *Adjutant*

Colonel Otto H. Schrader
Commanding Harbor Defenses of Portland and Portsmouth

Colonel Monte J. Hickok
Commanding Harbor Defenses of Boston

Lieutenant Colonel William C. Foote
Commanding Harbor Defenses of Long Island Sound

Major Edward L. Supple
Commanding Harbor Defenses of Narragansett Bay

Captain Charles N. Branham
Commanding Harbor Defenses of New Bedford

On June 14th General Daley left Boston and the First Coast Artillery District en route to Washington and New York to sail June 22d on the *Borinquen* for San Juan, where he assumed command of the Puerto Rican Department.

The General's final weeks in the district were crowded with activity. Not only did he find time before his departure to make a tactical inspection of all the harbor defenses in the district, but he also fulfilled numerous speaking engagements in many communities.

The entire district is keenly aware of our good fortune in having had General Daley in command for even so short a period. We congratulate the personnel of the new Puerto Rican Department in their good fortune, and wish the general all success and every happiness in his new command.

Colonel Rodney H. Smith assumed command of the District on June 15. With the full summer schedule of camps, target practices, and maneuvers, already under way under his leadership, the New England district is certain to have a professionally profitable year.

Harbor Defenses of Portland and Portsmouth

A series of recent inspections have kept us busy for some time. General Daley and his adjutant, Major Chaplin, were here for the annual tactical inspection on June 1. They were house guests of Colonel and Mrs. Schrader, and several parties were given for them.

Colonel Baird was here for the annual Chemical Warfare inspection and Major Cassard spent a week here on general inspection for the year. Major Imperatori is in the hospital as a result of an emergency operation and is doing well. The Mine Planter *Baird* (Captain McLamb) is here for a month's mine planting.

Technical Sergeant Bales, recently arrived from the Philippine Department, reported for duty as chief clerk, artillery engineer's office.

Harbor Defenses of Boston

By Captain Norman A. Congdon

Fort Banks contributes its mite to this issue with pardonable feelings of mingled pride and pleasure. District Headquarters rated the AA gun practice fired on May 26, 1939, by Headquarters Battery, as excellent (score 180.5).

The district commander, Brigadier General E. L. Daley made his annual tactical inspection of this command on May 15, and expressed himself as well pleased with it spirit and showing.

Our primary target practice with submarine mines i scheduled for July. In addition to conducting mine prac tice, Headquarters Battery will furnish nineteen men an one officer for the First Army Maneuvers in the Platts burg Area, in August.

First Sergeant Michael Byrne, Headquarters Battery 9th Coast Artillery, leaves for Hawaii in July and will b replaced by First Sergeant John A. Keidser. Staff Sergeam Charles A. Clark has been ordered to Panama.

Harbor Defenses of Long Island Sound

By Captain Frank T. Ostenberg

The hurricane of last fall which removed the slat roofs, chimneys, and most of the trees, nevertheles brought in its wake a great deal of good to Fort H. G Wright.

Before the snow flies we expect to see most of the fram buildings in the utility area removed and in their plac a new commissary with ample cold and dry storage room and additional space for the finance office; a new utilit building with work shops for the post painter, carpenter plumber and electrician; a new garage with an up-to-dat repair shop and storage space for vehicles; a new ordnanc office, storage and repair building. The old ordnanc machine shop will be remodeled and become the fir station. Fort Michie is to have two-family caretakers quarters and a new dock, in addition to restoration of th riprap around the island. Captain Orville E. Davis, QMC a constructing quartermaster, arrives from Fort San Houston, Texas on June 30th, to take charge of the new construction.

Construction in the National Guard camp is progress ing, with new lavatories going up, concrete tent floor being laid, and kitchens, roads, and street lights bein repaired. This area was a complete wreck after the hur ricane but will be ready for the National Guard o July 1st. Upon the arrival of Captain Davis plans will b completed for the construction of new kitchens, mes halls, and other necessary buildings.

All officers' and nearly all noncommissioned officers quarters have had electric stoves and ice boxes installe and a contract has been let converting the battery ic boxes to electricty before June 30th.

On May 8th, Major General J. A. Woodruff, who re cently assumed command of the First Corps Area in

GENERAL WOODRUFF INSPECTS FORT H. G. WRIGHT

Left to right: Major General James A. Woodruff, commanding First Corps Area; Lieutenant Colonel John Millikin; Lieutenant Colonel William C. Foote; Captain Norman B. Simonds; Major Earl L. Lyons; Lieutenant John J. Stark

spected the post. An inspection of the armament and installations followed a review of the troops.

Annual target practices were fired from primary assignment armament as follows:

On May 19th, Captain John M. Moore, commanding Battery A, fired the 12-inch mortars, score 51.3. On May 23d, Captain William J. McCarthy, commanding Battery B, fired the 12-inch disappearing guns, score 128.2. Captain Charles E. Dunham, commanding Battery C, fired the 6-inch disappearing guns, score 75.9. On May 15th, Battery C fired a calibration shoot with their 6-inch disappearing guns.

On June 7th, Brigadier General Edmund L. Daley, district commander, made his annual tactical inspection. After inspecting the command General Daley left with the best wishes of all for his continued good health and success in Puerto Rico.

The U. S. Cable Ship *Joseph Henry* commanded by Captain James B. Carroll, was attached to these defenses from May 16th to June 24th on cable maintenance work between Fort H. G. Wright and Fort Michie.

The post inter-battery baseball series ended in a tie—as it did last year—between Battery C and Battery B. On the play-off Battery C won by a score of 2 to 1. The following is the final standing of the teams:

Organization	*Won*	*Lost*	*Percentage*
Battery C, 11th C.A.	7	2	.700
Battery B, 11th C.A.	6	4	.600
Headquarters Battery, 11th C.A.	5	4	.556
Battery A, 11th C.A.	1	8	.111

Harbor Defenses of Narragansett Bay

By Captain Virgil M. Kimm

On May 2, 1939 our new corps area commander, Major General James A. Woodruff, was welcomed to Fort Adams, for his first inspection of the post, with a review of the troops consisting of the 10th Coast Artillery and the 2d Battalion, 13th Infantry.

On May 18, 1939, prior to his departure for Puerto Rico, the district commander, Brigadier General Daley, conducted his annual tactical inspection. For this event the mortar battery, Battery Greene, was manned. General Daley expressed himself as well satisfied with the excellent state of training that had been attained. He was particularly well pleased with the snap and precision displayed at infantry drill. His compliments to individuals were a source of satisfaction to all.

Headquarters Battery, 10th Coast Artillery, has completed its annual additional assignment target practice with antiaircraft machine guns at Fort Rodman. A quick estimate indicates the score will better the 140 mark. The battery was commanded by Captain Ephraim P. Jolls, assisted by Captain Isaac Chenery Salmon and Lieutenant Joseph C. Bogert, Officers' Reserve Corps on duty with the battery for two weeks' active training.

As a culmination of the spring training season, organization day for the 10th Coast Artillery, was held at Fort Rodman on June 24th. Events of the day included a track and field meet and a baseball game between the privates and the noncommissioned officers. After a hard fought game the noncommissioned officers nosed out the privates

by a score of 7 to 4. Following the ball game a regimental dinner was held at "Dan's," one of New Bedford's well-known beach taverns.

On June 10th the garrison was increased by four officers —Lieutenants W. Bruce Logan, F. M. McGoldrick, Lafar Lipscomb and George Weitzel—and a detachment of forty-eight men, all from Fort H. G. Wright, to assist in the ROTC and CMTC training.

Fort Adams held its first ROTC camp June 13-26. The trainees included 30 Infantry, 42 Coast Artillery, and 5 Ordnance. The camp was commanded by Colonel Jere Baxter, Infantry, with Lieutenant Colonel Frank C. Scofield, CAC as Executive Officer. Infantry instruction was handled by Major Henry E. Kelly, 13th Infantry. Instruction of the Coast Artillery and Ordnance sections was handled by Major Lucas E. Schoonmaker, who remained on duty here for the C.M.T. Camp as senior artillery instructor.

Reserve officers training at Fort Adams earlier in the spring included Captain Clarence D. Barker and Lieutenant T. T. Kauppinen.

Recent changes among the staff noncommissioned officers include Staff Sergeant Richard J. Weader, who joined the regiment from Fort Monroe, and Technical Sergeant Robert R. Hunter, OD, who joined us from Hawaii where he was replaced by Technical Sergeant Alfred V. Robinson, OD, who left May 18th.

Harbor Defenses of New Bedford

By Captain Charles N. Branham

The annual tactical inspection of the Harbor Defenses of New Bedford was made on May 26, 1939, by the district commander, Brigadier General E. L. Daley. On the following day Lieutenant Colonel P. L. Thomas, I.G.D., inspector general, First Corps Area, made the annual general administrative inspection of the post.

Following General Daley's inspection on the 26th a reception in his honor was given at the quarters of the commanding officer. Many of his friends in this vicinity were present to wish him *bon voyage* to Puerto Rico.

On June 17 the Portuguese destroyer *Tejo* visited New Bedford and remained here until June 20. Military, Coast Guard, and civil authorities joined in extending official courtesies to the ship, her commander and his officers and crew. For three days the whole community, including the personnel at Fort Rodman, was occupied with the many functions attending the welcoming of the first foreign warship to visit here in several years.

Fort Rodman was host to Headquarters Battery, 10th Coast Artillery, during the period June 14th to 24th. The visiting organization from Fort Adams again conducted its annual AA machine-gun target practice at this post this year, and regimental organization day was celebrated, at the conclusion of the firing, following a custom begun in 1938.

GENERAL DALEY MAKES FINAL INSPECTION OF FORT H. G. WRIGHT

Left to right: Captain Frank T. Ostenberg; Lieutenant Colonel James S. Brumette; Major Joseph C. Stephens; Colonel Rodney H. Smith; Captain Luther W. Evans; Lieutenant Colonel William C. Foote; Brigadier General Edmund L. Daley

Panama Canal Department

COLONEL WILLIAM R. NICHOLS
Department Artillery Officer

COLONEL EDWARD W. PUTNEY
Commanding Harbor Defenses of Balboa and 4th Coast Artillery (AA & HD)

LIEUTENANT COLONEL AVERY J. FRENCH
Commanding Harbor Defenses of Cristobal and 1st Coast Artillery (AA & HD)

FORT AMADOR

By Captain John H. Kochevar

During the past four months the seacoast and antiaircraft battalions have been busy with their annual record firings. Lieutenant Colonel H. E. Small, commanding the seacoast battalion and Major J. L. Hayden, commanding the antiaircraft battalion, dug deep in the bag for problems and hard-and-fast rules stressing service conditions. Batteries G and I firing 14-inch railway and 16-inch guns respectively, were required to open up at maximum ranges at high speed targets on 45-degree courses. Both batteries opened fire on the first course pronounced safe.

Battery D was required to fire at a target coming directly at the battery. The only fire control equipment provided was a percentage corrector and a coincidence range finder. The most difficult problem in the firing of the 6-inch D.C. guns by Battery D, was the improvising of a target and a method of towing so as to get a zero degree course and comply with all safety regulations. This work was done by battery personnel.

The antiaircraft batteries conducted their practices against targets of maximum speed, altitudes and ranges. All courses were "surprise courses." These practices were conducted prior to the receipt of the new scoring formula. When the scores were recomputed, decided cuts in all scores were made. The following are the results of the record firings. The antiaircraft gun practices are computed under the new scoring formula:

Battery A, 4th C.A.	AA Guns	(Day)	50.4
		(Day)	47.9
		(Night)	4.9
Battery B, 4th C.A.	AA Guns	(Day)	47.9
		(Day)	89.6
		(Night)	0.0
Battery C, 4th C.A.	AA S/L		70.2
			46.9
Battery D, 4th C.A.	6-inch DC		168.5
	Submarine Mines		142.5
Battery E, 4th C.A.	50-cal. AA MG	(1st Platoon)	72.6
		(2nd Platoon)	38.4
	30-cal. AA MG	(1st Platoon)	47.6
		(2nd Platoon)	57.6
Battery F, 4th C.A.	AA Guns	(Day)	28.7
		(Day)	57.7
		(Night)	7.5
Battery G, 4th C.A.	14-inch Ry Guns		140.8
Battery I, 4th C.A.	16-inch Guns		72.0

SPORTS

The Pacific Sector defeated the Atlantic Sector in both track and baseball for the department championship. The baseball team, composed of all Amador players except the centerfielder, won the first and third games. The second game was won with a team composed of players from all posts in the Pacific Sector.

After Fort Amador won the first half of the Pacific Sector Baseball League and tied Fort Clayton in the second half, Fort Clayton won the sector championship by defeating the Amador nine, four straight. However, the Fort Clayton jinx did not hold in the track meet for Pacific Sector Championship. The Fort Amador Team, under the coaching of Lieutenant Cherubin, won the meet by a score of 50, the 2d Field Artillery, second 47, and Fort Clayton and Corozal tied for third having 27 points each, Albrook Field fourth 5.

The Battery Basketball League is now in its final stages. Battery "I" with no defeats in either the regular season or the Six Team Playoff, looks like a sure winner.

Corregidor

Brigadier General Walter K. Wilson, *Commanding*
Colonel Frederic A. Price, *Executive*

Colonel George Ruhlen
Commanding 59th Coast Artillery (HD)

Colonel William C. Koenig
Commanding 60th Coast Artillery (AA)

Colonel Willis Shippam
Commanding 91st Coast Artillery (PS) (HD)

Lieutenant Colonel J. B. Crawford
Commanding 92d Coast Artillery (PS) (TD)

By Lieutenant Colonel R. E. Phillips

This chronicle marks the end of the 1938-39 training year for these defenses and the beginning of a new cycle of training activities. The departure of the transport *Grant* on May 31st, after an unusually rapid turn-around, inaugurated a general shake-up in assignments, both regimental and staff. Lieutenant Colonel John B. Martin now holds the artillery engineer job as replacement for Lieutenant Colonel William R. Stewart, in addition to commanding the Guard Battalion. Major C. E. Cotter succeeded Lieutenant Colonel R. E. Phillips as harbor defense plans and training officer. Captain Paul W. Cole took over Major Swett's duties at the S-4 desk. Major Dorsey J. Rutherford is the new ciné, recreation, and school officer, vice Major Conable. To add to our normal losses, Lieutenant Colonel C. M. Thiele was rushed to Manila, just after returning from a month's cruise to China and Japan, to become administrative assistant to the Acting American High Commissioner. Major William F. Marquat is soon to forsake Fort Wint for a new assignment in Manila, in the office of the military adviser to the Commonwealth of the Philippines. Not to be outdone, Captain "Sandy" Goodman also moved to the great city where he now is assisting the department G-4. Major Delbert Ausmus is soon to take over the Philippine Army Training Center at Fort Wint.

Since the close of our war condition period on April 8th, the post has been mostly concerned with the activities associated with the annual visit of the inspector general. Also we have furnished antiaircraft and antimarine target practice facilities for the 31st, 45th, and 57th Infantry regiments and the 14th Engineers, each battalion spending a week with us. What with their moving days—one in and one out—and full programs of firings with small arms and beach defense weapons, we have seen less of our visitors than we would have liked. The weatherman was unkind to our guests, who are camping in the Kindley Field area, by starting the rains in good earnest in the last week of May and thereby further restricting our opportunities to get acquainted with our mainland neighbors.

The hot season, which began in the latter part of March, has blighted many of the post social activities by sending large quotas of our officers and their families to the cool refuge of Camp John Hay where Captain Harold W. Brusher, officially of the 59th Coast Artillery, is upholding the fame of the Coast Artillery Corps by acting as master of ceremonies in addition to being host and landlord. Nevertheless we have had some distinguished visitors. Major General Hughes, the department commander, arrived on April 4th for the annual tactical inspection. After an escort of honor and a brigade review, General Hughes spent the next two days and part of the nights observing the tactical problems being carried out by the harbor defense troops. We were greatly gratified to receive the commendation that General Hughes gave us for the manner in which these exercises were performed.

Mr. J. Weldon Jones, Acting American High Commissioner, and Mrs. Jones were the guests of General and Mrs. Wilson on May 23d and 24th. Commissioner Jones, who is also Commander of the American Legion of the Philippine Islands, installed the newly elected officers of the local American Legion post, Oliver Davis, No. 6, during his stay on the island.

General Wilson gave the principal address, as army representative, at the Memorial Day ceremonies held at Del Norte Cemetery, in Manila, in honor of the American dead.

59th Coast Artillery

Early in April this regiment took its part in the operations of the war condition period, and then, after the armistice, began a period of relaxation and recovery from the arduous training of the past year. Colonel Ruhlen, Captains Fonvielle and Hendrix, and Lieutenants Lazar, Frith, Lind, and McLain went to Baguio; Major Campbell toured Luzon; and Captain Tredennick and Lieutenant Drake visited Japan. We report the loss of Captain Burgo Gill and Lieutenant R. E. Frith, Jr., on the May transport. Second Lieutenant John McM. Gulick who arrived on the May transport has been assigned to the regiment.

Other important losses are: Technical Sergeant Oscar E. Smith, master gunner and batter of home runs who is also commander of the local post of the American Legion; Staff Sergeant George J. Armstrong, all-around star athlete; and Technical Sergeant Julian B. Carmichael, operator of the local amateur radio station that has helped a lot in keeping us in touch with things back home.

We have won the inter-regimental tennis match with the 60th Coast Artillery. The six-man team consisting of Staff Sergeants Sperle, Matheison, and Heath, Sergeants Farmer and Pedrotti, and Private Paczkowski, won five of the six singles matches and two of the three doubles matches to take the contest by a score of 7-2.

Inter-battery bowling is in progress with the Quartermaster Detachment in the lead. The winner is hard to pick. Inter-battery volleyball is almost completed with Battery E and B in the lead.

In the one really important athletic event of the season, we report, with becoming modesty, that we have been successful. The baseball team has again won the championship of the department. The Philippine Department tournament (American Division) began on April 1st with six teams participating. The 59th had only two players who had seen regular duty with the team that won the Corregidor series in 1938. In spite of this handicap, the 1939 team set up a brilliant record. Teamwork was the keynote in a campaign in which the 59th lost only one game in ten starts. Coach Captain Hendrix deserves a lot of credit for the manner in which he turned an inexperienced squad into a championship outfit. The fielding of Armstrong, Woods, Cummings, and Sparks was outstanding. Backstop Alldredge, who was converted from a third baseman to catcher, started not only behind the plate but also with the bat. He batted over .500 for the series, which is good in any ball club. The team has a good nucleus for next year's team and should repeat in 1940.

60th Coast Artillery

The *Grant*, after quite an experience on the Guam shoals, arrived on May 28th, bringing Captain Arnold D. Amoroso and Lieutenant Godfrey R. Ames to the 60th. On her departure she took Major J. H. Harrington (ROTC, St. Ignatius High School, San Francisco); Captain Samuel H. Morrow (61st CA, Fort Sheridan); 1st Lieutenant Clifford W. Hildebrandt (Battery Officers' Course, Fort Monroe). We wish them the best, but their places will be hard to fill. Lieutenant John W. Romlein is leaving on terminal DS and leave preparatory to boarding the July transport for duty at Fort Monroe.

May saw the usual exodus for Baguio and points of interest in the Islands. Somewhat cooled off and refreshed, the absentees are reporting in for duty and preparation for the next target practice season.

Although relieved from the 60th to assume command of the mine planter *Harrison*, the regiment still claims Lieutenant Harry John Harrison as a member. His marriage on May 23d to Catharine Stewart Carswell, daughter of Major and Mrs. Robert M. Carswell (a member of the legal staff of the High Commissioner) at the post chapel, followed by a reception at the Corregidor Club, has been the social event of recent months. The best wishes of the 60th are theirs.

The departmental baseball tournament has come to a close. After splitting a hard fought two-game series with the 59th, the 60th was unfortunate enough to drop a game and come in second to the 59th, the new champions. We extend the 59th our hearty congratulations.

Volleyball is now the current event in the regiment but the curtain is about to ring up on softball and bowling. Battery standing in these sports will determine the winner of the regimental cup for athletic excellence. Battery A is now in the lead, slightly ahead of Battery D who are fighting them to a finish down the home stretch.

The officers' duckpin league starts next week and will be followed by ten pins. The schedule will help pass away the wet season.

Early April found the war condition period in full bloom once more. In so far as the 60th was concerned the results were eminently satisfactory. One of the principal features was the pronounced improvement of the AAIS. Communications were greatly improved over last year and are largely responsible for the successful completion of this period. Plans are being formulated to continue our progress next year.

A new training year is starting. One of the features will be continuous training throughout the year with air missions. By this means a high standard of efficiency is expected at all times. The brush-up period prior to target practice should be shortened and it is expected that a final savings in air missions will result.

91st Coast Artillery (PS)

Camp John Hay attracted Major Lohmann, Major Bowering, Captain Rousseau, Captain England, Captain Hartman, Lieutenant Moore, and Lieutenant Metz for DS periods during the past two months.

Captain England and Captain Hartman each enjoyed a five-weeks' trip to Japan in preparation for departure for the States.

The regiment also loses Lieutenants Moore and Morgan on the May transport and Lieutenants D'Arezzo and Rosenstock have been assigned from the *Grant*. Lieutenant Yost was transferred to 59th Coast Artillery during this period to operate the military police.

After a well conducted war condition period the regiment is now completing the supplemental small arms practices which will end the present successful training year.

The regimental baseball team started play in the Philippine Scouts League by winning the first four games. As the Scout teams were evenly matched, all games were closely contested and the outcome of the race was in doubt until the final game. The 24th Field Artillery, the 45th Infantry, and the 91st Coast Artillery (PS) battled for top honors through the season with the lead changing hands several times. The final two games proved disastrous to the 91st and, by dropping both, we lost all chances for the championship. We finished with six games won and four lost. Interest in the games was keen and large crowds attended every game. The season's play developed several promising young players and prospects for next year's team are bright.

We played the inter-battery volley league schedule during April, and Battery A—Captain Newman, commanding—duplicated its baseball championship by going through the ten-game schedule without a loss. Battery B—Captain Caluya, commanding—finished in second place followed by Battery G, D, E, and C in order. Battery A will meet Battery B, 92d Coast Artillery (PS), for the post Scout volleyball championship.

We are now engaged in the inter-battery duckpin tournament and, at present, Captain Rousseau's Battery E is

showing the way. However, the remaining teams are strong and may displace the high-flying pin topplers from Battery E.

The 91st Tennis team defeated the 92d team by a score of eight matches to one and thereby won the post Scout tennis trophy for 1939.

The officers and ladies of the regiment are practicing duckpins daily in preparation for the tournaments scheduled to begin June 5th. We lose several of our best players but have Captain Caluya, mainstay of the 92d last year, as an addition to the men's team. Major Lavery, Captain Denson, Lieutenant Morgan, and Lieutenant J. C. Moore leave on the next transports and their loss will be keenly felt. The ladies' team, last year's champion, is broken by the loss of Mrs. Pohl, Mrs. Lavery, Mrs. Routh, Mrs. Miner, and Mrs. Wollaston. However, newcomers in the regiment are showing promise and we hope to have strong teams again this year.

92d Coast Artillery (PS)

The months of April and May are comparatively quiet months, in theory, at Corregidor. The time was taken up with war condition period (a very strenuous period for mobile seacoast artillery), overhaul of artillery matériel, small arms firing, and development of instructors for the garrison training period which begins June 1st.

Softball, and duckpins are keeping the regiment well occupied. Battery B took the volleyball championship over a close race but lost to the 91st in the inter-regimental playoff. The regiment also came out second best in the tennis match with the 91st. The officers' duckpin team, led by Captain Santos, has been practicing arduously in preparation for the coming tournament. The ladies' team, captained by Mrs. J. B. Crawford, is also putting in practice sessions at the alleys.

The regiment was well represented at Camp John Hay, during the past two months. Captain and Mrs. Kyster and daughter, Lieutenant and Mrs. Cordes, Lieutenant and Mrs. Croker, Lieutenant and Mrs. Kessler, and Lieutenant and Mrs. Haynes have all paid short visits to the recreation center. Mrs. James B. Crawford, the wife of our regimental commander, and Mrs. Crawford's mother, Mrs. Gordon, took the Bali-Java-Indo China trip. Many ladies of the post have taken the China-Japan trip, the 92d being represented by Mrs. H. A. McMorrow and Miss Anne McMorrow and Mrs. Cordes.

The regiment welcomes Lieutenant and Mrs. Kappes. Lieutenant Kappes has been assigned to Battery D which is commanded by 1st Lieutenant Harvey.

The regiment regrets to announce the departure of Lieutenant and Mrs. Spann. Lieutenant Spann has done splendid work with this regiment as commanding officer of Battery A and as barrio officer, Barrio San Isidro.

Coast Artillery Orders

(May 1 to June 30, 1939)

Lieutenant Colonel H. C. Allen, from Office Chief of Coast Artillery to 13th, Ft. Barrancas.

Lieutenant Colonel R. D. Brown, for duty as military attaché to the Netherlands, The Hague, in addition to his other duties.

Lieutenant Colonel C. W. Bundy, from student, Naval War College, Newport, to Org. Res., Puerto Rican Dept., San Juan.

Lieutenant Colonel E. B. Dennis, from CCC, Schenectady, to 9th, Ft. Banks.

Lieutenant Colonel Frank Drake promoted Colonel June 1.

Lieutenant Colonel B. L. Flanigen, from Org. Res., Minneapolis, to 51st, Ft. Monroe.

Lieutenant Colonel F. E. Gross, from Hawaii, to Georgia School of Technology, Atlanta.

Lieutenant Colonel S. S. Giffin, will retire, Aug. 31, upon his own application.

Lieutenant Colonel G. F. Humbert, from 13th, Ft. Barrancas, to Denver High School, Denver.

Lieutenant Colonel T. H. Jones, from Georgia School of Technology, Atlanta, to 10th, Ft. Adams.

Lieutenant Colonel H. F. Loomis, to General Staff Corps, War Department.

Lieutenant Colonel J. S. Smylie, from Inspector General's Dept., Chicago, to Fordham University, N. Y.

Lieutenant Colonel W. C. Washington, from Panama, to Org. Res., 2d Corps Area.

Lieutenant Colonel S. E. Wolfe, from Org. Res., St. Louis, to Hawaii, sailing New York, Sept. 9.

Major N. L. Adams, from instructor, C.A. Ill. Natl. Guard, Chicago, to Panama, sailing New York, Sept. 27.

Major M. G. Armstrong, from 61st, Ft. Sheridan, to Hawaii, sailing New York, Aug. 15.

Major E. M. Benitez promoted Lieutenant Colonel June 1.

Major Maitland Bottoms, from Ball High School, Galveston, to Panama, sailing Charleston, Nov. 24.

Major L. L. Davis, from Hawaii, to 63d, Ft. MacArthur.

Major J. G. Devine, from Denver High Schools, to instructor, Mass. Natl. Guard, Boston.

Major A. F. Englehart, from General Staff Corps, Hawaii, to 14th, Ft. Worden.

Major M. B. Gibson, from 6th, Ft. Winfield Scott, to Org. Res., 7th Corps Area, St. Louis. Previous orders revoked.

Major H. S. Johnson, from Hawaii, to instructor, South Carolina Natl. Guard, Columbia.

Major J. P. Kohn, from Fordham University, to the Philippines, sailing New York, Sept. 12.

Major L. H. Lohmann, from the Philippines, to 2d, Ft. Monroe.

Major H. E. Pendleton, from William Chrisman High School, to Hawaii, sailing New York, Sept. 9.

Major G. W. Ricker, from General Staff Corps and from duty in office of the Chief of Staff, Washington, D. C., to Air Corps Tactical School, Maxwell Field.

Captain L. W. Bartlett, from student, C.&G.S.S., Ft. Leavenworth, to Panama, sailing New York, Sept. 27.

Captain O. D. Bowman, from Atlantic Branch, U. S. Disciplinary Barracks, Gov-

ernors Island, to Panama, sailing New York, Sept. 27.

Captain J. V. deP. Dillon, transferred to Judge Advocate General's Department, May 25.

Captain R. E. Dingeman, from student, C&G.S.S., to Hawaii, sailing New York, Sept. 9.

Captain D. S. Ellerthorpe, from Hawaii, to C&G.S.S.

Captain J. H. Featherston, from Hawaii, to 13th, Ft. Barrancas.

Captain H. P. Gard, from Hawaii, to 11th, Ft. H. G. Wright.

Captain E. M. Gregory, from 62d, Ft. Totten, to the Philippines, sailing New York, Sept. 12.

Captain John Harry, from the Philippines, to 3d, Ft. Rosecrans.

Captain M. A. Hatch, from Panama, to 62d, Ft. Totten.

Captain E. F. Heidland, from 7th, to USAMP *General Edward O. C. Ord*, Ft. Hancock.

Captain Hobart Hewett, from student, Army War College, Ft. Humphreys, to Hawaii. Previous orders revoked.

Captain David Hottenstein, transferred to Judge Advocate General's Department, May 25.

Captain J. H. Kochevar, from Panama, to University of Delaware, Newark, Delaware.

Captain J. H. Madison, from 62d, Ft. Totten, Aug. 14. Previous orders amended.

Captain W. J. McCarthy, from 11th, Ft. H. G. Wright, to Hawaii, sailing New York, Sept. 9.

Captain F. C. McConnell, from Panama, to instructor, Ill. Natl. Guard, Chicago.

Captain O. A. Nelson, from Panama, to 10th, Ft. Adams.

Captain C. L. Partin, from Hawaii, to 69th, Ft. Crockett.

Captain M. B. Raymond, from 62d, Ft. Totten, to Panama, sailing New York, Sept. 27.

Captain C. Q. Shelton, from student, Air Corps Tactical School, to office of the Chief of Staff, Washington, D. C. Previous orders revoked.

Captain P. W. Shunk, from student, Mass. Inst. of Tech., to 62d, Ft. Totten.

Captain H. F. Townsend, from Panama, to University of Alabama.

Captain C. B. Wahle, from Panama, to 2d, Ft. Monroe.

Captain A. E. Wilson, from 61st, Ft. Sheridan, to Panama, sailing New York, Sept. 27.

Captain W. L. Wright, from student, C&G.S.S., to Panama, sailing New York, Sept. 27.

Captain N. D. Young, retired, June 30.

First Lieutenant R. L. Anderson promoted Captain June 13.

First Lieutenant J. T. Barber promoted Captain June 13.

First Lieutenant C. R. Bard, from West Point, to University of Virginia, Charlottesville, and to Judge Advocate General's Department.

First Lieutenant F. T. Berg, from Panama, to 14th, Ft. Worden.

First Lieutenant L. H. Brownlee promoted Captain June 13.

First Lieutenant G. R. Carey promoted Captain June 13.

First Lieutenant N. A. Congdon promoted Captain June 13.

First Lieutenant G. H. Crawford, from student, C.A.S., to the Philippines, sailing New York, Sept. 12. Previous orders revoked.

First Lieutenant K. I. Curtis, from Hawaii, to 61st, Ft. Sheridan.

First Lieutenant Paul Elias promoted Captain June 13.

First Lieutenant W. H. Francis promoted Captain June 13.

First Lieutenant O. H. Gilbert promoted Captain June 13.

First Lieutenant E. G. Griffith promoted Captain June 13.

First Lieutenant L. M. Guyer promoted Captain June 13.

First Lieutenant W. H. Harris, from 11th, Ft. H. G. Wright, to Panama, sailing New York, June 1. Previous orders revoked.

First Lieutenant E. B. Hempstead promoted Captain June 13.

First Lieutenant Joseph Horridge promoted Captain June 13.

First Lieutenant R. K. Kauffman, from 63d, Ft. MacArthur, to Hawaii, sailing San Francisco, Sept. 7.

First Lieutenant G. E. Keeler, Jr. promoted Captain June 13.

First Lieutenant A. A. Koscielniak, from 69th, Ft. Crockett, to Hawaii, sailing San Francisco, Sept. 7.

First Lieutenant A. M. Lazar, from the Philippines, to 2d, Ft. Monroe.

First Lieutenant W. F. McKee promoted Captain June 13.

First Lieutenant F. J. McMorrow, from student, Ordnance School, Aberdeen Proving Ground, to Wright Field, Dayton. Previous orders revoked.

First Lieutenant E. C. Mitchell, from C.A.S., to Mass. Inst. of Technology, Cambridge.

First Lieutenant C. J. Odenweller, Jr., from Panama, to 10th, Ft. Adams.

First Lieutenant H. C. Parks promoted Captain June 13.

First Lieutenant W. H. Parr promoted Captain June 13.

First Lieutenant P. E. Passarella, from Panama, to 3d, Ft. Stevens.

First Lieutenant P. S. Peca, from student, C.A.S., to Puerto Rican Dept., San Juan. Previous orders revoked.

First Lieutenant P. A. Roy, from the Philippines, to 63d, Ft. MacArthur.

First Lieutenant S. C. Russell, from C.A.S., to Mass. Inst. of Tech., Cambridge.

First Lieutenant Andrew Samuels, Jr. promoted Captain June 13.

First Lieutenant J. R. Seward promoted Captain June 13.

First Lieutenant A. P. Taber, from Panama, to 13th, Ft. Barrancas.

First Lieutenant M. R. Thompson promoted Captain June 13.

First Lieutenant J. F. Thorlin, from C.A.S., to Aberdeen Proving Ground.

First Lieutenant J. H. Twyman, Jr., from Panama, to 3d, Ft. MacArthur.

First Lieutenant W. M. Vestal promoted Captain June 13.

First Lieutenant N. B. Wilson, from Hawaii, to 14th, Ft. Worden.

First Lieutenant K. J. Woodbury promoted Captain June 13.

Second Lieutenant W. S. Blair promoted First Lieutenant June 12.

Second Lieutenant B. R. Brown, from Air Corps Training Center, Randolph Field, to 6th, Ft. Winfield Scott.

Second Lieutenant A. S. Buynoski promoted First Lieutenant June 12.

Second Lieutenant C. F. Cordes, Jr. promoted First Lieutenant June 12.

Second Lieutenant P. R. Cornwall, from 51st, Ft. Monroe, to Hawaii, sailing New York, June 1, revoked.

Second Lieutenant L. R. Drake promoted First Lieutenant June 12.

Second Lieutenant L. J. Ellert promoted First Lieutenant June 12.

Second Lieutenant F. L. Furphy promoted First Lieutenant June 12.

Second Lieutenant G. H. Holterman promoted First Lieutenant June 12.

Second Lieutenant W. H. Jordan promoted First Lieutenant June 12.

Second Lieutenant M. M. Kallman promoted First Lieutenant June 12.

Second Lieutenant R. H. Kessler promoted First Lieutenant June 12.

Second Lieutenant W. H. Kinard, Jr. promoted First Lieutenant June 12.

Second Lieutenant Arthur Kramer promoted First Lieutenant June 12.

Second Lieutenant C. A. Langford, from 63d, Ft. MacArthur, to Hawaii, sailing San Francisco, June 24.

Second Lieutenant H. D. Lind promoted First Lieutenant June 12.

Second Lieutenant E. E. Lockhart promoted First Lieutenant June 12.

Second Lieutenant R. H. Mattern promoted First Lieutenant June 12.

Second Lieutenant O. A. Moomaw, from Panama, to 65th, Ft. Winfield Scott.

Second Lieutenant D. B. Nye, from 2d, Ft. Monroe, to Hawaii, sailing New York, Aug. 15.

Second Lieutenant N. T. Perkins promoted First Lieutenant June 12.

Second Lieutenant H. P. Persons, Jr. promoted First Lieutenant June 12.

Second Lieutenant C. L. Register, from Hawaii, to Aberdeen Proving Ground.

Second Lieutenant L. H. Ripley, from Panama, to 63d, Ft. MacArthur.

Second Lieutenant J. W. Romlein promoted First Lieutenant June 12.

Second Lieutenant C. E. Spann, Jr. promoted First Lieutenant June 12.

Second Lieutenant Oren Swain promoted First Lieutenant June 12.

Second Lieutenant E. H. Thompson promoted First Lieutenant June 12.

Second Lieutenant B. M. Warfield promoted First Lieutenant June 12.

Second Lieutenant H. B. Whipple promoted First Lieutenant June 12.

Second Lieutenant J. B. Yost promoted First Lieutenant June 12.

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The Contributors

MAJOR J. HALPIN CONNOLLY is an officer of the Army of the United States.

* * *

GENERAL F. CULMANN, French Army, is an outstanding artillerist. He is also widely known for his contribution to the field of technical literature: *Tactique D'artillerie*. He recently completed a tour of duty as Chief of Secretariat, Commission for the Fortification of the Maginot Line.

* * *

MAJOR CHARLES WINSLOW ELLIOTT, U.S.A. Retired, has seen service in the Philippines, China, Mexico, and France. He is the author of *Winfield Scott, The Soldier and the Man*, published in 1937 by the Macmillan Company. He makes his home in Manlius, New York.

* * *

CAPTAIN JOHN R. LOVELL, Coast Artillery Corps, is a native of Iowa. Entering the service in 1920 as a private, Signal Corps, he won an appointment to the Military Academy in 1923. Graduating with the Class of 1927 he was appointed a second lieutenant, Coast Artillery Corps, and has served with that arm to date. He is a graduate of the Coast Artillery School Regular Course (1937) and the Command and General Staff School (1939). His article in the current issue is one of the two entries in the 1938 prize essay competition that won honorable mention from the judges. Captain Lovell is now on duty as a student, German General Staff School, Berlin.

* * *

LIEUTENANT COLONEL AUGUSTIN M. PRENTISS, Chemical Warfare Service, is an outstanding authority on the use of gas in war. His book *Chemicals in War*, published in 1937, is the Bible of chemical officers of all armies. Entering the service in 1913 Colonel Prentiss served in the Cavalry, Coast Artillery, and Ordnance Department before joining his present arm during the World War. A graduate of George Washington University from which he received the degrees of B.S. and Ph.D., he has also graduated from the Chemical Warfare School, the Command and General Staff School, and the Army War College. He was awarded the D.S.M. for his services during the World War. Colonel Prentiss is on duty at Headquarters Panama Canal Department.

* * *

LIEUTENANT JACK W. RUDOLPH, Infantry, has been keeping JOURNAL readers informed on the undeclared Sino-Japanese War for the past year. He is now on duty in the Panama Canal Zone.

* * *

DR. FRITZ STERNBERG, well-known German writer and authority on economics, will be recalled as the author of *Germany and a Lightning War* which was reviewed in the preceding number of The JOURNAL. Dr. Sternberg has contributed extensively to periodicals in this country and Europe. He makes his home in Paris although he is temporarily living in New York.

* * *

W. A. WINDAS, who lives at Hollywood, California, specializes in short feature articles.

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BOOK REVIEWS

THE NEW WESTERN FRONT. By Stuart Chase. New York. Harcourt Brace & Co., 1939. 188 Pages; Bibliography; Index. $1.50.

Further simplifying an elementary exposition of political economy at home and abroad, *The New Western Front* is a succinctly presented argument for a policy of self-sufficient isolation for the United States to shield it from the troubles of Europe and Asia. Mr. Chase undoubtedly makes his points clearly and effectively; he has expended much study and thought in arriving at his conclusions, yet somehow he fails to convince us that the situation is as simple as he says it is.

The book omits complicated statistics but does contain several tables to show the relative self-sufficiencies of the major powers and Continental groups of powers and to indicate the pre-eminence of the United States in practically every material resource. Mr. Chase scouts the importance of our foreign trade; he says we should consume our own surplus though he does not object to devoting some of it to cementing our relations with the remainder of America.

In comparing our Army and Navy with those of other nations the author bestows a modicum of praise on our armed forces but, although his view is tinged with rosy optimism, again we are beset with doubt that the situation is so simple as he thinks. He seems to base the military side of his arguments on *The Ramparts We Watch* by Major Eliot and argues, with no little logic that no nation or combination of nations is in a position to attack us successfully from overseas bases. From this he deduces (especially if we get rid of the Philippines) that we are immune from attack. He blithely ignores the time element.

Having shown that it is but reasonable for us to live at home and like it, Mr. Chase goes on to show that it is profitable as well. He does this in a chapter entitled "Twenty Million Grand," which represents the sum we lost by our intervention in the World War. He also mentions the 350,000 dead and wounded which the last war cost us, giving us nothing to offset that loss.

Finally, after proving that we can remain at home on our own continent and live happily, peacefully, and profitably, he finishes by arguing that it is our duty to stay at home and not mingle in the troubles of Europe. He has no love for Merry England; he says that we are the guardians of the civilization of the world which has "come to us by default, perhaps," but has none the less come. Without painting quite so black a picture of the next war as is customary, he insists that, if we are to preserve what civilization we now have, we must solve the almost impossible problem of keeping out of the next war. It is our duty, he says, to maintain the safety and integrity of our own country and all the Western World, not by shouting the Monroe Doctrine or by marching out Marines into Central America, but by following the "Good Neighbor" policy and by having an Army and Navy adequate to repel any would-be invaders. Whether or not you agree with Mr. Chase throughout, you will surely find something to think about when you read this *New Western Front*. That is, you will if you do not object to Mr. Chase's trend toward over-simplification. This trend extends even into his style of writing, which might be damned by serious students as jerky and colloquial, but is nevertheless skilfully attuned to the taste of the Man in the Street and results in a volume that is entertaining, instructive, and easy to read.

P. D. B.

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BOMBS BURSTING IN AIR: THE INFLUENCE OF AIR POWER ON INTERNATIONAL RELATIONS. By George Fielding Eliot, formerly Major, Military Intelligence Reserve. New York: Reynal & Hitchcock, 1939. 173 Pages. $1.75.

To some extent an elaboration of things which the author touched upon in *The Ramparts We Watch*, but mainly a clear and sensible exposition of air power and what it means to Americans in terms of present and future, peace and war—and perhaps of life and death. Major Eliot's new book, like his earlier one, is a contribution of no small value to our national defense. The fact that at least one writer is doing his utmost to present vital military matters to the public in a clear and simple manner is a fact to be thankful for.

Major Eliot opens *Bombs Bursting in Air* with a short chapter on some of the fundamentals of warfare. Here he treats most briefly the hoary so-called "principles of war" —which he appears to accept without question, and gives the merest sketch of what he considers to be the main elements of invention or discovery that have revolution-

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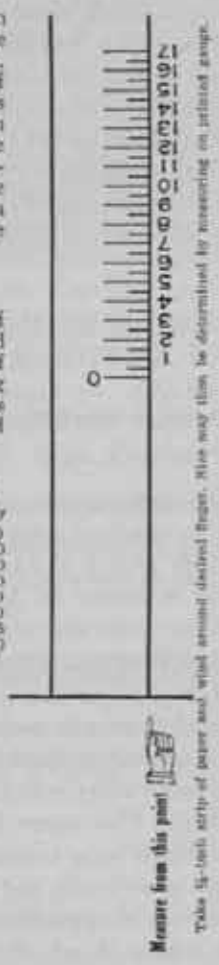

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ized warfare. The airplane, of course, is the latest of these. This chapter, though it contains enough academically debatable material for extended argument, is simply an introductory section and need not delay the reader long. The author soon gets down to business.

He discusses in succeeding chapters the qualities of air power, the elements of air superiority, the great gamble—Germany vs. Britain, international blackmail by air threat, the general possibilities of air warfare in Europe, and then turns to discuss at some length how the air power of the rest of the world affects the defense of our own nation, and what we should do about it. In conclusion, Major Eliot asks "how much air power do we need?" expressing some disagreement with our present air-power objective. The program is weak, he believes, in that it calls for only 178 long-range bombers.

There are always a few points in a sound book for a critic to pick on. For one thing, Major Eliot neglects to point out, in discussing attack aviation and its uses, that the full, concentrated antiaircraft fire power of ground troops has never been tried in warfare against low-flying planes. For another, when he indicates that the series of bombing raids on Barcelona in March, 1938, destroyed the morale of that city, he does not say that its morale, at the time of bombing, was already on the down-grade. Also, in arriving at the numbers of bombers needed to raid large cities repeatedly, the author does not discuss losses of planes from accidents. This was an important item in the World War, and will be an important item in the next, even if planes are safer to fly than they used to be.

Perhaps the finest part of *Bombs Bursting in Air* is the discussion of international blackmail by threat of air attack. Of all who have written in recent months on this most immediate aspect of European affairs, no other writer has weighed the facts so accurately or done his weighing with a better balance. It does any military reader's heart good to find Major Eliot emphatically saying, "There is no certainty whatever as to the result." It is not hard to agree with him, either, when he writes as follows: "In the physical field, it (air power) remains a weapon of uncertain value and untried possibilities. In the psychological field, it is dominating and all-important."

It is to be hoped that nothing dams Major Eliot's flow of books on military subjects. Besides, there are still other titles to be found in the National Anthem. But as one commentator on such matters has said, may the state of the world never reach the point at which a book by such a writer as Major Eliot could be appropriately entitled *And Our Flag Was Still There.* G. V.

* * *

THE RISE OF AMERICAN NAVAL POWER. By Harold and Margatet Sprout. Princeton University Press. 1939. 398 pages; illustrated; documented; analytical index; $3.75.

This book is not a technical study. It can be read as

easily by a landlubber as by a seafarer. It is not a chronology of naval exploits, history of naval technology, or description of naval organization; these topics are mentioned only incidentally and briefly. Essentially this excellent work might be called an exposition, in historical form, of the conditions, institutions, events, ideas, motives, personalities, and politics which have shaped the development of American naval policy, strategy, and evolution from 1776 to 1918. Studies of this nature frequently are dull, uninteresting collections of facts and figures. This one is different. It is fascinating.

Specifically, the authors go into: (1) the problem of naval defense as envisaged by different persons, groups, and sections at each stage in the expansion of the United States; (2) the continuing historic debate over the nature and scope of the Navy's functions in peace as well as in war; (3) the arguments of successive generations as to the size and kind of navy required to perform these functions; (4) the evolution of ideas as to the principles of naval strategy and warfare; (5) the strategic and political implications of advances in naval architecture and technology; (6) the similar implications of changing ideas as to the organization, disposition, and management of the forces afloat; (7) the like implications of the problems of Navy-Department and navy-yard administration; (8) the process of formulating and enacting naval legislation within our governmental system; (9) the respective rôles of organized groups and of unorganized public opinion; and (10) the international repercussions and consequences of the rise of American naval power.

The Rise of American Naval Power is a valuable contribution to American history that can be enjoyed by everyone. This book is recommended as something that should be read, and for those interested in a military-naval library, something that should be owned. W. G. J.

SEA DUTY: THE MEMOIRS OF A FIGHTING ADMIRAL. By Rear Admiral Yates Stirling, U. S. Navy (Retired). New York: G. P. Putnam's Sons, 1939. 309 Pages; Illustrated. $3.00.

Admiral Stirling had a real talent for being on deck whenever anything exciting happened. He came from a strong Navy family and first saw action off Santiago where he attempted to rescue Hobson's crew. He commanded a gunboat in the Philippines campaign with a self-reliance that exasperated superiors. He was in the Asiatic fleet commanded by his father during the Russo-Japanese War, and went around the world with the White Fleet. During the World War he served in the transport service. Other commands were the Yangtze Patrol, and Hawaii during the famous Massie case. But no matter where Admiral Stirling was, he saw plenty of action. Moreover, he seemed to have a genius for pulling the straw out of stuffed shirts.

His memoirs are full of rare stories, which seem dull

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when torn from their context. One will interest present day readers. In 1913 Secretary of the Navy Daniels had invited the cabinet members and their wives to view target practice of the Navy's greatest dreadnaughts. Mrs. Franklin D. Roosevelt, then wife of the Assistant Secretary of the Navy, donned dungarees and climbed to the fire top in the mainmast of the *Rhode Island* and came down after the firing covered with soot but enthusiastic. Stirling was in charge of Mrs. William Jennings Bryan, who sat down behind a canvas screen just as four battleships began to fire at a range of five miles on targets within sight. She could not be prevailed upon to stand up to view what to everyone else was a majestic and terrible scene. "I don't take any interest in that sort of thing."

Admiral Stirling has plenty of criticism for the Navy's system of bureaus and feels that it will never meet the requirements of a long and bitter war. Sooner or later the Navy must have a general staff, and this staff must enjoy the peacetime priority that a well-established general staff should have. In his opinion, we should set it up in peacetime so that we will not be forced to improvise such a system under shellfire. He takes no comfort from the glib assurance that the Chief of Naval Operations is in reality a Chief of Staff. Stirling believes we need a *Naval General Staff Corps* with a deep indoctrination on fundamentals. Lacking this there will be waste motion, indecision, and delay in time of war, despite the efficiency of the fleet.

A very interesting and thought-provoking book.

H. A. D.

* * *

UNION NOW. By Clarence K. Streit. New York: Harper & Brothers, 1939. $3.00.

This book has, in two short months, created international attention. And small wonder, for it proposes nothing less than a federal union of the democracies of the North Atlantic *now* as a prelude to an eventual world government. The purposes of this union are to prevent war by opposing to the Fascintern and the Comintern an International of Democracy, 280,000,000 strong and possessing 60% to 95% of practically every essential war material as well as overpowering military and naval forces; to end the depression through the economic advantages offered by a union free-trade area, single currency, and single communications systems; to save our liberties by constructing a superstate too powerful to be attacked and dedicated to the proposition that the state is made for man, not man for the state. This idea is developed by Mr. Streit as a sound and practical project with no obstacle to its consummation except that of overcoming national prejudices and selfishness for the general good. That this sort of obstacle has been overcome he proves by the example of the final acceptance of the American constitution by the thirteen original American colonies and says that trends of American opinion as shown in the recent Gallup and *Fortune* polls must be studied closely

before saying too hastily that it could not be overcome again. The interest of this book to Army officers, whether students of the international situation or not, lies in the author's suggestion that all defense forces be combined under a single head and general staff that would be subject to the orders of the Union government. Mr. Streit's proposal offers a basis for peace and the orderly development of civilization as we know it. Visionary? Yes; but there have been many visions in the history of man.

D. S. B.

CANTIGNY: A CORNER OF THE WAR. By Captain Jeremiah M. Evarts, 18th Infantry (1st Division, AEF). Privately printed, 1939. 96 pages. $1.25.

In his preface to this book, Lieutenant General Robert Lee Bullard writes as follows of these brief true stories of war: "Doubtfully, at the request of the writer whom I commanded in the things he writes of, I picked them up to read, two or three perhaps, surely not all. I laid them down only when I had read the very last. With few words and simple he more accurately and more truly than any other that I have ever known makes us feel, take part in what he and his comrades beside him were feeling at the time of men's greatest strain, fears and passions in perhaps all history. He felt with them and you feel with him and them. Stories such as his will for the orator's thousand years inspire writers who would really tell of the men who fought this mighty war."

High praise? High praise for a small, privately (though finely) printed book of war memoirs? Not one particle too high! The reviewer will add no words to this accurate praise except to say that he, too, could not put down the book until its last word was read. J. E. L.

FRÉMONT: PATHMARKER OF THE WEST. By Allan Nevins. New York: D. Appleton-Century Company, 1939. 629 Pages; Illustrated; Maps; Appendices; Index. $5.00.

On August 14, 1796, General Bonaparte reported to the Directory on his subordinate commanders. Sauret, he said, was good, even very good as a soldier; but he did not have sufficient breadth of understanding to be a general; and he was *not very lucky*. On the other hand, Augereau had a strong character, courage, energy, determination, and experience in war; he was well liked by his soldiers, and he was *lucky* in his operations. Despinoy was "very good in Milan, and very bad in command of a division." As a major general in command of a military department during the American Civil War John C. Frémont was unlike Despinoy in all respects, like Sauret only in that he was unlucky, and like Augereau in all except luck. John C. Frémont as a general was unlucky. Why?

Seemingly Frémont combined happily in himself all of

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the principal qualities which make for success in war. He was unselfish in his devotion to his country. He was upright, incorruptible, and honorable. He had physical stamina in a high degree. He was physically fearless and had high moral courage. He had initiative. He had the resolution necessary to overcome great obstacles. He had the gift of inspiring confidence, loyalty, and enthusiasm in his troops. He had public confidence and support to the degree that millions of his fellow countrymen had campaigned for him and voted for him to be President. His strategy was sound and even brilliant, except that it was more nearly related to his ardent temperament than reality. It may be all very well to say that it would have worked if he had been supported: but he had the strategy without the support. It appears, then, that Frémont had the confidence of all except his political and military associates and superiors. The biographer and his reader ask why.

One cannot help speculating on what might have been had Frémont been given appropriate employment in the sphere in which he had made his reputation (and in which alone he was "lucky,") and had been placed in charge of the topographical and cartographical work of the army; or even if he had been given a small but important command in the Southwest where his knowledge of the country and his acquaintance with the people might have been decisive, and have given him time to develop as a general.

Mr. Nevins's attempt to reveal the strength and weakness of a romantic figure is a model biography—it is scholarship, not on parade, but on field service. He presents the problem of the man who was Frémont, and lets the carefully compiled story of his life unravel by degrees before us. The resulting portrait is sympathetic and just. It is the kind of picture that has a rare fascination; so that one is content to gaze one's fill. And it is the kind of picture that is worth reflecting on, especially by those who may some day hold a high command in war—if they wish to be "lucky." J. M. S.

* * *

FROM VERSAILLES TO MUNICH, 1918-1938. By Bernadotte E. Schmitt. (Public Policy Pamphlet No. 28). Chicago: University of Chicago Press, 1938. 57 pages. $.50.

For the reader who has seen the headlines jump during the past few years from one part of Europe to another, and therefore needs a sensible, accurate, and not too long review to set him straight, this pamphlet will serve admirably. Doctor Schmitt, its author, Professor of Modern History in the University of Chicago, wrote also *The Coming of the War, 1914*, which some fifteen years ago went far to set the record straight on the origins of the World War and still shares honors here and abroad with Fay's *Origins of the World War* as a standard work on the subject. The present pamphlet covers the two decades since Versailles not only concisely but clearly and readably. L. M.

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