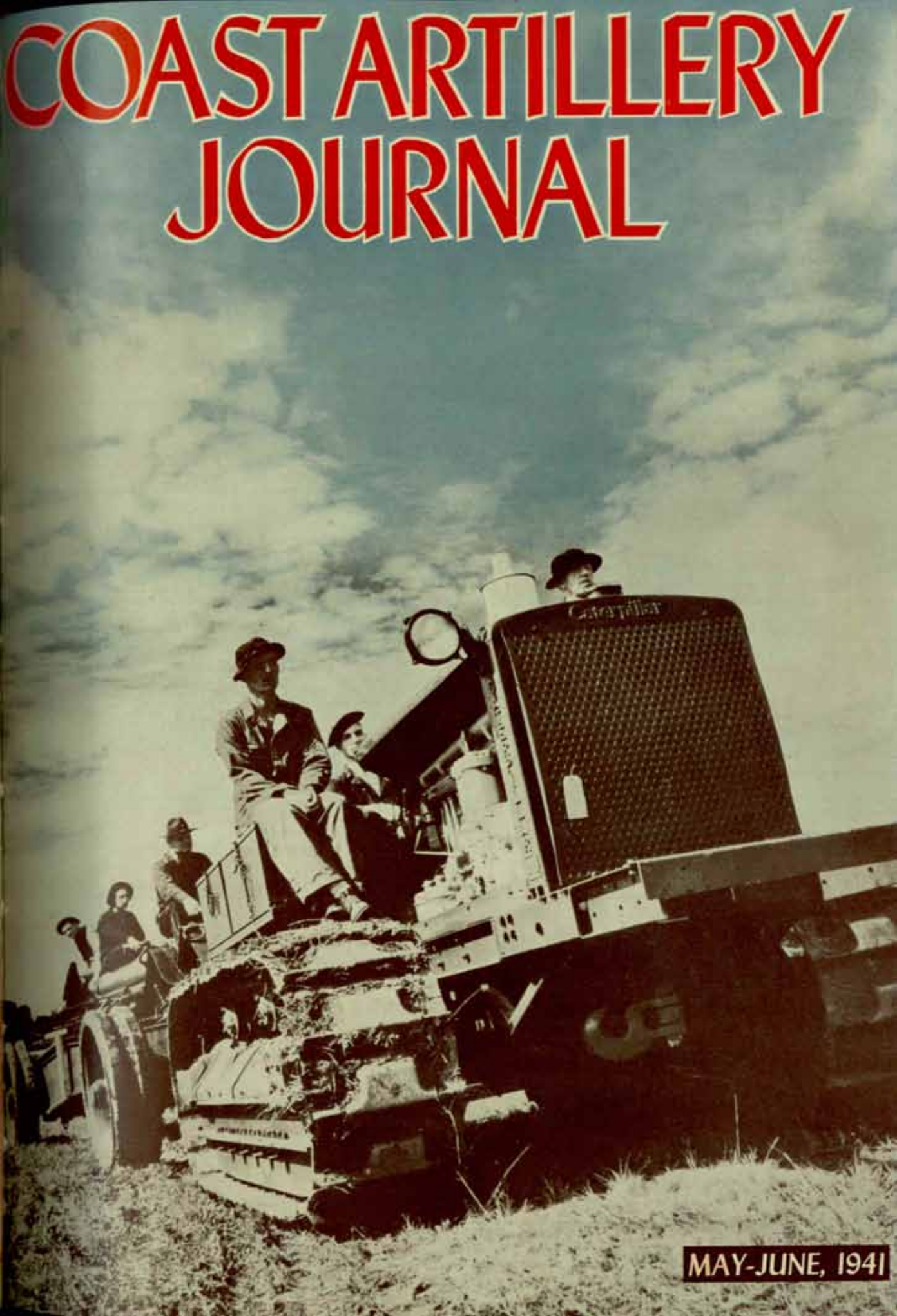
COAST ARTILLERY JOURNAL



MAY-JUNE, 1941

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COMPANY ADMINISTRATION

Including Supply and Mess Management

AND

PERSONNEL RECORDS

Including Personnel Office Organization and Procedure

By MAJOR C. M. VIRTUE

The readoption by the Army of a personnel system similar to that in use from 1926 to 1933, thus freeing the unit commander and first sergeant from responsibility for practically all individual records and concentrating these personnel records in the unit personnel section, has required a considerable rearrangement of the matter in this text.

In addition to the rearrangement, new chapters have been added on the following subjects: "Company Supply and Supply Procedure," "Mess Management and Records," and "The Company Fund." A chapter on the new personnel system, including a discussion of the organization and operation of the personnel office in the regiment, also has been added. The new edition contains pay tables for enlisted personnel, including air mechanics' pay and flying pay. 396 pages.

CONTENTS

CHAPTER
- I. INTRODUCTION
- II. SUPPLY AND PROPERTY RECORDS
- III. THE COMPANY MESS
- IV. THE COMPANY FUND
- V. MORNING REPORT
- VI. DUTY ROSTERS
- VII. DAILY SICK REPORT
- VIII. SOLDIERS' DEPOSITS
- IX. MISCELLANEOUS PERSONNEL MATTERS PERTAINING TO THE COMPANY
  - The Physical Record
  - Company Punishment and Punishment Records
  - Records and Reports of Qualification in Arms
  - Appointments and Reductions Within the Company
  - Rating and Disrating of Specialists
  - Reduction and Restoring of Base Pay
  - Company Orders
- X. ORGANIZATION OF THE PERSONNEL OFFICE
- XI. SERVICE RECORD

CHAPTER
- XII. PAY OF ENLISTED MEN
  - General Provisions Affecting Pay
  - Conditions Under Which Payment May Be Made
  - Conditions Under Which Payment May Not Be Made
  - Additional Pay
  - Stoppages of Pay
  - Forfeiture of Pay
  - Miscellaneous Pay Matters
  - Preparation of Pay Rolls and Other Vouchers
- XIII. DISCHARGES AND DISCHARGE CERTIFICATES
- XIV. CORRESPONDENCE
- XV. MISCELLANEOUS PERSONNEL MATTERS
  - Reports of Change
  - The Soldier's Qualification Card
  - Government Insurance and National Service Life Insurance
  - Furloughs, Passes, and Delays
  - Reports Required, and Action To Be Taken, In Case of Death
  - The Company Correspondence File
  - The Company Field Desks
  - Authorized Abbreviations

APPENDIX
INDEX

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THE COAST ARTILLERY JOURNAL

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CONTENTS

LEADERSHIP. *By Brigadier General Edmund L. Gruber* 194
IT CAN STILL HAPPEN HERE. *By Lieutenant Colonel James D. MacMullen* 200
UMPIRING FOR AAA. *By Colonel Fred M. Green* 207
THE MECHANIZED AGO. *By Lieutenant Henry C. Wendler* 216
THE FLOATING FORTRESS. *By Lieutenant Charles F. McReynolds* 220
WAR ROCKETS OF THE PAST. *By Willy Ley* 226
TRIP TO BAGUIO AND BANAUE. *By Colonel Joseph T. Cottrell* 234
THE CHURCH ON WHEELS. *By Elizabeth Pattison Wing* 241
LOOK ALOFT! *By Captain Carl T. Schmidt* 242
TACTICAL TRAINING OF AAA IN THE THIRD ARMY 248
ARMORY DRILL PAYS DIVIDENDS. *By Colonel Malcolm W. Force* 252
STANDING OPERATING PROCEDURE. *By Lieutenant Colonel Charles S. Harris* 254
SHELL BURST PROJECTOR AND SPOTTING TRAINER. *By Major Burgo D. Gill* 259
RANGE PERCENTAGE SPOTTING BOARD. *By Major Lindsay M. Applegate* 260
AROUND THE BASES: *(Anonymous).*
JAMAICA 265
GREENLAND 270
THE STORY OF ARTILLERY THROUGH THE AGES. *By W. A. Windas* 275
NEWS AND COMMENT 276
COAST ARTILLERY BOARD NOTES 279
COAST ARTILLERY ACTIVITIES 282
COAST ARTILLERY ORDERS 297
BOOK REVIEWS 299

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LEADER

By Brigadier General Edm

This morning when the Assistant Commandant came in to see me just a few minutes before this meeting, he said he hoped I would tell you how to be a great leader. I believe that is something you would not care about. It isn't being a great leader that counts—the important thing is to be just a good, common garden variety of a leader. Like the common people, they must be good because there are so many of them in the Army.

Our Field Service Regulations give us a few hints on Leadership. They tell us that Man is the fundamental instrument in war. They tell us that Leadership is based on a knowledge of men and that Command and Leadership are inseparable. They go on and discuss a lot about Leadership in Chapter 3. You will find it interspersed throughout that text. But strange to say, in the five Field Service Regulations that our Army has had in the last forty years I don't think any one of them, until this new edition, ever said anything about Leadership. Oh, I will take that back. I remember the text we used shortly after I graduated had something on Command which I believe I would put under Leadership—young men and mules will sleep well in the early hours of the morning. That was homely. Since then I have found that soldiers will sleep at all hours and sleep well. I think of another principle of leadership, one that came out originally under the regime of General Leonard Wood as Chief of Staff, who was a great leader—it said something to the effect that inertia and lack of initiative were more reprehensible in a leader than an error of judgment or a mistake in the application of means, words to that effect. That has been repeated, I think,

Leadership was delivered as a lecture to the students at the Command and General Staff School, December 28, 1940, by General Gruber, Commandant of the School. It is printed here by courtesy of the *Command and General Staff School Military Review*.

SHIP

ruber, United States Army

every copy of the Field Service Regulations that we have had since that day. We are admonished to study the lives of great leaders to our profit—we hope to profit by what they did. But I often think we would profit more by studying the lives of men who have failed, because then we would have warning signs telling us what not to do.

If you stop to consider how many really great military leaders there have been, you could probably count them on your digits, there are so few. I remember, in this very room, when I was an instructor, a certain point came up for discussion and it was acknowledged that the decision under consideration probably would be taken by a great leader—whereupon I raised a roar by saying, "But remember in the fifty years of existence of this school it has not turned out a single leader of that kind." And that is true. How many Grants and Lees have we turned out here? But we have turned out a lot of competent commanders—good, capable leaders of men, leaders who were able to pass on their ideas and to inculcate those who served under them.

So the first thing I want to deal with today is the importance of knowing—having knowledge of the behavior and mentality of our soldiers, because man is the fundamental instrument of war. I think it was Napoleon who said: "In war it's the *man* who counts and not men." In the days before the machine gun, quick-firing artillery, tanks and airplanes, when men fought in close order, the masses were held together by drill and discipline. But today large units fight in small groups, each under a leader; very often our men must fight as individuals. Therefore, I have often felt it is the individual soldier and his elemental behavior and impulses that are matters of paramount importance to us as leaders. We should know what his reactions will be under certain motivating conditions, and by observation find out how we can exploit and control those reactions.

A knowledge of men has always been difficult to acquire for two reasons: one, you cannot learn it from books, and the second is, that soldiers react entirely differently in war from the way they do in peace. Since modern combat is based so largely on the conduct of many small groups, the task of influencing the soldier today does not fall on some courageous plumed general on a white horse, nor is it produced by some commander issuing a proclamation to the effect that "forty centuries are looking down upon you." Just imagine what effect that would have on the average American soldier. I think he would give a good bronx cheer. The job of leading and influencing soldiers in combat falls upon subordinate commanders who are nearer to them and must command them. All the higher command can do is to further the efforts of the group leaders by proper training.

Now what can the command do? What can you gentlemen do as the commanders' assistants—as their staff officers?

In the first place, the command must train you and the subordinate leaders to look after the welfare of the men so that the first essential condition in the group—that feeling of comradeship—can be welded in the group.

Second, the command must train the groups and their leaders to meet the dangers of war and to warn them of the surprises that come from the use of new weapons. Probably nothing has caused more break downs—a quicker break down—in the morale of troops than the failure of the command to train troops in what is in store for them in the way of new instruments of war.

Third, the command must prepare the soldier to meet the terrific mental strain of combat, to prepare him for those profound impressions caused by misery and destruction that accompany war.

Fourth, it must impress upon all commanders the importance of studying and knowing the characteristics of subordinate commanders because each must be handled differently and each will react differently under different circumstances. You know yourselves how differently your commanders must be trained in the battalion. The division commander must know how each commander will react to the orders that he is going to get.

Fifth, the command must make subordinates feel that they are not alone out there on their jobs—out there in the front. That behind them also is a higher commander and a staff, both of whom are constantly seeing that something is being done about the business in hand.

Sixth, the commander must keep alive the idea of offensive action, because with this idea comes the sense of superiority. He must keep up the feeling of movement, the lack of which so paralyzes combat action.

Let me develop some of those ideas a little further:

Men must be taught to expect accidents, wounded and dead. They must be encouraged in the idea to live for today, and do the job of the moment. They must be taught that war is full of friction, and mistakes are the

invariable rule of war, and that everything will seem to be going wrong.

Men must be permitted to cultivate harmless superstitions—the third light from a match, spitting through the fingers, putting the hat on backwards—all those things give men the feeling of protection and security.

When men feel themselves constrained to accept a situation and get the idea that nothing is being done about the matter, they become nervous and anxious. The job of the staff officers is to anticipate troubles and to be ready to compose them.

We must teach men that their nervous excitement in the first encounter with the enemy will cause them to see danger everywhere.

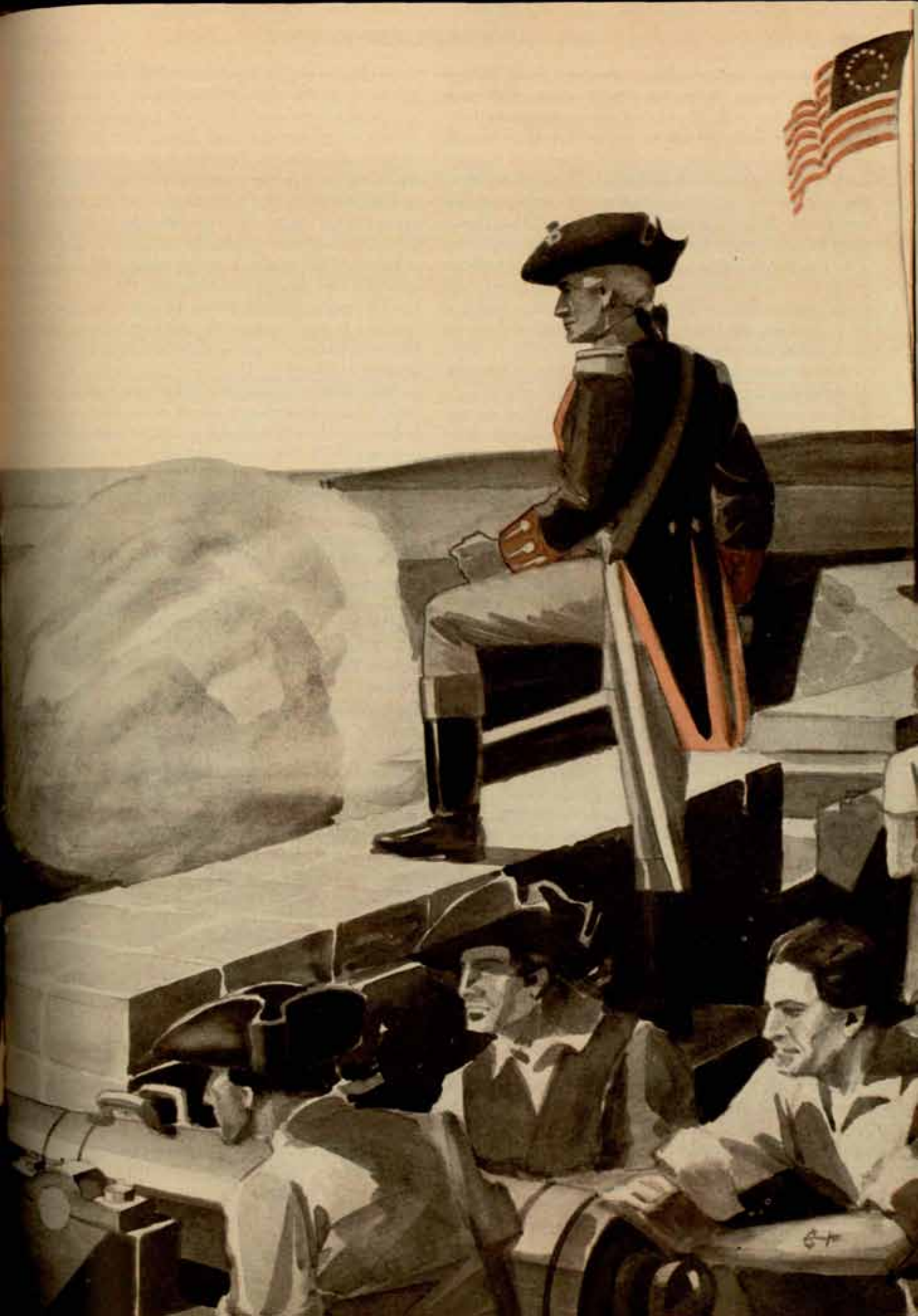
Every officer and soldier must be warned of false news and exaggerated reports. They must be taught to weigh carefully rumors and to scrutinize reports, and to be careful in making reports and of sending them.

Staff officers and unit commanders must get accustomed to the fog of war; they must get used to operating on insufficient information and sometimes with no other basis than that they know what the intentions of the higher commander are.

In war, the average soldier rarely knows what is going on and what's more, he doesn't care to know. He is satisfied if things are going well with him and his buddy. As he sees it, life is hard enough just looking out for himself, and he looks upon that as his biggest problem in life. And I believe he is right. He must eat, he needs drink, and he fain must sleep. If he is cold, he tries to keep warm; if he is hot, he will exploit every means to keep cool. If he feels dirty, he will find a way to clean up, but he doesn't do that because there is any particular virtue in cleanliness, but because it just makes him feel better.

He knows he must march. He is trained to do that. He really is not so very much afraid of the enemy once he meets up with him. When he meets him he knows that he must fight and he will do that, especially if he is fighting with a buddy alongside of him, when he knows he is part of a group, because he doesn't want to fight alone. He wants to be led. He wants to be *well* led. And he will follow his leader if he is a good one, because he has confidence that this guy will see him and the group through.

The average soldier wants to win; to succeed. And if he is well led and well fed he cares little if he is marching or fighting. But all the time he is ready to take a rest, maybe a little snooze. He is always ready to do bunk fatigue. His one idea is to get it over with so he can rest and eat and sleep. And whatever the job, he will always do it much better on a full stomach than on an empty one. There is an old song that you often hear sung—oh, somewhere between eleven and twelve o'clock over in the barracks. It goes to the tune of Old King Cole. You all know it. It begins by telling what all the top grades want, in regular order, and finally you get down to the Buck Private and what he is thinking about—Beer, Beer, Beer. There is a lot of leadership psychology in that song.



The average soldier is little concerned about strategy and grand tactics. If combat action is successful he is pleased. If his leader is able and smart, especially if he is putting over something on the other fellow, he will go anywhere with him. He asks no questions because such things are too much bother. He likes to keep moving because that gives him a feeling of confidence and superiority. If he is going places he knows that things must be going right. He does not mind defensive action if he can keep moving around a little, but he dreads being pinned down to the ground, especially if he gets the notion that nobody is doing anything about it and that all he is doing out there is sitting tight and sticking his neck out to take it.

In war, men are prey to certain emotions—strongest of them are fear, fright and sometimes frenzy.

Fear, you will find, is generally the product of rumors that always spring from a dread of the unknown and a feeling of inferiority. It tends to break up that feeling of security which the individual soldier always finds within the group. You counteract fear by squelching rumors and making gossips look silly. A leader must always do that. If he gets a man in the outfit who is a rumor spreader, he should make it a point whenever he can to make that fellow look like a dumbbell.

Fright is caused by surprise. Its immediate effect is to make the individual think of flight or heedless action. When it affects several members in the group simultaneously in the same way, each discovers that the other is likewise without protection and support and the effects are so compounded that a panic results. Sometimes the only way to break up a panic is to meet it with a greater fright. That might require taking strong measures.

Now frenzy—you frequently see it in ordinary life. You see it on the football field. It is an infectious manifestation of joy which engulfs all those like minded about the favorable outcome of an event. The individual abandons himself to any crazy suggestion by his neighbor—by his buddy. The danger is that it tends to disrupt group action and it may lead to dangerous excesses. In combat its danger is that the group fails to take the conventional action that it would ordinarily take, and thereby it becomes vulnerable to an alert enemy. All commanders and staff officers must constantly insulate themselves against these emotional infections which will disrupt the group and disturb their men.

Now take the other side of these disruptive influences, those which act on the group and are caused by individuals of that group. You all know that the greatest harmony exists within a group when there is a feeling of equality among its members. Whenever you have a member of a group who attempts to put himself above the group or arrogates to himself prerogatives or privileges, you start a feeling of unrest in that group. You make the other members take positions pro and con and, in general, you begin to loosen that bond of comradeship—that feeling of community that must exist in the group. A similar disruptive influence is started when you permit some member of the group to be separated from it for a long time and during that period the impression gets abroad that the particular member gets some favored treatment not accorded the group.

The formation of cliques is also bad for a group because cliques always have special interests, secrets and gossips that always arouse the suspicions of the other members of the group. You start clashes and conflicting interests, and this goes to the point that finally within the group you have different factions that do not cooperate. A single renegade can never start a rebellion. He must have a clique behind him in order to spread dissatisfaction.

Now all these disruptive influences: privileged individuals in a group, individuals who think themselves better than the others in the group, members frequently detached from the group, and the existence of cliques inside the group, are all sure signs of the loosening of bonds of comradeship and of common interest. The leader who hopes to strengthen his position by catering to such interests only undermines his own position and in the end he will find that the cliques he permitted to exist, or let us say, he supported, will freely stab him in the back simply because he lacked guts and leadership. That is why every commander should carefully watch the component groups of his unit, and stay clear of any favored group or clique. He must study the composition of his groups and remove the rotten apples from the group barrel. He must always strive to compose differences within the groups; be constantly on the alert to constitute his groups so that they will have like interests. If a commander observes these simple rules he will find that the decent elements will always prevail; they will give voice to the reasonableness of his actions and attitude. The men will see that what he does is for the benefit of all and they will accept hardships. They will subscribe willingly to the proper rules of discipline. And if there should be among them some reckless spirit, they will deliver him before he has an opportunity to do any harm. But if they should not, the leader must never falter or fail to take swift and ruthless action, all with a studied purpose of establishing his leadership.

Now I spoke earlier of the hopeless feeling some officers have when they find that there are really few great military leaders. But that should not deter us from practicing good leadership ourselves or inculcating sound ideas of leadership in our subordinates. I know that you gentlemen have fully developed your characters years ago. No one can change that. I recall my father saying to my mother: "You can have these boys until they are fourteen years old. After that I will take them. I will take care of them and build on their character." Well, I think the old man over estimated himself because all the character-making was done by that time. Since your adolescent years you may have acquired some veneers. We all do. Unfortunately, this is often

an ability to dissemble or to hide your true self. But if you study and watch your brother officer and your subordinates you will find that it is not very difficult to pierce their veil or disguise. In any event, remember that an attempt to imitate the character of some great leader will only produce false and spurious results. Why? Because a man's true character is the result of his own upbringing—his personality and his early environment. If we know ourselves we will cultivate and rely more on our good traits, and we will be more watchful to mitigate or neutralize our weak points, to watch ourselves when we do not have so much confidence.

In all leadership, character is the foundation. Character is what a man is. His reputation is what others believe him to be. And that depends largely upon his professional talents. Together they go to make up his prestige, that is, his influence, and really that is what counts. Prestige is absolutely necessary for leadership. What we want is a man who starts off with an adequate character, who has excellent professional talents, has been able to establish a good reputation and thereby has acquired some prestige. Now all of these things apply to a general staff officer too. His character determines how he performs his duty; his professional ability determines what discretion you will allow him; his reputation, what credence you will place on what he says. These are all attributes which you as staff officers must always think about in your dealings with your subordinate commanders and other staff officers of your collegial group.

Avoid the spirit of routine which dulls initiative and causes officers to view an undertaking with pessimism, and to be afraid to stick out their necks, and to have a fondness for the old American game of passing the buck. I well remember a humorous remark once made by a general officer who had a way of taking the other side of an argument. He believed in doing that simply to sound you out, to feel you out. He pursued this same line with a certain commander and found that, lo and behold, this commander was just turning things against him. So finally he looked at him and said: "Why, what you propose is unheard of. It violates a good old Army custom. The buck is never passed up, it is always passed down."

Avoid hypocrisy and four-flushing, especially when you have nothing on the ball. Have dignity and self-respect, simply because you never saw a clown make a great leader. He may amuse but he doesn't inspire confidence. And you must have the confidence of those you expect to lead.

Have a broad tolerance for the ideas of others, otherwise you will be unable to examine ideas and reports of others with an open mind. Know the state of mind of those with whom you deal and those you will lead. You should be restless for the welfare of the men who are to do the work and should look out for their interests and be moderate toward them.

A commander must be willing to accept responsibility. That is the first essential of leadership, and so I repeat what was in our old Field Service Regulations, and what is repeated in the present one: "Every individual from the highest commander to the lowest private must always remember that inaction and neglect of opportunities will warrant more severe censure than an error of judgment in your choice of means." You will find that statement in paragraph 128 of Field Service Regulations. Please open your text to that paragraph and underscore it.

And finally, let me emphasize this point—that once a decision is made do not dally. Get busy on the execution, and execution does not mean just issuing an order. See that the thing is done and have a resolute will to see it through. Never be afraid to take a calculated risk, especially where the stakes are great. Instill this will in your associates and in your subordinates. Then you can say: "This is a great outfit. It can do anything." And when you can say that you will have learned a lot about leadership.

IT CAN STILL HAP

The sensation was eerie, uncanny. The effect was that of illumination, but there was only a faint flicker of greenish light from time to time, when the hull and upper works of the anchored motor sailer glowed with a fleeting, momentary phosphorescence.

Captain Arthur Hogarth, Coast Artillery Corps, Retired, stroked his grey beard in perplexity. The night skies were clear, the lights of Lynnhaven Inlet glowed on his port beam, and there was no evidence of an electric storm or atmospheric disturbance. Hogarth got up from his deck chair, went over to the rail, and knocked the ashes from his pipe. The sea was calm, with a slight swell; from across the water could be seen the dancing lights of fishing craft and the running lights of a rapidly moving vessel, apparently a patrol boat or a medium sized yacht.

As the latter approached, it took on something of the appearance of a lakes whaleback or a submarine awash. Completely turtle-backed, the only apertures were for the mast, funnel, and ventilators, a streamlined deck house, and bulges for small turrets from which protruded the muzzles of antiaircraft guns.

A searchlight clicked on, and briefly illuminated the *Sea Dog*; the moving vessel came alongside and lost headway. A port amidships in the turtle back swung open, and there was a hail. "Ahoy, Motor Sailer! May I come aboard?"

"Help yourself; what is this, a raid? My papers are all in order, including income tax receipts up to date."

"Oh, no, Sir, just a few observations in the interest of science." A gangway was lowered, and the speaker, in blue uniform and scarlet facings, wearing the single stars of a brigadier general, stepped to the deck of the motor sailer. "We are conducting some experiments, and I wondered if I might observe from here for half an hour or so, while the artillery boat cleans up another job?" He spoke briefly over his shoulder to a junior officer; the gangway was drawn in and the port closed, and the grey-hulled craft got under way.

"Glad to be of any assistance, General. I was in this racket once myself, and . . . By all that's holy, it's Butch!" He shoved out a gnarled fist.

"Butch it is, all right, though my young men are not encouraged to make a habit of calling me that to my face, but I don't . . . wait a minute . . . I *do* believe it is Bull Hogarth, after all these many years! How come, and what have you been doing with yourself? I completely lost track of you years ago, and here you turn up, all festooned with spinach like Neptune the First!"

"Well, to begin with, this calls for a drink—or would that interfere with the pursuit of science? A Cuban cigar then?—I seem to remember that you were partial to them. After my horse accident—I'm still unable to figure out why a cosmolene soldier has to be sent to school to learn to ride a hayburner—it took me quite a while to get on my feet again; then—a retiring board and all that. I knocked around a bit in the Andes, turned a reasonably honest penny here and there, and a few months ago picked up this noble craft. Been cruising around the Caribbean, with the help of a couple of paid hands, and I'm now in quest of the bright lights of civilization.

"That's quite a vessel you have there—since when did the Corps rate such luxury? What is it—your flagship?"

"Flagship, and then some," replied General Williamson. "She's equipped with high-speed Diesels; she can tow targets at twenty knots or better, and can also lay and repair cable, plant mines, and do patrol and reconnaissance work. The shield, of light laminated armor, comes off in sections as required; under the turtle back she has two motor boats, and her navigating gear has all the latest Navy improvements. Each seacoast District has one or more of them, plus autogyros and artillery planes on shore.

"Now, if you will excuse me, we'll get on with the survey business." He unshipped a pair of field glasses

Colonel MacMullen was born in New Jersey in 1890. His first military experience was with the Regiment of Cadets at the University of California. Shortly after graduating from the university he enlisted in the California National Guard, and was commissioned in the Regular Army from the Guard in 1916. He served overseas with the 55th Coast Artillery. His subsequent experiences have been varied, but have all been with the Coast Artillery.

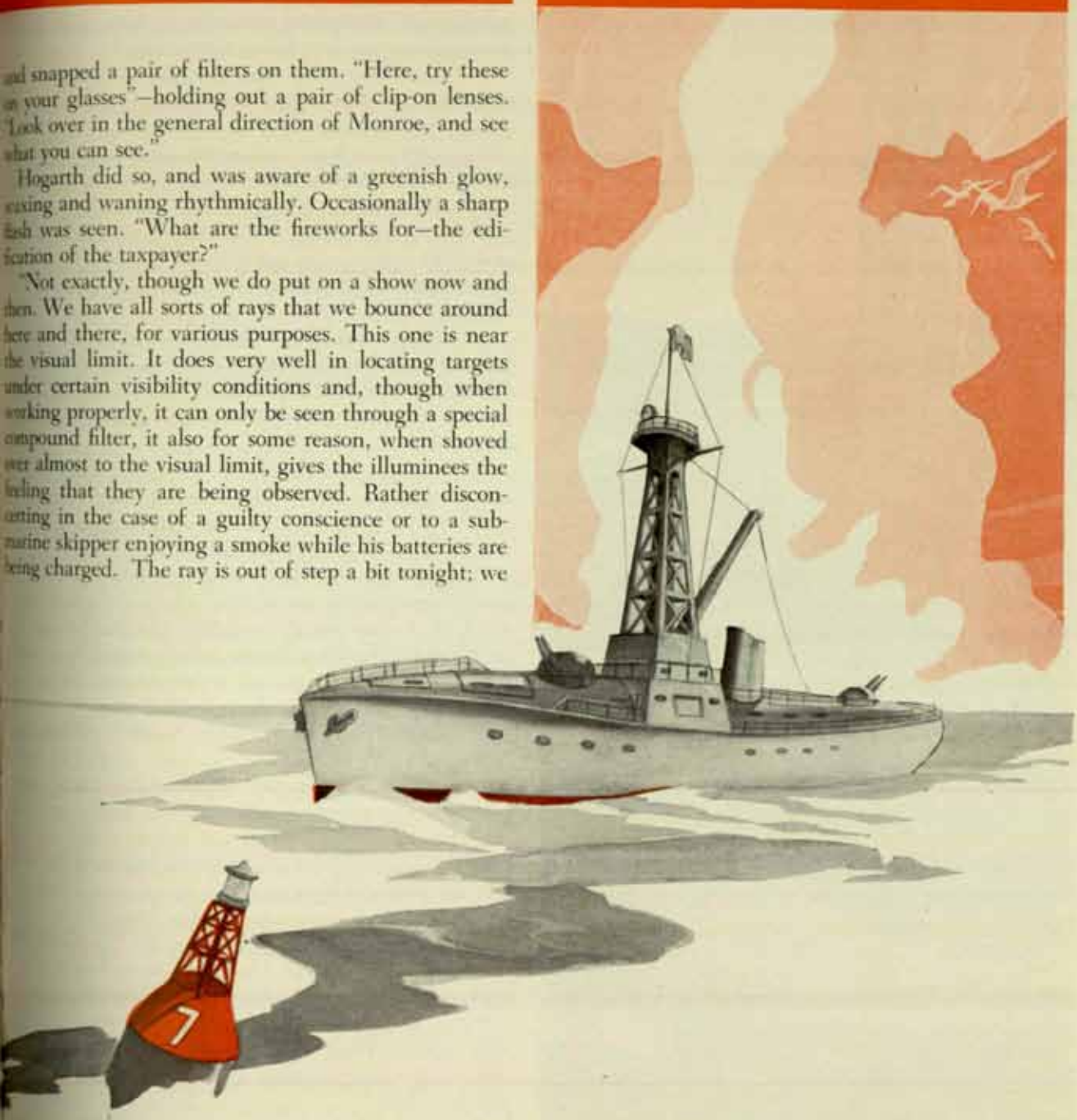
N HERE

By Lieutenant Colonel
James D. MacMullen
Coast Artillery Corps

and snapped a pair of filters on them. "Here, try these on your glasses"—holding out a pair of clip-on lenses. "Look over in the general direction of Monroe, and see what you can see."

Hogarth did so, and was aware of a greenish glow, waxing and waning rhythmically. Occasionally a sharp flash was seen. "What are the fireworks for—the edification of the taxpayer?"

"Not exactly, though we do put on a show now and then. We have all sorts of rays that we bounce around here and there, for various purposes. This one is near the visual limit. It does very well in locating targets under certain visibility conditions and, though when working properly, it can only be seen through a special compound filter, it also for some reason, when shoved over almost to the visual limit, gives the illuminees the feeling that they are being observed. Rather disconcerting in the case of a guilty conscience or to a submarine skipper enjoying a smoke while his batteries are being charged. The ray is out of step a bit tonight; we



are working out a closer control, and I am out here to check up on it.

"Some of our rays are directional; others go all over the place and reflect back from any object encountered. Some of them can be seen through filters, but others have to be 'seen' by an instantaneous photographic process. Long ago, one of our experts held that anything which could be photographed could be seen, and we have just worked a process out with the help of the Hollywood section of the Coast Artillery Board.

"Well, I've seen enough from here. How about coming ashore tonight in the artillery boat? The AA's are putting on a little show in about an hour, and in the morning we can do a bit of sightseeing."

A large bullet-proof staff car was waiting at the wharf; inside the vehicle was visible a profusion of panels, handles, drawer pulls, and dials. "Here," said Williamson, "we have the *ne plus ultra* in perambulating CP-OP's. A full outfit of fire control instruments, radio telephone and telegraph, wire reels, disappearing bunks and desk, galley, and what not, with a periscope and a thirty-foot telescoping tower on top. I can live in the thing for a week at a time, with all the comforts of home."

The car got under way and proceeded up the beach. Hogarth noted many changes in the aspect of the fortifications, principally a profusion of towers resembling water tanks, and turrets protecting all guns and defense elements.

Approaching the antiaircraft firing point, a battery of eight guns was seen, dually mounted in turrets, and with smaller turrets for the fire control apparatus and the machine guns and searchlights.

"Pretty fine, all this cover and concealment," Hogarth remarked. "I can see the idea for the fixed matériel, of course, though even there the weight must be tremendous. But what do the mobile outfits do for protection from the slings and arrows of the outrageous enemy? Isn't it a bit tough on them?"

"*This*, my son, is a mobile outfit," Williamson answered. "We make these 'bennies,' as we call them, out of a newly-developed, light-weight, tough alloy, with layers of cellulose—old telephone books—between the thin metal plates. You can actually lift some of them, and yet they are proof against anything but a direct hit with a 3-inch projectile or greater. We maintain forced draft, and scavenge the bores, with a self-contained air compressor, and they are practically gas-proof—although gas is no longer as terrifying as it was once considered to be. As morale factors alone their value is considerable; furthermore, as they are pretty well soundproofed, the minds of the hairy-eared cannoneers are kept on their jobs. Now let's see what is going on here."

A plane, with running lights on, was circling over the battery position, as they approached. Entering the fire control turret—more spacious than it had appeared from the exterior—the principal object seen was

fluorescent screen about two by three feet in size, with a row of illuminated dials at the top. Hogarth stepped over to it, and saw an image of the plane, brightly illuminated and with distinct three-dimensional effect. It was as though a model plane were suspended in space, and so close that one could touch it by stretching out his hand. A smaller plane was visible at the end of a short towline. Hogarth turned around, a query in his eyes.

"Just some more black magic—a development of stereo-optics and electrochemistry—again with the help of Hollywood. Watch now, and see what happens. We are going to tell the plane to cut loose from his baby and go home." The operation was visible on the screen; the small plane went into a wide spiral.

The battery opened fire; the effect in the sound proofed turret was hardly more than a dull rumble. Arcs of fire appeared on the screen, brightening momentarily, and patches of light were seen as the projectiles exploded. Again Hogarth turned to Williamson.

"Tracers—that's all—they brighten up as they pass through the 'focal plane.' Thus we can tell whether we are high or low, and when the bursts are 'over' the time factor gives us the magnitude; the stereoscopic effect tells us whether we are over or short, and gives us an idea of the magnitude; and the dials also give us all the information needed, as well as the data for the records and reports. Now see how the fire is adjusted."

The operator turned several of a series of knobs at the bottom of the screen; the bursts, which had been over and low, moved onto the target and became brighter, almost obscuring the tiny plane. In a moment it was seen to stagger, and go into a steep dive.

"That's all—there goes some of your income tax money. Not very much of it, though, as we get the gliders in quantity, knocked down. We have others, with motors and radio control, but we try not to expend too many of *them*. We put on about the same show with the 2-inch and the machine guns, by the way. A delayed tracer has finally been developed for the small stuff, and they use a simpler form of director, without some of the sound effects. What you have seen is our full dress affair, with ray illumination and everything, but we have other tricks, and emergency methods for use when needed. Let's go over to one of the gun turrets and see what they have to offer."

This turret, resembling in shape two joined sections of a melon, accommodated two guns, with sliding shields over the turret apertures. Cylinders, about four feet long, protruded from each side of the turret, and inside, to the rear of the guns, was a machinery and fire-control space. A projectile well and fuze setter were located conveniently to the breeches.

"Here," Williamson remarked, "is in a way a return to first principles. We normally use director control, of course, but each pair of guns is equipped with sights and range disc, and the turret has a stereoscopic height finder built into it. Thus we have a complete fire unit,

which can function quite well on its own without benefit of the gadgets pertaining to the higher command. Double eyepieces permit the height finder to be used for spotting also. If the height finder goes out, or becomes temperamental, the turret has another piece of equipment which is basically an inverted bomb sight. If it can 'pass a miracle' in one direction, why not in the other? The guns—five inches—are a bit heavy, but after all, if we are to remain in business we have to keep a few jumps ahead of our competitors—and we don't try to beat the Fire Department any more in getting into position. The whole outfit comes apart for transport, and can be set up in a very short time, all things considered. We have smaller guns, of course, for units working with the highly mobile forces, but these are just about what the doctor ordered for area protection. With a much larger volume of burst, we don't have to be quite so particular about rate of fire and time of flight, and furthermore we can swap projectiles with the Navy."

"Say no more," Hogarth interjected as they left the turret and returned to the car. "With your talents, you ought to be selling fur coats to the Hottentots—I can plainly see that you are wasting your time in the army. But tell me something about your organization. From what I have seen and heard, you seem to have eight-gun batteries instead of four, all sorts of calibers, and several dozen assorted death rays and what not. Isn't all this a bit complicated, and what do you do if your rays turn sour on you?"

"The eight-gun battery is pretty well standardized for all calibers," Williamson responded. "Time being of the essence of the contract, we don't like to waste any of it, and the use of eight guns cuts our adjustment time in half. Colonels Whistler and Quinn Gray, and other luminaries, believed in this sort of thing, and of course the Navy has used it ever since the modern battleship came into being. Our AA gun battalion has a headquarters battery, which handles ammunition; a searchlight battery, also containing the 'death ray' experts; and four gun batteries—5-inch for area protection and 4-inch for units in the 'Blitz Army.' It is quite an outfit on the road. The fourth gun battery was added primarily because, as you said, sometimes the rays don't work, or the searchlights either. We have a very effective star shell, and for night work one battery is told off to pump them out, getting bursts above and beyond the bomb-release zone. It is easy to keep up a ring of illumination around a fair-sized area with the fire of one battery—not all night, of course; we start when the intelligence merchants tell us something is on the way—and the bursts are so high that they don't illuminate the ground to any appreciable extent. Enemy planes can thus be distinguished at ranges far beyond the scope of the searchlights; the lights come on as needed, as the planes approach. This sort of thing does advertise the objective to some extent, but the enemy probably knows where it is anyway, and one can't have everything in this wicked world.

"When the 'Alice-in-Wonderland' director can't be used, we must again return to basic principles. Observers—who are also part of the Artillery Intelligence Net—are disposed radially from the battery or battalion position. They have little splinterproofs that look like shelter tents and are carried on trucks to their locations. They are mounted on sleds for use in swampy country, and mounted on rafts, or placed on outlying islands or shoals in water areas. They are tied in by cable to the switchboard, the observers telephone in the overs and shorts, and the battery range officer functions in the good old-fashioned way.

"Another recent development is the 'shotgun barrage,' where the eight-gun battery comes in again. Bearing in mind the time factor when firing on a single plane or a small formation, and the necessity for doing a lot of damage quickly to a large formation, an adaptation of the old 'sheaf ranging' has been worked out. When all guns are fired with the same settings, the cumulative effect of gun, instrument, and personnel errors might well place the pattern so far off initially that the enemy could accomplish his mission or make a major alteration in his course before the battery could adjust. By the simple expedient of 'opening' two guns in fuze range, two in elevation, and two in azimuth, we get so large a battery burst volume that the target will either be in it or will be brought in by a single bold correction. Mr. Probability does the rest.

"This method of fire is also very useful in attacking dive bombers. With the bomber's initial position as he starts his dive and with his objective known, it is easy to predict his course, and to plant one or more of these barrages on it. In nine cases out of ten he runs into it: if he manages to pull out, his dive is spoiled and he has got to start over again.

"Here we are at the quarters—and that drink you spoke of is long overdue."

Hogarth buried his nose in the fragrant leaves. "This alone is well worth coming back for. There is precious little mint to be found in the bosom of the vasty deep, and the brethren of the Caribbees run too much to rum to suit my once-educated palate."

There were a few moments of silence. "Now that that is down the hatch, tell me some more about this 'frightfulness.' There still are a lot of things that I have seen and heard that don't click just yet. You are wearing stars and cross guns, you talk of 'seacoast Districts,' 'Artillery planes,' and the 'Hollywood section of the Coast Artillery Board,' and though I saw—or thought I saw—some fearful and wonderful things in the shadows as we went past, you haven't as much as mentioned anything but Antiaircraft Artillery. Further elucidation is in order."

"All right—you asked for it. First off, seacoast artillery has kept step in every way with the development of antiaircraft; obviously many, if not most, of the im

provements in the latter are applicable to the former. All secondary and mine batteries are dual purpose, and guns and ammunition of practically all types are interchangeable with the Navy. We swap personnel, too, for maneuvers and general educational purposes.

"All of our matériel is housed in bombproof shelters where practicable—otherwise in shelters which are at least splinterproof. It was a very simple matter to put turrets over the new type seacoast guns, but some of the older ones gave us a little trouble. All of our towers are now quadrupodal affairs, one leg being capable of holding the structure up in case of damage to the other three. When you consider that, not so long ago, important elements were occasionally housed in wooden towers, and creosoted wood at that, this alone is an indication of some progress. Our barracks, quarters, offices, and warehouses, incidentally, are fireproof, and bomb- or splinterproof wherever possible.

"All cables are duplicated, and, without going into endless detail, we have gotten rid of the immoral distinction between war and peace set-ups. Everything—tables of organization included—is permanently on a war basis."

"That is all very well," Hogarth cut in, "but how do you arrange for leaves, healthful rest and relaxation, and all that, if everyone is on his toes and full of beans twenty-four hours a day?"

"You took me a bit too literally on that one; what I meant to say was that we have the men, the guns, and all the stuff. As a matter of fact, though, any proper personnel set-up should make allowances for changes of station, detached service, and so forth, as well as casualties. In peace time, about the same proportion of officers and men go on leave or furlough as would be casualties in war time. It is as simple as that.

"There actually is a Hollywood section of the Board, as well as 'detachments' at other places where the operations are of interest to us. Many of the acoustical and optical problems of the movie studios, as well as television developments, have a bearing on our work, and we pool our ideas with very good results. Incidentally, as you might imagine, the Hollywood detail appeals greatly to our young bachelors, and there is usually a waiting list for it.

"We have always operated our mine planters, DB boats, and other water craft; if we can run our own navy, there is no reason why we shouldn't maintain our own air service. We need observation planes, gyros, and that sort of thing, and planes to tow and handle our aerial targets; now we have our own, with warrant aviators as pilots. They get a lot of their training, of course, with the Air Corps, and the scheme works out very well indeed.

"The answer to your question about organization is somewhat involved, but I'll try to make it as brief as possible. To begin with, all of the Coast Artillery, except school and experimental elements, are Army or GHQ Troops, each contingent commanded by a general officer of suitable grade. Corps Area commands as such are now limited to administration and supply functions; there were finally so many exempted stations and activities that it was thought better to have a unified system. Overseas Departments rank as Armies.

"Coast Artillery Districts are really of three kinds: seacoast harbor defense, corresponding in general to the old harbor defenses; seacoast shore—or beach—defense; and antiaircraft defense. In some cases a seacoast District will include more than one harbor defense, or a harbor defense and a beach defense. I guess it would be better to define them as sectors or subsectors. Seacoast Districts include antiaircraft elements, naturally. These districts are geographical and supervise the training of all elements of their war garrisons, and their administration when in the Federal service.

"A typical Coast Artillery District will be garrisoned by units of the Regulars, National Guard, and Reserves. Sometimes one or more of these components are lacking, as in the cases of certain National Guard Districts or overseas Regular Districts.

"The district, then, is the equivalent of a brigade, and the District Commander is usually a temporary brigadier general, detailed for a period of two years from the colonels of the Corps. The instructor personnel for the Guard and Reserve units in the District, as well as for its 'feeder' ROTC and CMTC units, is furnished from his staff. Officers who have held down a District command with credit are eligible for appointment to command GHQ or Army Coast Artillery, or for appointment as assistants to the Chief of Coast Artillery.

"Temporary promotions are made clear down through the Corps, as needed, and are the rule for maneuver periods. Guard and Reserve officers get in on this also. In so far as possible, each officer is given actual command training in the duties of the next higher grade.

"Guard as well as Reserve officers can get active duty training as individuals for periods up to a year at a time, and many of them are keen for it. They are put through the mill, and not only learn the pitfalls of routine administration but gain a lot of technical and tactical knowledge.

"In the same way a retired Regular, who is physically fit and wants to keep his hand in, can be placed on active duty for a year at a time, or for summer training periods only. He thereby keeps in the swim professionally, and qualifies for increased pay and promotion.

"Enlisted Guardsmen and Reservists may also apply as individuals for up to a year's active duty in each enlistment. We don't get many this way in prosperous times, but when the periodical depressions come along we do a brisk business. Units of the Guard and Reserves may also apply for active duty in addition to their required periods, which are, for the Guard, one month per year, taken all at once or in instalments, plus one drill per week, and two weeks per year 'refresher training' for the Reserves.

"Reservists, of course, put in a year initially between their twenty-first and twenty-fourth birthdays, and remain in the Reserve for four years thereafter. Discharged Regulars also remain in the Reserve for four years. Reservists may reënlist, and are encouraged to, but in this case must put in a minimum of three months active duty—in instalments, if desired—per enlistment. Each Reservist keeps his uniform and equipment—less weapons, field glasses, and that sort of thing—at home, and must produce it at the annual "show down" in order to draw his retainer pay. He may turn out for parades, small arms practice, and Armory training—yes, they have armories—for which he is paid on the National Guard scale.

"As the result of all this, we have a very effective military force, completely equipped, and ready to turn out at practically a moment's notice; and all at the minimum expense to the taxpayers you mentioned."

"That is all very fine," Hogarth remarked, "and I begin to see how it all works out, but with all this detail to handle, I can't see how there has been time for anyone to work out all of the technical developments of which you are so proud. They must have taken many years, and a lot of effort."

"You are quite right, but don't forget that we have a lot of people working on them, and we try not to pay too much attention to non-essentials. For instance, our AA directors used to go through all sorts of mechanical and mathematical gyrations to correct for such things as angular travel errors; when it is realized that a plane is only on a given course for from a few seconds to a fraction of a minute after being fired on, as a general thing, such refinements are relatively unimportant. We now try to blast the enemy out of the sky right now, rather than to follow him with a nice pattern of bursts. By using approximations, we have been able to evolve a number of very satisfactory—as well as rugged and cheap—fire control instruments out of speedometers—damped, of course—and adding-machine and phonograph parts.

"We have a competition every year, with cash prizes and a Meritorious Service Medal to boot for the big winner, for the best instruments or apparatus using at least 50% of commercial parts and costing—optical elements excepted—not more than $200.00 to build. Contestants are given all the technical help needed, the use of machine shops and facilities, and a reasonable amount of time to work out their ideas; funds required are expended on District Commanders' certificates.

"The inventors are ordered to Monroe for the annual 'gadget parade,' where they can see, talk over, and hear criticized their own and each others' achievements, and are then sent, with all expenses paid, on a tour of the arsenals and factories putting out our principal items of equipment. In this way we are constantly developing new talent, and, best of all, the young men are encouraged to study and to think!"

* * *

"Well, it all fits together now," said Hogarth, "and a very pretty picture it is. I hardly see how I could have done better myself, even in my prime. The only defect that I can see is that you and your experts seem to have covered everything—there is nothing left for the bright individual who wants to make his way in the world."

"Oh, no," laughed Williamson, "you give us far too much credit. There are myriads of things still to be done—but we do try to keep up with the popular magazines, at least. As we unfortunately have to stick to realities, that is often difficult. We still have a few objectives to meet—and we even hope, some day, to have a single system of angle measurement and a single origin for azimuths!"

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Honorable Mention Essay

1940 Competition

United States Coast Artillery Association

UMPIRING FOR AAA

By Colonel Fred M. Green, C.A.C.

During the present emergency, army tactical exercises are increasingly frequent and extensive; greater importance is attached to air operations and to countermeasures by ground troops; and our antiaircraft regiments are increasing both in number and in strength. For these reasons, more and more Coast Artillery officers will find themselves detailed as maneuver umpires for antiaircraft units, and it seems timely to open a discussion of how best to discharge such duties.

To most of us the problem is wholly new; even to the few who had previously umpired in air-corps-antiaircraft exercises for coastal defense, a field maneuver presents many new factors, because the frequent movements of troops, the consequent shifting of antiaircraft armament, and the enhanced difficulties of communication present a fluid problem which requires methods unnecessary when dealing with a more static defense.

Should undue stress appear to be placed upon my failures and errors, it is because I believe that there is no happier way to learn than from the mistakes of one's predecessor.

Upon arriving at Camp Beauregard, La. about May 1, 1940, the writer was detailed as Antiaircraft Control Officer for the Third Army Exercises. The antiaircraft elements present were:

IV Corps	Blue (East):	62d Coast Artillery.
IX Corps	Red (West):	61st Coast Artillery.
		69th Coast Artillery.

As a primary purpose of this maneuver was to develop tactical methods for the triangular division, the area assigned for operations was unusually extensive, measuring about 75 miles on each side; control headquarters was located even outside these boundaries. During the maneuver, the average distance from control headquarters to the respective antiaircraft regiments was about 40 to 80 miles, a physical separation which precluded personal contact. And no Unit Control Officers (unit umpires) were provided for these regiments.

Under these circumstances it was very difficult to know what was going on. Regimental commanders and staff officers were too fully occupied by their normal functions to furnish bulletins of their progress, nor were there accessible to them any direct means for conveying such intelligence. From time to time, scraps of information were secured from Contact Control officers moving about the area on other missions; occasionally a Liaison Control officer on a Corps or Army Staff contributed a fact or two; but most of the time I was distressingly ignorant of where the antiaircraft artillery was and what it was doing.

In contrast, Air Control was admirably informed as to each combat aviation mission undertaken. Immediately upon return to the airdrome, the commander of each bombardment or attack unit reported by teletype, using a set form, every detail of his operation: the loading of his bomb-racks and machine gun belts; the hour of taking off; his course and altitude from the airdrome to the initial point; the hour, formation, character, direction, and altitude of his attack; the nature of the hostile reaction thereto; the direction of his withdrawal; the rallying point; and the route and altitude back to the airdrome.

To rebut such precise accounts, I could offer only the thinnest of evidence as to any opposing antiaircraft defense. Even had the location of each antiaircraft fire unit been known precisely, the question of whether or not hostile aircraft would have been exposed to its fire was a matter of opinion rather than of fact. On a 4 miles-to-an-inch map, the radius of fire of a 3" AA battery was only ⅞"; that of a cal. .50 AAMG platoon only ¼". The routes of air missions were indicated only in general terms, and their exposure to or immunity from antiaircraft fire depended upon the width of a line. Even accepting the fact of exposure, the duration of the AA fire and its probable effectiveness were matters of conjecture rather than of measurement. No conclusions of value could be warranted by such incomplete data.

As to observation aviation, Air Control and Antiaircraft Control were equally in the dark as to the position, course, and altitude of any given plane at any particular moment during its reconnaissance. For lack of such detailed information, observation aviation became endowed with a miraculous immunity to AA fire. The situation rapidly became increasingly unsatisfactory, and it was with a feeling of exasperated frustration that I prepared my final report, which read in part as follows:

1. During the last two months I have acted as Liaison Control Officer for:

   a. A combat team (CT 29)

   b. A division (6th Div)

   c. Antiaircraft Artillery (AAA Control O).

Colonel Fred M. Green is one of the long-time contributors to The JOURNAL. A hasty search of our files indicates that Colonel Green has been a contributor since 1915, and that more than twenty of his articles, on a wide variety of subjects, have been published. Colonel Green entered the service in 1910; he is a graduate of the Coast Artillery School and the Command and General Staff School. He was director of the Department of Engineering at the Coast Artillery School, and has served on the Coast Artillery Board.

An umpire transmits orders *via* walkie-talkie

The means of communication which suffice for the first two are utterly inadequate for the third, because of the time element. A particular operation by ground troops will usually consume several hours, so that delays up to one hour in communicating the plan for the operation are admissible.

2. For Air Corps-Antiaircraft exercises, such delays are prohibitive. For the outcome of AC-AA contacts to be evaluated, it is necessary for control to know:

a. Within the effective radius of how many AA fire units did the plane or formation in question pass?

b. Exact time of passage.

c. Altitude of plane.

d. Mean horizontal range during firing.

e. Duration of firing.

3. In an AA regiment there are 21 fire units from which these data may be required. To collect them by telephone may require 10 to 15 minutes. Little time remains in which to transmit the digest of results to control if this digest is to be made available to control at the same time that the Air Corps report comes in by teletype. To drive from the average regimental CP to the nearest control phone usually takes 30 to 40 minutes. The consequence is that, lacking means of prompt communication, only the Air Corps side of such contacts is presented. The result is usually misleading. Actually, in many cases reports of firing did not reach the Antiaircraft Control Officer until after the exercise had been completed and his written report submitted. Such data came in by mail or by oral message during the rest period, far too late to be of value. For reasonable evaluation of results, both sides of the story must be weighed.

4. This requirement can be met only by:

a. Providing a Liaison Control Officer for each Antiaircraft Regiment.

b. Giving him a direct line from the AA CP to Army Control.

5. It is my belief that during the last two months a misleading picture has been presented as regards the menace of aircraft to ground troops, due to:

a. The scarcity of aircraft, except during the period 23-24 May.

b. The absence of any spectacular means for signalling from aircraft that they are attacking troops in a particular area. . . .

c. The deficiency in antiaircraft fire power throughout the exercise.

d. The impossibility of evaluating the effect of AA fire, due to inadequate provision for antiaircraft control communications.

6. The outcome is a general disregard by ground troops of precautions for concealing their operations from air observations. Instances of this are: . . .

Early in August, 1940, being then on duty at Canton, N. Y., the writer was detailed as umpire Antiair for the First Army Maneuvers. This maneuver area was about fifty miles long and twenty-five miles wide. Umpire Headquarters was not far from the center thereof; circumstances permitted preliminary personal contact. Eight antiaircraft regiments were designated

Umpire switchboard, First Army Maneuvers

to participate—a record for our army. These were allotted as follows:

Blue (Southwest):

II Corps	212th Coast Artillery (N.Y. N.G.)
III Corps	213th Coast Artillery (Pa. N.G.)
Army	62d Coast Artillery (Regular)
	198th Coast Artillery (Del. N.G.)
	260th Coast Artillery (D.C. N.G.)

Black (Northeast):

I Corps	68th Coast Artillery (Regular)
	197th Coast Artillery (N.H. N.G.)
	211th Coast Artillery (Mass. N.G.)

The three Army AA regiments of the Blue force, and the three regiments of the Black Corps, were each organized into Antiaircraft Artillery Brigades, but for reasons of simplicity and speed it appeared that for umpire purposes it would be preferable to deal directly with the several regiments. Being informed that at least one Unit Umpire would be provided for each regiment, the writer decided:

(1) To try to obtain a direct umpire telephone line from control headquarters to each AA regimental CP.

(2) To exploit to the utmost all auxiliary means of communication (radio, commercial telephone, and teletype).

(3) To prescribe simple and concise forms for submitting reports.

(4) To prepare and issue instructions to unit umpires for their guidance in a relatively unexplored field of activity.

The problem of communication is, and probably always will be, the most critical one. Inquiry showed that umpire trunk lines were limited to two telephone lines to Blue Army, one additional to each (II and III) Blue Corps, and two to the Black (I) Corps, supplemented by one teletype line to Blue Army, and one to the Black Corps. With from 300 to 400 umpires working, it was clear that these lines would often be congested, but no hope was offered of any additional umpire lines, let alone any special telephone lines to AA regiments. A suggestion for an extension from the nearest trunk to each AA CP was considered, but finally was disapproved. The best that could be arranged was a recommendation that each AA regiment, upon displacement from its initial position, should lay one pair of field wire for umpire use. This, of course, demanded the employment of tactical lines up to Corps or Army as a link in the chain of communications. At times, this arrangement resulted in delays up to one hour between the time that a unit umpire originated a call, and the time that connection with the umpire Antiair was finally obtained.

Any dependence upon tactical lines for umpire purposes is to be deprecated. Inevitably it leads to friction with tactical commanders, whether from actual delays in transmission of their orders or from a mere apprehension on their part that "Flash" messages might be delayed through umpire use of their tactical lines at a critical moment. Under such conditions it is necessary to convince tactical commanders that umpire credit cannot be allowed to their units for the effect of their fire unless commanders coöperate in the transmission of essential umpire intelligence.

ANTIAIRCRAFT POSITION REPORT No.____, ____CA

Location of Regimental CP	AFFIRM .....
Position of B Btry.	BAKER .....
" " C "	CAST .....
" " D "	DOG .....
" " 1st Plat E Btry	EASY .....
" " 2d " " "	FOX .....
" " 3d " " "	GEORGE .....
" " 1st " F "	HYPO .....
" " 2d " " "	INTER .....
" " 3d " " "	KING .....
" " 4th " " " (if 37-mm.)	LOVE .....
" " 1st " G "	MIKE .....
" " 2d " " "	NEGAT .....
" " 3d " " "	OPTION .....
" " 4th " " " (if 37-mm.)	PREP .....
" " 1st " H "	QUEEN .....
" " 2d " " "	ROGER .....
" " 3d " " "	SALE .....
" " 4th " " " (if 37-mm.)	TARE .....
" " A Btry (if in bivouac)	UNIT .....
Number of searchlights deployed for operation, if any:	VICTOR .....
Approx. position of centre of ring of lights	WILLIAM .....
Approx. mean radius of outer ring of lights (yards)	X-RAY .....
Approx. mean radius of inner ring of lights (yards)	YOKE .....
Name of unit umpire (signature)	ZED .....
Telephone: Call UMPIRE 30.	Teletype: UMPIRE ANTIAIR.

(For Umpire Hq. Use)

Reported to—

Hour Received ..... Posted on Op. Map ..... Serial Number Checked .....

Initial ..... Umpire Air .....

Figure 1

ANTIAIRCRAFT OPERATIONS REPORT No.____, ____CA

Direction of approach: from (A)	AFFIRM .....
Number and type of planes: (such as "9 Bombardment")	BAKER .....
Form of attack (such as "formation," "single planes at 2 min. interval.")	CAST .....
Altitude of planes (feet), or "Dive," or "Gliding"	DOG .....
Time of opening fire (or of illumination)	EASY .....
Point of change of course (B)	FOX .....
Apparent hostile mission was—	
Observation (yes)	GEORGE .....
Bombardment of area (describe)	HYPO .....
Neutralization of gun btry at—	INTER .....
Neutralization of searchlight at—	KING .....
Low-flying attack on area (describe)	LOVE .....
Low-flying attack on road between— (point where strafing began)	MIKE .....
Point where strafing ended	NEGAT .....
Smoke or flares used? (which)	OPTION .....
Direction of withdrawal: toward (C)	PREP .....
Fired upon by 3-inch guns? (yes)	QUEEN .....
Fired upon by 37-mm. guns? (yes)	ROGER .....
Fired upon by MG's? (yes)	SALE .....
Illuminated by searchlights? (yes)	TARE .....
Damage to aircraft assessed by unit umpire: (number of planes destroyed; *if zero so state*)	UNIT .....
Penalties to AA units (state briefly any imposed):	VICTOR .....
Since last report of expenditure:	
Estimated expenditure 3-inch rounds	WILLIAM .....
Estimated expenditure 37-mm. rounds	X-RAY .....
Estimated expenditure MG rounds	YOKE .....
Name of unit umpire (signature)	ZED .....
Telephone: Call UMPIRE 30.	Teletype: UMPIRE ANTIAIR.

(For Umpire Hq. Use)

Reported to—

Hour Received ..... Posted on Op. Map ..... Serial Number Checked .....

Initial ..... Umpire Air ..... Am. Exp. Rep. .....

Figure 2

AWS—Flash messages in by telephone; orders out by teletype

To minimize the interference with tactical telephone systems, external means were exploited wherever possible. A "Courtesy Card" was issued to each regimental umpire, by which he could use any commercial long-distance telephone for reporting to umpire headquarters, such calls being billed to the Army Signal Officer. Each unit umpire was informed as to the teletype system, and also as to the call letters and frequency of the umpire headquarters radio sets. At one time or another, each of these methods proved its value.

Brevity in reports was of obvious importance, not only to reduce "busy" reports on the Umpire Antiair telephone, but also to avoid needless congestion on the few umpire trunk lines. After considerable study, there were evolved two types of report—the Position report (Fig. 1) and the Operations Report (Fig. 2). A supply of mimeographed copies of these forms was issued each unit umpire, and a further supply retained for convenience in the recording of messages. The advantages obtained from use of these forms repaid a thousand times over the effort involved in their preparation.

The question naturally arose as to how far the authority to assess umpire penalties (whether to aircraft in consequence of AA fire, or to AA elements in consequence of air attack) should be decentralized. As all unit umpires were experienced regular officers, a considerable degree of decentralization appeared practicable, and with a very few exceptions it worked well. Quite evidently the Unit Umpire, being on the ground, knowing the field of fire of each battery, in most cases knowing intimately[1] the battery and platoon commanders, and sometimes able personally to observe the targets in question, was more favorably situated for assessing damages than was the Control Umpire, to whom none of these data were available.

The following general instructions were issued to unit umpires under date of August 3:

1. In previous maneuvers, analysis has shown that too little credit was given for antiaircraft fire, due to delays in communicating the fact and probable outcome of such fires to Umpire Headquarters. In the Third Army Maneuvers last May, reports of change of position and reports of firing were greatly delayed; consequently, for lack of evidence to the contrary, it was often assumed that hostile air missions were unopposed, whereas subsequent investigation showed that their objectives

[1]Six out of the 8 regiments were from the National Guard; in these cases the regular army Instructor of the unit acted as the Unit Umpire.

were actually defended by AAA, and that the damage claimed from bombardment should have been reduced or disallowed. No credit can be allowed an antiaircraft regiment when its dispositions and activities are unknown.

2. For proper evaluation of antiaircraft fires, an immediate report must be rendered for each target engaged. The unit umpire of each antiaircraft regiment, knowing how many fire units attacked the target, the duration of each firing, the altitude of the plane, and its mean range from each fire unit, should assess the damage promptly. Annexes 1, 2, and 4 to Training Memorandum No. 4, May 5th, 1940, will be used as a guide. For this information to be of value, such reports should reach Umpire Headquarters within 15 minutes of the firing.

3. Under par. 2 *c* (3) (b) and (f) of Training Memorandum No. 4, the following reports from AA unit umpires will be expedited:

a. Upon occupation of any tactical position, or upon change of position of any fire unit, an immediate Position Report.

b. Upon delivery of any AA fire, an immediate Operations Report.

c. Forms to be used for Position Reports and Operations Reports are enclosed.

d. Telephone reports will be forwarded over direct umpire lines when these are so accessible that little delay is involved in reaching an umpire telephone station. In most cases, it will be necessary to employ tactical lines to the Corps CP, from which the Umpire Antiair can be called by asking for "Umpire 30."

e. In many cases reports can be expedited through use of the teletype lines from First Army and I Corps to Umpire Headquarters.

f. Initial Position Reports, and lengthy reports of changes in position, will be confirmed by overlays forwarded by any practicable messenger service.

4. The most essential thing is to keep the Umpire Antiair informed at all times of the present position of each AA fire unit, and of the amount of damage the regiment has inflicted since the last Operations Report. Operations Reports will not be delayed for the purpose of compiling data as to any less important matters which may be covered later by a supplementary report.

With respect to the forms issued (see Figs. 1 and 2), these general instructions were amplified as follows:

1. These forms are prescribed:

a. To insure brevity in messages.

b. To avoid omissions of essential data.

c. To expedite recording.

d. To exploit the teletype system to the greatest extent.

Teletypes at umpire station, Canton, N. Y.

2. Position Reports and Operations Reports will be numbered consecutively, in an independent series for each class of reports, throughout the Army Maneuver period. (See 6 below.)

3. For reports telephoned directly to Umpire Headquarters:

a. Call "Umpire 30."

b. Identify report as follows:
"Position Report No. 2, 62d CA"; or "Operations Report No. 5, 211th CA."

c. Continue with body of message, for example:
"AFFIRM, NORWOOD; BAKER, 3 BOMBARDMENT; CAST, SINGLE at 2; DOG, DIVE; EASY 1140; FOX, KNAPPS STATION 11-0; HYPO, KNAPPS STATION; OPTION, YES; PREP, VARIOUS; QUEEN, YES; TARE, YES; UNIT, ONE; WILLIAM, 200; ZED, JONES."

4. Teletype messages should be filed on plain paper, as follows:

a. Address "Umpire Antiair, Canton."

b. Follow by identification repeated, as—"2 POS 62-2 POS 62" or "5 OP 211-5 OP 211."

c. Continue with body of message, as in 3c above.

5. Omit all headings where there is nothing to report, or where the data are not available immediately. Thus:

a. In a Position Report:

(1) If C Btry has not moved since last Position Report, omit entirely the heading CAST.

(2) If all searchlights are in bivouac, omit headings VICTOR, WILLIAM, X-RAY, and YOKE.

b. In an Operations Report:

(1) If hostile aviation used neither smoke nor flares, omit heading OPTION.
(2) If 3″ guns did not fire, omit headings QUEEN and WILLIAM.
(3) Of the headings GEORGE to MIKE, only one will ordinarily be used in any one message.
(4) In an extreme case, an Operations Report might be limited to a few headings such as EASY, INTER, SALE, UNIT, and ZED, such report to be amplified later by a Supplementary Report (see 6 below).

6. A previous report may be amplified or corrected by a supplementary report of the same number followed by a letter. Thus if Operations Report 7 is later to be amplified or corrected, the ensuing report should be numbered 7 A, from which it will be understood that no new operation is involved, but that the previous Report 7 is to be amplified or corrected as indicated.

7. When messages are telephoned, the phonetic alphabet ("affirm," "baker," etc.) may be used to spell out words not readily understood.

8. Identify places by squares; thus "BUCKS BRIDGE, 7-M." In position reports, fire units may be given by abbreviated coördinates; thus "14-11" rather than "hill-top ½ mile southeast of RJ 334 (square 7 M)."

9. Indicate routes of hostile flights by naming three points (Operations Report headings AFFIRM, FOX, and PREP), of which A lies in the direction from which approach was made, and C in the direction of withdrawal, regardless of the distance to A and C.

10. Forward overlays, and confirmation copies of especially involved and important messages, to Umpire Antiair, Umpire Headquarters, Canton, N. Y. by most rapid means available. Clear carbon copies will be satisfactory.

There remained the vexatious problem of fixing convenient rules of thumb for the guidance of unit umpires in assessing the effects of AA fire. The references cited in par. 2 of the above general instructions were mainly extracted from the Manual for Umpires of Field Maneuvers, amplified by certain data from Air Corps Tactical School publications. These were rather voluminous for rapid reference. It appeared reasonable to assume average values for the destructive power of antiaircraft weapons as follows:

For the 3″ AA gun, one hit in twenty rounds for a target in straight level flight; one hit in fifty rounds for a maneuvering target; one 3″ hit to suffice for destruction.

For the 37-mm. gun, one hit in sixty-seven rounds; three hits (in 200 rounds) required to effect destruction. An effective slant range of 2,500 yards was assumed for platoons favorably situated, to be reduced for targets of low altitude where nearby masks (trees, houses, hills) or hastily occupied roadside positions restricted the field of view of targets at low angular heights.

As to the effects of AAMG fire, a vast amount of conflicting evidence was found. In Spain it appeared to have proved highly destructive, yet numerous current reports spoke of planes returning safely although riddled with bullet holes; perhaps the armoring of motors and cockpits, and the supply of self-sealing gas tanks, may explain this. For lack of a better criterion, an average of 2% hits was assumed, with five .50 caliber or ten .30 caliber hits required for destruction. Boiled down, this works out to destruction of a plane exposed for a total period of thirty seconds to the fire of two AAMG platoons, or exposed for one minute to the fire of a single platoon, effective range being assumed in either case.

All generalities are false, including these; it is easy to challenge any of the above rules, and to show the misleading results which may be obtained if it is applied too literally. Thus a 3″ battery opening fire on a distant target will have some forty rounds in the air before cessation of fire could be accomplished, even though destruction were attained by the first burst; hence to report such a target destroyed by twenty rounds is unreasonable. So also, the light, the background, the angle of approach, the size, speed, and type of the target, and particularly its range, angular height and course with respect to the battery, all require consideration. In many cases even the regimental umpire may lack many of the essential data and must depend upon the battery commander's recommendation as to penalties.

Some simple rules must, however, be provided. It must be recognized that with but a single umpire for each regiment, some firings are bound to occur while he is absent at mess, asleep, or for other necessary purposes. His place must then be filled by some staff officer, or by some other individual of less training and experience, for whose guidance fairly specific rules are necessary.

At Umpire Headquarters a consolidated AA operations map was improvised by using the regular umpire maps (standard tactical map, scale 1:62,500, provided with a 5,000 yard grid in which squares were numbered horizontally and lettered vertically for convenience in rapid indication of approximate locations over the telephone). Postings were made as Position Reports came in. Range discs to the scale of the map were made of colored cardboard, using one distinctive color for every element of each of the eight regiments. Initially, these discs were made to represent the actual armament of each regiment, as entered on matériel data sheets sent out to unit umpires for completion and return.

The eight regiments had but 22% of their authorized searchlights, 87% of their 3″ guns, and 42% of the

authorized number of automatic weapons. Of these last, there were available but 2% of the authorized number of 37-mm. guns, the rest being .30 and .50 cal. MG's. The 2d Bn. of the 68th Coast Artillery (less one Btry) was in use as a QM Truck Train. All searchlights of the 211th Coast Artillery had been sent to Malone, N. Y., for floodlighting the Corps airdrome. Due to shortage of prime movers, the 62d Coast Artillery had been able to bring the 3" guns of but two batteries to the maneuver area.

As the time for opening the maneuver approached, however, instructions were received that weapons authorized by tables of organization, but not yet issued to units, could be simulated. This led to considerable expansion of the range-disc equipment, as cal. .30 MG's blossomed overnight into cal. .50 MG's, which a few days later experienced another metamorphosis and became 37-mm. platoons. Luckily, the supply of cardboard was ample.

To avoid the necessity of defacing a staked-out map by charcoal lines, short and varying lengths of black elastic braid ("hat elastic") were prepared with a loop at either end. A push pin through each loop, and one or more intermediate push pins, made it easy to indicate front lines, boundaries, the courses of important hostile formations, or other matters of transient importance.

At conferences of antiaircraft umpires, points of difficulty were ironed out wherever possible, and all practicable steps taken to assure mutual understanding and cooperation.

With the opening of the maneuver at daybreak (5:00 AM) Aug. 19, messages began to come in. The rate fluctuated widely, from over twenty reports per hour down to periods of over two hours without a call. In all, 313 reports were received during the fifty-six hours the maneuver ran, giving an average of only one in ten minutes, but during busy periods they came at least one per minute, at which times the prearranged provisions for shortening messages and expediting their recording proved indispensable.

The largest number of reports received from any regiment was 104; the smallest from any one regiment, ten. These figures should not be interpreted to mean that the former regiment was more active than the latter; indeed, subsequent evidence showed the contrary. But the second regiment, moving rapidly with the 1st (triangular) Division, was separated from all regular communications, and was often able to maintain communication from its CP to its batteries only by motorcycle messenger. In consequence, one of its reports was a hasty summary of the events of the last seventeen hours. This comparison serves to illustrate the degree to which any umpiring system must depend upon the continuity, freedom, and adequacy of umpire communications.

In busy periods, messages were received too rapidly for the officer on duty to do any more than to record them. When messages came in at greater intervals, some steps could be taken to evaluate them, and to trace the movement of hostile aircraft from one regimental area to the next. This last step proved more difficult than had been expected, however, because of delayed messages from one or another of the units. The sequence of receipt of messages sometimes bore no relation to the sequence of the events which they recorded.

As frequently as practicable, the Air Umpire was advised of the time, place, and description of planes reported destroyed by antiaircraft fire, and as to penalties imposed upon antiaircraft units in consequence of air attacks upon them. On the opening day of the maneuvers the ceiling was very low, varying from 1,500 to 2,500 feet; at the time this was accepted as an adequate explanation of the fact that so many single observation planes were engaged at altitudes so low as to assure early destruction. On the second day the ceiling was much higher, but continued reports were received of single observation planes shot down at equally low altitudes. Believing that hostile planes would in wartime avoid flying over defended areas at such low altitudes after the danger of such a practice had been proved by severe losses, an especial effort was made to inform the respective air commanders of the penalties which were being inflicted for such reckless exposure. This usually provoked an immediate reaction in the form of positive denial that any missions had been operating in the areas in question at the time indicated, or at the low altitudes reported.

This conflict of evidence probably resulted from a number of causes:

1. Since automatic-weapons batteries were not provided with height-finders, it is probable that in many cases the altitudes of aircraft were underestimated—a bit of wishful thinking quite understandable, but none the less deplorable.

2. Some of the planes upon which fire was simulated were actually "neutral" planes—mail planes, umpire planes, commercial "movie" planes, and sightseeing planes. (Repeated ecstatic reports were received of the shooting down of an amphibian, which subsequently was identified as having been flown about the area for several days by a naval observer).

3. In other cases, planes were undoubtedly fired upon in traversing one area while en route to or from an observation mission in some more distant area, or while cruising for purposes of general observation of the area as a whole.

4. There is abundant evidence to indicate that in many cases friendly planes were fired upon and (hypothetically) destroyed. It was reported that in repeated instances instructions to withhold fire were not received until *after* the completion of a firing series which should have insured destruction of the plane in question. In other cases, unit umpires reported identifying as friendly a plane which had

just emerged from a defended area, yet had clearly been taken on as a target by an AA unit posted therein. Route 11 appeared to be used as a guide and landmark in many cases, and it is my belief that a considerable part of the planes reported shot down in the vicinity of Gouverneur, N. Y. were actually friendly planes. "Black" planes were marked by black wing tips and a black stripe around the tail, but at even a very little distance these markings became indistinguishable. The experience of this maneuver has confirmed me in the opinion that for any aircraft to fly over an area defended by friendly antiaircraft artillery is exceedingly hazardous.

Of the planes reported destroyed, 34% had been fired on by 3" gun batteries, 52% by automatic weapons, and 14% by both classes of armament. It would, perhaps, be unsafe to draw too many inferences from these data, but they certainly suggest that many observation missions were executed at altitudes which would have proved impracticable under war conditions.

There was a definite tendency to underestimate the expenditure of ammunition. It was shown above that while one hit in twenty rounds may be representative for the 3" gun over a long period of firing upon a single target pursuing a rectilinear course, the necessity for continuous fire makes it appear that a minimum of forty rounds will be in the air before the first burst occurs anywhere in the vicinity of a new target. In the long run, it is probable that the best-shooting gun battery would ordinarily expend a minimum of one hundred rounds upon each new target engaged. Ammunition expeditures based upon a rigorous 1:20 ratio, regardless of the number of targets attacked, can only be regarded as wholly misleading insofar as ammunition supply estimates are involved.

Umpires of every grade must always contend with another artificiality inherent in maneuver conditions: in war a hostile plane exposed to sufficient fire over an adequate period will be destroyed spectacularly, unmistakably, and conclusively; in maneuvers the same plane continues on its way, to be engaged successively by every AA unit over which it passes. Hence, destruction of the same plane may be reported in good faith and upon reasonable grounds by each of a dozen units which have simulated fire upon it, each unaware of the activities and claims of adjacent batteries.* The same principle applies when a target passes from one regimental area to another. In the first case the regimental umpire, and in the second case the antiaircraft umpire, should endeavor to recognize the situation; duplicated and hence excessive claims must be scaled down to reasonable limits. The antiaircraft umpire should also cross-check the reports from antiaircraft units with the operation orders for both the friendly and the hosti air force; this check will often show bombardment or a tack formations erroneously reported at times or places where no such planes were sent. There is, ho ever, no evident means by which the absence of obs vation aviation from a particular area at any given tim can be established.

*A total of ninety-five Blue and eighty-five Black planes were reported as destroyed by AA fire in a period of fifty-five hours—a rate far exceeding actual battle experience. Much of this magnification of losses undoubtedly resulted from multiple reports on a single plane.

Conclusions

Two general methods exist for approaching th problem of AA-AC umpiring:

1. Knowing the position of each AA fire unit, the combined reaction to a given air maneuver may be in ferred, and the damages to be assessed as a result there may be evaluated accordingly. Or—

2. Dependence may be placed wholly upon repor of action actually taken (or simulated) by AA units.

The first method is scarcely more valuable than map maneuver; the same thing could be done, an equal results be attained, if no AAA at all were prese Essentially, it amounts to no more than a bit of theori ing, synchronized with a background of moving troop

The latter method presents every advantage, both as to training value and as to the evolution of proper tac cal doctrines. Its operation, however, is contingen upon the successful solution to four problems of mo than usual difficulty:

1. The Unit Umpire must evaluate properly th reports received from the fire units of his regimen Excessive claims must be scaled down to reasonab limits, and obvious instances of duplicated reports o destruction of the same plane by different batteries mu be deleted. Only by the most thorough prelimina training of the commanders of the gun batteries an automatic weapons platoons can satisfactory results b secured.

2. The Antiaircraft Umpire must interpret the re ports from the various AA regiments in the light of:

a. The operations orders of the opposing air force

b. The reports from adjacent AA regiments.

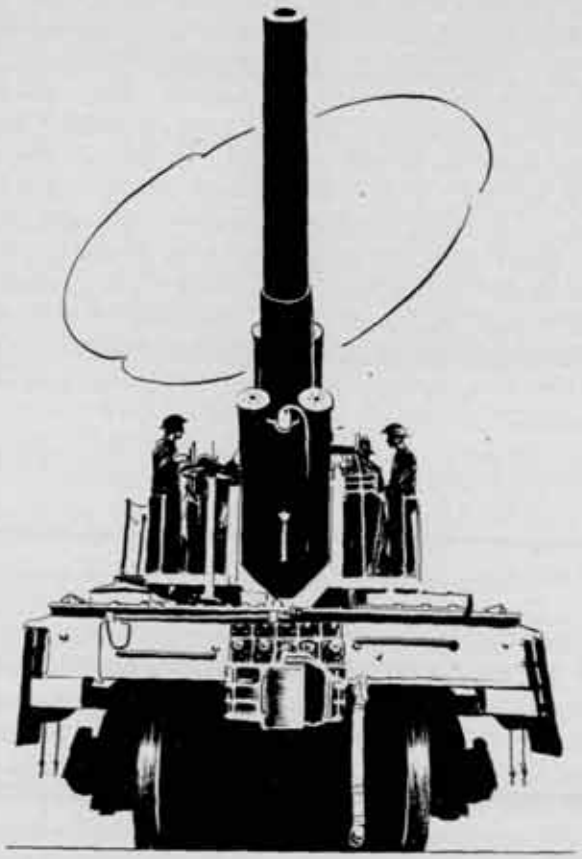
He must endeavor to eliminate, as far as practicable the artificialities which are inherent in maneuver con ditions, in order that his decisions may reproduce a closely as practicable the outcome which is reasonabl to be expected from a given situation under the con ditions of actual warfare.

3. The coöperation of all unit commanders, fro the MG platoon up to the AA Brigade, must be secure This demands unusual tact, for quite understandabl there are many commanders who view any umpire a a natural enemy. No one likes to be watched, perhap questioned, and possibly later on criticized, on the basi of his conduct and decisions at moments of extrem tension. No one likes penalties assessed against hi command; no one likes to be told that in a particula instance his fire was ineffective. On top of all this an umpire has to receive and forward umpire repor over already congested tactical lines (as explaine

above) the commander experiences apprehension of possible delay to tactical orders, reports, or flash messages. The ensuing conflict of interests can be surmounted only through patient forbearance, mutual understanding, forethought, efficiency, and unfailing good humor. Much can be done by advance planning, and the thorough preliminary indoctrination of all fire unit commanders with umpire requirements; in many cases, friction can be minimized by training especially selected enlisted men or staff officers (two reliefs in either case, two of the former for each fire unit, and two of the latter at each Bn CP) to forward the necessary data, thus leaving already burdened commanders free to exercise their normal functions.

4. Last, but most important of all, is the problem of communication. This includes both the transmission of reports from fire units to the regimental CP, and the digest of such reports from the regimental CP to Umpire Headquarters. Much can be done through systematizing such reports by use of set forms as indicated in Figs. 1 and 2 above, but the communication difficulties to be expected in any moving situation should be recognized and weighed beforehand.

Unless communication facilities are at least reasonably good, and unless capable unit umpires can be had, the Antiaircraft Umpire may as well abandon objective methods and be guided by joyous momentary inspiration. As a senior umpire once remarked philosophically, "It is inevitable that umpires will make some mistakes. In such cases, their decisions represent the fortunes of war."



The Mechanized AGO

By Lieutenant Henry C. Wendler

Adjutant General's Department

Mechanization of the Army has been one of the most widely discussed topics of the day. From the platform, press, radio and screen has come an unending flow of comment and pictures, pointing with pride to the implements of war which are flowing from the factories of America to make ours the most modern and best equipped army in the world. Behind the scenes, however, quietly and without fanfare, another process of mechanization is taking place. The vast record-keeping processes, so necessary to the efficient direction and coordination of the men and materials which make up our Army, are being modernized.

The problems of management facing those charged with the responsibility of running our increasingly large military machine do not differ in principle from those faced by executives in private industry. Accurate, up-to-date, complete records and reports must be at hand if timely and important decisions are to be made with confidence, and orders executed with precision. To meet this problem the War Department has turned to the experience of private industry and has adopted for its own use modern accounting methods and machines.

The Adjutant General's Office, which must maintain complete information on the identity, characteristics, qualifications, status and location of every individual in the Army, will serve as an example. A basic record must be established for each soldier in the Army and this record must be subsequently altered to reflect each change in the individual's status. During the last war, these changes were reported on small slips of paper known as *Reports of Change*, each of which had to find its way to the original record of the corresponding individual for manual recording of the new information. At the height of the conflict it was not unusual to have many boxes of these reports descend upon the GHQ or War Department in a single day, and they shortly came to be known as "snowflakes"—an apt analogy. The problem of manually sorting, classifying, and recording these forms was obviously a great task.

The former system of World War I was carefully studied and it was found that the inability to handle reports of change manually was the only major problem to be solved. Based on this assumption, a similar system was designed to care for the conditions existing today. After considerable study in the War Department, and a thorough investigation of accounting systems, the installation of punched card accounting equipment was authorized and therein lies the story of "mechanization of the Army Personnel System in The Adjutant General's Office."

The snowflakes are descending again and, for an army of comparable size, the deluge will be greater than before, since the records required are more voluminous and intricate. But they are not the paper snowflakes of the past. The *Report of Change* today is what is known as a "punched card" (Figure 1) in which the significant data are recorded by patterns of punched holes in the cards. By means of electrical contacts made through them, these punched holes actuate the electric accounting machines into which the cards are subsequently placed—machines which automatically sort and classify the card, reproduce additional sets of cards, combine into a single card the data from other cards, prepare printed listings, reports, statistical tables, etc. To the layman it may appear that magic is being performed but to the trained clerk in the War Department and in the field it is but a daily routine job.

The basis of this new system is the *Status Card* (Figure 2) which is prepared for each individual in the Army. This card contains all pertinent facts pertaining to the soldier's status, including serial number, name, grade, specialist rating, arm or service, date of commission or enlistment, type of enlistment, race, station, duty, primary qualifications, and also space for recording subsequently the type of change and date of change in any of the preceding information. A particular section of the card is allotted each item of information (Figure 2). For example, it may be noted that there are columns across the bottom of the card, numbered from one to eighty. The first eight columns have been allotted for the serial number of the individual. No army serial numbers exceed eight digits.

The next twenty-two columns were allotted to the name of the individual since experience has shown that practically all last names and initials can be accommodated by the use of this number of digits. Column 62, *Race*, allots only one column for this information—each column is numbered from one to nine (top to bottom) and therefore permits nine classifications. If these classifications exceed nine, additional columns must be used. Two columns accommodate up to ninety-nine subdivisions, three columns up to 999 subdivisions, etc. As of the date these cards were originally prepared from a

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Lieutenant Wendler was born in Boerne, Texas, in 1912. He graduated from Texas A and M College in 1934 and went to work immediately for International Business Machines Corporation as a salesman in Dallas, Texas. He was a first lieutenant, Infantry Reserve, when he was called to active duty in October, 1940, to give the Machine Records Section of The Adjutant General's Office the benefit of his experience. Lieutenant Wendler acknowledges the assistance of Irvin Wolloch and others in the Machine Records Section of The Adjutant General's Office in preparing this article.

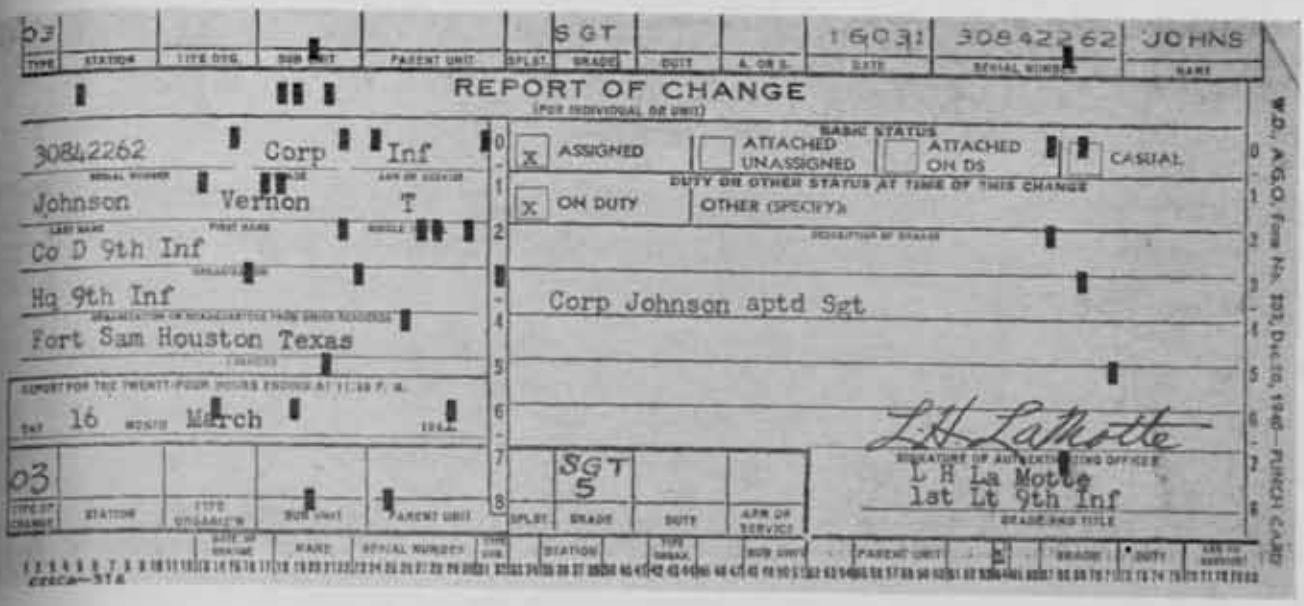


Figure 1: Report of Change Card

Special Roster of November 15, 1940 for that purpose, the status file contained the complete record of every man in the service at that time.

The problem from that point on is to keep these cards up-to-date with changes in the status of the individuals covered and other men coming into or going out of the service. In order to handle this phase of the work, the new Report of Change was designed ..... the snowflake of previous days. This new form of Report of Change serves a dual capacity in that the data written on the face of the card are subsequently recorded in the card itself in the form of punched holes, thereby making it capable of mechanical handling from that point on.

A sample case by which Corporal Johnson was appointed sergeant serves as illustration. The remarks covering this promotion were entered in the company's Morning Report. The morning report was forwarded to the Unit Personnel Section and here the report of change was prepared and forwarded through the Administration Center at Division Headquarters to the Machine Records Unit. When a report of this nature is received in the Machine Records Unit, some of the data written on the card are first reduced to numerical codes. The card is then passed to a Key Punch operator, who, using a punching machine similar in operation to a typewriter, records in the card by means of punched holes, the date, first five letters of the surname, the serial number, type of change, and the new grade, which in this case is Sergeant. This card is then passed through what is known as an interpreting machine which, by means of electrical contact through the punched holes, records in printed figures across the top of the card the data punched therein. The accuracy of the data is then assured by visually checking the printed figures against the information written on the face of the card.

When all the Reports of Change received for a given period have been prepared in this manner, the cards are passed through a sorting machine which, operating at 400 cards per minute per column, automatically arranges the cards in serial number sequence, the same sequence in which the status cards are maintained.

In order to bring up-to-date the Status Card of each individual for which there has been a change, it is obviously necessary to associate each change card with the corresponding Status Card. This task is accomplished automatically by the *Collating Machine*. The status cards are placed in one side of this machine and the Reports of Change cards are placed in the other side of the machine. Automatically and at 240 cards per minute, the collator compares the serial number and first five letters of the surname on the Report of Change cards with this same information in the Status Card. For each individual for whom there has been a change, the machine withdraws the Status Card from the file and interfiles it immediately following the corresponding change card.

Another machine, known as the Reproducing Punch, completes the process by taking the permanent information from the old status card, the new information from the Report of Change card and combines both into a new Status Card. At the same time the machine makes a duplicate of the new Status Card, which together with the corresponding Reports of Change cards are immediately forwarded to The Adjutant General's Office in Washington. The other set of new Status cards is then placed in the collating machine together with the Status cards that did not have changes affecting them. The collator automatically refiles the new cards in their respective places in serial number sequence. Naturally, if only a few status cards require changing, the cards may be withdrawn manually.

In the War Department in Washington the dupli-

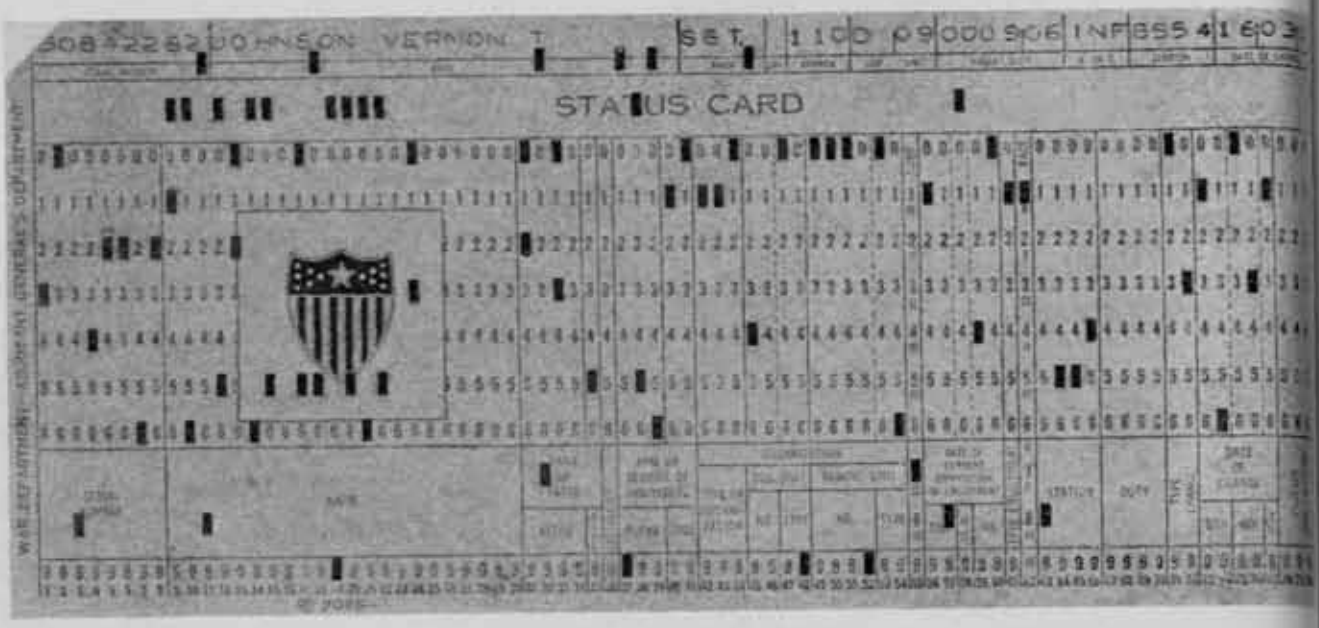


Figure 2: Status Card

cate set of status cards is maintained in serial number sequence. Change cards are also sent to the War Department where they are interfiled by means of a collating machine in serial number sequence. This file, therefore, constitutes a complete historical record in chronological sequence of every change or movement that has affected a given individual. These reports will be kept indefinitely so that complete and easy references may be made at any time.

Since the status file contains an up-to-date record of every man in the service, let us see what purpose the cards perform. An important document in the army record-keeping procedures is the Monthly Personnel Roster; it is a listing for each organization of all the personnel associated with that unit. At the end of the month the status cards are sorted alphabetically by grade for each organization and placed in the Alphabetic Accounting machine, which, reading the punched holes on each card automatically prints at a speed of eighty lines per minute the serial number, name, grade, specialist rating, component, arm or service, organization, date of current commission or enlistment, duty, status, and date of last change in status. These rosters, a separate one for officers, Army nurses and warrant officers, and one for enlisted men, after being authenticated by the personnel officer, go immediately to the Adjutant General's Office in Washington.

During the production of the Monthly Personnel Rosters a *Summary Punch*, attached to the alphabetic accounting machine, automatically produces summary or total cards in which are recorded in punched holes the designation of each unit and total of officers, nurses, warrant officers or enlisted men by component of the Army. These summary or total cards are listed by the machine for a table showing totals of parent units, divisions, corps, armies, or corps areas to provide up-to-date strength figures in the War Department.

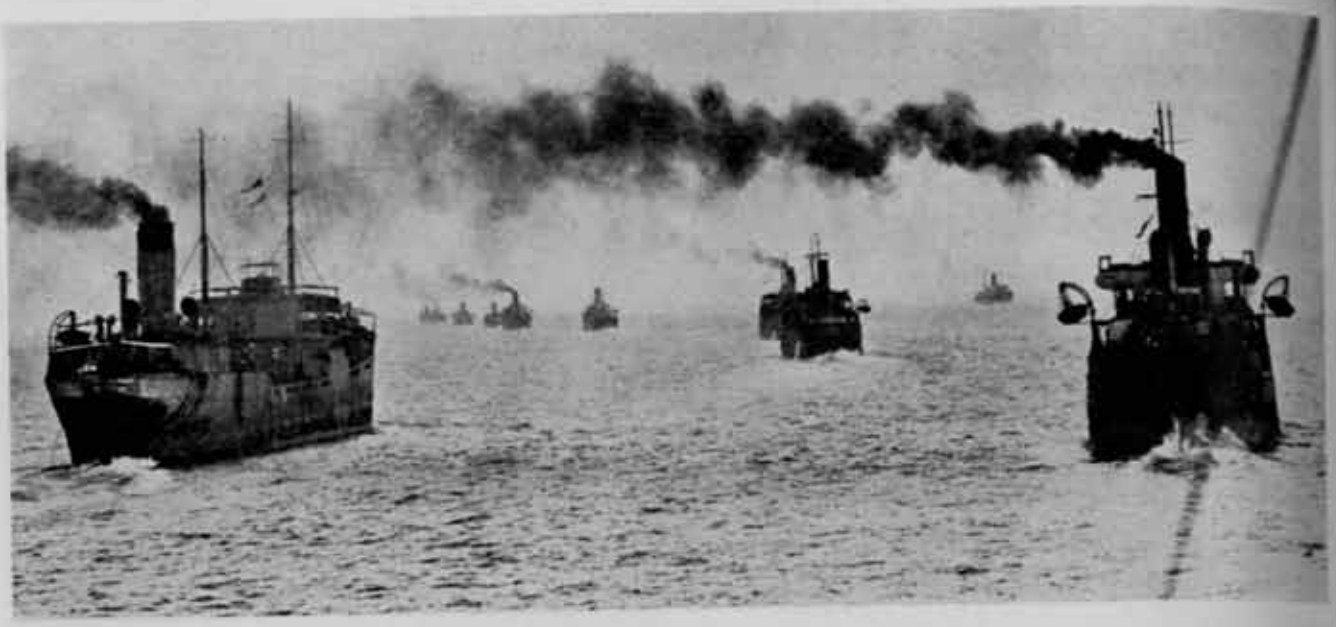
One other use which is made of the status file is the production of special listings. In the case of mass transfers from one organization to another, including the transfer of selectees from reception centers, etc., it is unnecessary to forward Reports of Change covering each individual. All that is necessary is to provide the Machine Records Unit with a copy of the order transferring the individuals, showing the serial numbers and names of the men involved. From these orders the cards are selected from the file and the necessary changes made therein. In addition to the handling of mass transfers, special listings are also available as in the case of embarkation lists, entrainment lists, and special rosters, all of which are prepared merely by selecting the proper cards from the file and passing them through the Alphabetic Accounting Machine. The status file is used for the production and maintenance of another record—namely, the Locator Card. By a listing of the status cards the Locator Cards are prepared for all men in the Army. The cards show all the pertinent data necessary for location and identification of the individual. These cards are prepared in multiple copies and distributed to regimental, division, post, army and Corps Area Headquarters for reference purposes.

In addition to the basic personnel record-keeping work just outlined, this modern method has been expanded to include other records of the A.G.O. No longer is the search for a man with particular qualifications a task of endless thumbing through voluminous documents. For each officer in the Army a punched card is maintained in which is recorded by means of punched holes his identity, military qualifications, civilian qualifications, languages spoken, education, recreation, and other pertinent factors. To find among all officers those who were in civilian life business executives, college graduates, speak Portuguese and are interested in fencing merely requires placing all the

1—Machine Records Unit, GHQ Air Force. 2—Key punch operator transcribing Reports of Change into punched hole form. 3—The sorter arranges punched cards into numerical sequence at the rate of 400 cards per minute per card column sorted. The machine can sort alphabetically also. 4—Punched status cards, an alphabetic accounting machine, and one operator prepare rosters at eighty names per minute.

cards in a sorting machine, setting the switches, and pressing the button. The cards for those individuals who possess the qualifications desired are automatically selected from the file. Thus not only does this process make it possible to select a particular individual or group of individuals with speed and dispatch but also with these data readily accessible the task of placing each individual in the task for which he is best suited is simplified and the army is correspondingly strengthened.

A.G.O. is not alone in its progress in streamlining of our modern army's records. Ordnance, Medical Corps, Air Corps, Quartermaster Corps and others are relying on these robots to convert their mass of original data into timely and accurate printed reports. And again, as in A.G.O. the punched hole makes the wheels go round. The net result is twofold—mechanization of office routines which has released more soldiers for combat training, and at the same time has provided more accurate and timely information so essential to the proper direction and coördination of the personnel, activities, and materials of our modern army.



The Floating Fortress

By Lieutenant Charles F. McReynolds, Coast Artillery Reserve

American military men have learned important lessons from the progress of the war in Europe to date, but it is probable that the most important lessons are just ahead, especially for Coast Artillerymen. The war has now entered a stage where invasion will probably dictate the decision. Landings in force must be made on hostile shores. And the strategy back of such an invasion, as well as the tactics employed, will have the greatest bearing on the future defense of the United States.

As these words are written it seems that Germany must try her much advertised total assault on England in the very near future. Unless such an assault is made, and unless it is successful, there is every prospect that England will receive sufficient support from abroad to wage the war to a victorious conclusion. Therefore it seems unlikely that the German attack can be long delayed and our minds naturally turn to the question of possible method.

There has been much talk of the "secret weapon." No really new weapon has yet appeared in this war. And we may confidently expect that any "new" weapons or tactics which yet appear will be thoroughly grounded in the history of warfare. It is certainly of the most vital importance to the national security and future welfare of the United States that we observe with the utmost intelligence the course of the war during the expected "active" stage, and that we act with speed and energy as a result of lessons so learned.

Unfortunately for the future security of this country it appears that there is one possible weapon against England which is also applicable to an attempt to bridge the Atlantic or Pacific as support for an invasion attempt against this country. Fortunately for us this weapon also has strong defensive potentialities, whether used by England or the United States, and much may depend upon which power first recognizes and uses it.

The possibilities of an attack against England at this stage of the war are bewildering in their variety. Reliance might be placed in a massive submarine assault on the sea lanes, or in an all-out aerial Blitzkrieg, or a combination of both, or an invasion by gliders, or by barges, or a simultaneous invasion by sea and air. These have all been rather generally discussed but there is one weapon—the "Floating Fortress"—which deserves more careful study.

Before we write a specification for a floating fortress let us consider how it might serve both sides. In the case of the Germans, since the bulk of British shipping and British naval operations has been driven out of the English channel and north sea, it is reasonable to assume that submarines, planes, destroyers, "E" boats, and other naval craft would be able to do from floating bases on the west what they have already done from land bases in Norway, Denmark, Holland, Belgium and France on the east.

Furthermore, if a string of Floating Fortresses menaced Britain on the west she would have to divert a considerable part of her bombing effort and surface navy from the present attacks on the "invasion coast," to further attacks on these "invasion floats." But this very effort to break the seaward ring would weaken her at

tacks on the continental bases, and on Germany proper, thus relatively strengthening the operations conducted from the continent. If the floating fortresses proved impregnable to the attacks of weapons now possessed by England the siege would become airtight. British merchant shipping would be unable to break through this ring of bases and commerce with the outer world would cease. The British navy would face an insoluble problem, for every floating fortress would be the equivalent of a powerful land fort protected by submarines, "E" boats, and aircraft.

Since a semicircle around England, from Norway to the coast of France, is less than 2,000 miles in length we can assume that ten floating bases would serve to complete the blockade. Each base might support up to 500 fighting and bombing planes, and fifty each of submarines and "E" boats. The distance between bases would never be more than 300 miles, which would bring Germany's vaunted baby submarines within easy range of any ship seeking to run the blockade. And powerful concentrations of bombers would be within an hour's flight at the most of any vessels either attacking or seeking to slip through the ring.

But let us suppose that the British are first to appreciate the potentialities of the "impregnable" Floating Fortress. If ten such floating bases were built by the British they could string five of them along each of the two main approaches to the western British ports. By operating planes and "E" boats from these bases they should be able to "sterilize" two corridors, each about fifty miles wide and 750 miles long, against any operations of submarines or bombing planes. Provision of such protected sea-lanes might well solve the problem of the submarine menace now facing the British. The entire German campaign of coördinated air and submarine action would be thrown out of gear. Subs would be hunted down and sunk in such numbers that the submarine warfare would collapse. Once England was assured of access to world supplies it would then be only a question of time until she could win the war. Eventually she could turn these same floating bases against the continent to make her own blockade airtight, and to serve as powerful weapons for a future invasion effort.

Tactically, then, we must concede that the "Floating Fortress" has great potentialities. But many questions will be propounded as to the practical side of such a suggestion. Can such bases be built in a reasonable time? Would such huge structures be too expensive for employment? Would such Floating Fortresses withstand the action of storms and could they be moved to position and kept there? And would such floats really be impregnable, or would a few well aimed aerial bombs send them gurgling to the bottom.

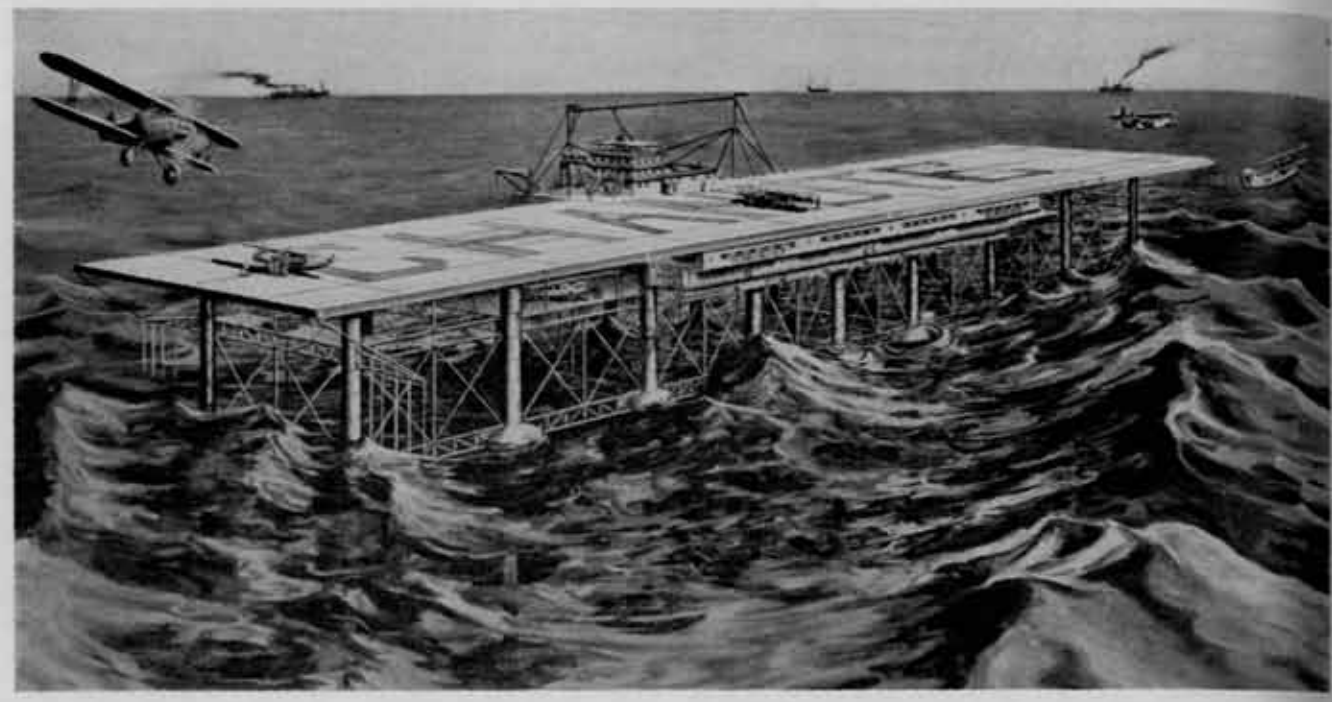
It is true that the conception of a ring of floating fortresses is a daring one. For military and civil leaders to develop such a project would certainly take imagination. But for a country which has built the Panama Canal, Boulder Dam, and other great public works, the project is relatively simple from the physical and financial standpoint. And the concept of huge ocean bases is not new. In fact it has been thoroughly explored by competent engineers.

Back in 1926-27-28, E. R. Armstrong conducted a well-financed and extensive research program on development of the Armstrong Seadrome. This Seadrome was a floating island to be used as a way station for servicing transport airplanes flying the ocean between the United States and Europe. Engineers found the plan entirely feasible and financiers were willing to back it. But the whole matter was dropped chiefly due to the fear on the part of some legislators and other officials that provision of such stepping stones to Europe would provide the means for future attack against us. So there we find, more than twelve years ago, the germ of the Floating Fortress idea. Armstrong's Seadromes were designed to be 1,200 feet long and 200 feet wide, with the landing deck 100 feet above the water. Tests indicated they could be anchored satisfactorily in water to a depth of three miles, and that they would safely ride out storms of double the intensity of any recorded. Armstrong and his associates made studies which indicated that the Seadromes, spaced 400 miles apart, would make a Transatlantic air service both practicable and profitable.

Fortunately we have other testimony than that of Armstrong as to the practicality of our huge floating bases. We know that floating dry docks have been built large enough to lift the biggest ship afloat. Back in 1928 the Southampton floating dry dock was put in service, 860 feet long and more than 165 feet wide. This dock was towed in the open ocean and engineers have stated that there is no limit to the future size of such docks other than the size of ships to be docked. This dry dock had fifty-six separate water-tight compartments.

Then we have the Lake Washington bridge, in Seattle, which floats on concrete pontoons for a length of one and a third miles across Lake Washington and carries the heaviest vehicular traffic without a tremor. A large number of compartments, plus a pumping system, assures that this bridge will be floating for many years to come.

And we have the record of ocean-going log rafts, of which one company alone has towed 118 the length of the Pacific Coast from Seattle to San Diego, through all sorts of weather, and lost only three rafts. Two of the 118 broke up in storms and the third caught fire and burned. These rafts are about 1,000 feet long, sixty feet wide and draw twenty-six feet of water. They weigh more than 15,000 tons and are towed by a single tug of about 1,000 h.p. It has proved commercially profitable to tow such huge rafts for more than 1,500 miles through rough water despite the fact that the structure is held together by nothing more than rather make-shift chains.



Artist's conception of the Armstrong seadrome

The record encourages us to believe that our Floating Fortresses may well be of a size sufficient to serve our military needs. That means big enough for housing and serving as a flight deck for 500 planes, with several runways in use at once; big enough to serve as a base for about fifty "E" boats and an equal number of baby submarines; and also to serve as a port for naval and cargo vessels if need be. Such purposes can be achieved by constructing our raft to a size of about 1,500 feet long, 500 feet wide, and 120 feet thick. Such a raft would also serve to mount a large number of artillery batteries sufficient to outgun any fleet that might be brought against it. The deck and sides could be made ten feet thick all the way around of reinforced concrete, and the Fortress could be provided with 750 separate watertight compartments, all separated by reinforced concrete walls one foot thick and, "Believe it or Not," the entire structure would float with the deck forty feet above the surface of the water. There is everywhere around England, and also along our own coasts, sufficient depth of water to handle a Fortress with an 80 foot draft. It is not conceivable that any scale naval attack, or aerial attack, could penetrate a ten foot wall of reinforced concrete and then open up enough of the 750 compartments to really endanger the buoyancy of such a structure.

The reader may ask about the amount of concrete for such a structure. It figures out at about one million cubic yards, which is just one seventh of the amount of concrete that was poured into the Boulder Dam. And since Boulder Dam was built for about $47,000,000, we may assume that the structure of our Floating Fortress could be built for not more than $8–$10,000,000. Since the work could be conducted at a selected point, with standardized forms, and would not require excavating and blasting as must be done in dam construction, nor the hauling overland of huge quantities of structural materials, it is reasonable to believe that each Floating Fortress could be built for even less than the amount mentioned above, and in relatively quick time. Perhaps six months would be enough time in which to build such a structure. During the World War we built concrete ships and sailed them across the ocean. They were cheap and quick to build. It is interesting to consider that the Fjords of Norway present ideal sites for the construction of such floating bases by the Germans. It should be possible to camouflage the whole project so as to be indistinguishable from the sea or air. There is no reason to suppose that the same engineers who built the Siegfried line could not turn out ten or even twenty such barges in six months under the pressure of war necessity.

Two final objections may be raised to the Floating Fortress. One is as to its stability in rough weather. And the other is whether or not it can be moved to position and kept there. In the first case it is interesting to study the reports of oceanographers who have made a science of wave action and magnitude. We learn that the normal North Atlantic storm wave is only eight feet high and 200 feet long. We find that the greatest wave scientifically recorded was only forty feet high, and that the outside report, not authenticated but believed reliable, was of waves 70 feet high and 2,000 feet long. Furthermore, it has been found that wave action rarely extends more than fifty feet below the surface. This latter point means that thirty feet of the draft of our barge would be below the effect of wave action. This is almost forty per cent of the barge's buoyancy which

Log boom on the Columbia River

would exercise a constant stabilizing effect on the upper portion. Then taking the effect of the greatest wave recorded, seventy feet high and 2,000 feet long, we note that our barge is 1,500 feet long and so would tend to "average out" the wave effect and float level at all times. Furthermore, the wave action, if of seventy feet magnitude, would extend thirty-five feet each way from the normal water line, which would still leave the crest of the wave five feet below the deck of the barge. It is probably a safe statement to say that such a barge would float more steadily and be far more seaworthy than any ship yet built.

As for the problem of getting the Floating Fortress into position and keeping it there we need only refer to the 118 1,000-foot log rafts that have been towed the length of the Pacific Coast by a single 1,000 h.p. tug in each case. We have grown so accustomed to battleships with huge power that we must reëxamine the power problem of a really slow moving vessel. Our Floating Fortresses could move into position at speeds as low as five miles per hour without sacrificing their effectiveness. A study of the resistance of ships to movement through the water shows that up to eight knots 90% of resistance is caused by skin friction of the body being driven through the water, and the power required goes up as the square of the speed. Above eight knots the wave effect enters into our equation and the power required is as the cube of the speed to twelve knots. Above twelve knots the power required is as the fourth power of the speed.

This can be graphically illustrated by quoting figures on some of the world's greatest battleships to show how very great an increase in power is required to achieve one or two knots more speed. The British battleship *Royal Oak*, with 40,000 h.p. was rated at twenty-two knots; the *Rodney* took 45,000 h.p. to achieve twenty-three knots; the *Queen Elizabeth* required 80,000 h.p. to do twenty-four knots; the Battlecruiser *Hood* has 144,000 h.p. and does thirty-one knots; and our own aircraft carrier, the *Lexington* (the world's most powerful ship), established a record of thirty-four and five tenths knots for a one-hour run while developing 210,000 h.p. Put another way we can estimate that if it takes 210,000 h.p. to drive the *Lexington* thirty-four and five tenths knots then a mere one hundred horsepower will drive the same ship at a speed of five knots or about six miles per hour. And since our barge is more than ten times as big as the *Lexington* we can say that a mere 1,000 h.p. will serve to move it into position and to hold it there against wind and tide. The strongest current in the open ocean only flows at a rate of two miles per hour, with certain local exceptions. Even if our Floating Fortress requires the power of a hundred *Lexingtons*, we will be able to move it around with a relatively small 10,000 h.p. powerplant, a small fraction of the power used in an ordinary battleship. And there is no reason why this power should not be installed in the barge to make it completely self-contained and self-propelled.

It seems logical that such Floating Fortresses are strategically and tactically desirable and that they are

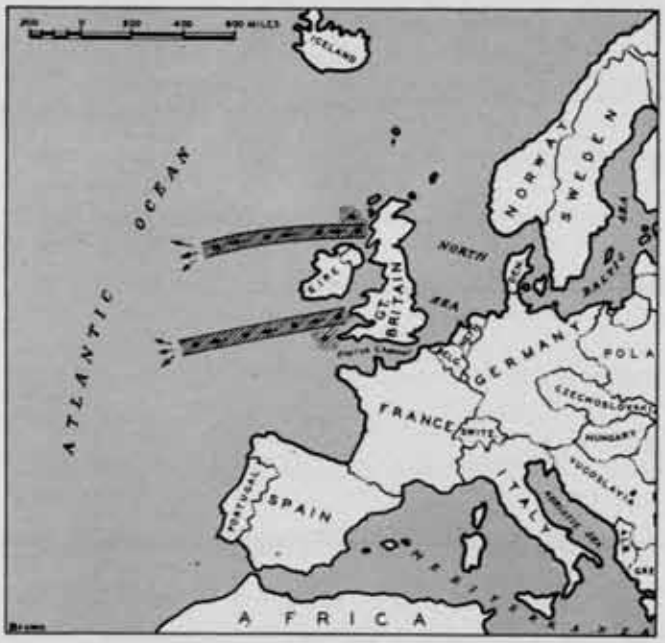


Figure 1: Floating fortesses used defensively by Great Britain

This map indicates how Great Britain, using ten Floating Fortresses for basing aircraft and motor torpedo boats, might establish two zones of security for shipping, each zone approximately fifty miles wide, and extending six hundred miles to sea. Submarine-spotting aircraft and MTB's in these zones would make an enemy blockade too costly to maintain. The Royal Navy would have its convoy responsibilities lessened in the most critical zone.

Figure 2: Floating fortresses used offensively against Great Britain

This chart illustrates how Germany, using Floating Fortresses, might establish a strangulation blockade, and at the same time provide a ring of aerial bases around the British Isles from which to launch attacks. Motor torpedo boats, submarines and aircraft operating from the ten bases plotted, would effectively shut off a large proportion of British shipping. The bases might act as stepping stones for concentration of aircraft where needed; by bringing the circle closer to the British Isles the bases might serve as the line of departure for a portion of an invasion attempt.

physically and financially practicable. In fact, there might be a good argument in favor of transferring all our coast defense batteries to such floating barges. The cost of maintenance of such a floating base would probably be reasonably comparable with the cost of real estate and maintenance of a shore fortification. But the Floating Fortress could be driven out to sea for target practice at any time instead of having to keep the guns idle for years on end in peacetime due to complaints of housewives about broken dishes and windows. Also, normal target practice could be conducted away from shipping, whereas our fixed coast defense artillery is always located at the point of maximum shipping activity for any given area.

In event of an attack on either of our coasts we could concentrate our "Floating Fortresses" at the point of attack. Even assuming a successful enemy landing, we could bring up the Floating Fortress in a period of a few days at most and then completely destroy the enemy base. Certainly there are real advantages to protecting our harbors from a floating island that is ten miles at sea in the direction from which the enemy must launch his attack. And we may assume that, in the face of a seacoast defended by such fortresses no fleet as now constituted would dare risk attack. On the other hand, if our enemy brings such a fortress against us we could not stand against it at any coastal point attacked and would have to concede a local landing area as a base for further enemy operations.

Suppose that a distant enemy starts such a fleet of Fortresses moving against us today, and we are warned from the day they start across the ocean. Knowing that our planes and ships will be shattered against the impregnability of these floating chunks of concrete we must set to work at once to build similar weapons. But it will take six months at best for us to provide such fortresses. And our attackers, at five knots, will make about 150 miles per day, or a total time for the 5,000 mile crossing of from thirty days to six weeks. It is obvious we cannot afford to be caught short against such a weapon.

Let us close with a more immediate consideration. Suppose such Floating Fortresses have been built by the Germans and are shortly used against the British Isles. Then they will provide a ring of bases from which German short range fighter planes may operate against British bombers, and from which German bombers may carry maximum loads against British targets. It is obvious that the power of a German aerial assault can be greatly augmented through the use of such floating bases. And as the ring of floating fortresses is tightened these barges might be propelled close enough to shore to cover troop landings with their batteries of heavy artillery. A concentration of such gun power and air power would serve to protect the approach of troop transports for the assault through the breach.

You may ask, "What will the British Navy and Air Force be doing as these ponderous sea elephants come wallowing out of the Skaggerac and head out across the North Sea? It is true that, at five knots, it will take several days for them to reach positions north and west of the British Isles. Some of this time might be covered by selection of foggy or stormy weather, and some of the approach might be covered by intense air activity from plane based on land and on the floating islands themselves. But let us assume that the element of surprise is entirely lacking, and that the British are informed of the operation from the time these forts start moving out of the Baltic, or the Norwegian Fjords. To realize the course of the action that must follow we are forced to review again the enormous defensive strength of such fortresses and their unprecedented offensive power. Each such fortress could carry at least 500 planes, the equivalent of five large aircraft carriers. Each fortress could also carry at least fifty "E" boats and fifty baby submarines at the same time, with suitable launching and retrieving apparatus. In addition to this the fortress will dispose an array of antiaircraft artillery and long range heavy artillery. Many 14-inch or 16-inch rifles could well be mounted on such a float.

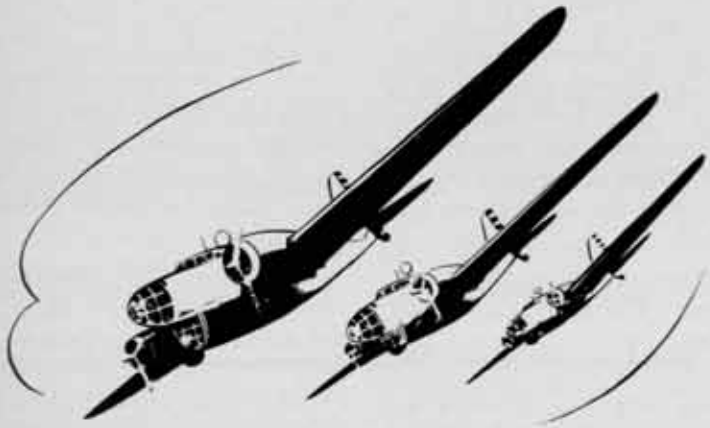
Thus any fleet attacking the Floating Fortress would first face determined opposition from its bombing planes. If the fleet continued to attack it would come within range of the Fortress-based baby submarines and even before it came within artillery range it would be caught in a net of torpedo-carrying "E" boats. But even without all this protection the artillery batteries

alone on such a floating base should be able to more than match the most determined fleet attack.

Fleets of bombing planes flying to attack the Floating Fortresses would be met in the air by strong concentrations of pursuit planes. Within bomb-launching range the bombers would meet heavy concentrations of antiaircraft fire. Finally, against such a floating block of concrete and steel even the heaviest air bombs would be relatively harmless. Most of the "E" boats, submarines, and planes would be carried completely inside the protective hull and so be safe from attack.

Once in position on the sea lanes these sea forts would cut off all water-borne commerce. Spaced at intervals along the main approaches to the British Isles, these forts would launch continuous heavy concentrations of submarines, "E" boats, and air bombers against any hostile shipping. Operating outside such a screen the German surface fleet might soon clear the seas of enemy shipping. As the screen drew closer to English shores German shipping could mass troops for the final assault.

As in the case of all "new" weapons it is apparent that the floating fortress is simply the ancient pentere adapted to the warfare of a modern world. And as is ever true of the history of weapons, no weapon could stand against the Floating Fortress except another floating fortress. It is true that an enemy navy could elude such a ponderous pursuer. But the Fortress could systematically destroy all existing naval bases and so strangle sea power at its source. To prevent this it will be necessary for the defenders to present defensive Floating Fortresses to meet the aggressor. Then will ensue a truly epic battle between these giants of the sea as they come to grips in a struggle for supremacy.



War Rockets of the Past

By Willy Ley

Rockets as a weapon of war are nowadays about as obsolete as catapults and crossbrows. Their once important rôle—especially in amphibious operations—and the fact that rockets are still in use not only for amusement but also for the more serious purposes of serving as distress signals, or as a line-throwing apparatus for the rescue of the crews of stranded vessels, warrants some interest in their history.

Historians, however, have always treated the powder rocket as a stepchild. The volume of the literature about the early history of guns and gunpowder is enormous but more than seventy per cent of all the books and treatises ever written on the history of gunpowder fail even to mention the fact that rockets constitute one of the three early applications of gun powder. The other two were Roman candles and bombs; guns do not appear until almost a full century later.

Neglecting a few rather doubtful and unreliable reports it seems that the oldest source about the application of gun*powder* is the Chinese chronicle T-hung-Lian-Kang-Mu which speaks about new weapons used in the battle of Kai-fung-fu (Pien-king) against the Mongols. This battle took place in 1232 A.D. and the new weapons used were the Tchin-tien-lui (heaven-shaking thunder) and the Fe-ee-ho-tsiang (arrows of flying fire). The former were bombs that were dropped from the city's walls while the latter were rockets.

One passage has been translated as follows:

"In addition the defenders had 'arrows of flying fire.' They attached an inflammable substance to the arrow. The arrow suddenly flew away and spread its fire over an area measuring ten steps. The Mongols dreaded those arrows of fire very much."

The term "fire arrow" tends to be misleading but the statement that these "arrows" began to fly away suddenly and the lack of mention of a bow or other instrument capable of throwing arrows suggests that they were rockets. The French Jesuit Pater Amiot succeeded in finding drawings of such fire arrows in ancient Chinese chronicles. They look exactly like powder rockets, save for a pointed tip attached to the front end of the guiding stick and for feathers attached to the other end. The latter feature can be found on handmade Chinese sky rockets even nowadays.

J. von Romocki, a German historian of military arts and sciences, held the theory that the early Chinese powder rockets slowly "evolved" from fire bearing arrows. He believed that the Chinese, while experimenting with various kinds of "salt" accidentally used saltpetre with the result that the fiercely-burning incendiary mixture acquired explosive properties. If it is assumed that the Chinese habitually wrapped those incendiaries that were to be attached to fire bearing arrows in paper tubes instead of parcels—as is likely—the reaction of a quickly burning saltpetre mixture must have been noticed. It was probably found that fire arrows flew much farther than was to be expected or else that they were greatly retarded, depending upon whether the fire mixture had been ignited from one or the other end. Finally some such arrows may have departed "on their own volition" after igniting without being shot from a bow.

At any event it seems to be certain that saltpetre mixtures really were concocted first in the Far East. In the occident mention of saltpetre made its first appearance in the writings of Arab savants and they adorn not only saltpetre but also other pyrotechnic implements with the term "from China." Abdallah Ibn Baithar, for example, writing about 1240 A.D., said that "the flower of the stone of Assos" is called "Snow from China" by the Egyptians. Strangely enough Ibn Baithar does not mention the qualities of saltpetre at all and since it seems unlikely that he should not have known about them we might conclude that he wanted to keep them secret.

The next Arabic manuscript, entitled *Fighting on Horse Back and with War Machines* has an entirely different attitude. It contains fairly accurate recipes for rockets, gunpower, Roman candles and even for a rocket driven torpedo. The latter was called a "self-transporting and self-combusting egg" and consisted of two large convex pieces of some material forming a hollow lens shaped body, two large rockets for propulsion and a central beam with a pointed tip which was to penetrate the hull of an enemy vessel. The hollow lens-shaped body was probably to be charged with incendiary mixtures for setting fire to enemy vessels. The author of this book and possibly the inventor of the first torpedo about which we have knowledge was one Hassan Alrammah, a hunchback of great brilliance. He died "at an age between 30 and 40 in the year 695 of the Hegira" which dates his book as having been written between 1275 and 1295, probably during the first half of that period.

Hassan Alrammah used an Arabic term for saltpetre but he did call rockets "Chinese arrows" and scattered

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Willy Ley was born in Berlin, and came to this country in 1935. He studied at the universities of Berlin and Koenigsberg, and became interested in rocket research in 1925. He was one of the founders of the German Rocket Society; was co-editor of the Society's monthly journal, and took part in many rocket experiments. Mr. Ley is now with the research department of the newspaper PM. He has his first papers for naturalization, and hopes to acquire full citizenship late this year.

a few "from China's" around in other places of his manuscript.

At that time explosive saltpetre mixtures and rockets were already known in Europe. The first certain mention of a rocket in Europe dates back to 1258, the locality being Cologne. Latin manuscripts of the period immediately following that date always refer to rockets as "*ignis volans*" or "flying fire." The Cologne MS uses a German term, but not "Flugfeuer" as should be expected as a translation of the Latin. Instead the term used is "Windfeuer"[1] or "wind fire" which may have to be read "wildfire," soon to become a common term for rockets in all Germanic languages.

The history of gunpowder, rockets, and pyrotechnics in general emerged from comparative obscurity soon after that first mention. The three main sources are the writings of Roger Bacon, Albertus Magnus (Albert von Bollstädt) and Hanns Hartlieb, a rarely mentioned German plagiarist of the same period. All three are based upon the mysterious *Liber Ignium* or *Fire-Book* written by one otherwise unknown Marcus Graecus.

The *Liber Ignium* of which Roger Bacon and Albertus Magnus seem to have known more complete copies than the two Paris manuscripts now in existence has been a source of never-ending speculation.

The Fire Book applies the term *ignis volans* to two different things, Roman candles and rockets. The recipe for the driving charge of a rocket begins as follows:

"Take one pound of live sulphur, two of charcoal and six of saltpetre"—a fairly weak mixture, especially with the impure saltpetre of that time, but sufficient for the purpose, as I found out by experiment.

In Alberti Magni's book *De Mirabilibus Mundi* the rocket charge recipe reads the same as does also the German text of Hanns Hartlieb. Both these books date from the same period, the period during which Hassan Alrammah wrote his own book. The writings of Roger Bacon, much discussed on account of the deliberately mysterious language he used, also fall into the same period. Without joining the controversy about the proper meaning of Bacon's famous anagram I state that Hime translated it as meaning: "Take 7 parts of saltpetre, 5 of young hazelnut wood and 5 of sulphur" a mixture that would also be rather weak.

Rockets, then, were fairly well known in intellectual and military circles in 1280 and after. They were apparently used as self-propelling fire arrows, fired at the enemy—and especially against the rigging of enemy vessels—in the hope that they would set the target afire. The extensive use of rockets as a weapon of pirates (and against pirates) is mentioned as late as the sixteenth century by Italian authors.

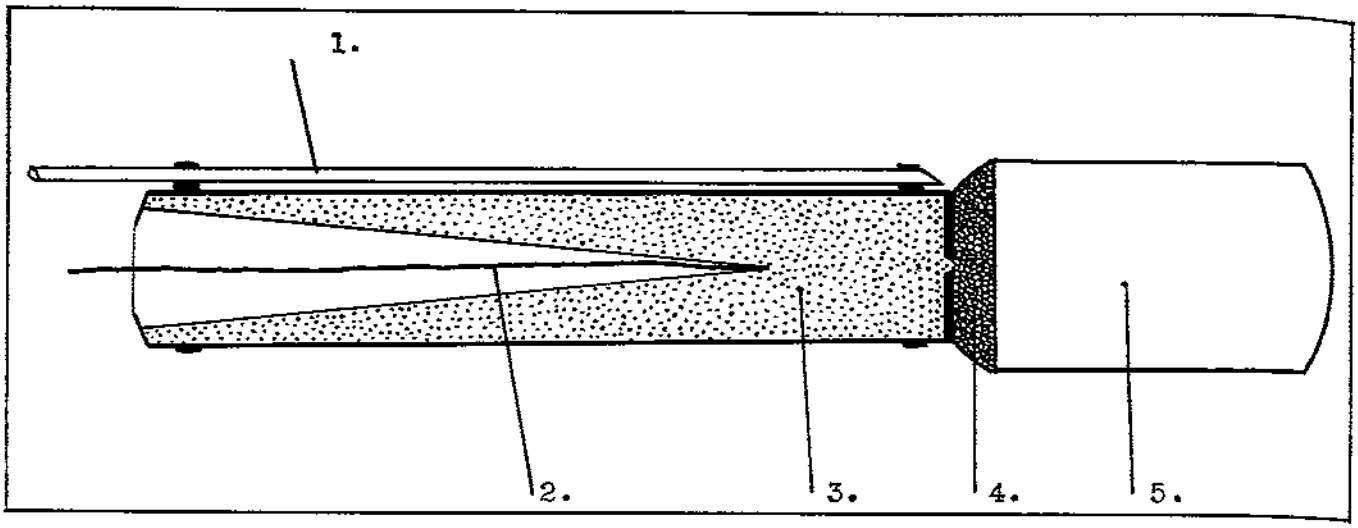
Firearms throwing solid bullets and not lumps of burning powder (as is characteristic for "Roman candles") appeared early in the 14th century. The oldest known picture of a gun is still the famous miniature in the Oxford manuscript *De Officiis Regum* of 1326. Unfortunately the manuscript, which deals with the duties of a monarch, does not mention guns or gunpowder at all. The year 1313 as date of the invention of firearms seems to be generally accepted now after a long and bitter controversy that dragged on for decades in historical journals of all countries. This date was claimed by the so-called *Memorieboek* of the City of Ghent which shows among the entries for the year 1313 the following sentence: "By the way, during this year the use of *bussen* was found for the first time by a monk in Germany." There is no doubt that the term *bussen* means "portable guns," the word still survives in modern High German in the form *Büchse* which means a hunting rifle or a smooth bore rifle in general. This entry is corroborated by other entries in the *Memorieboek* speaking about *bussen met kruyd* (shotguns with powder); by the fact that the first guns in England came with Flemish soldiers; and by the legend about *Bertholdus niger*, a lengendary German monk and supposed inventor of artillery.

Firearms throwing solid bullets slowly replaced not only bows and arrows and crossbows and darts but rockets as well. Rockets, however, had an important advantage: they bore fire. The historian Muratori emphasized that in 1379, in the battle about the island of Chiozza an otherwise invincible tower was fired by this means which decided the outcome.

The book *Bellifortis* by the German military engineer Konrad Kyeser von Eichstädt, finished in 1405, described three varieties of rockets; ordinary sky rockets, swimming rockets and rockets running along taut strings. The latter type was presumably used to carry messages. An approximate contemporary of Konrad Kyeser, the Italian engineer Joanes de Fontana, is known to have written an apparently comprehensive book on the weapons and the armament of his time. The manuscript of this book is said to be in the library of Milan but not even excerpts have ever been published. The same de Fontana, however, jotted down many of his ideas in a kind of sketchbook which can be dated as having been finished in 1420 and which was later called the *Bellicorum Instrumentorum Liber*.

In this book Joanes de Fontana made drawings of flying rockets disguised as pigeons, swimming rockets disguised as fish and ground rockets camouflaged as running hares. All these forms were supposed to carry fire to the enemy's camp or to his fortifications. De Fontana also designed a rocket driven torpedo, consisting of a powder filled roughly triangular wooden vessel with a long drawn-out and sharply pointed bow, propelled by two large powder rockets. The hollow of the vessel was to be charged with powder, of course. Two huge eyes were painted on top of the contraption to make it look like the head of a sea monster. Another idea of his was a heavy wooden car, moving not on wheels but on two large wooden rolling pins to be serv-

[1]The spelling is that of modern High German.



PROPAGANDA ROCKET, SPANISH CIVIL WAR, MADRID, 1938
1—Guiding stick. 2—Fuse. 3—Driving charge. 4—Small explosive charge. 5—Container for propaganda leaflets printed on tissue paper

iceable on rain soaked terrain or on poor roads. The propelling force was three large rockets, working through a common exhaust nozzle. The purpose for which this first rocket car had been conceived was not so much the battering of heavy stone walls, but to confuse enemy cavalry or enemy foot soldiers advancing in solid formations.

Probably closer to actual practice than these designs were the pictures of barrels filled with rockets and tied to the masts or bowsprits of ships to be fired against other vessels in solid volleys. Such pictures can be found frequently in books of the period from 1550-1650.

That rockets might be used to give signals seems to have been a fairly late discovery. Count Reinhart von Solms was apparently the first to describe rockets equipped with small parachutes. At about the same time (1550) rockets with stabilizing fins instead of stabilizing sticks were described for the first time; the first underwater rockets were mentioned in 1610.

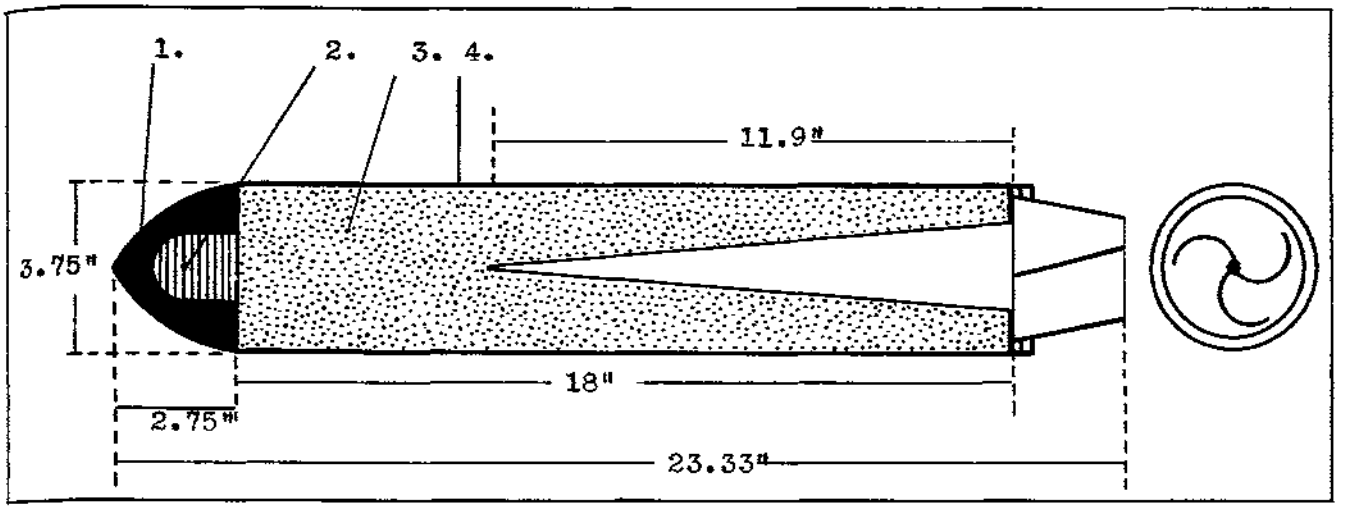
Save for special applications like pirate fighting and signal shooting, guns had replaced rockets as a weapon of war completely by 1550. A once-famous book, written by one Leonhart or Linhart Fronsperger in 1557, gave detailed directions for the manufacture of various kinds of rockets, but emphasized that "this most common piece of fireworks" would serve for amusement only and had no serious applications. It has to be borne in mind, however, that Fronsperger lived far inland in Europe and was discussing land warfare only; it is doubtful whether he ever even saw the sea.

There exists a very conspicuous gap in the history of rockets, reaching from about 1550 to 1800. This gap is not apparent but real; it was caused by lack of activity, not by lack of records.

It is true that during this period Sir Isaac Newton established his Third Law of Motion which provides the scientific explanation for the motion of rockets, stating that every action has an equal but opposite reaction. It is also true that one of his disciples, the Dutch professor Jacob Willem s'Gravesande, experimented with a simple apparatus to produce steam reaction and that he proposed a "steam car" based on his invention. And it is finally true that at least one man was trying to revive the war rockets of the late Middle Ages during that "dull season" lasting two and a half centuries. He was the Prussian colonel Christoph Friedrich Geissler who constructed rockets weighing not less than 120 pounds. They were equipped with rather heavy bombs, but it seems that those bombs were a bit too heavy because Geissler reported that his rockets burned for "quite some time" until they finally rose and that they did not go very far.

The revival of the ancient war rockets really came around the year 1800 and, curiously enough, it again came from the East. In 1789 there appeared in London a book by one Innes Munro, Esq. It was entitled: *A Narrative of the Military Operations on the Coromandel Coast Against the Combined Forces of the French, Dutch and Hyder Ally Cawn from the Year 1780 to the Peace in 1784.* In this book Munro related that the Indians possessed war rockets, "not unlike those our boys are playing with," but consisting of an iron tube, filled with powder and incendiary matter, weighing between six and twelve pounds and fastened to a stick of bamboo between eight and ten feet long. The range of these rockets was estimated to be around one and a half miles. Munro stated that it was very difficult to aim these rockets but reported that they did much damage nevertheless, especially among the cavalry of the British.

It was probably this report that caused the French "Citizen Chevalier" to experiment with war rockets near Paris in 1799. The rockets were fired against a large square of canvas which served as a target. Some of them missed and a few tore through the fabric without doing any further damage. But those that stuck to the



ROCKET, WAR, 24-pr. MARK VII (c)
1—Cast iron. 2—Hardwood. 3—Driving charge. 4—Steel tubing. All measurements in English Imperial inches. (From *Treatise on Ammunition*, British War Office, 1905)

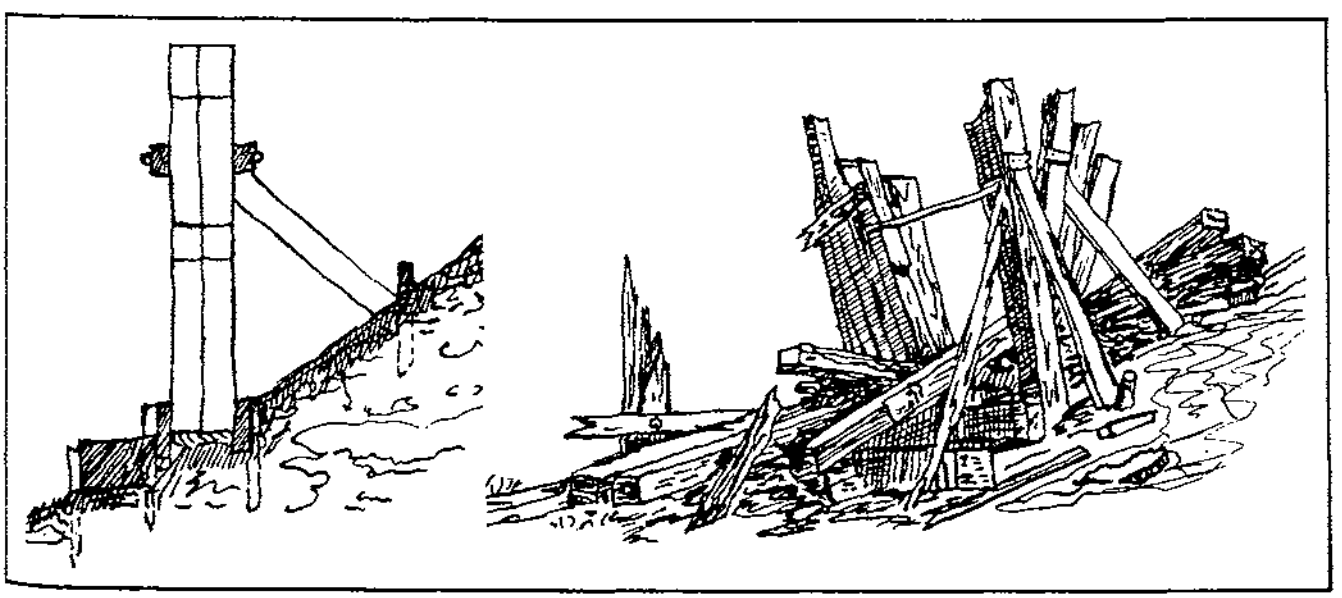
target—they were covered with some kind of sticky resin—ignited it immediately.

When the British troops attacked Seringapatam in 1792 they were again greeted with war rockets and Colonel Dirom of the British Force had to report that there were "a good many wounded, though in general but slightly, chiefly by rockets."

The Indian potentate responsible for the creation of a special corps of rocket throwers in his private army was Hydar Ali, Prince of Mysore. His rocket corps numbered 1,200 men, but his son Tippoo Sahib increased the number to 5,000. It seems that the rockets had been improved also, at the siege of Seringapatam in 1799 the Indian war rockets proved quite destructive and must have carried an explosive charge. An eye-witness, Lord Egerton of Tatton, spoke of "rockets of uncommon weight" and another eye-witness, Colonel Gerrard, saw three British soldiers killed and four others wounded by the explosion of a single rocket.

The news caused much excitement in England and a British officer, Colonel William Congreve, (later General and Sir) conceived the idea of duplicating this "new" weapon in England and of improving it with the superior science and better technological methods of the Western world. Contrary to common belief Congreve never saw the Indian war rockets in action, because he never went to India.

In a treatise published in 1807 Colonel Congreve wrote that he had conceived the idea of his war rockets in 1804. "I knew that rockets were used for military purposes in India; but their magnitude was inconsiderable and their range not exceeding 1,000 yards. . . . I immediately procured, at my own cost, the largest rockets I could get made in London, but found, on trial,



Effect of a Congreve rocket with explosive charge on a target wall erected of planks of oakwood about six inches thick

that none of them was capable of more than five or six hundred yards range."

After trying out various methods he eventually obtained ranges of 1,500 yards "from the same class of rocket which at first would range only 600." He then applied for permission to use the Royal Laboratory and soon a range of 2,000 yards was obtained. One year later, in 1805, he demonstrated the use of his new weapon to the Prince Regent. Later in the same year he accompanied Sir Sidney Smith in a naval attack on Boulogne, France.

What actually happened during that first trial of his rockets and what results were obtained is somewhat mysterious. The Encyclopedia Britannica says that "the weather prevented the use of the rockets." French and German history books claim that about 200 rockets were fired but without results worth mentioning. Only three houses were set afire by the 200 missiles, French sources claim, and those fires were quickly extinguished by French soldiers who carried the empty shells of burned out rockets through the streets of the town, laughing and joking about the "English fireworks." It may be, however, that these claims refer to the second attack on Boulogne in 1806 which was termed "very effective" by the British.

There is no disagreement whatever about the effects of the next attack with Congreve rockets, during the siege of Copenhagen in 1807. The British discharged large numbers of Congreve rockets—estimates vary from 20,000 to 25,000—and the greater part of the city burned to the ground. Incendiary missiles were terribly effective against the average structures of that time. Congreve had other than incendiary rockets made early in the course of his experimentation, as the following table, taken from his "Concise Account etc. . . ." proves. In that book the table is headed: *List of the different Species of Rocket-Ammunition hitherto made:*

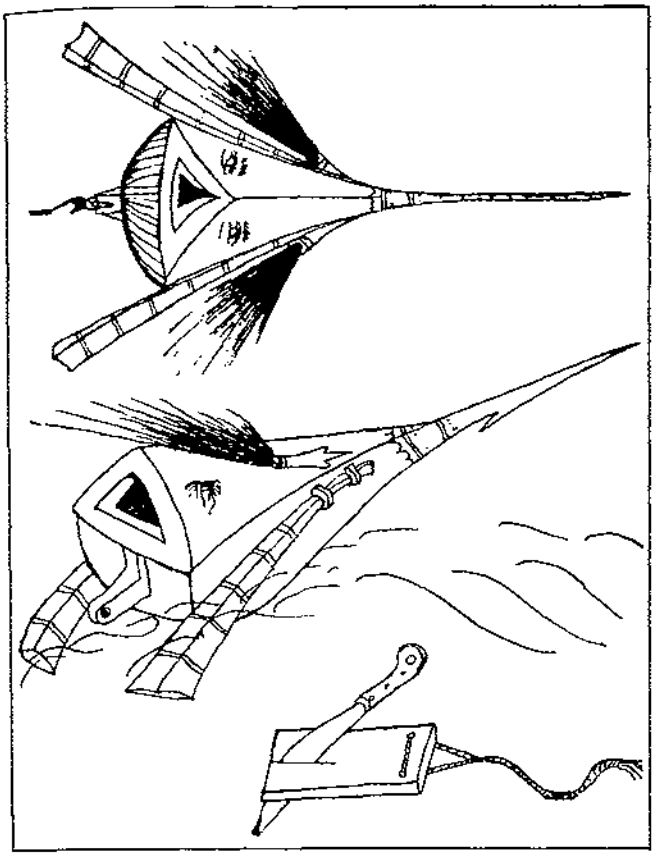
Congreve himself had hoped from the outset that his war rockets would replace artillery completely, especially for land warfare. The British authorities, however, while watching his experiments and considering his proposals made up their minds that this was an excellent weapon for naval battles. It must be remembered that naval engagements were close range encounters at that time and that the high masts and the huge spread of canvas were towering, easy and inflammable targets. Consequently Congreve's rockets were first used from small boats and barges. Congreve liked to term his rockets the "soul of artillery without the body" since they needed no ordnance to project them; thus, naval men said, they were excellent artillery for vessels too small to carry real artillery.

The launching mechanism was as simple as possible on those "rocket boats." It consisted of an extra mast with a ring of iron to accommodate the guiding stick of the rockets. This ring could be adjusted in varying heights to determine the elevation of fire.[2] The equivalent of the "launching mast" for land warfare was a wooden rack looking somewhat like a very wide stepladder, later cannon like launching tubes of copper were employed and found to be very satisfactory.

The rockets themselves consisted of an iron shell containing the driving charge to which the "head" (incendiary carcass or explosive bomb) could be attached. The long and heavy guiding stick was at first fastened to the driving shell in the customary manner of sky rockets. When it was found in the course of experi-

[2]Later this design was greatly improved in attaching a launching device resembling a very narrow stepladder to the launching mast. The rocket rested on the rungs of the ladder the head of which could be fastened to the mast at varying heights. This design was ready in 1816. British "rocket boats" (or "rocket flats") played an important rôle in the bombardment of Algiers on August 27th, 1816 where the Dey's forces were bombarded into submission. Five gun boats, ten mortar boats (launches belonging to the fleet), eight rocket boats (flats belonging to the fleet) and thirty-two gun boats (barges, yawls, etc.) took part in the bombardment; the rocket boats were equipped with 2,500 rockets, not all of which were used.

Nature of Ammunition	Armed With	Extreme Range	Elevation for Extreme Range Not Less Than
	Carcasses:		
42 lbs. Carcass Rocket	large 18 lbs.	3,000 yards	60°
	small 12 lbs.		
42 lbs. Shell Rocket	Shells 5½ lbs. or 12 lbs. spherical	3,000 yards	60°
	Carcasses:		
32 lbs. Carcass Rocket	large 18 lbs.	2,000 yards	60°
	medium 12 lbs.	2,500 yards	55-60°
	small 8 lbs.	3,000 yards	55°
32 lbs. Shell Rocket	9 lbs. spherical shell (bomb)	3,000 yards	50°
32 lbs. Case Shot Rocket	large 200 carbine balls	2,500 yards	55°
	small 100 carbine balls	3,000 yards	50°
32 lbs. Expl. Rocket	strong iron cones 5-12 lbs. of powder	2,500-3,000 yards	55°
12 lbs. Case Shot	large 72 carbine balls	2,000 yards	45°
	small 48 carbine balls	2,500 yards	45°
Rocket Light Balls	(Flare Rockets equipped with Parachute.)		



Torpedo from the Sketchbook of Joanes de Fontana about 1420. Top and side view. The painted eyes are plainly visible. The small picture at the bottom apparently refers to a trailing "tail" like that of a kite; the dagger stuck into it is to signify that the whole structure is built of wood.

mentation that the off-center weight of the guiding stick impaired accuracy too much the center line stick was introduced. This was accomplished in attaching to the upper end of the guiding stick a two pronged fork with prongs about five or six inches long. The two prongs in turn were attached to a ring which fitted around the exhaust nozzle of the rocket shell. Since it was found that a two-pronged fork failed to keep the heavy stick in perfect alignment three- and four-pronged forks were built, the three-pronged variety seems to have been the most common form.

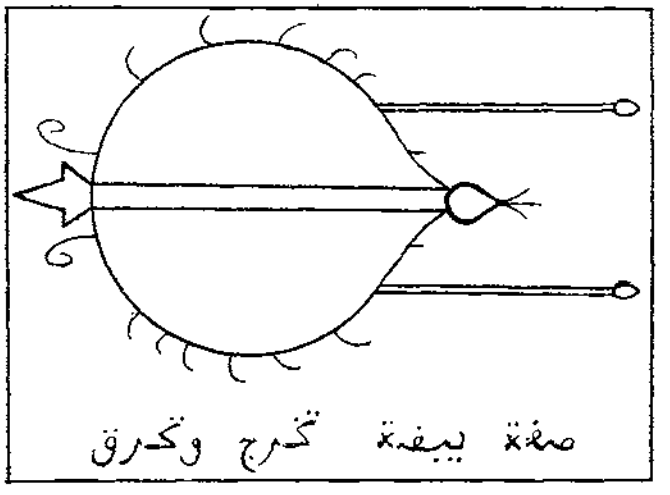
"In September, 1811," to quote from H. B. Latham's article on the history of the British Rocket Brigade,[8] "Congreve's experiments had so far impressed the Board of Ordnance, that they placed at his disposal a detachment from the Horse Artillery at Woolwich commanded by Second Captain Richard Bogue and consisting of one N.C.O. and thirty men. His experiments now continued both at Woolwich and Bagshot until the middle of May, 1813, when a select committee of artillery officers reported that 'they were unable to offer any opinion as to their utility and recommended that a trial should be made with them upon actual service.' The Master-General of the Ordnance concurred in this recommendation. By this time the original small detachment had grown considerably. Lieutenant Thomas Strangways had joined it in October, 1812, and now with the order to proceed on 'Active Service' immediately, it was granted the right to style itself 'The Rocket Brigade.' "

The "active service" consisted at first of participation in the battle of Göhrde (September 16th, 1813) where the Congreve rockets made a rather bad showing. They proved inaccurate and scored only a few direct hits, much impressing the French commander of the opposing forces, however.

Things were different at Leipzig (October 16th to 19th, 1813) where the Rocket Brigade joined in the second attack on the village of Paunsdorf in the afternoon of October 18th. Bogue opened fire at a very close range, scoring very many direct hits. The French fell back, but Bogue's assault at the head of the dragoons escorting his Rocket Brigade proved premature and it was not until after Strangways brought up the rockets for close support that French resistance collapsed. The village of Sellerhausen was the next objective, but Bogue was killed by a bullet before the attack started. Strangways took command and directed fire so effectively that the Allied troops took this village away from Napoleon's soldiers after a fairly short fight. However, the French retook the village with a counter-attack performed by the Old Guard of Napoleon's army.

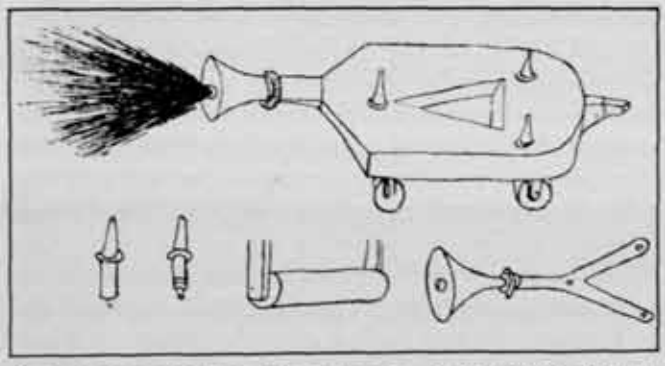
The Rocket Brigade took no part in the actual taking of Leipzig, but was granted the right to bear the word "Leipzig" on their appointments.

Another famous battle of the same year where rockets were used is that of Danzig. English transport ships that arrived in July—during an armistice—brought artillery and other war material, including 3,500 Congreve rockets of the incendiary type. After the armistice had



The "self-propelling and combusting egg" of Hassan Alrammah. The short curly lines are to indicate that the torpedo is to swim on the surface

[8] "The Rocket Service and The Award of the Swedish Decorations for Leipzig," by Captain H. B. Latham, R.H.A. *The Journal of the Royal Artillery.* Vol. LVI, No. 4, January, 1930, pages 419-452.



Rocket-propelled car. From Joanes de Fontana's sketch-book

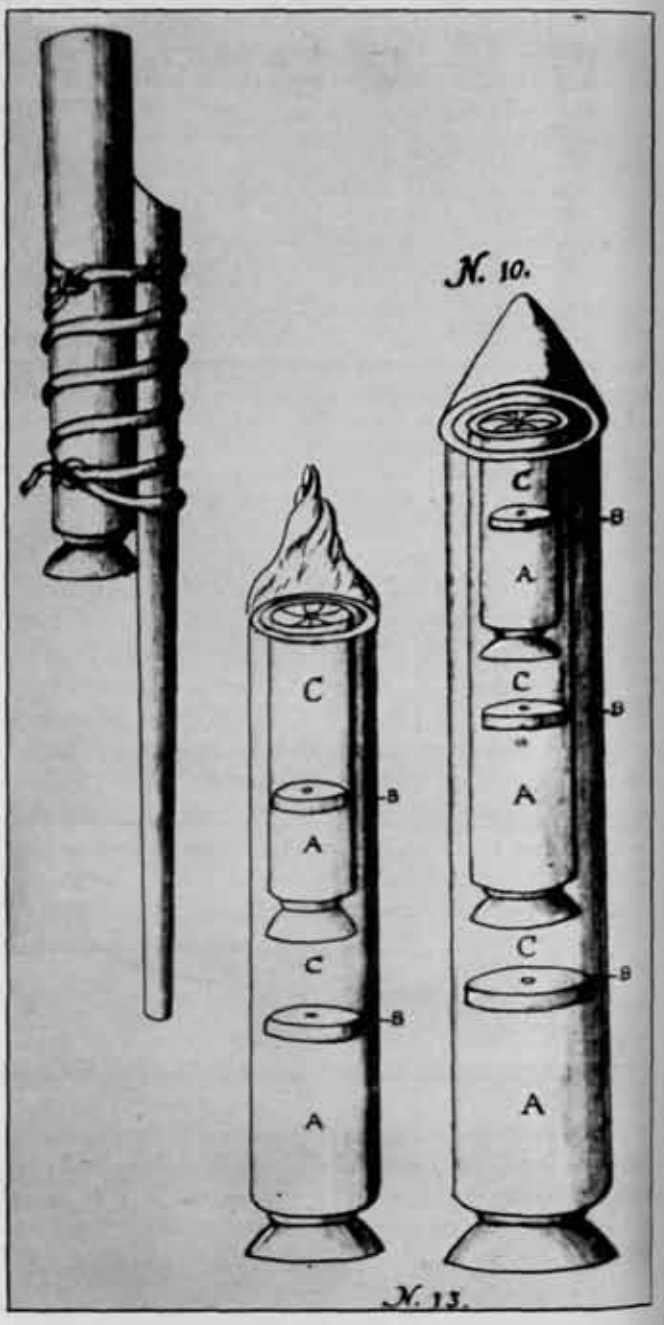
expired the first bombardment of the city was ordered on August 26th. But the rockets did not do any harm; as in Boulogne they were carried around in the streets and a few business-minded people secured them for "semi-permanent" exhibits. The next bombardment on September 10th was more effective; twenty-three buildings were set afire, among them the hospital of the Dominican monks with 700 beds, occupied mostly by Russian prisoners of war. On October 20th Duke Alexander of Württemberg ordered another bombardment which meant the end of the siege. The rockets fired the food storage buildings so that the city was forced to surrender on November 27th.

It is not surprising that the commands of all other European armies were striving desperately to learn the secret of Congreve's rockets after these conspicuous applications. Experimental laboratories were established in virtually all European countries by their respective governments. The experience gathered by those laboratories must have been fairly much alike everywhere because the final results differed only slightly, but it seems just the same as if the British succeeded in keeping their original designs secret. In 1817, when many other nations already boasted war rockets of their own manufacture and about as effective as those of Great Britain Sir William Congreve still wrote in the introduction to his *Concise Account:* "I have cautiously avoided any disclosure which might lead to a discovery of the interior structure and combination of the Rocket."

This book was, incidentally, mainly a political-military pamphlet instead of what the term Account seems to indicate, i. e. an engineering description. Congreve had apparently been attacked by artillery officers as to the efficiency of his rocket system and he violently defended its superiority as compared with the artillery of his time. He always put emphasis on the superior mobility of rocket equipped bombardment groups and when mentioning the fact that the 32-pound rocket contained about seven pounds of carcass composition he did not forget to add that the ten-inch mortar fired bombs with the same weight of carcass composition. But the range of the ten-inch mortar was only 2,000 yards at the very best and it was "the most ponderous piece of ordnance."

Somebody must have said that the incendiary rockets lost most of their terror as soon as the enemy got acquainted with them and that soldiers, after having learned that there was no immediate danger to them, could easily extinguish incendiary rockets that fell close to them. Congreve's reply was very definite:

"A certain portion of the rockets have a 6-pounder shell or a cylinder, holding nearly one pound of powder, contained in the carcass which bursts during the combustion; nor can the enemy distinguish the one sort from the other, and will, therefore, avoid all. But in addition to the above precaution, every rocket contains a certain quantity of smoke-ball composition; and the suffocating quality of this matter is well known to



Multiple powder rockets as pictured in a book on fireworks, printed in Austria about 1625

be such, that no person can exist in the room where it has burnt but a few seconds."

The question which type of weapons, rockets or artillery, was the more expensive was answered by a little expense account for either sort.

ROCKETS

	£	s.	d.
Case complete	0	5	0
Cone	0	2	11
Stick	0	2	6
Rocket charge	0	3	9
Carcass charge	0	2	3
Labour, paint etc.	0	5	6
	£1	1	11

TEN INCH MORTARS

	£	s.	d.
Carcass charge	0	15	7
Powder charge	0	1	0
Cartridge, etc.	0	1	0
	£1	2	7

(Plus the cost of the mortar.)

It was Congreve's dream to construct rockets weighing 500 or even 1,000 pounds and drawings for 8-inch rockets were found later among official reports. They were never built.

In the meantime army experts of other countries were furiously at work. The Dutch army started experimentation in 1816, at first with Congreve rockets of British make. But the results were so unsatisfactory (probably because the rockets had been stored for more than a year) that the experiments were discontinued as soon as the supply was used up. Ten years later, in 1827, stickless rockets with three stabilizing vanes were proposed by the Dutch Captain de Boer. They were made and tested, but two years later British rockets were ordered again for renewed experiments. The Dutch seem to have had particularly bad luck, they finally decided not to use rockets at all, except in colonial warfare. Actually Dutch rockets won (in 1825) a seemingly hopeless battle against about 5,000 native warriors in Celebes.

Another army where much attention was paid to rockets was the Polish. They did not rely on British rockets but made their own experimental rockets from the start. In charge of the work was Captain Joseph Bem. He compared his rockets to a light Russian field piece (the so-called *unicorn*) and stated that they had a slightly longer range, that they were at least as mobile and much cheaper.

The French army experts were doubtful at first and the *Aide-mémoire à l'usage des officiers d'artillerie de France* of the year 1819 came pretty close to stating that everything ever said in favor of war rockets had to be regarded as imaginative exaggeration. But the French did create a special commission for rocket research and various types of rockets were constructed and tested. They strove to develop a rocket as short and as heavy as possible, their largest model had a weight of close to twenty kilograms. Its range was two miles. Military books—secret at that time—stated that those rockets penetrated between three and six feet of sand at a distance of 100 yards. The explosive force of the bombs carried by those rockets was very high, their destructive effect surpassed that of comparable artillery shells by far.

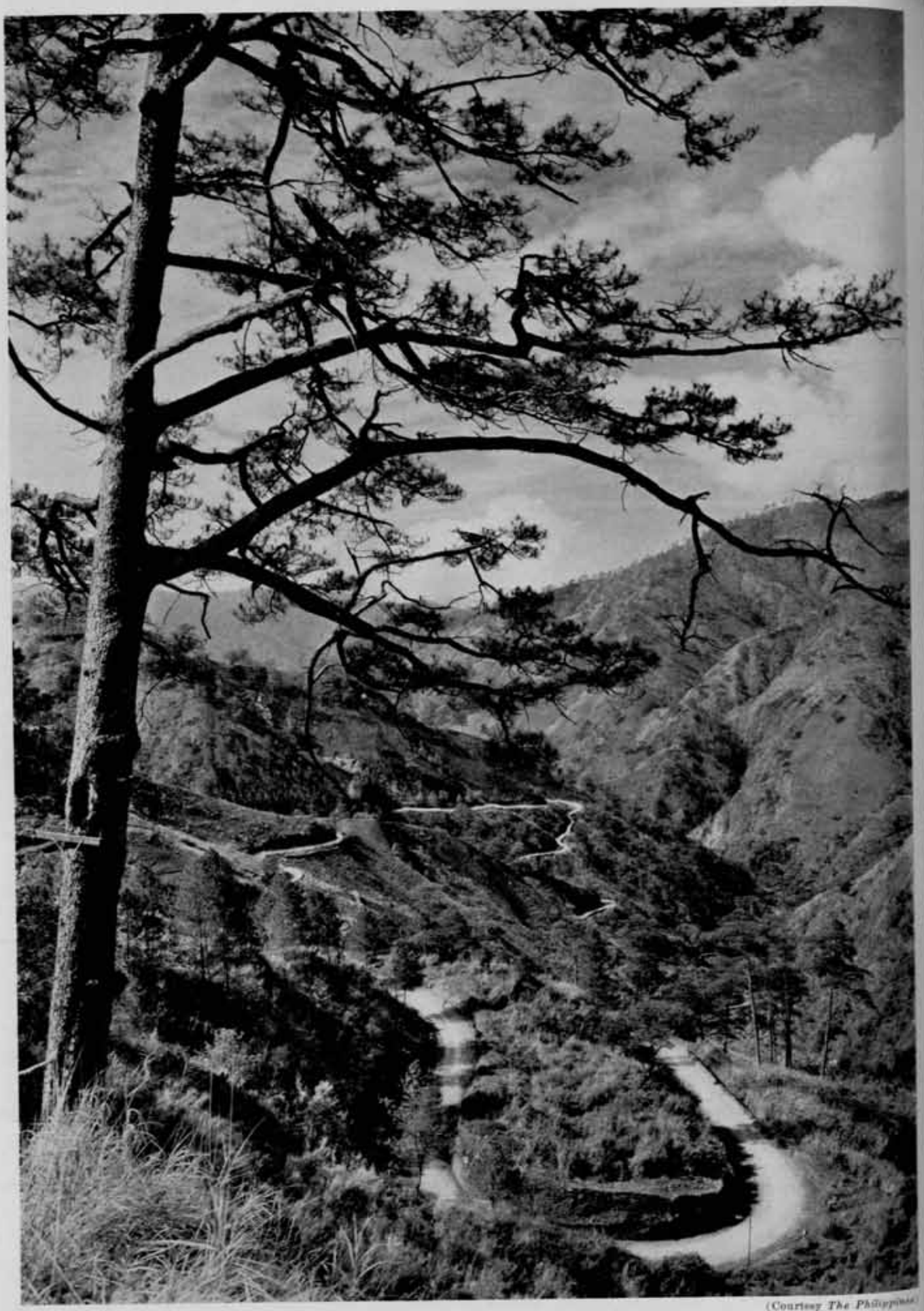
The Danish army assigned the development of war rockets to Captain Schuhmacher. It seems that Captain Schuhmacher, who worked on a lonely island in the Baltic in a specially equipped laboratory (all his workers were convicts) was very successful, but nothing was ever published. We know about these experiments only through a few notes made by the French Captain Brulard who visited Schuhmacher's island with the special permission of both governments, his own and that of Denmark. The Danish experiments were surpassed in secrecy by the Swedish, all that is known is that the officer in charge of the laboratory had the name of Schröderstjerna.

The most extensive use of war rockets, however, was made by the Austrian army. They used only the stickless rockets originally invented by William Hale near the end of the first half of the last century and proudly recorded a long list of battles and minor engagements in Hungary and in Italy that were decided in favor of the Austrians by the rocket batteries. In Switzerland everything was organized down to the smallest detail for the creation of an independent rocket corps, but it was never actually formed.

None of all these rocket corps was very long lived, in 1860 only that of Austria was left. It was dissolved seven years later, after it had failed in the war against Prussia. The Prussian *Feuerwerks-Abteilung* served only as a commission for the study of rockets for military purposes. When after the war against Napoleon III in 1870-71 the Prussian Army underwent complete reorganization the rocket department quietly disappeared from history.

There has been a revival of interest in rockets during the present war. Major General J. F. C. Fuller, British Army, Retired, in an article in *The Gunner*, quoted in part in the January-February, 1941, issue of the COAST ARTILLERY JOURNAL, mentions the rocket as the possible "secret weapon." He indicates that directional control is all that is needed to make rockets effective weapons. Controls similar to the clever ones for controlling naval torpedoes are possible for use in bombing large targets.

If defense against the night bomber becomes more effective, as recent developments hint that it might, there is even greater possibility that some form of rocket may be evolved to take the place of night bombardment aviation.



(Courtesy *The Philippines*)

Zig-zag Road to Baguio.

Trip to Baguio and Banaue

By Colonel Joseph T. Cottrell, Coast Artillery Corps

No tour of duty in the Philippine Islands is complete without a visit to Baguio, the beautiful mountain city once known as the "Summer Capital" and visited mainly in April and May, but now a year-round recreation center. This change in character came principally with the construction of the two dependable mountain roads from the lowlands but was also helped along by the "gold rush" of 1933 which brought with it increased and all-year commercial and social activity to this attractive place.

In spite of the fact that it was cool enough at night at Corregidor to make a blanket or two feel comfortable, we could not resist the opportunity offered by the holiday season and decided to make our visit then. From Manila, Baguio is only one hour by plane, or about six hours by train in comfortable air-conditioned cars, with the last hour by bus over the mountain road up Bued Canyon. However there are so many advantages in travelling by private transportation that we planned our trip that way. We spent the night of the twentieth of December in Manila with friends, and early the next morning started north for Baguio in their car, through the sugar cane and rice fields of the flat central plain. When we were nearly to the Lingayen Gulf we turned a little to the northeast and struck into the mountains. At first we drove along the bottom of a deep gorge where the air began to cool as we went deeper into the mountains. It was really a good two-way road, although very narrow and a bit thrilling on some of the turns. The cliffs went almost straight up above us and occasionally we would pass a rock about the size of a house that had come down from above, and some of these had dates on them of only a few years past. The biggest thrill of the ride however was when we started up the famous "Zig Zag." To tell the truth we went up so fast and made so many sharp turns that we really did not see much of it and when we got out of the car at Camp John Hay on the upper level some of us were dizzy and could hardly walk straight.

Camp John Hay is really a beautiful spot on top of a 5,000 foot mountain well up among the pine trees. It might better be called a plateau for it is relatively flat on top, and there is plenty of room for the army post with its eighteen hole golf course, a civilian colony with its country club and the small city of Baguio which is on a slightly lower level.

Mess Hall at Camp John Hay. (Philippine Tourist Bureau)

Golf Course at Camp John Hay.

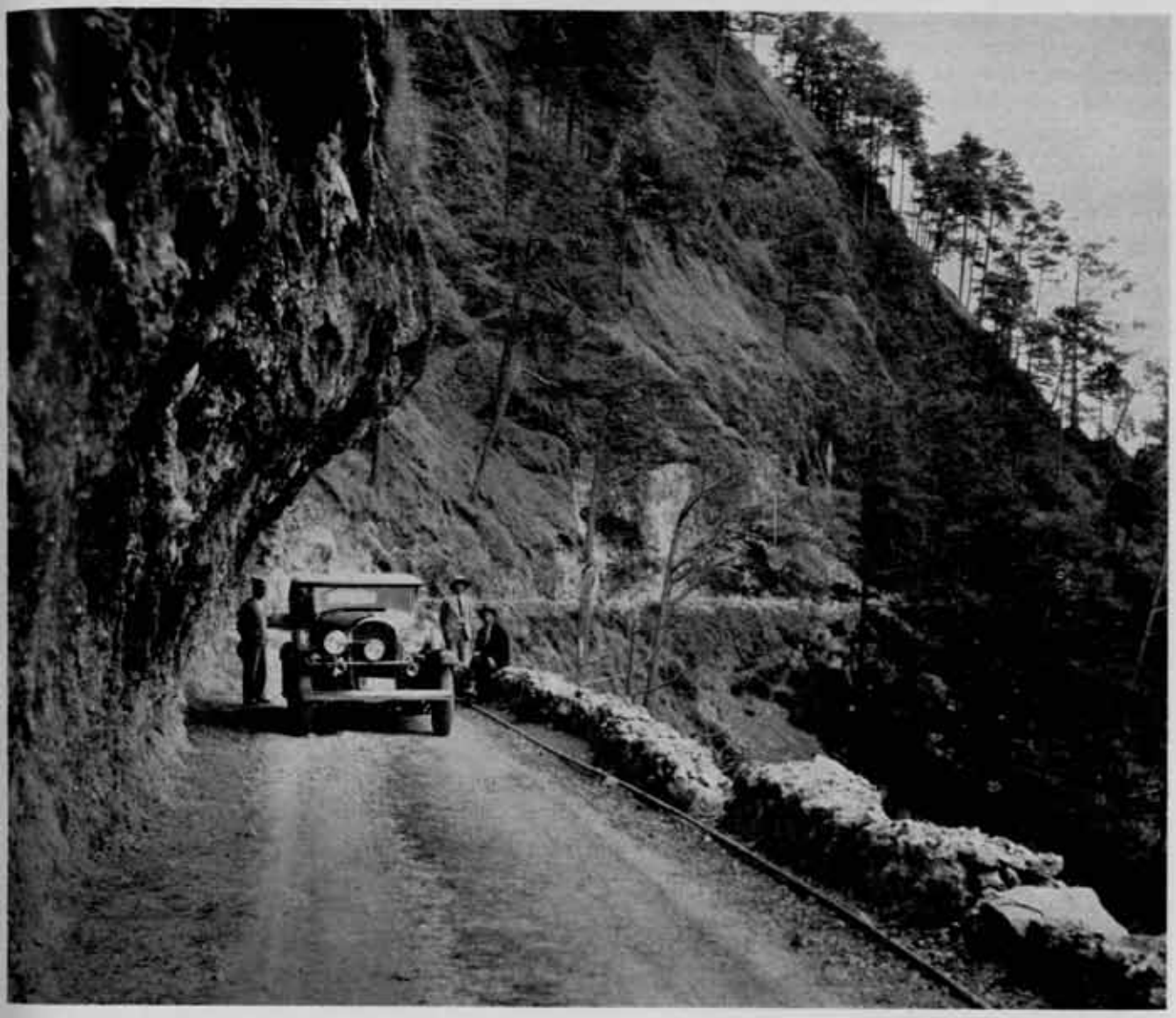
The post was started in the early days as a recuperation center for the army and is a wonderful place to relax and get away from the heat. Most of the activity is centered around the "Officers Mess" where nearly every one has his meals and where rooms are available for quite a number. There are also some small cottages grouped around in the same general vicinity and we were fortunate enough to be assigned to one of them. Believe it or not, we had a log fire blazing in our living room most of the time! Under such pleasant circumstances we completely relaxed and forgot that there was a war going on anywhere in the world. In the mornings we drove around, visited native markets and mission schools to buy souvenirs and other plunder while in the afternoon there was golf and in the evening we just sat around before a fire and talked to friends as long as we could hold our eyes open. It was an ideal place for rest and change in the midst of gorgeous mountain scenery, with just enough cocktail parties to add a little spice and Christmas cheer.

The people up in the mountains are entirely different from those down in the lowlands. There are about ninety-six different tribes in the Philippine Islands and those up in the mountains are called Igorots. They are non-Christian and were formerly headhunters but are supposed to have reformed under pressure. In fact, there hasn't been a head hunting expedition that broke into the newspapers since last May when a small band attacked another "barrio" or village and there was a net loss of seven heads. They seem to like Americans pretty well, however, and so we decided to take a three day trip up into the heart of the head-hunting country and see it for ourselves.

A party of nine of us started out in a special bus early on the 27th and headed north for the town of Bontoc, which is more or less in the center of things and boasts of a rest house or so called "hotel" where we could stay over night and get something to eat without being too much afraid of the lack of sanitation. The paving soon disappeared from the road and it became a rough and rocky single-way dirt road, chipped out of the side of a mountain ridge. It developed more curves than a pigs tail. One section, nearly a kilometer in length, had been blasted not out of a rocky slope, but from the sheer face of the limestone cliff that forms the eastern end of Mount Data. It is said to have taken six months to build, and cost several lives. The roadway is well protected by a retaining wall and instead of being dangerous as it looks is really perfectly safe because of its solid bed and the absence of slides. The scenery was beautiful and, as the air was clear, we had wonderful ever-changing views of the green valleys a couple of thousand feet below us whenever we could forget about the road long enough to take a good look. The road was very narrow—so narrow that traffic control-gates, connected by telephone, were placed about every five kilometers to insure that traffic would flow between gates in only one direction at a time. It was surprising how seldom we had to wait for something coming the other way and it certainly made driving a lot safer.

The road seemed to stay well up on the ridges most of the time and got up as high as 7,800 feet but long before that we had to get into our overcoats and wrap up in blankets. After we started down from this high point we began to see more people along the road and we seemed to be as much of a curiosity to them as they were to us. They were very dirty and wild looking but seemed very friendly and when we waved they would all smile and laugh and wave back. I think it amused them to see us all wrapped up for all the clothing that custom seemed to require of them was a gee-string and a hat for the men, a piece of cloth wrapped around the hips and reaching to the knees for the women, and principally nothing for the small children. Of course lots of them had been touched by civilization to the

Baguio—A mile above sea-level. (Courtesy The Philippines)



"The roadway is perfectly safe." Baguio to Bontoc. (Courtesy *The Philippines*)

extent of a shirt, a small jacket, or a piece of cloth over their shoulders but it was very evidently not considered necessary. As a matter of fact their reddish brown skin seemed to take away the effect of nakedness and we soon took it for granted.

The men all carried long knives, which of course they use for working, and occasionally one had an ax, shaped like a head ax but really for work, while a very few carried spears. The women had plenty to keep them occupied for most of them had babies tied on their backs and carried heavy baskets on their heads. The men were not very tall but were of very sturdy build with well-developed legs and a lively springy walk while the women were, one might say, built close to the ground since they were very stocky and strong. They did not seem to mind a little dirt and their hair looked matted and greasy and disorderly, but their eyes were bright as jet buttons and they had happy smiles, especially the little children that swarmed around the bus every time we stopped for a gate.

As we came down into the valley approaching Bontoc we got our first view of the rice terraces but by that time we were so tired from bouncing around on the rough road that about all we thought of was reaching our destination and having a chance to stretch our legs.

We were a bit surprised at Bontoc for, at first glance, it seemed to be more or less like any native town with wooden stores and houses along both sides of the main roads. While we were wandering around, a native, who could speak a little English, volunteered to show us the place. He was evidently the town dandy, as he sported a gee-string of bright blue print cotton cloth of American or Japanese manufacture, and he seemed to be the best available guide.

We engaged him, and then learned from him that there were really two entirely different towns side by side. The one we had first seen was the Philippine government town occupied by merchants and the lowlanders who had come to rule while off a little to one side and up the hill was where the real natives lived

just as they had for centuries. Their houses were little more than thatched roofs of palm or straw that came practically down to the ground at the eaves and were entered by a small wooden door at one end that was not more than two feet by three feet in size. It was too small to go in but we took a good look and had no desire for closer acquaintance. There were no windows or openings for smoke to get out and nothing but a dirt floor which was not too clean. The only furniture that we could see was in the "Olog" or girls dormitory where there were a few planks raised about a foot from the floor to form a sleeping bench. Of course, except in wet weather, they do most of their cooking and living in a small open space just outside the house and we had a full view of their primitive life as we walked around. Our attention was a bit distracted, however, for almost every house had beside it a small round pit about three feet deep with walls of mud and stone in which were one or more pigs, and the only walk was along the top of the wall between these pits. We did not relish the thought of what a single misstep might mean but managed to get through without accident.

Although there were not more than a few hundred huts, the people of the town were apparently divided into a number of subdivisions called atos, each under control of a headman who settled all disputes and maintained order. The guide's English was not too good but, as far as we could find out, it seemed to be a family organization. We visited one old fellow who was sitting around with some of his retainers and he struck me as being a rather wise old chap with a decisive manner but with a touch of humor and tolerance. We made friends by presenting a box of matches, and the natives were apparently amused by our visit. It was just about as primitive and savage an existence as could be imagined and we were struck by their lack of appreciation of money. Wealth to them meant rice fields, carabaos and pigs and the thing that they wanted most from us was matches although they always seemed to keep a fire going. As far as we could see they never used a match to light a pipe but always a brand from the fire so, apparently, matches were valuable.

We finally got back to the hotel which was certainly not much to brag about. It was no more than the second floor of a store that had been cut into little rooms by thin board partitions but it seemed like a palace to us in comparison with what we had just seen. After a little rest and a rather terrible dinner we were about ready to call it the end of a perfect day when our guide of the afternoon turned up with the information that there was to be a native dance.

It did not take us long to get up a party of about a dozen Americans and we started out after our gaily-dressed guide. We thought that the place was close by, so very few had the foresight to take flash lights, but the guide headed for the river bridge and the open country on the other side. After walking about a half mile we turned into the rice paddies and there the going

Bontoc.

(Courtesy *The Philippines*)

Rice terraces near Banaue . . . the steps are often as high as a house.

began to get pretty rough. Everyone got as close to a light as possible, especially after we got to the little native barrio and began stumbling along the walls between pig pens. We could hear the gongs in the distance . . . a weird sound in the darkness.

We finally reached the small open space between the huts where the dance was going on to the music of gongs. There was a fire in the center surrounded by a circle of natives standing six or eight deep, leaving a small ring for the dancers. It was their party and they paid very little attention to us but our guide finally managed to get us a place in the crowd from which we could see everything that went on around the fire. We were certainly right in the thick of it.

The dance team consisted of eight or nine men in their gee-strings and little round hats who danced around the fire beating gongs with a wild sort of rhythm. They moved with a queer shuffling side-step in single file around the fire, bending over or straightening up more or less together and occasionally reversing their direction, while all the time their bodies were swaying in time with the gongs. Four or five women were also in the dance a little to the rear and to one side. They went back and forth with the same slow step with their arms outstretched, waving their hands and swaying to the music. Soon the men suddenly stopped, threw down their gongs, and went off into the crowd while another group came out and took their places. They stood around for a moment or two before one of them started to beat his gong and then one by one they took up the time and started to dance and were joined by the same girls who had danced before. It was truly as wild and primitive a scene as one could see, with those nearly naked savages dancing in the fire light to the beat of the gongs.

We got home without anyone falling into a pig pen or turning an ankle and the next morning got an early start in our bus to spend the day among the famous rice terraces near Banaue which was over the mountains to the southeast. We had a steady climb along the side of a ridge through beautiful scenery until we reached the pass at Mt. Polis. There we left the country of the Bontocs and found ourselves among the Ifugaoes as we went down into the next valley. They really did

Land-owner of a village near Banaue—the local rich man.

not look much different from the Bontocs except possibly they were a little dirtier, a little more savage, and a little less inclined to bother about clothes. The demand for matches was also more frequent and more insistent, especially from the children along the road. They were cute, though, for when they saw us coming they would start dancing or would stand on their heads or try to attract attention in some other way and then call MATCHES! They all seemed to have a smile for us and most of them knew how to say "Merry Christmas" or "Happy New Year."

We were most fortunate in having a clear day for as we came down the side of the mountain and stopped at the control gates we were able to get a splendid view of the rice terraces that these people have built clear to the top of the mountains. They are really a remarkable engineering accomplishment. We counted as many as forty different levels on one slope and some one later claimed to have counted sixty. The walls are of mud and stone and represent a terrific amount of labor on the part of these untutored savages. Those who have made a study of the terraces have estimated that there are approximately one hundred square miles of them watered through many miles of ditches and supported by some 12,000 miles of terrace walls in the mountain provinces, which may or may not be true. At any rate we thought that they might well be classed as one of the wonders of the world and could not help but marvel that ancestors of the present natives could have built them over 2,000 years ago, as the story book has it. At Banaue we found several villages more or less close together.

The Ifugaoes live in much smaller villages than the Bontocs and act in smaller groups. All the land worth owning, that is, all the land that can be irrigated, is owned by the ruling families of a village and the rest work for them.

After lunch at the government rest house we went across the river and up the hill to a native barrio where the houses were entirely different from those of the Bontocs. The Ifugaoes build their houses up on four posts about six or eight feet off the ground topped by wooden disks to keep rodents out, and enter them by small ladders which they afterwards pull up and hang beside the doorway. The houses were about eight feet square and had sides but no windows. They were dark and very stuffy as there seemed to be no hole in the roof for the smoke to get out. Some of the houses had various kinds of animal skulls nailed on the outside as souvenirs of past feasts and one had a number of human skulls as trophies of the happy days gone by.

Banaue was the farthest point of our trip and we went back to Bontoc for the night. There some of the party made another visit to the native barrio to see the "Olog" or girls dormitory at night. As soon as children reach the age of seven they leave their homes and go to sleep in the dormitories. There were said to be eighteen of these dormitories in the barrio at Bontoc, apparently about two for each subdivision or family group. These dormitories, in addition to being sleeping places, are schools in which the laws and religion of the tribe are handed down. The girls live in the dormitory from the time they are seven until they are married, which is usually at an early age.

The next morning we left early for Baguio and Camp John Hay. After a rest of a day we joined our friends again for the trip to Manila and made it in time for a late lunch.

Ifugao home at Banaue—(Note construction on posts and ladder for access).

The Church On Wheels

By Elizabeth Pattison Wing

One soldier Priest has brought a dream to fulfillment; his trailer Chapel is the horse-and-buggy of bygone days brought up to tomorrow.

Chaplain Patrick J. Ryan, of the 64th Coast Artillery (AA), has been fulfilling the tradition of the itinerant country Minister. In his station wagon he has moved from camp to camp of the scattered 64th. The travel was not easy, but Father Ryan did not mind that particularly. He did mind the fact that when he reached his destination he could find no really satisfactory place to hold devotions. A mess tent, or a space under the trees, was hardly the most satisfactory place for worship.

To Chaplain Ryan came an idea—why not a traveling Chapel, on a trailer, to carry Chapel equipment and a traveling library? With Chaplain Ryan, an idea means action. Built to his own design, a trailer took shape in the regimental repair shop. It was particularly suited to the needs of the 64th, which spends much of its time in the field. Several enlisted men gave freely of their time and labor to bring the dream into reality.

The trailer is equipped with a movable altar, and has shelves for a circulating library of 300 books. A salvaged truck chassis was the beginning of the project, and much of the material used was also salvaged.

The outside measurements of the trailer are 125½ inches by 89 inches, with a height of 79½ inches. It may be transported with perfect ease over camp roads and can be parked for services on any fairly level ground. When being transported, the altar is locked to the floor in the forward part of the trailer. It is beautifully fabricated of Marlite, a form of Masonite. The altar is fifty-four inches long, twenty-three inches wide, and thirty-six inches high. Castors make it easy to roll it to the open end of the trailer for services, leaving room for the Chaplain's office behind.

The Women's Club of the 64th, ever on the alert to do something useful for the regiment, made the trailer a real part of their lives by making the altar cloths and other pieces needed for the services.

The trailer stands today a monument to the untiring efforts of Chaplain Ryan, who held his first trailer services on Easter Sunday, April 13th. With the aid of a public address system he preached to a congregation of service people. During the Army Day celebration, the trailer was a much-discussed exhibit.

Chaplain Ryan and his trailer chapel

LOOK ALOFT!

By Captain Carl T. Schmidt, Infantry

Early in the morning of May 10, 1940, a battalion of German parachute troops dropped from Junkers transport planes on the outskirts of Waalhaven, the airport of Rotterdam. Bombardment and combat aviation had already won local mastery of the sky. The Dutch troops at the airport—infantry and antiaircraft units—fought bravely. But the suddenness with which the parachutists descended and pressed their attack was too much for the defenders. Within a half hour, the Dutch resistance was overcome. Soon, plane after plane landed, bringing hundreds of air infantrymen. Once securely established on the field, forces were hurried out to seize the nearby bridge from Rotterdam over the Maas. In the meantime, parachutists and air infantry had taken other bridges to the southeast of Rotterdam, bridges that are links in the main line of communications with Belgium and of great strategic importance to the defense of the Netherlands. Throughout May 11-12 German troops continued to land at Waalhaven. By mid-afternoon of the 12th, it was reported, an entire division had been brought in by planes. Dutch efforts to dislodge the forces holding bridges in and around Rotterdam were unsuccessful. On May 13 a German armored division broke through the Dutch positions fifty miles to the east, and by evening it had made contact with the air infantry at Rotterdam. The rear of the Fortress of Holland had been turned by these swift operations. French armored and mechanized troops that had pushed into the southern Netherlands were unable to join the Dutch and were withdrawn. The Dutch Army surrendered the next day.

The attention of the world was thus tragically rivetted on a new way of war—the surprise "vertical envelopment" by air troops. But as is true of almost every discovery that is "suddenly" revealed to an unprepared world, a long period of development and experimentation lies behind the use of air-borne troops in the present war. Techniques and tactical possibilities had been discussed in the military literature for some years. And the Germans were by no means the first in the field.

Historical Background

The idea of the parachute leap is, of course, an old one. Parachutists are said to have entertained the crowd at a court festival in early fourteenth century China. The principle involved was certainly known to Leonardo da Vinci, and a Venetian made a parachute jump from a tower in the seventeenth century. Joseph Montgolfier, who with his brother Jacques invented the first practical balloon, tested various types of 'chutes. In 1785 another Frenchman, J. P. Blanchard, is said to have saved himself by a parachute leap when his balloon burst. A successful jump of 3,000 feet from a balloon was made by Jacques Garnerin in 1797, and five years later he leaped from a height of 8,000 feet. Already before the First World War, the parachute had been proved to be a means of escaping from an airplane. But the early 'chutes were cumbersome, and there was considerable danger of the canopy and lines becoming entangled with the plane. During the first years of the World War itself, only balloonists were equipped with parachutes. Aside from the difficulties encountered in developing compact equipment suitable to airplanes, there apparently was a fear among authorities that parachutes would tempt aviators to abandon ship at first sign of danger. However, mounting casualties led to a demand for a practical parachute for aviators. Such a parachute, automatically opened by a line attached to the plane, was developed in Germany in 1917. It was used by many German aviators. Shortly after the war, marked improvements in design were made in the United States, and the resultant manually operated, "free" type of parachute came to be widely adopted as an essential safety device in military and civil airplanes. At the same time, parachute-jumping developed into

something of a sport. In Russia, above all, it was vigorously promoted by the government during the 1930's. "Parachute clubs" were organized, and jumping from towers and planes became widely popular. In 1937 these clubs were said to have more than a quarter of a million members.

The use of airplanes for landing troops behind enemy lines, too, is somewhat older than is generally assumed. Early in October, 1915, the Germans captured a French frontier guard in the vicinity of Hirson. The guard carried explosives, several carrier pigeons, and written instructions to blow up a section of railway line. He declared that he had been landed by an airplane during the night. A similar attempt was made by the French in July, 1916. This too was frustrated by capture of the soldier before he was able to reach the railway tracks that were to have been destroyed. At dawn on October 2, 1916, a German plane landed a lieutenant of the air corps some fifty miles behind the German-Russian front. His mission was to blow up a portion of the railway from Rowno to Brody, and thus to interrupt Russian transportation. He reached the railway by evening without being detected, and accomplished his mission. Early the next morning he was picked up by his plane. In the following years, a number of effective raids of the same kind were carried out both by the French and Germans. Moreover, shortly before the Armistice, two Italian officers made a parachute descent in the Austrian rear, and were able to secure valuable information. About the same time, Italian airplanes successfully landed a reconnaissance patrol behind the enemy's lines. Plans were made by the Germans in the spring of 1918 to employ twelve to sixteen planes for landing a sizable force behind a weak sector of the French lines. This force was to destroy communications and occupy certain defiles just before the launching of a German offensive. The plans were abandoned, however.

After the war, a number of armies made use of airborne infantry, especially in colonial operations. Thus, during the French Moroccan campaign of 1925 transportation of troops by plane proved effective. Moreover the practical possibility of employing air-borne engineer troops for destruction of communications was demonstrated in French maneuvers during the 1930's. The British, too, undertook such experiments in the Near East. During operations in Iraq, they moved a fully equipped battalion of infantry in transport planes from Suez to Bagdad, a distance of about 750 miles. Similar movements of troops were made by the United States Army. Indeed, it proved the feasibility of landing a machine-gun crew, with gun and ammunition, by parachutes at Kelly Field, Texas, in 1929. In the Abyssinian campaign considerable use was made of parachutes for furnishing isolated units of the Italian Army with large quantities of munitions and foodstuffs. In the advance on Dessie, in the battles of Ascianghi and Ogaden, and in the second battle of Tembien, ground forces were supplied in this manner. Among other things, radio equipment and live goats and steers (live animals rather than meat, because of the great heat) were dropped without damage. An infantry regiment was transported by air to Albania during the occupation of that country in April, 1939. The Germans also employed air-borne troops in the occupation of Austria.

Although a number of army commands had given thought to the possibility of landing large detachments of troops by means of parachutes, as well as by planes, behind the enemy's front, it was not generally considered to have practical military value until the Russian demonstrations of 1935-36. During a review of the Soviet Air Force on August 18, 1933, sixty-two parachutists were dropped *en masse* from three large planes. But this was generally thought to be little more than spectacular propaganda for the Soviet Air Force. However, the Russians announced that training in parachute jumping was to be introduced into the Red Army. And in maneuvers near Kiev during September, 1935, considerable tactical use was made of parachutists for the first time. An attacking Blue Force had pushed the Red lines back, but had not succeeded in its attempted penetration. Thereupon, the Blue commander decided to employ his parachutists and air infantry. As soon as the Blue air force had established superiority over a Red airfield, some 600 to 700 parachute troops with 150 machine guns and eighteen light field guns were dropped on the field from thirty planes. These troops cleared the field for reinforcements of air infantry, tanks, artillery, and supplies. The Blue "island" grew steadily and made for so much confusion and dissipation of the Red forces as to insure a complete success for the blues. The experiment with parachutists was carried further in subsequent maneuvers, and several brigades of air infantry were organized. Publicity was also given to the possibility of dropping political agitators and saboteurs in the interior of a hostile country. By the end of 1937, about 800,000 parachutists—soldiers and civilians—were said to have been trained to jump from towers and 25,000 to jump from planes.

The Russian demonstrations were viewed with considerable skepticism in the outside world. There was some inclination to look upon them as purely theatrical and propagandistic, or at least to insist that masses of parachutists in real combat must become easy targets before they ever could reach the ground. Nevertheless, sufficient impression was made upon the French, Italians, Poles, and Germans for them to begin the organization and training of parachute troops and air infantry. A French school for military parachutists was established at Avignon-Pujout in 1935. About the same time the formation of volunteer parachute units within the German air force became known. The thoroughness with which the German army and air force undertook to develop this new arm has been only too well shown in the present war.

The Russians, it is true, have not fared very well in

their employment of parachutists in actual combat. No tactical successes appear to have been scored with such troops in the Finnish campaign. According to an Italian military correspondent, "the first parachute troops dropped in full daylight from an airplane at a great altitude, and the Finnish patrols spotted them while they were dangling in the air and did not let them reach the ground alive. The Russians then tried to scatter parachute troops at night, but the results were no better. The snow always exposed them, and their tracks led to their capture either by military patrols or by isolated civilians. Among other incidents reported, there is that of a parachutist provided with skis who landed on a frozen lake, where he remained, waiting for the Finns to come and free him from the parachute cords tangled around his skis. . . ."[1] A Finnish officer is quoted as saying that "nothing has been achieved by this secret weapon of Stalin on the Finnish terrain. If there are a few, they are of no value; if many, their fate is sealed."

But it was not long before the campaigns in Norway and on the Western Front proved the tactical and strategical effectiveness of air infantry, given certain conditions of surprise, training, and coöperation with other troops. Small parties of saboteurs are reported to have been dropped in Poland by the Germans during September, 1939. The successful use by the Germans of air-borne troops for the capture of Oslo and for reinforcing their army in Norway is too widely known to bear repetition here. They also attempted some small-scale parachute forays in central Norway, but apparently with no success whatever. Bad weather prevented the reinforcement and supply of these troops, and they were soon disposed of by the Norwegians. Moreover, poor visibility forced them to jump from very low altitudes, and a number were injured in hitting the ground. On the other hand, the isolated German troops holding part of the railway from Narvik to the Swedish border were reinforced and provisioned by means of parachutes, and this doubtless helped them to hold out until the Allies withdrew from Narvik. As we have noted, the parachute attack upon Waalhaven was highly effective, in that it permitted the infiltration of air-borne forces that were able to seize and hold bridges and other important approaches to the rear of the main Dutch forces. A similar attack upon The Hague was broken by the defenders, but inasmuch as it required the diversion of considerable numbers of Dutch troops, it too must be considered to have had strategic significance. The Germans employed parachutists in Belgium and France—and certainly they spread confusion in rear areas by the threat of sudden thrusts by air troops. Eben Emael apparently was taken with the help of troops who landed from parachutes or gliders within the fortress itself, but little specific information is available on this. The seriousness with which the British have made preparations against an air invasion is common knowledge. Plainly, the parachutist and air infantry arm may no longer be disregarded anywhere. Properly employed, it can well have a very important tactical and strategic influence. It may be of interest, therefore, to review such foreign opinions on training, techniques, and tactics as have appeared in print.[2]

[1]Hamed Venanzi, "Parachute troops and the War," *Nazione Militare*. March, 1940

Training

In general, it is agreed that training in actual jumps from airplanes must be preceded by theoretical and practical lessons in the construction of parachutes, in methods of packing, handling, and taking care of them, and in packing and unpacking the containers that carry weapons and supplies. There must be thorough instruction, on the ground, in methods of opening the parachute, leaving the plane, controlling the body and 'chute so that a safe landing may be made. This preliminary training is often followed by practice in jumping from a high tower, intended to accustom the beginner to the sensation of falling. The greatest psychological difficulty to be overcome is the frightening thought, "Will it really open?" "What if it doesn't open?" that comes just before the leap is to be made. Anything that will build up confidence is therefore of great importance. Leaps from parachute towers, ski jumping, and dives into water from high spring-boards are said to be useful for this purpose. A few jumps from a tower are enough to dissipate the parachutists' apprehension. At any rate, only a small percentage of jumpers are unable to surmount this mental barrier. But towers also have their disadvantages: The leap is made with the parachute already open, and the jumper may get used to that. In exceptional cases, he may even forget to open the parachute when he jumps from a plane —that is, if he is equipped with the manually operated parachute. Furthermore, unless the tower is equipped with a lift, the jumper must climb steps to the platform, and this adds to his nervousness. (In Russia, a catapult has been developed for the purpose of escaping some of the disadvantages of the tower. A blast of air opens the parachute and at the same time the jumper and parachute are thrown upward about 100 feet.) The Germans apparently do not use towers at all. The training in actual jumps from planes should include practice in guiding the opened parachute to a predetermined spot on the ground, in learning to delay opening of the parachute, and in coördinated mass jumping, and—if the non-automatic 'chute is used—in delaying opening of the parachute.

For military purposes, parachutists should drop as

[2]Among the most informative discussions are: Major L. Schuttel, *Fallschirmtruppen und Luftinfanterie*, Berlin, 1940; Lt. Col. Bassenge, in *Deutsche Luftmacht*, January, 1939; Major J. T. Godfrey, in *Journal of the Royal United Service Institution*, August, 1935; Captain V. Nikolsky, in *Krasnaya Zvyezda*, July 10, 1940 (English digest in C. and G.S.S. *Military Review*, December, 1940); L. Susani, in *Nazione Militare*, July-August, 1940; Major Eggebrecht, in *Militärwochenblatt*, October 4, 1936; Lt. Col. Leon, in *Ibid.*, April 30, 1937; Captain Koch, in *Ibid.*, November 26, 1937.

rapidly as possible. This makes it easier for all of them to land within a relatively small area. It also gives the defending troops less time to take action against them. Pictures of the swarms of Russian parachutists floating slowly earthward from great heights, like so many enormous thistledowns, certainly make them appear to be easy targets. Therefore effort must be made to train the jumper, either to delay the opening as long as possible, or to jump from a relatively low altitude. The German parachutists leave the airplane at very low altitudes, apparently not more than 300 feet. That is, they are in the air less than five seconds. Some men may be injured when landing after such a short jump, but it is felt that this is more than outweighed by the advantages of great speed. Combat also requires ability to jump at night. Special training is needed for this purpose, inasmuch as it is not only difficult for the jumper to orient himself at night but also for him to tell how close to the ground he is. Russian training includes jumps in bright moonlight as well as on dark nights. For air personnel likely to operate over lakes and seas, practice in jumping over water is essential.

Techniques and Equipment

Parachutists and air-borne infantry may be used in small or large numbers, independently or in conjunction with each other. The situation and mission will determine the composition of such forces, and their strength and equipment. Attacks by parachutists and air infantry must be preceded by aerial reconnaissance, and local air superiority must be won if anything but a very small number of parachutists is to be employed. The transport planes obviously must be protected by fighters and bombers. In their operations at Waalhaven, the German air force heavily bombed areas near the field in order to hold back defending troops. Bombs were dropped in a circle around the field, and the craters were used by the parachutists. However, landings need not necessarily be made on airfields. In the Netherlands and Norway some German troops were brought by planes that landed on roads or other level areas. Parachutists coöperating with air infantry are really an advance guard. They must take immediate possession of the landing field and hold it until transport planes can bring reinforcements. Surprise is fundamental to their success. Once they have established a foothold, large numbers of air infantrymen can be landed in a relatively short time.

As noted, air-borne troops may be variously equipped for different missions. There would seem to be a premium on light automatic rifles, grenades, light machine guns, mortars, and signal equipment. Tools, explosives, flame-throwers, and smoke projectiles—and even firecrackers to deceive the enemy—might be required. Parachutists must be provided with special clothing, particularly helmets, trousers, and shoes. The weapons and ammunition used initially by them are dropped in containers suspended from parachutes. If local security is maintained, the further supply and reinforcement of parachute troops does not seem to offer particular difficulty. German parachutists in Norway apparently were furnished light, collapsible bicycles. As soon as planes are able to land, motorized vehicles and field guns can be provided. However, bombardment aviation may take the place of artillery in support of air-landing parties. It is also important that communications be maintained with the friendly air force. In general, combat training of air troops is identical with that of infantry and combat engineers.

Tactical Employment

The chief merit of air troops is that they can swiftly carry the fire and holding power of infantry deep into hostile territory. Their possible missions are numerous. In many respects they are akin to the missions of cavalry. However, the following are perhaps the most advantageous uses of this arm:

Key points in the rear of the enemy may be seized, in conjunction with a penetration or envelopment by ground troops. So far, the attack on Waalhaven is the prime example. The effectiveness of offensive operations by the ground troops—who themselves must be highly mobile—may be greatly increased if air troops capture positions useful for observation, local defense, and the advance of motorized forces. Furthermore, they actually make possible the capture of fixed fortifications or the completion of an envelopment. Close coöperation with the ground forces is necessary, and the air attack must not be directed too far behind the front. In 1937 a French officer wrote—prophetically—that "at the very beginning of a war units of the 'air legion' might be landed 15 to 50 kilometers in front of their own motorized divisions. In this way they could attack the enemy's rear and disturb his movements. Later they might join their own advancing ground troops."[5]

Similar attacks may be made to relieve friendly ground forces of heavy pressure by the enemy, as, for example, by intercepting his reserves. Small numbers of parachutists and air infantrymen may be sufficient to block roads, destroy bridges, or otherwise make difficult the advance of the enemy. When the enemy retreats, parachutists may be able to capture fortified areas and strong points, and thus block or accelerate his withdrawal. Bridges, mountain passes, and other defiles may be taken and thereafter destroyed or defended. In mountain warfare, certain positions are accessible only by air. Occupation of such positions, even by small detachments, may have great importance.

The enemy air force may be weakened by attacks on airdromes and destruction of field, planes, hangars, stores, and the like. Here, too, small forces are likely to be effective. Similarly, air troops may be used to destroy power plants, railway yards, docks, munitions factories and other industrial facilities, as well as to

[5]Major André Langeron, in *Les Ailes*, May 6, 1937.

spread confusion and apprehension far and wide in interior zones.

Air troops may be employed to relieve, supply, and reinforce isolated units. An illustration of this is the relief by air of German troops in the campaign for Narvik. They may also be useful in making quick attacks in distant areas, as in colonial regions. Under certain conditions, they may undertake swift reconnaissance, especially under cover of darkness.

Defense Against Air Troops

It is apparent that military and civil authorities must reckon with attacks by air troops wherever enemy aviation can operate. What defensive measures give promise of effectiveness?

As has been pointed out, the attacking force must win local air superiority if it plans to land air-borne units of any size. This imposes on the defender the task of preventing the enemy from mastering the sky over any area where his forces might land, and certainly over all areas of strategic significance. In other words, the prime reliance of the defense must be upon its own aviation and antiaircraft weapons. Enemy reconnaissance and bombing planes must be destroyed or driven off before the transport planes appear. If the attack progresses so far that parachutists and air infantry are in process of landing, then they must be disposed of in detail. If, finally, a landing is effected, the defending air force and ground troops must crush the enemy force before it can be reinforced. Fields and other vulnerable areas must be protected by special details of motorized troops, amply equipped with fast-moving vehicles and automatic weapons. These troops ought to receive training in shock tactics. They must be thoroughly familiar with the area to be defended, and they must be able to move rapidly to threatened points. In certain situations, it may be possible for the defense to employ its own air infantry effectively against enemy landing parties. Major airports ought to be provided with pillboxes that can command wide areas with machine-gun and antitank fire. It will be impractical, of course, to defend every conceivable landing place so thoroughly. But resort may be had to passive means. Fields and roads should be blocked against plane landings, or blocking devices should be readily available. Bridges should be mined and local commanders must be authorized to destroy them whenever this is demanded by the situation as it has developed.

Troops in the forward zone must be also prepared for attacks by air troops. However, inasmuch as an important mission of air attack is to distract the defender or to intercept his reserves, troops needed for other purposes must avoid being committed to major engagements with air-landing forces. This again suggests the necessity for special security elements.

It must be kept in mind that surprise is highly important—if not essential—to successful action by air troops. Hence the defense must utilize all measures that tend to reduce or eliminate the possibility of being surprised. Throughout the area subject to attack there must be an efficient system for warning of the approach of large planes. In addition to special troops, it may be necessary to organize quasi-military patrols, on the order of the "parashooter" corps in Great Britain. There must be close coöperation between civil and military authorities for protection of strategic areas. Beyond this, not only the armed forces but also almost everyone in the population should have some knowledge of the tactics of air troops. For these tactics have given a literal meaning to the phrase "total war."

Whether a well-knit defense, incapable of being caught off guard, can nevertheless be overwhelemed by great masses of air troops is still an open question. The next weeks or months may give the answer.

★ ★ ★

Tanks in Battle

The lessons I learned were mostly the ones my prewar commanding officer had drummed into me so often—always try to get as much advance information as possible and pass it on to your junior commanders.

Always be planning what your action is going to be if so-and-so happens, in this way nothing is really a surprise—never work without support of at least one other tank.

Make it a habit to be proficient in all the arts of your trade, for in these days of good tank design, efficiency of the crew means a battle won—refuse to be dismayed, even if you know you are up against the much-vaunted larger divisions.

Lastly, if you must die, then inflict as much damage to the enemy as possible before they write *finis* to you, and while there is life there is hope of getting out of a seemingly impossible situation.—Section Sergeant Major W. R. Armit, in *The Tank* (British), February, 1941.

Tactical Training of AAA in the Third Army

WAR DEPARTMENT
OFFICE OF THE CHIEF OF COAST ARTILLERY
WASHINGTON

4/10/41

Memorandum for the Editor Coast Artillery Journal.

Subject: Advanced training of Coast Artillery units.

Inclosed is a directive issued by the Commanding General, Third Army, covering the advanced training of antiaircraft artillery regiments and separate battalions. This is so comprehensive that I suggest you find a place for it in the next issue of your Journal. I suggest, too, that the directive issued by General Headquarters, U. S. Army, dated March 31, 1941, subject "Advanced Training, Coast Artillery Units", be published also.

J. A. GREEN,
Major General,
Chief of Coast Artillery.

EDITOR'S NOTE: *The Third Army directive includes pertinent general instructions and two series of exercises, one for battalions, and another for regiments. It provides for the antiaircraft artillery definite objectives in field training, comparable to those prescribed for Infantry Divisions by G.H.Q. in its letter of January 4th on "Combined Training." While the scope and objective of each exercise is indicated, the local commanders prepare the exercise in detail, and supervise the execution. Pertinent extracts of the directive and the exercises follow.*

HEADQUARTERS THIRD ARMY

Office of the Commanding General
Smith-Young Tower

353-(AA-S)

San Antonio, Texas,
February 10, 1941.

Subject: Field Training Exercises.

* * *

2. *a.* Upon completion of Mobilization Training Programs, antiaircraft units will devote the period available until participation in Army or Corps Exercises to:
   (1) Intensive training for and conduct of annual target practices.
   (2) Tactical field training.

   b. Target practices and training therefor will be conducted in accordance with T.M. 2160-35 and 1941 Supplement to T.M. 2160-35, "Instructions for Coast Artillery Target Practice—1941," W.D. 9/28/40. This phase of the training will be given first priority.

   c. Tactical field training will be conducted along the lines indicated by, and include the field training exercises outlined in Inclosure No. 1 hereto. The exercises include a battalion series (AAB) and a regimental series (AAR). It is desired initially to stress the operation of, and teamwork within the battalion as a well coordinated unit. To that end it is desired that transportation be pooled as necessary to provide proper facilities for battalion problems. In the regimental series the teamwork and coördination within the regiment will be stressed. The exercises may well be repeated with a change in the terrain.

   d. Training will be varied in order to prepare units both:
   (1) To support the mobile forces in highly mobile warfare where rapidity in reconnaissance, in issuance of orders, in movement into position, and in withdrawal, are essential; and
   (2) To operate in more stable situations where deliberate reconnaissance, thorough organization of positions, and artful camouflage are appropriate.

3. *Director.* The next higher commander will prepare the exercise and act as director.

4. *Critiques.* Critiques should be held not only to draw definite lessons from the results of the exercise just completed, but also to orient subordinate commanders and the staff for the next exercise.

5. *Supply.*
   a. Supply training will be carried out for all elements, particularly in the supply and resupply of ammunitions, rations, water, motor fuels, and other important supplies. Supply agencies will function, and subordinate units will render the required reports for ammunition, motor fuels and rations.

   b. In the Exercises AAR 3, AAR 4, and AAR 5 it is desired to have the supply officer prepare the menu, procure rations in bulk for one day, break down, and deliver same in the field.

   c. It is desired to have organization ammunition loads and combat train loads carried in actual ammunition where possible; otherwise sand-filled ammunition boxes of approximate weight and cubic space, or other suitable substitute will be used.

6. *Evacuation.* Appropriate medical detachments

will participate. Problems will be injected to require simulated care and evacuation of the wounded.

7. *Airplanes.* For those exercises which require airplanes to represent enemy aviation, it is proposed to furnish, upon request, one flight of observation aviation, to include one photographic plane.

8. *Standing Operating Procedure* should be adopted and published prior to, and perfected during the conduct of the exercises.

9. *Reports.* Brief reports are required. They should be largely factual. It is desired that they be completed with minimum delay and forwarded in number to provide two copies for this office and one copy to each intermediate headquarters.

By command of: Lieutenant General BREES.

* * *

Inclosure No. 1

BATTALION SERIES

AAB 1. Field exercise. 1 day. Tactical loading. Develop and practice the tactical and systematic loading of each vehicle, to include personnel, equipment, weapons, and ammunition: inspection; tactical march. The exercise to be developed into an alert plan for the unit to the end that it may take the field for extended field service in a minimum time, without confusion, fully equipped, and uniformly and neatly loaded.

Notes: By battalion or by battery depending upon availablility of vehicles. Vehicles assigned as per T/O as nearly as practicable. Vehicle capacity checked by weight and space. Determine an average weight for one man and equipment and base all weight computations on that average.

Required report:

(1) Strength report by unit—officers, enlisted men and vehicles.
(2) Summary of loading plan.
(3) Ammunition loads for each battery and combat train.
(4) Any pertinent recommendations.

AAB 2. Field exercise. 1 day. Daylight march on highway.

a. Develop:

(1) Tactical march formation.
(2) March control and discipline. Stress:
  (a) Clearance of road for other motor units on the march or at a halt.
  (b) Exercise of active control by all subordinate commanders down to and including the man in charge of each vehicle.
(3) Methods of maintaining route over unfamiliar roads.
(4) Security measures and anti-mechanized defense.
(5) Utilization of automatic weapons and rifles for AA protection on march.
(6) Motor maintenance.
(7) Rapid refueling.

b. This exercise should serve as a basis for developing standard operating procedure to be adopted by the unit governing motor movements under varying conditions. The following points should be considered and checked:

(1) Take periodic synchronized time checks against mileage both at the head and tail of column and compute average length of column per vehicle.
(2) Check time length of column at various points to include the starting point, difficult points in the road, and entrance to camping area, and compute average time per vehicle in seconds.
(3) Seek minimum time length of column, consistent with appropriate march dispersion for AA protection. Avoid gaps in column by requiring drivers to close up where progress is slow (at start, on hills, muddy points, sharp turns). Prescribe a maximum speed for regaining lost distance to require same effected gradually.

c. Required report:

(1) Strength report by unit—officers, enlisted men, and vehicles.
(2) Summary of results.
(3) Pertinent recommendations to include normal speed on open highway, and normal distance between vehicles.

AAB 3. Field Exercise. 1 day. Cross country daylight march similar to AAB 2.

Required report: Same as AAB 2.

AAB 4. Field Exercise. 1 night. Night march without lights.

Notes for initiation of exercise. Make arrangements with local authority to minimize interference with civilian traffic. Allow no headlights in column. Insofar as practicable, avoid roads where headlights are encountered. If tail lights or stop lights are permitted, cover same to dim.

Required report: Same as AAB 2.

AAB 5. Field Exercise. 1 day. Occupation and organization of position, to include all weapons, communications, C.P's, kitchen, bivouac, truck park, camouflage of positions, dummy positions.

Required report:
(1) Strength report by unit in officers, enlisted men, and vehicles.
(2) Plan of defense.
(3) Time from arrival to "ready for action."
(4) Time required to establish telephone communications.
(5) Time required to complete fully the organization of position.
(6) Pertinent recommendations.

CPX 1. Command Post Exercise. Preparation for AAB 6.

AAB 6. Field Exercise. 2 days and 1 night. Defense of an airdrome outlined or actual. Reconnaissance by advance parties; issuance of orders; march; occupation, organization, and concealment of positions; establishment of all elements of defense; conduct of defense by day and night against hostile aerial reconnaissance and bombardment, represented by actual airplanes; one or more night alerts; ammunition resupply. Serve breakfast and return to station.
Required report: Same as AAB 5.

AAB 7. Field Exercise. 1 night and 1 day. AA defense of an Independent Army Corps on defense.
Occupy and establish all elements of the defense by night without lights; ammunition resupply during night. Allow not to exceed two hours for all ground reconnaissance and issuance of orders. Bivouac in positions.
Notes:
(1) Gun Battalion provide defense for ammunition, Engineer, and Quartermaster depots outlined and/or strategic bridges on line of communications. Assume AA Battalion defense.
(2) A.W. battalion provide defense for Corps reserve, Corps Ammunition D. P's, and Corps C.P., all outlined. Assume Gun Battalion defense.
(3) If the exercise is repeated, shift terrain, alter the mission and reduce time limit for reconnaissance.
Required report:
(1) Brief statement of tactical situation, plus Report same as AAB 5.

Regimental Series

AAR 1. Field Exercise. 1 day.
Daylight march. Similar to AAB 2.
Required report:
(1) Strength report, officers, enlisted men, and vehicles.
(2) Summary of results.
(3) Copy of the developed standing operating procedure for motor movements.

AAR 2. Field Exercise. 1 night. Night march without lights.
Required report: Same as AAR 1.

CPX 2. Command Post Exercise. Preparation for AAR 3.

AAR 3. Field Exercise. 2 days and 1 night. Defense of an industrial center, outlined. Same in general as AAB 6, to include Class I and ammunition resupply by night. If necessary, occupy position by shuttling.
Required report:
(1) Strength report, officers, enlisted men, and vehicles.
(2) Plan of defense.
(3) S-1, S-2, S-3 and S-4 reports for period.

AAR 4. Field Exercise. 2 days and 1 night. Similar to AAR 3, except the objective to be represented by actual industrial plant, village, town, or portion of city.
Required report: Same as AAR 3.

AAR 5. Field Exercise. 1 night and 1 day. AA defense of an independent Army Corps on the offensive. Occupy and establish all elements of the defense by night without lights. Limit time for reconnaissance and issuance of orders. Reorganize the defense by day. Ammunition resupply during night and day.
Required report:
(1) Strength report, officers, enlisted men, and vehicles.
(2) Brief statement of tactical situation.
(3) Plan of initial defense.
(4) Copy of developed standing operating procedure for field operations.

The directive from General Headquarters, United States Army, on the subject of advanced training for Coast Artillery units, follows:

GENERAL HEADQUARTERS, U. S. ARMY
Army War College
Washington, D. C.

353-AA March 31, 1941.

SUBJECT: Advanced Training, Coast Artillery Units.
TO : All Army Commanders.

1. Reference is made to letter, this headquarters, January 4, 1941, subject: "Combined Training."

2. Due to a wide variation in requirements for particular units, it is impracticable to prescribe a detailed program for the advanced training of all Coast Artillery units. As a general guide, however, such training might include the following:

a. Attainment and maintenance of a high state of proficiency in individual and small unit training prescribed in Mobilization Training Programs.

b. Intensive artillery training in serving the armament and equipment to which assigned, with special emphasis in the training of personnel for key positions, such as stereoscopic observers, sound locator listeners, plotters, and spotters.

c. Maintenance of armament, weapons and equipment in a state of readiness for combat.

d. Preparation for and conduct of service target practices, to include, for appropriate units, the conduct and careful analysis of subcaliber practices.

e. Completion of small arms target practices.

f. Antimechanized defense, to include, if practicable, firings at suitable ground targets.

g. Infantry training.

h. Marches, day and night; to include, for mobile units, convoy control and occupation of and withdrawal from positions.

i. Security, to include means and measures of defense of movements, bivouacs, and positions against air and ground attack.

j. Camouflage and camouflage discipline, to be tested, if practicable, by visual and photographic observation.

k. Gas defense training.

l. Searchlight drills and exercises.

m. Command post exercises.

n. Training of combat intelligence and signal communication personnel of all echelons, and their participation in tactical exercises and problems, including, for appropriate units, a local combined AAAIS and seacoast defense system of observation and warning.

o. Training of evacuation and supply personnel of all echelons, to include their participation in tactical exercises and problems.

p. (1) Command and staff training, to include: Estimates of the Situation; issuance of orders, with special emphasis on speed, clarity and brevity; preparation and use of maps, overlays and air photographs; reconnaissance; and development of standard operating procedure.

(2) Attention is invited to par. 205, FM 100-15, and par. 56, FM 101-5, with reference to standing operating procedure (SOP). Such procedure should be developed and employed to the maximum extent practicable within Coast Artillery units. Standard operating procedure for a Coast Artillery unit might cover such instructions as the following:

For a harbor defense: Organization and operation of observation and warning systems for both antiaircraft and seacoast defense; camouflage and local security; supply of troops at batteries; action to meet a chemical attack; action to meet a bombing attack; action in case of disruption of specified elements of the signal communication system.

For a mobile unit: Loading procedure; convoy formation and control; maintenance on the march; protection of columns and bivouacs against aerial and mechanized attacks; conduct of night marches; and the order and priority for establishment of signal communications.

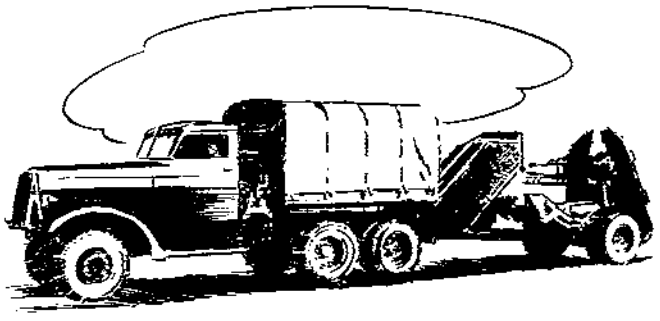
q. Tactical field training, to include preparation for participation in field exercises and maneuvers of higher units. Harbor defense units should be prepared to participate in joint Army and Navy exercises; antiaircraft units, in air defense, army, or army corps exercises and maneuvers.

r. Troop schools, with particular emphasis on tactics, gunnery, fire control and position-finding.

3. All Coast Artillery training should have one principal objective: the attainment and maintenance of a complete state of readiness for combat of both individuals and units.

By command of GENERAL MARSHALL:

(signed) L. J. McNair,
Major General, General Staff Corps,
Chief of Staff.



Armory Drill Pays Dividends

The National Guard Trophy

By Colonel Malcolm W. Force, 244th Coast Artillery

When General Rollin L. Tilton presented the Coast Artillery Association Trophy to the 244th on Army Day, a long-cherished ambition of New York City's "Old Ninth" was finally realized. Twice before, since the trophy was established, the 244th has finished in the running, with a fourth place in 1937 and a third in 1938. No firing was conducted in the 1939 season.

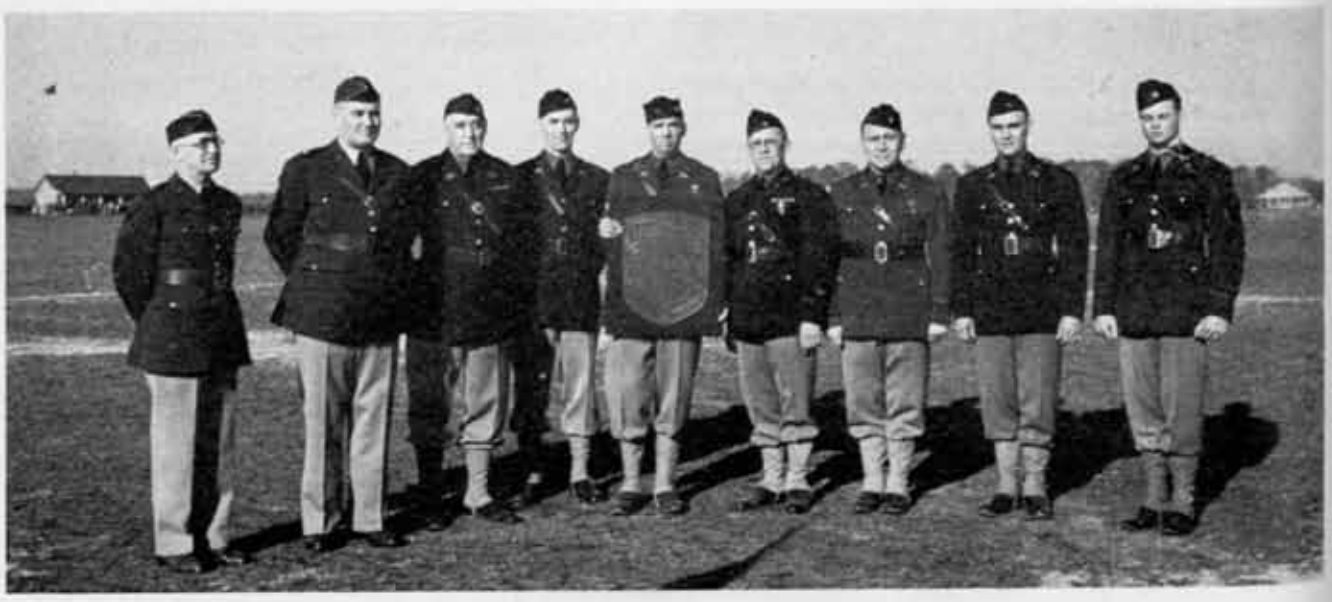
The 1940 shoot was conducted in part by relatively inexperienced gun crews. Among the personnel were scattered a few men who had previously been "under fire" in 1938. However, we realized early during the Armory training period exactly what our problems were going to be, and plans were laid accordingly.

The real reason for the success in the conduct of the 244th's 1940 target practice goes back beyond the field training period into the armory drill season. Realizing that the one week to be allowed for firing was only half the time normally allotted, every effort was made to duplicate actual conditions in the Armory. Naturally, the duplication of target practice conditions in the heart of New York City is difficult. Every known device —and a few hitherto unknown—was introduced for training, and these contrivances were invaluable in the training of key men in all batteries.

Through the coöperation of the Coast Artillery Reserve Officers Association of New York, the regiment was able to secure the use of a field artillery trainer for the training of gun pointers. This device, through the use of a .22 caliber cartridge, propelled a ball into a sandbox, raising a "splash" of sand. The panoramic sight was mounted on the side of the trainer, and a target towed across the sandbox. The invaluable aid which this device furnished to the training of gun pointers in Case II pointing was indicated clearly by the results of last summer's shoot.

Gun pointers were also assisted in training by a home-made device that looked like something by Rube Goldberg. A series of mirrors and a large electric light bulb were fastened on top of the 155-mm. gun as an excaliber gun. When the command to fire was given, a button was pressed, and a "shot" of light . . . a small circular spot . . . was "fired" at the target. The spot of light marked the position which a splash would have taken in relation to a moving target had an actual shot been fired.

The range sections and observers had their gadgets, too. Training in tracking was supplied by the use of a miniature vessel which ran across the Armory on a system of pulleys and wires. The base line, scaled down to meet space limitations of the Armory floor, was established, and base end and range details drilled continuously throughout the Armory training period. Spotters received their training through the use of a board bearing a target and a series of flashlight bulbs.



Left to right: Brigadier General Arthur G. Campbell; Brigadier General Tilton; Colonel Force; Lieutenant Colonel Eugene T. H. Colvin; Captain Jules L. Mallay, adjutant, holding the trophy; Lieutenant Colonel George Zentgraf, chaplain; Major John Mazzei; Captain Mario Gemminiani, and Lieutenant Charles R. S. Jones

These lights, placed at varying distances from the target, were flashed on and off to simulate a splash.

Through the use of all these agencies, we were able to conduct coördinated drills of all sections throughout a number of months. Data flowed through its normal channels during each drill session, giving communication details needed training. All officers actually conducted adjustment of fire based upon the data received.

The assignment of the 244th Coast Artillery as the Army Artillery for the First Army maneuvers interfered somewhat with the process of training because the Field Artillery principles which would be needed during the mock war were taught to the command. For the first two weeks of the training period in the field, the regiment received invaluable training in marches, convoys, night emplacements, reconnaissance and selection of positions. But the pace of activities on maneuvers was so rapid that no time was available for training in Seacoast Artillery Problems.

On Thursday of the second week of Field Training, the advance party left the 244th base camp just outside Gouverneur, New York, bound for Fort Ontario. The rest of the regiment arrived at Oswego Saturday morning. The base line was established, communications installed and targets built. All was placed in readiness to conduct tracking practice on Monday. Subcaliber practice took up Monday afternoon and Tuesday, and record practice was completed by late Thursday afternoon.

Here the value of the team practice which the 244th had received during its Armory drill period became clearly apparent. Records were gathered, results tabulated and placed in the hands of the battery commanders the evening of the completion of the shoot. In most cases, the target practice reports were well on their way to completion before the regiment left for its home station on Friday.

The Shoot

Firing for all batteries was conducted at ranges of approximately 12,000 yards. We used unilateral spotting and the bracketing method of fire adjustment, employing the fire adjustment chart. As far as the results of the shoot were concerned, four firing batteries were awarded E's by the War Department, with Battery F, Captain O. C. Buser commanding, scoring a high of 117.1, only a few points lower than the all-time National Guard high score of 120.2 scored by Battery C of the 244th in 1932.

Firing 24 shots at an average range of 12,600 yards, Battery F succeeded in placing 16 impacts in zone A, and the remaining 8 equally divided between zones B and C, giving a hitting component of 90.0. The corrected time for record fire was 314 seconds, which, with 2.3 shots per gun per minute gave F a time component of 13.1. Shooting 2,600 yards over normal range gave a score of 14 as a range component.

The battery commander's narrative states in part, "The battery commander is particularly gratified with the results of this practice, since 47% of the enlisted personnel had never seen a gun fired before, and all their training had been confined to Armory drill and such drill as was received during the First Army maneuvers."

Second highest score was 107.7, by Battery E, Captain M. T. Ketz commanding. Battery B, Captain W. A. Shaw commanding, was close behind with a score of 106.5, and Battery A, Captain J. G. Becker commanding, with a score of 99.0, was the last of the four batteries to be awarded E's.

Expedients Still in Use

So successful were the gadgets used last year for Armory training that the 244th has been using somewhat similar training methods throughout its present year of extended training at Camp Pendleton, Virginia. Caliber .22 gun barrels have been mounted on top of 155-mm. guns on the shore of nearby Lake Christine. These "ex-ex-caliber guns" have been used constantly for the training of all gun pointers and substitute gun pointers in Case II firing, with the .22 slug kicking up a splash just about big enough for corrections to be made. A base line, scaled down to fit the range of the .22's, has been set up, and tracking as well as Case III firing has been conducted from the Lake installation daily.

By the time this appears in print, the 244th will have already completed its 37-mm. sub-caliber practice, and will be ready to begin its 1941 service practice. We confidently expect that the record this year will again prove the value of expedients when conditions do not permit actual field conditions for training.

Standing Operating Procedure

By Lieutenant Colonel Charles S. Harris, Coast Artillery Corps

During recent years, the training and operations directive, termed *Standing Operating Procedure,* has worked its way into general usage. While the name may be new, the idea is not. It covers, in general, matter which was formerly included in a series of memoranda, or possibly in conferences.

The general policy now is to require the publication of Standing Operating Procedure for each regiment or higher unit. It covers appropriately those features of operation which lend themselves to a standardized procedure, without loss of effectiveness. It may include such matters pertaining to Field Orders, March Orders, and Administrative Orders. It may also include matters of tactical and training doctrine upon which special emphasis is desired.

In the preparation, the following points are applicable:

(1) Brevity is essential. Otherwise it is not effective.

(2) Avoid superlatives. The Commanding Officer can best obtain superior performance by applying the steam personally.

(3) Format: Mimeographed in standard typewriter size, or pocket field manual size.

References: Par. 205, FM 100-5
Par. 56, FM 101-5
Letter, GHQ, 3/31/41, file 353 AA, subject: "Advanced Training, Coast Artillery Units."

"A Solution" for an antiaircraft mobile regiment follows:

HEADQUARTERS_____COAST ARTILLERY (AA)
FORT_____, _____.

April 25, 1941.

STANDING OPERATING PROCEDURE

SECTION I —General
SECTION II —Motor Marches
SECTION III—Reconnaissance and Security
SECTION IV—Communications
SECTION V —Intelligence
SECTION VI—Administration

SECTION I—General

1. *Purpose.* To reduce to routine such operations as are practicable, in order to:

a. Make procedure habitual.

b. Avoid confusion under stress.

c. Facilitate prompt and simplified orders and operations.

2. *Development.* As the training and operation of the regiment progress, it is contemplated that Standing Operating Procedure will continue to develop, and be revised to conform to developed practice. Pertinent recommendations are desired.

3. *Unit Procedure.* All subordinate and attached units conform to the Regimental S.O.P.

4. *Orders.*

a. Normally, appropriate warning orders will be dispatched, and the orders will be issued to assembled unit commanders, or their representatives, in oral or dictated form. When practicable, such orders will be supplemented by an operations map or a simple sketch. When necessary, action may be initiated by fragmentary orders transmitted by the most rapid means available.

b. All subordinate commanders will be trained in giving and receiving concise and clear orders with dispatch. When time is limited, subordinates are given wider latitude in the execution of their missions.

SECTION II—Motor Marches

5. *Convoy Procedure.*

a. In accordance with state traffic laws.

(1) *Speed limits* will be observed in towns and on open highways.

(2) *Stop Signs* may be driven through provided adequate military or civil traffic control is maintained at the intersection.

(3) *Stop Lights* will be disregarded only *when authorized by local civil authority,* and when adequate military or civil traffic control is maintained at the intersection.

b. In accordance with F.M. 25-10.

Colonel Harris is Antiaircraft Officer of the Third Army. He was born in North Carolina, and is a graduate of the University of North Carolina. He accepted a commission as second lieutenant, CAC, in the Regular establishment November 11, 1917, after a short period of service in the Officers Reserve Corps. Colonel Harris is a graduate of both the basic and the advanced courses of the Coast Artillery School, of the Field Officers' Course at the Chemical Warfare Service School, and of the Command and General Staff School.

6. *Formation.*

a. The regiment will be trained and prepared to march in one regimental serial, in battalion serials, or in battery or detachment serials, either independently, or with other troops.

b. Movement by battery or battalion serials is preferred.

c. The normal tactical formation for a battalion serial in movement to occupy position is as follows:

(1) Advance Guard, when required.
(2) Command Echelon: Bn. Executive, Operations and Communications Sections, Battery agents.
(3) Combat elements.
(4) Service Echelon.

Combat battery maintenance sections march at the rear of their respective batteries, except when otherwise prescribed.

d. Normally, in tactical marches, battalion and battery commanders precede their units to the area to be defended for reconnaissance and meet their respective units en route.

e. In non-tactical marches, commanders accompany their respective units. The advance officer, accompanied by the quartering party, consisting of representatives from each battery, precedes the column and lays out the bivouac area. Battery representatives meet their respective units, guide them to their areas, and transmit pertinent instructions.

f. Route markers will be employed habitually under the direction of the serial commander. They will be assembled in personnel trucks under command of an officer and move with the advance guard when one is employed; otherwise near the head of the serial. Empty trucks will be provided at the tail of the column to pick up the markers.

g. Unit commanders are authorized to pass their respective units for march supervision. Other vehicles pass the column only when authorized.

h. The tactical formation for other separate serials will conform to the scheme outlined above for a battalion.

7. *Speeds:*

a. Convoy Speed, as prescribed by the commander, to be established by the leading vehicle, which will reduce such speed over rough or dangerous roads, or through towns, but never exceed the prescribed speed.

b. Maximum Speeds. Vehicles will not under any circumstances exceed the following speeds:

Vehicles	*Maximum Speed*
(1) Command Cars, light cars, ½-ton trucks	50 m.p.h.
(2) Cargo trucks	40 "
(3) Searchlight trucks and heavy prime movers	35 "

c. All concerned are warned against high speeds on down-hill grades.

8. *Distances.*

a. In order to avoid "whipping" at the tail of the column, effort is made to maintain a constant time interval between vehicles rather than a fixed distance.

b. March by day or with lights.

Distance per vehicle: *100-200 yards, when moving at a normal cruising speed. When the vehicle ahead slows up, each driver closes up and follows at a minimum safe distance until normal cruising speed is resumed. Lost distance will be regained gradually.

*Lower limit to utilize maximum road capacity; upper limit to minimize interference with other traffic and driving fatigue.

c. Secret night march, without lights:
Distance per vehicle: 20-40 yards.

9. *Halts.*

a. Tactical marches, under threat of air attack: Every effort will be made to avoid halts en route.

b. Other marches:

(1) 10 minute halts: At the end of first hour, and thereafter every two (2) hours.
(2) Other halts: As ordered.

10. *March Discipline.*

a. All vehicles will keep well to the right of the road. Persons in the cab with the driver remain on the alert. Personnel will not be allowed to ride with arms or legs outside. Protruding objects of a dangerous nature such as tent-poles or timbers, will be loaded on the right of the vehicle, and clearly marked by a cloth or flag.

b. Each vehicle will have one enlisted man or officer detailed in charge.

c. At a halt, either on road or trail, drivers move promptly and well to the right, allowing clearance for other units. Traffic control will be established, and all personnel kept off the road.

d. Arm signals will be used habitually by drivers and assistants.

11. *Disabled vehicles,* each accompanied by a towing vehicle, will be moved to the side of the road and await the repair section. If repairs are not practicable, the vehicle will be towed and turned over to the M.T.O. at the march destination.

12. *Refueling.*

a. All units will be trained in rapid refueling, utilizing all spare containers and sufficient personnel.

b. Safety precautions will be taken against smoking or open fires. All tanks or other containers will be grounded electrically prior to transfer of gas therefrom.

13. *Motor Accidents.*

a. AVOID MOTOR ACCIDENTS.

b. Battalion commanders will detail an officer to follow at the tail of the column to investigate motor accidents on the spot and prepare required report.

SECTION III—Reconnaissance and Security

14. *Reconnaissance.*

a. Unit commanders normally precede their units to

the area to be defended, complete appropriate reconnaissance and the issuance of orders in time to allow all units to be met and led to positions without delay. Depending upon the time available, battalion commanders may select in detail all positions, or this responsibility may be delegated to battery or platoon commanders. All subordinate commanders will be trained in rapid reconnaissance.

b. In the selection of positions, 1st priority will be given to field of fire for antiaircraft employment—360° field of fire with minimum mask.

c. Officers will utilize fully opportunities for reconnaissance. From each position, commanders will reconnoiter the road net to the front, rear, and laterally, for future movements.

15. *Security.*

a. All units, in position or on the road, are responsible for their local security against air attack, parachute troops, raiding parties, mechanized forces, and sabotage. Higher commanders will direct coördinating measures when required.

b. Air defense on the march will provide for use of automatic weapons and rifles from march positions.

c. Anti-mechanized defense, when practicable, will utilize defiles in the road net and terrain and road blocks.

d. Each local unit will maintain a warning service against air and gas attacks; particular attention to meal hours.

16. *Miscellaneous.*

a. Battery commanders will select and report alternate positions, reconnoiter and prepare routes thereto.

b. All elements will be camouflaged, and camouflage discipline enforced.

c. Maximum use of cover will be utilized for the dispersion and concealment of vehicles, kitchens, command posts, supply installations, and aid stations.

d. Battery commanders will construct dummy positions.

SECTION IV—Communications

17. *Means.* All elements will be trained to utilize fully the radio, messengers, and visual or other available emergency means of communications to supplement the normal telephone net.

18. *Normal Telephone Net.*

a. In accordance with Chap. 8, F.M. 4-105, except that when practicable, Battery "A" C.P. is established with direct telephone communication to platoons.

b. Communication and other available vehicles will be utilized to complete wire laying with dispatch.

c. In stable situations, additional lines will be laid as ordered.

19. *Radio Net.*

a. Consists of regimental station and a station for each battalion.

b. When a battalion or battery is located beyond normal field telephone range, a battalion radio crew is normally attached to provide communications.

20. *Reports.*

a. Upon receipt of orders, unit commanders will habitually acknowledge receipt, and report when action is initiated to comply.

b. Upon arrival in position, unit commanders will report to next higher commander:

(1) Date and hour of arrival.
(2) Hour ready for action.
(3) Unit strength in officers, enlisted men, and vehicles.
(4) Ammunition on hand.
(5) Other pertinent information.

c. When units are attached to divisions or other units, or when assigned to protect such units, the above report will be made, if practicable, by the commander in person. Likewise, when units are withdrawn from such assignments, report will be made of authority for and hour of withdrawal.

d. Unit Reports, Battery.

(1) *Form.* [Omitted. See par. 214, F.M. 4-105]
(2) Forwarded every six hours, at midnight, 6:00 AM, Noon, 6:00 PM, to battalion headquarters. Upon completion of a major enemy attack, report is closed and forwarded at once. One copy is forwarded by battalion to regimental C.P. when in same area.

e. Unit Reports, Battalion. Combined S-2, S-3 report twice daily as of 6:00 AM and 6:00 PM to regimental C.P. on form below. After a major attack, report is closed and forwarded at once.

MESSAGE How Sent: Radio Messenger Telephone
From____M
To: C.O., __C.A.(AA) Date_____ To ____M

COMBINED S-2 AND S-3 REPORT

Batteries engaged: _____
Enemy Action: (By Flights, No. and Type of planes, Formation, Tactics, Objectives, Results.)

_____
_____
_____

A.A. Action: Rounds fired: ____3"; ____37-mm; ____.50 Cal; ____.30 Cal.
Planes illuminated: ____.
Results:
No. and Type shot down: _____
Flights turned back: _____

Enemy's probable purpose and further action indicated:

_____
_____

Message No. ____ Time signed ____ Signed _____
Time sent ____ _____

f. Administrative Reports:

(1) Strength Report, every 24 hours, by battery, in accordance with instructions and blank forms to be issued.

(2) Ammunition Expenditures—same as (1), above.

(3) Gas and Oil—same as (1), above.

21. *Telephone Code.*

a. Switchboards—Code Names:

(1) Regimental: SCARLET (subject to change)

1st Bn.	RED	2nd Bn.	WHITE
Btry A	AFFIRM	Btry E	EASY
Btry B	BAKER	Btry F	FOX
Btry C	CAST	Btry G	GEORGE
Btry D	DOG	Btry H	HYPO
Hqrs Btry	QUEEN		

(2) Examples: To call 1st Bn. Switchboard, ask for SCARLET RED; to call Battery F Switchboard, ask for SCARLET WHITE FOX.

It is necessary to give only the code names for switchboard through which the call goes.

b. Staff Code Numbers.

(1)

Adjutant	1*	Commanding Officer	6
Intelligence Officer	2*	Transportation Officer	8
P & T Officer	3*	Munitions Officer	9
Supply Officer	4*	Communications Officer	10
Executive Officer	5	Message Center	11
		Aid Station	16
		Radio	28

*Code Numbers 1, 2, 3, and 4 are also used to designate battery platoons.

(2) Examples.

To call	*Ask for*
C.O., Hq Btry, 2d Bn.	WHITE QUEEN SIX
Adjutant, 1st Bn.	RED ONE
Regimental Aid Station	SCARLET ONE SIX
2d Platoon, Btry F	WHITE FOX TWO

c. The phonetic alphabet will be used.

d. Numbers will be transmitted by digits. Examples:

Number	*Spoken as*
45	Fo-wer fi-iv
189	Wun ate ni-yen
730	Sev-ven th-r-ee ze-ro

22. *Command Posts.* Regimental orders announce the positions of regimental and battalion command posts. If changes become necessary, the regimental wire party will be met and led to new location.

SECTION V. — *Intelligence*

23. [Omitted.]

NOTES. *This important section of the S.O.P. Preparation will require study and experiment. Present field telephone and switchboard equipment is not suitable for use of the prescribed "Flash Messages" within the regimental area. One message may tie up the whole net, and it usually reaches the batteries too late to be of value. An evaluating agency is required to eliminate false alerts. Otherwise, the main purpose of the A.A.A.I.S., i.e., to permit rest of the troops when the enemy is inactive, is defeated. By rigid abbreviation of the message, and by simplification, it may be practicable to utilize searchlight listening posts for warning by day. By night the searchlight activity in itself provides the best warning to local air guards.*

SECTION VI—*Administration*

24. *Evacuation.*

a. Aid Stations.

Regimental: Near C.P.

Battalion: As announced.

b. Prophylactic Stations: At each aid station.

c. Sick Call: Daily, normally in battery positions.

d. Water will be used only from authorized sources.

e. Sanitary inspections: Daily, by responsible medical officer; all kitchens, latrines, bivouacs, and pertinent local conditions. Report to this office.

25. *Motor Maintenance.*

a. 1st Echelon Maintenance: By battery, continuously. Weekly inspection will be made by Battery M.T.O., and report on required form to Regimental M.T.O.

b. Motor Transport Officer

(1) Supervises 1st Echelon maintenance.

(2) Performs 2nd Echelon maintenance.

(3) Arranges for 3rd and 4th Echelon maintenance.

(4) Maintains motor repair park, normally near Regimental C.P.

(5) Maintains inspection crews, who make periodic inspections at battery positions.

(6) Provides repair crews for major motor movements.

26. *Ammunition.*

a. Loads. All batteries and combat trains maintain full organizational loads.

b. Ammunition is drawn from Corps or Army Refilling Points by the combat trains, and delivered to the battery positions, or to Battalion D.P's, as directed by the Battalion Commander. Batteries are called upon for additional vehicles when expedient.

c. Battalion D.P's, in moving warfare, normally consist of mobile truck loads. Ammunition is dumped only when and where ordered by the regimental commander—usually at the battery positions.

d. Ammunition at Battery and Battalion D.P's will either be protected by bomb-proof shelter, or dispersed and concealed.

e. Regimental Munitions Officer
- (1) Consolidates and forwards daily ammunition expenditure reports.
- (2) Receives and suballots to Battalions ammunition credits.
- (3) Keeps complete record of ammunition status.
- (4) Supervises ammunition supply.

f. Battalion Munitions Officers
- (1) Command combat trains.
- (2) Draw ammunition from Refilling Points and deliver to batteries.
- (3) Consolidate and forward to R.M.O. ammunition expenditure reports, reports of ammunition drawn (by R.P.) and delivered (by battery).
- (4) Maintain record of ammunition status.

27. *Supply.*

a. Ammunition: See paragraph 26, above.

b. Rations: Delivered daily, usually at night, b R.S.O. to battery positions.

c. Water: Drawn by battery from Water D.P.

d. Gasoline: Drawn by battery from Gas D.P's Usually by exchange of empty for filled containers.

e. Motor parts, oils, lubricants: By battery on call t M.T.O.

f. Expendable Supplies: Weekly by R.S.O. witl rations:

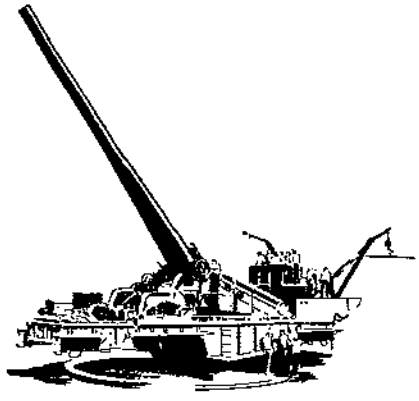
Calcium hypochloride	Paper, toilet
Candles, issue	Soda, caustic (lye)
Lime chlorinated	Soap, laundry, issue

Matches, safety

g. *Other Supply:* By requisition on R.S.O.

By order of Colonel TUFNUT:

WRIGHT BAUER,
Lt. Col., CAC,
Executive.



SHELL BURST PROJECTOR
and Spotting Trainer

By Major Burgo D. Gill, Coast Artillery Corps

To train AA spotters during inclement weather and during the winter indoor season, a *Shell Burst Projector and Spotting Trainer* was developed by the 61st Coast Artillery (AA). A civilian designer and inventor, Mr. S. E. Rice, had a large share in the development of the matériel.

The spotters were trained in the use of the various AA spotting and observing instruments, and in the use of the unaided eye as well. To emphasize realism, the device was constructed to incorporate a cloud projector, which aided in simulating the motion and direction of flight of the plane.

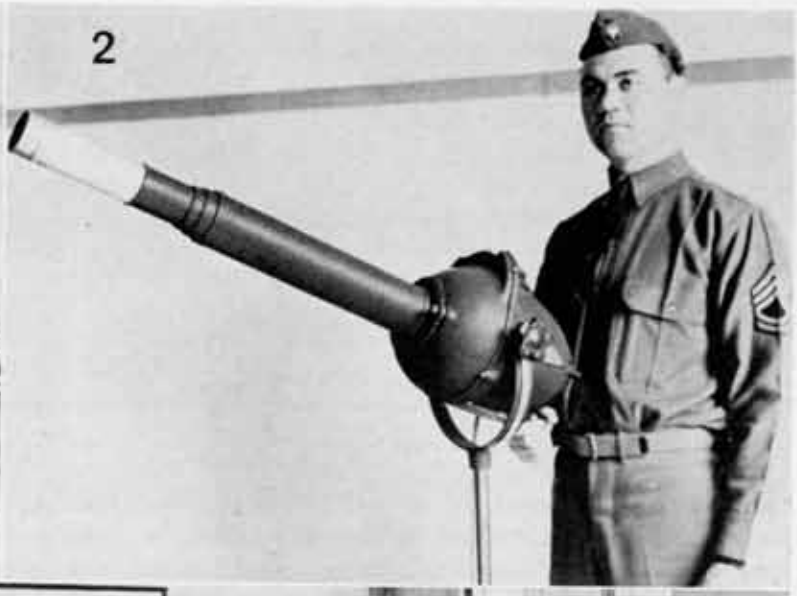
The cloud projector consists merely of a light source and a motor for rotating a cloud film, which is of heavy glass on which cloud designs had been drawn and baked on. An operating lever with clamp permits the head of this projector to be fixed in any position to change the direction of cloud movement.

In the cloud projector, a small silhouette of a plane was mounted to be projected on the screen as a target.

The instructor has another projector which is merely a lens and light source in which various slides are inserted to simulate various types and sizes of bursts. A foot switch enables the instructor to project bursts as often as he wishes, as well as to control the length of time the bursts appear on the screen. This projector was mounted on a ball and swivel joint so that the instructor could place his "shots" easily.

By checking on the apparent width of the screen, and keeping track of the mil distance the bursts appeared from the target, a close check may be made on the observers.

Furthermore, flank, "right and left," and "high and low" observers may all be trained simultaneously if desired. A further use might be made of this instrument in training recorders. The "flank" spotters could be connected by field phones to recorders in some other part of the building.



1—The cloud projector. 2—The "burst" projector. 3—The trainer in operation.

Range Percentage Spotting Board

By Major Lindsay M. Applegate, Coast Artillery Corps

This spotting board was developed for Case II firing in batteries where the M2 spotting board is not available. It is accurate, easy to construct, easy to use, and gives range deviations in percentage reference numbers. This board was made as much like an M2 as was considered practicable for construction by the battery mechanic. Construction has been facilitated by having all scales composed of uniformly divided straight lines. This board in its present form, due to the arrangement of scales, can be used only for range deviations but it could be constructed using similar forms of scales for lateral deviations if desired.

The complete board is shown in Figures 1 and 2, in which the principal parts are designated by letters. The letter designation of parts corresponds as far as practicable to the lettering shown in Figure 61, FM 4-15. The board has a base and frame *A* which provides a broad channel in which a block *T* carrying an azimuth disc *D* can slide easily. At the upper end of the base a platform *B* provides support for the deviation grid *G*. Below platform *B*, a cross piece *R* supports a pivot or hinge assemblage *P* for the ends of the two spotting arms *J*. The spotting arms rest on the azimuth disc *D* on which they are positioned by bringing them in contact with base end station stops *H*. Two supports *K* are provided to support arms *J* when at or beyond the circumference of disc *D*. Two blocks *S* are supported between guide blocks on arms *J*. Blocks *S* carry xylonite deflection indices *N* and deviation arms *M*.

Along one side of the base *A* there is a range scale *C*. Block *T*, which is made thick enough to enable disc *D* to clear scale *C*, has a pointer *E* for indicating range from the directing point at the center of azimuth disc *D* to the target at the center of hinge assemblage *P*. Range scales *L* are placed along arms *J* to indicate the ranges from the target to base end stations *H*. The azimuth disc is graduated in degrees (increasing in a clockwise direction)—around its periphery. Two deflection scales *O* are provided for use with indices *N* for giving the proper lateral displacement to deviation arms *M* in spotting. The deviation grid *G* is arranged to slide laterally on platform *B*.

The scales in this board are made to solve the equation: $\frac{dR}{R} = \frac{R^1}{R}\frac{\text{Cos } T^2}{\text{Sin } T} \tan dS^1 + \frac{R^2}{R}\frac{\text{Cos } T^1}{\text{Sin } T} \tan dS^2$ as derived in FM 4-15 where dR (or delta R) is the range deviation, R is the range directing point to target, R^1 and R^2 are ranges to the two spotting base end stations, T is the angle at the target between the lines from the target to the two base end stations, T^1 and T^2 are the angles at the target between the respective target-base end station lines and the target-directing point line, and dS^1 (or delta S^1) and dS^2 are the observed deflection angles at the base end stations. In addition, as in the M2, this board expresses the solution of the equation in terms of reference numbers based on percentage.

The solution of the equation in this board is accomplished by arrangements analogous to those in the M2 and the same approximations are used, but in this board no logarithmic or curved scales are used. The functions of the discs *O* and scales *P* in the M2 board are accomplished in the present board by dividing these functions between two grid scales, *O* and *G*. Scales *O* provide displacements of deviation arms *M* which are proportional to the product $R^1 \tan dS^1$ and $R^2 \tan dS^2$ respectively. These displacements are proportional to the actual deviations in yards. These deviations are resolved into their range and lateral components by the same geometrical system as in the M2. The range component of deviation is divided by the directing point-target range by the scale *G* which is graduated to read directly in reference numbers for correction. The scale of the deviation grid in this board, as in the M2, is made larger than that of the range scale. In the board shown here the range scales are drawn 800 feet per inch, while the deviation scales are 100 feet per inch.

These scales provide for a range from 7,600 to 23,000 yards and a range deviation of 600 yards over or short. Observing instrument deflection readings of 0.6 degree to 1.5 degrees and deviation grid readings of from 3% to 8%, depending on the range, are provided for by the scales in this board as built. Other ranges can be had by appropriate changes in scale.

Scales *C* and *L* are simple linear scales drawn on gummed paper strips. The scale on the periphery of the azimuth disc is drawn to each degree with the 5th and 10th degrees indicated by longer lines. Deflection scales *O* and the deviation grid *G* are drawn as shown in Figures 3 and 4. The deflection scales and the deviation grid are both multiple scales drawn with range as a parameter in each case.

The deflection scales are drawn so that readings, in degree reference numbers corresponding to the graduations in the 1910 azimuth instrument, set on the lines corresponding to the base end-target range shown on scales *L* produce deflections in actual scale yards. This requires that the distance from the center 3.00 or zero line on scale *O* is proportional to the tangent of the observed angular deflection multiplied by the range. Accordingly, the scale is made up with range lines at convenient intervals to accommodate the range of the board. In a board built for a range of 7,500 to 20,000

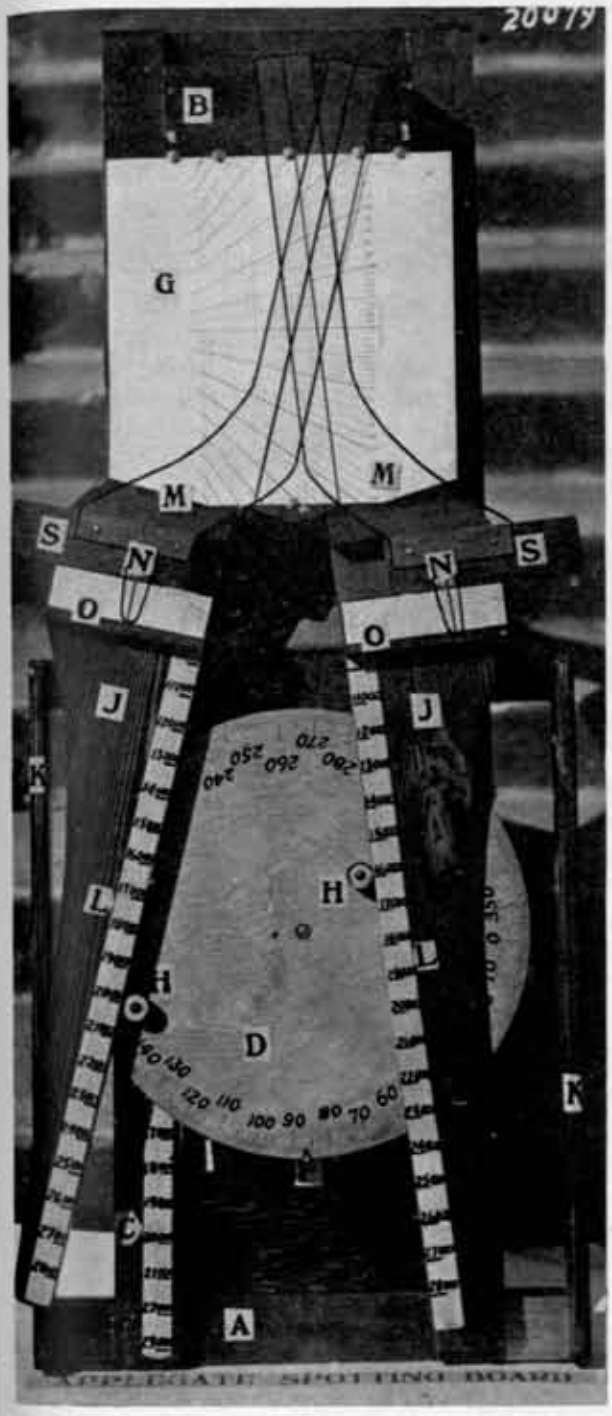


Figure 1

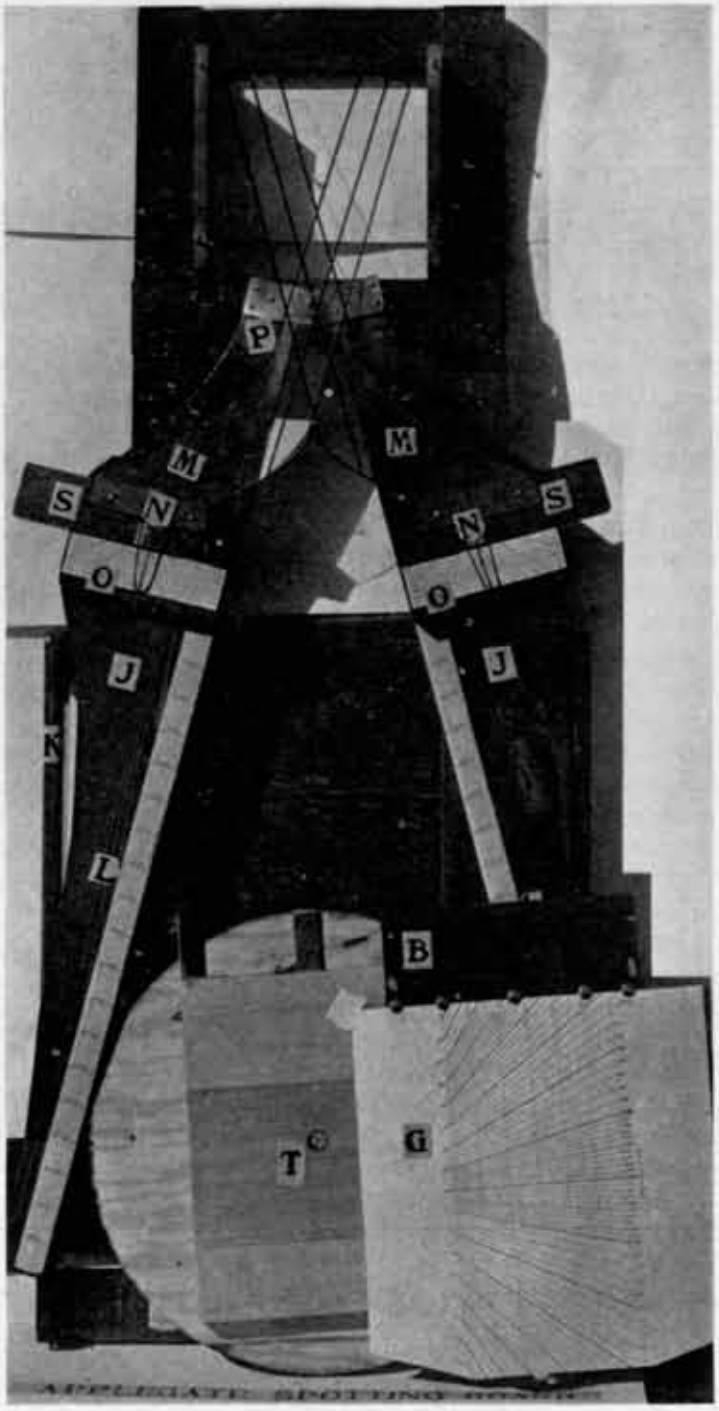


Figure 2

yards, the arm scales will have a comparable range preferably extending both below and above the board range, for example, from 5,000 to 25,000 yards. The range lines are drawn at convenient spacing such as ¼". The angular readings are laid out on the range lines as indicated in Figure 3 which has for convenience been drawn at 100 yards per inch.

In laying out these scales, a central point O is first drawn. Next along a line OA intersections for the range lines are laid off at convenient spacing, in this instance ¼" for each 2,500 yards through which the range lines are drawn. On one of the range lines, for example the 20,000-yard line, the distance corresponding to the product of the tangent of the deflection angle and the range is laid off at the point B. For one degree this is $(0.175)\ (20{,}000) = 350$ yards. At 100 yards per inch this scales to 3.5 inches. The line OB is the 200 line. This line is projected to a location C so a line CD of conveniently divisible length is produced and extended beyond point C a distance of about twice CD. Line CD is divided into twenty equal parts and the extension beyond C in convenient longer intervals. The points of division are used with the central point O to produce radial lines as shown. Lines for every

0.05 degree are drawn in for the longer ranges, but only those for every 0.1 degree or 0.5 degree are continued through the shorter ranges. For the upper part of the scales, if it becomes inconvenient to extend the line *CD* far enough, a second divided line can be made using a point scaled on the 10,000-yard line at the distance (tan 2°) (10,000) = 350 yards. A second easily divided line is laid off as described for *CD* and it is projected sufficiently to complete the scale.

The deviation grid is drawn in much the same way as the deflection scales. A central line *OA* is drawn first. A series of range lines covering the range of the board, for example 7,500 to 20,000 yards is drawn perpendicular to this line at convenient intervals. Intervals of about 1″ for each 2,500 yards are satisfactory. Along a convenient range line, such as the 20,000-yard line extended beyond the required dimensions of the grid, marks are placed at points corresponding to each 0.1% for the first one per cent and each 0.2% or 0.5% for the rest of the grid. At 20,000 yards scaled at 100 yards per inch, one inch equals 0.5%. If the grid is 12 inches long there will be 6″ for 3% over and 3% short. On the 10,000-yard line one inch, that is 100 yards, equals 1.0%, so the grid will accommodate 6% over and 6% short at 10,000 yards. The deviation grid can be made as a simple cardboard slide as shown in the present board, but, if time were available for some elaboration, the scale might be extended into a tape carried on rollers.

In placing the range scale and in locating the base end stations, the dimensions of the azimuth disc and the locations of the pointers *E* and *F* have to be considered. To place the range scale, the azimuth disc is placed at any convenient range and the distance from the center of the disc to the center of the hinge *P* is measured. The range that should appear for this setting at pointer E is the scale range per inch multiplied by the measured distance. The base end stations *H* are located at radii determined by the actual distance from the directing point to the base end station divided by the scale, in the present board 800 yards per inch. The azimuth of the base end station on the disc is different from the actual azimuth by the amount of the displacement of the pointer *F* from the directing point-target line. In the present board this is 180°, as this puts the pointer *F* at the location nearest the operator and the one most convenient for reading and manipulating the azimuth disc. Thus the azimuths of the base end stations *H* in the present board are laid out on the disc at 154° and 311° whereas the real azimuths are 334° and 131° respectively.

The base end stations *H* can be of any firm material such as maple. They should be circular and preferably of a radius of about ⅜″ or ½″. This radius must be taken into account in making the hinge *P* so that the edges of the arms *J* in contact with the stations *H* will be parallel with the lines through the centers of the stations *H* and the center of hinge *P*. The stations *H* can be screwed, bolted, or pinned to the disc *D*. In the present board 3/16″ pins snugly fitting into drilled holes are used. If the stations are not moved too often or loosened by bumping the pins will remain tight. The inner edges of the arms *J* should be straight and smooth. If the arms are made of soft wood, a strip of maple, as in the present board, is desirable for the finished surface. Indices *N* and deviation arms *M* are made of xylonite of about 5/100 inch thickness. The deviation grid *G* in the present board is held and guided on platform *B* by thumb tacks suitably spaced. This is satisfactory in operation but guides made of thin metal strips would be preferable.

Platform *B*, grid *G* and thumb tacks are so placed that the "300" line on grid *G* travels at right angles to

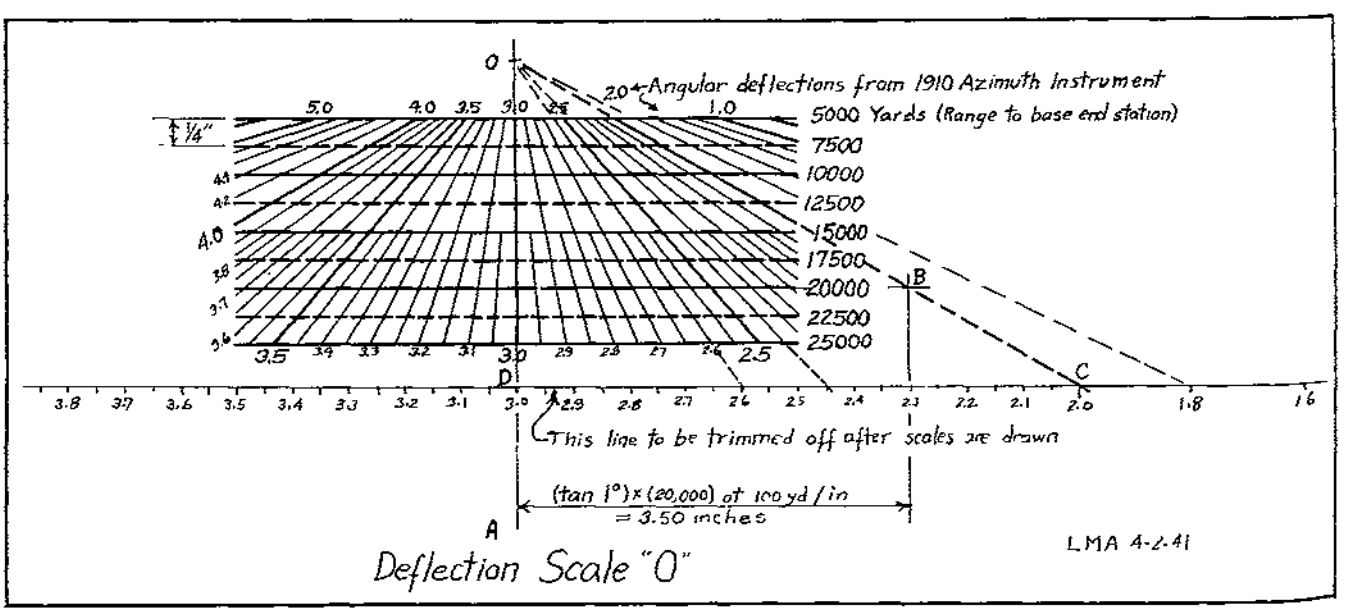


Figure 3

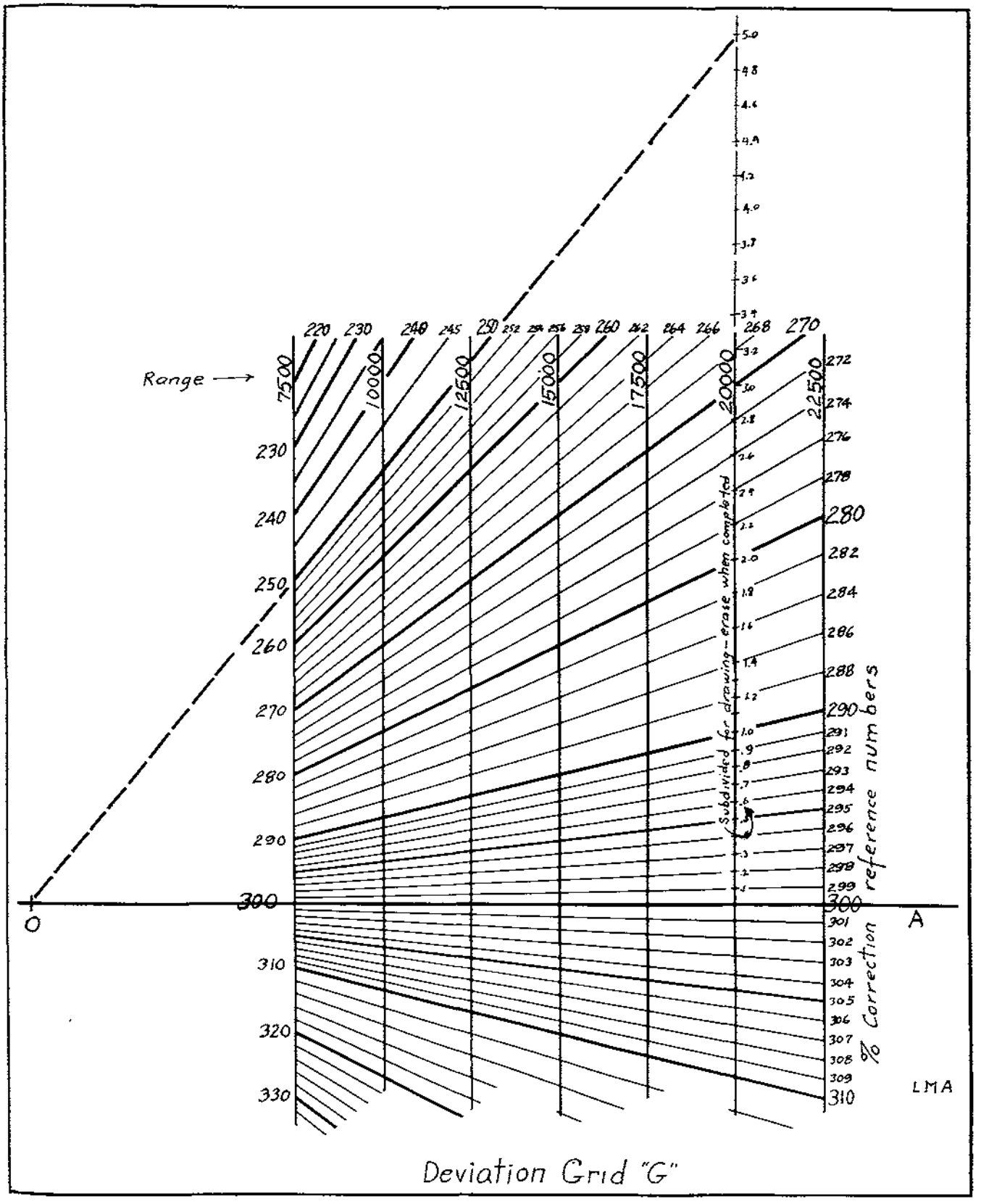


Figure 4

the directing point-target line at the center of the hinge P.

The arms *M*, slides *S*, indices *N* and deflection scales O are so placed that the fiducial lines on arms *M* intersect on the "300" line on grid *G* when the indices *N* are set on the line 3.0 on the deflection scales O. Briefly, when arms *M* are set at 3.0 on the deflection scales the range deviation registered on grid *G* should be zero yards or reference number 300.

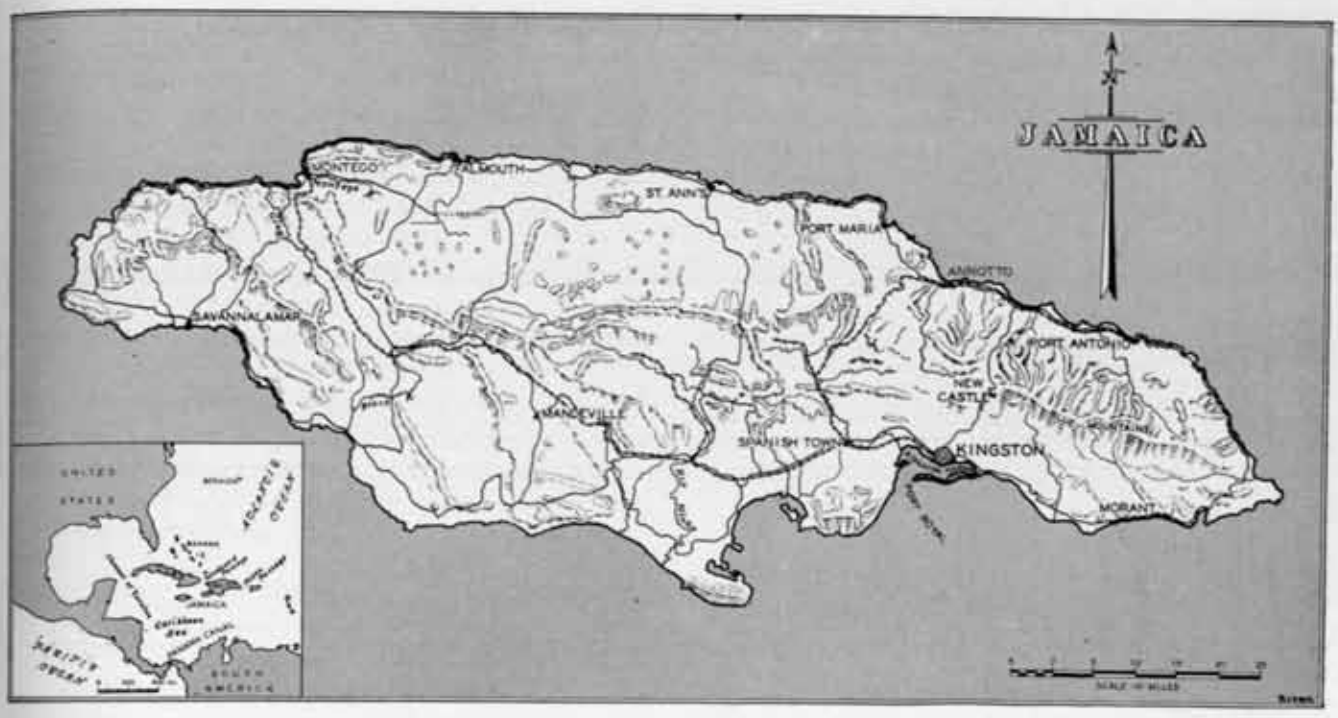
The board is operated as follows: The range from

the directing point to the target is set by moving the azimuth disc *D* along the base channel until the pointer *E* indicates the range. The azimuth disc *D* is rotated so pointer *F* indicates the directing point-target azimuth. The deflection operators set the indices *N* on scales *O* to the reported deflection angles on the lines in scales *O* corresponding to the ranges indicated by the stations *H* on scales *L*. For example, if the setting were somewhat as shown in Figure 1, the right hand operator would set the index *N* to the reported deflection, say 2.65, on the horizontal line in scale *O* nearest 16,000 which would be the 15,000-yard line. The left hand operator would set his index *N* to his reported deflection, say 3.0, on his scale *O* using the horizontal range line nearest to the reading indicated by the left hand station *H*, in this case 20,000 yards. The deflection settings having been made, the reader slides the deviation grid *G* to the right or left until the vertical line in the grid corresponding to the range indicated by the pointer *E* is placed under the intersection of the fiducial lines on the deviation arms *M*. In this instance the range is 17,500 yards so the vertical line marked 17,500 yards is placed under the deviation arm intersection. If the range is, for example, 18,500 yards, the setting should be such that the deviation arm intersection is about half way between the 17,500-yard and the 20,000-yard lines. The range deviation is read on the nearest convergent line to the deviation arm intersection; in this instance about 2.90.

The construction of the present board was intentionally made as simple as possible. It was constructed in the shop of Headquarters Battery, Harbor Defenses of San Francisco, by Sergeant E. A. Fortin following rudimentary sketches. Many refinements in construction will suggest themselves to other builders, but the present construction will be found reliable and accurate. This board has been compared with an M2 board using identical data and found to agree with the M2 board within one division of the deviation grid *B* for most settings. Although the accuracy of this board could be improved by mechanical refinement, the present construction is satisfactory for actual operation.

Around The Bases

Anonymous



JAMAICA

Jamaica is about 600 miles from the Panama Canal. It covers the Windward Passage squarely and the Mona Passage and the Yucatan Channel obliquely. Therefore it is the site of one of our new hemisphere-defense bases and therefore it finds itself included in this august series of sketches in which we leap from island to island of our new frontier. Admiral Mahan wasn't just trying to be alliterative when he called Jamaica the Key to the Caribbean. On the other hand, when the local Tourist Trade Development Board refers to its island as "the brightest jewel in the British Crown" we may be pardoned for reserving judgment pending investigation.

Jamaica is a compact little island, located well below the Tropic of Cancer and well within the Caribbean Sea. It is the largest, and according both to Admiral Mahan and the Tourist Board, the most important of the islands in the BWI (British West Indies). It (Jamaica) is about the size of Connecticut (4,500 square miles) and has about the same total population (1,200,000)—which is all the use we will have for Connecticut in this exposé.

The history of Jamaica goes all the way back to Columbus, who discovered the island on one occasion (1494), and used it to escape impending shipwreck on another (1503). Following the shipwreck incident, Columbus was marooned on the island for about a year; and it may be significant that he spent much of that year trying to get away from Jamaica and over to Haiti.

In the centuries following the Columbus era, Jamaica figured prominently and luridly in the history of the New World. The Spanish conquerors ruled the island for 160 years, during which they succeeded in exterminating the native Indian inhabitants (replacing them with Negro slaves). Then, in 1655, the British (who have always known a strategic position when they saw one) gained possession of the island in a squeeze play which resembled a maneuver in modern power politics. Under the British, Jamaica soon became the brightest jewel on the Spanish Main, if the Tourist Board will pardon the paraphrasing of its slogan.

During this era of sudden death and pieces-of-eight, the town of Port Royal on Jamaica's southern coast became "the wickedest city of its day"—the only hitch being that its day ended in a violent earthquake in 1682. In due course, the slave trade had become organ-

ized, and Jamaica was by way of becoming the No. 1 slave mart of the world. That was around the turn of the eighteenth century, when the "golden triangle of trade (muskets and calico from Liverpool to Africa, slaves from Africa to Jamaica, sugar and rum from Jamaica to Liverpool) was in full bloom. Those were years of high prosperity, followed by the freeing of the slaves (1837), followed by decades of depressions and strife, followed by the discovery of the banana and tourist trades. This brings us to the Jamaica of today.

Jamaica's appeal to tourists, and to those of us who may have to live there, is based chiefly on its wild and mountainous terrain. The island has a mountain range for a backbone. The range runs generally east and west, and near the eastern end the peaks rise to elevations higher than 7,000 feet above the nearby sea. Between the mountain range and the sea are limestone plateaus, scarred by numerous rough valleys and hills. The only level land on the island is found along the coast. In general, the coastal plain is very narrow. But along the southern coast, where lie the bases and installations with which we may be concerned, the plain is as much as ten miles wide.

In the important matter of climate, there is a parallel to be drawn between Jamaica and the Philippines. Down near the coast where one must work and live, the climate is "warm and humid"—which is guidebook terminology for hot and damp. Up in the hills and mountains the climate becomes "delightful and equable"—which may be taken as equivalent to fairly comfortable. The coolest months are from December to March, but at any given place the temperature is not likely to vary more than five or six degrees over the year. Along the southern coast, the thing to look for is a northern exposure, on the chance of catching the cool breeze which is said occasionally to blow down from the mountains by night. Normally, the breeze is from the sea, with the Trade Winds whipping up strong surf along the eastern and northeastern coasts.

Rainfall through Jamaica is more variable, even, than the climate. The annual average for the island as a whole is about seventy-five inches (about the same as for Mobile). However, up in the Blue Mountains, the figure reaches 200 inches per year (a figure not approached anywhere in the United States), while down around Kingston and the bases it falls to about thirty-two inches per year (about the same as for Iowa). The rainy season comprises July and the first part of August. But it is within the realm of meteorological possibility for any spot in Jamaica to get a torrential rain at any time.

Jamaica is in the hurricane belt although it seems that for some mysterious reason most of the biggest blows have passed to one side or the other of the island during the past century. However, the island is also in the earthquake belt, and in 1907 the capital city, Kingston, was almost completely destroyed in a great quake. Incidentally, a day or two after that catastrophe some American marines were rushed to the rescue, whereupon something resembling another earthquake occurred. It developed that the Jamaicans didn't want to be rescued, not by the marines at any rate.

Terrain, climate, and rainfall being what they are, Jamaica has (1) a varied and luxurious vegetation; (2) plenty of mosquitoes and other bugs; and (3) many short, torrential rivers. The rivers form in the mountains and hills and within a few miles tumble down thousands of feet to the sea. Rapids and falls are featured in all the guidebooks.

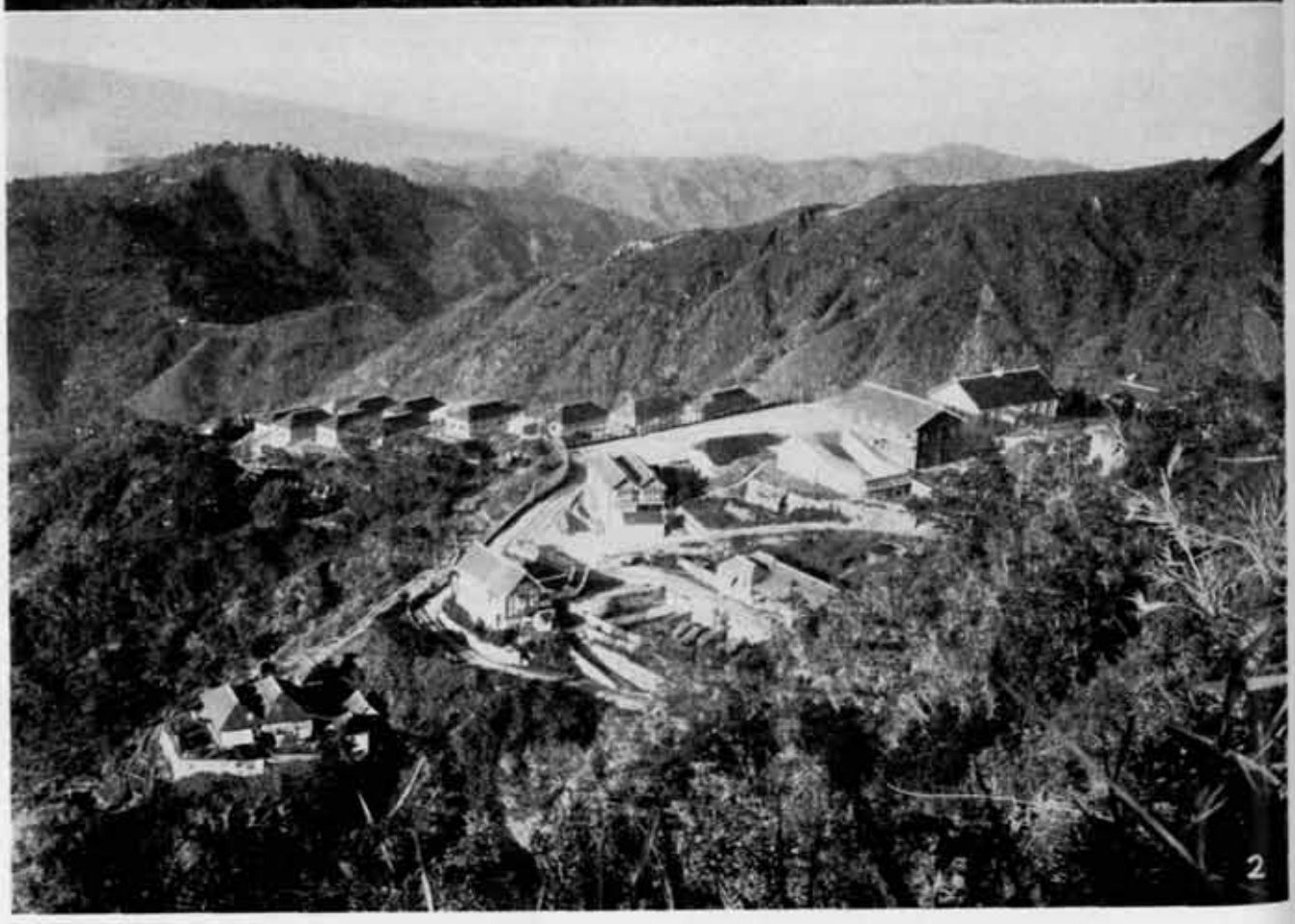
It has been noted that the Jamaican economy has at one time or another been based on (1) buccaneering; (2) the slave trade; or (3) sugar and rum. Along about 1860, in the midst of the long depression that had followed emancipation of the slaves, an American ship captain introduced the banana tree to Jamaica. The introduction clicked; and before long Jamaica had gained some measure of prosperity on a banana-sugar economy. That is about the situation today. Banana stems account for more than half the island's cash income. Sugar and rum account for another twenty-five per cent. Then come spices, coffee, oranges, extracts, coconuts, and cocoa, in about that order. Jamaica's great customer is England, with Canada a good second, and the United States (with its protective tariffs) a very poor third.

The population density of Jamaica figures out at about 650 persons per square mile, which places the island among the heavily-populated areas of the world. When it is realized that only about one-third of the island is cultivated, the true state of its population-density is apparent. The mass of the population lives on the land. The standard of living is low, but there is little actual want. Jamaica is one of those tropical islands where nature takes care of most bare essentials.

The population of the island is predominantly Negro. In this case, "predominantly" means about ninety-five per cent, that figure including the seventeen-odd per cent of people of mixed white and Negro bloods. Among the remaining five per cent of the population are found the 20,000 whites who, by and large, rule the island. Incidentally, the odd five per cent also includes about 20,000 "orientals" who were imported years ago in order, of all things, to cover a "labor shortage" in that over-populated land.

In our researches on Bermuda we saw how white control over a population predominantly colored was maintained through the institution of a property-clause on the voting franchise. Examining the situation in Jamaica, we find that Jamaica operates as a Crown Colony. There is a Governor, an Executive Council, and a Legislative Council which is the lawmaking body. It is composed of twenty-nine members—fifteen of whom are appointed by the Crown. This airtight system has been operating since 1865, the year of the last great Negro rebellion. Meanwhile, the question of full representative government remains a delicate matter, temporarily pushed to the background by the war.

(1) The rooftops of beautiful Kingston looking toward the harbor. (2) Street scene in an outlying part of Kingston



(1) Port Antonio, a small city on the northern coast of Jamaica. (2) Newcastle, a military cantonment located on a western spur of the Blue Mountains

Every island seems to have its Leading City, its metropolis to which all roads lead, and around which business and pleasure and life in general revolve. In Newfoundland, it was St. Johns; in Bermuda, it was Hamilton; and in Jamaica, it is Kingston. Kingston is near the eastern end of the southern coast where the finest harbor in the BWI meets the largest piece of level ground in Jamaica. The city is the Island Capital; it has a population of nearly 80,000 and it is "modern in every respect." It is within a few miles of the new naval and air installations, and therefore, if and when you go to Jamaica, you will get to know Kingston very well. You will like it, especially if your room faces to the northeast so as to catch that nocturnal mountain breeze.

Compared to Kingston the other towns on the island are not so much. In fact, there are only three of them worth mentioning. First, there is Spanish Town (pop. 9,000), which was once the capital of the island, but which has been in a state of decline ever since 1872 when it was de-capitalized. And there is Montego (pop. 8,000), which is the largest town on the north coast and which, with its excellent beaches, is the most thriving resort spot on the island. Finally, there is Port Antonio (pop. 5,000), which has the second best harbor on the island and is the center for the export trade in bananas.

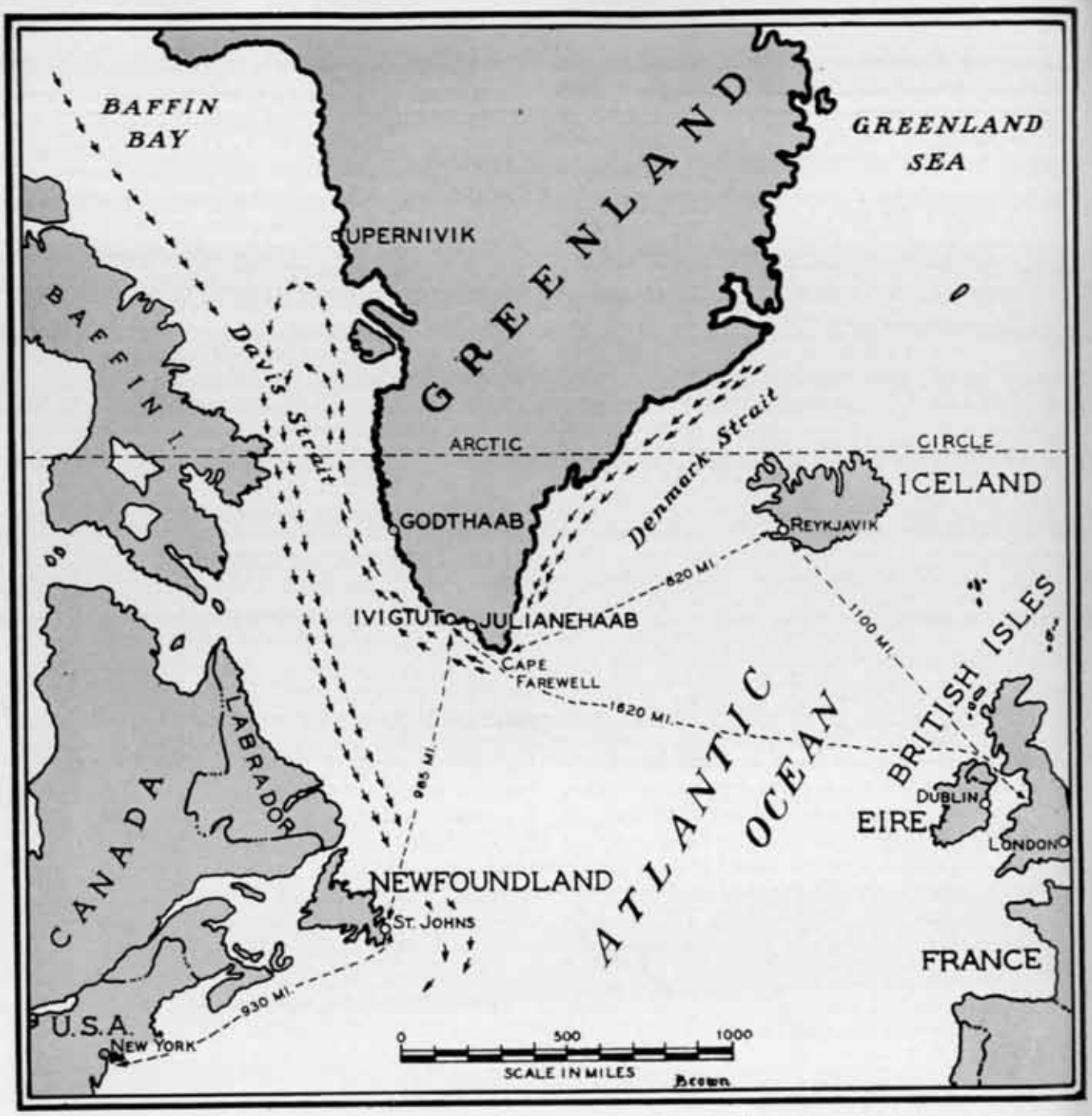
In Jamaica we've at last found an island base where a personal automobile will not be a drug on the market. The island has plenty of roads—almost 5,000 miles of them suitable for motor traffic. If you have a car you will find escape from that hot coastal plain relatively simple. For example, the fifteen-mile drive from Kingston to Newcastle will put you high into the hills (where in addition to being cool you will very likely be wet). If you haven't a car, you will be able to get around over the island fairly efficiently by bus and by railway.

As you will have grown to expect of these bases, living in Jamaica will be on a style which at once is more expensive and less comfortable than that to which you are accustomed. You will have to get used to paying for things in pounds and pence and to getting less for your money in general. In Jamaica we have another example of a government which raises its revenue chiefly by taxes on imports—and items like gasoline and beef and canned goods all are imported. But there's a ray of hope here because the QMC ought to come to our rescue with commissaries which won't be subject to import duties. The more optimistic even look forward to five-cent packs of cigarettes.

In view of its good roads, its numerous rivers, its long coastline, and its varied terrain, you will be expecting me to report that the sport and recreation situation in Jamaica rates superior. Frankly, as regards this important matter, my conclusions are on the bearish side. However, there are a few good beaches (notably near Montego), and there are numerous tennis courts and golf courses (nine of the latter) scattered over the island. Furthermore, up at Mandeville there are some mineral springs which will help your rheumatism, if any. On the other hand, the many rivers of the island are a disappointment to me. They are not good fishing streams, and the ballyhooed trips over the rapids aboard bamboo rafts leave me cold, not to say wet. As for hunting, there is a pigeon season and a duck season; and you can go alligator-shooting any time. Horse racing is popular, and there is one race course (Knutsford Park) which is modestly billed as "the Ascot of the Caribbean." Cricket is the national pastime—which makes me think that I'll do considerable alligator-shooting. Meanwhile, I have my eye on some of those small hotels up in the hills. After all, I expect to spend most of *my* spare time in the greatest of all Jamaican sports—the pursuit of a cool breeze.

The College Student and the Army

It is not a pleasant thing to have one's college course interrupted. It is not a pleasant thing to have any agreeable, normal, beneficial human activity interrupted. But certainly it is better to endure such an orderly interruption as a year of military training than to have a classroom ripped apart by high explosive, or a library laid in ruins by incendiary bombs. I am not here to tell you that a year of military training will be an agreeable substitute for a year of academic application, but I think you will agree with me that even such a hiatus in your careers is preferable to the sort of uninterruptedness you would be enjoying if you were students at the Sorbonne, or Leyden, or Copenhagen, or Oslo, or Prague. In each of those institutions, I believe, the physical structure of the university is reasonably intact. But is anything else?—*Address by* THE HONORABLE ROBERT P. PATTERSON.



Greenland: Note the double line of arrows that show the direction of the Greenland Current

GREENLAND

In Greenland, the Ice Age is making its last stand; but the newsworthiness of that item is doubtful, inasmuch as the stand has been in the process of being made for *x* thousand years, and will be for *x* thousand years more. Anyway, it gives you an idea of the kind of books I've had to read in order to rig this piece. Unfortunately (for the pirate-writing fraternity), the tourists' associations and the chambers of commerce have not yet gone to work on Greenland. Therefore, instead of getting my facts the easy way, out of multi-colored guide books, this time I've had to get them the hard way, out of the salty diaries of the explorers, the dull accounts of the scientists, and the unindexed yarns of the adventurers.

As a matter of fact, there's very good reason for the dearth of tourist literature on Greenland. For here at

last is a place which has no, and wants no, tourists. I don't know whether to be pleased or chagrined, I'm that surprised. After having built up a considerable resistance to tourist sales-talk while researching Bermuda and Jamaica, and even Newfoundland, this situation of no-tourists-allowed in Greenland leaves me perplexed. It's not that I have any good reason for *wanting* to go to Greenland; it's just that I don't understand why the Greenlanders (or rather, why the Danes) don't want me to *come*. The official explanation is that the Eskimo must not be exposed to civilized greed—and civilized diseases. Another explanation, of lower rank, has to do with the ruins of the settlements of the ancient Norsemen, which ruins must not be disturbed. The third explanation, and rank it where you will, has to do with the trade monopoly maintained by the Danes through the years. This, also, must not be disturbed.

The contrast, Greenland-versus-the-other-bases we have considered in this series, goes deeper than policies regarding tourists. Most of the other bases (Bermuda, Jamaica, *et al*) are small and hot and overpopulated. Greenland is very large (the largest island in the world, four times the size of Texas), very cold (ninety per cent of it lies within the Arctic Circle), and very sparsely populated (it has not half as many people as that speck of coral reef, Bermuda). Another of Greenland's peculiarities is that it fails to belong to England.

The physiography of Greenland can best be described in a by-the-numbers manner, and with the help of a map. The island is rimmed by mountains, rocky and rugged, rising precipitously to elevations of 6,000 feet and more. In places, the mountains rise sheer out of the sea. In other places, between the mountains and the sea is a narrow (maximum width: eighty miles) rocky shelf or "coastal plain." The coast is deeply indented by many valleys or *fjords*. These often extend inland, piercing the wall of mountain ranges.

Beyond the mountains, and contained by them, is the great *Greenland ice cap*. The latter covers more than eighty-five per cent of the surface of the island. Formerly, it was assumed (and by such as the *Encyclopaedia Britannica* it is still assumed) that the ice cap rested on a high plateau, the edges of which were marked by the coastal mountain ranges. Then, in 1930, while several other expeditions were talking about doing it, the German explorer Wegener led an expedition onto the ice cap and measured the thickness of the ice. Using methods faintly resembling those used in sound-ranging by the artillery, he found the ice at the center of the ice cap to be something like 9,000 feet thick. Since the elevation of the surface of the cap at that point is less than 11,000 feet, the conclusion was that the surface of the ground is at elevation 2,000 feet, or lower. Therefore, Greenland has come to be regarded not as a plateau with a veneer of ice, but as a deep soup plate, heaping full of ice. Someone calculated that if all that ice were to melt, the levels of the oceans of the world would rise about twenty-five feet—in which event, I hope I am in Greenland rather than in one of those warmer but lower bases, such as Bermuda.

During those same years when Greenland was supposed to be a plateau capped with ice, there flourished another interesting theory. This one had it that Greenland, and specifically the Greenland ice cap, was the source of much of our weather. The theory was that the air came into contact with the ice cap, and so set up currents which ultimately were reflected in such phenomena as lows over Michigan and gales down the eastern coast. In the words of the meteorologists (quite a word in itself), the situation over the ice cap was constantly *anticyclonic* (the books one must read to put together a piece like this!). Well, be the words as they may, the same German who measured the thickness of the ice sent up a lot of balloons, and he couldn't find anything the least bit anticyclonic about the situation. My conclusion is that whether it's made in Greenland or not, we're going to have weather.

But while Greenland's status as a manufacturer of weather may be in doubt, there can be no doubt as to its status as a manufacturer of icebergs. That great ice cap is the father of practically every iceberg in the North Atlantic. The mechanics by which the bergs are formed are simple: The ice of the ice cap is a viscous mass. Under the pressure of great weight in the center, it is slowly oozing outward toward the mountains which form the rim of the inland basin. The ice oozes through the gaps in the rim—that is, through the fjords. Flowing down the fjords, the river of ice finally reaches the sea. There, big chunks crack off the end, and with each of them, an iceberg is born. The rivers of ice themselves constitute *glaciers*. Some of the glaciers flow at the breakneck speed of sixty feet a day—comparable, I gather, to about a 10-second hundred.

The easiest way to dispose of the Greenland climate is to say that it is cold, and that as you go north it gets colder fast. There isn't a place on the island that isn't frozen up solid in winter time, and there isn't a place along the coast where you can't snare a floating piece of ice for purposes of refrigeration at any time of the year. By far the warmest and most equable climate is along the southwest coast, where the influence of the Gulf Stream seems to be vaguely felt. At Ivigtut, on this Greenland Riviera, the July average temperature is about fifty degrees; while the January average falls to about eighteen degrees. The corresponding figures for Upernivik, above the Arctic Circle, are forty-two degrees and minus seven degrees, respectively. However, all along the southwestern coast there are summer days when the temperature touches maybe seventy-five degrees. There also are bright-colored flowers, and perhaps some radishes and lettuce and certainly plenty of mosquitos.

The curious night-and-day relationships which one encounters in the Arctic are worth a word, even though it's like an excursion into high school astronomy. At the Pole itself there are six months of darkness and six

A view of Umanak, a small fishing village on the west coast of Greenland

months of daylight. However, at no point below the Arctic Circle is there ever a real midnight sun. At Ivigtut, for example, you would have long summer days, and the nights would be a sort of twilight. In the winter, the days would be short—perhaps six hours long—and the nights would be very dark indeed. If you like to sleep you will like those winters.

Any appreciation of Greenland must include note of the ocean current which so influences the life and activities of the island. The reference here is to the so-called Greenland current, which debouches from the North Polar Sea and courses south roughly along the eastern coast of Greenland. This current is as cold and forbidding as the Gulf Stream is warm and inviting; but it is of interest chiefly because of the freight it carries. That freight consists of great slabs of ice, fresh from the polar pack (but not to be confused with the bergs, fresh from the Greenland cap). Moving south under the influence of the prevailing winds, the current makes a wide sweep around Cape Farewell, the southern tip of Greenland. The current keeps right on bending, and now moving north, whips up along the western coast of the island. All the time, the strength of the current and the size and density of the ice floes are decreasing until finally, somewhere north of Julianehaab, the current and the ice disappear. Thus the entire eastern coast of Greenland, and the western coast from about the latitude of Julianehaab south, are made more or less (more on the eastern coast, less near Julianehaab) inaccessible by the band of floating ice which although only a few miles wide is usually too much for a ship to negotiate. Incidentally, under certain conditions of wind, this ice blockade may move on down to envelop the north coast of Iceland. (Now that I think of it, the ice blockade may have something to do with that no-tourists-wanted policy. There's not much use in wanting them if they can't get in.)

If it's unusual and interesting people you're looking for, this is your place. Some of the authorities on Greenland talk about the ice cap, and some talk about the flowers, and some talk about this and that; but all of them dwell at length on the curious character of the inhabitants. These inhabitants—all 16,000 of them—live in tiny settlements along the coasts, on the narrow shelf between mountains and sea. The most populous area is the same southwestern coast which as we have seen basks in comparative warmth behind its barrier of floating ice.

The native inhabitant of Greenland is the Eskimo, a full discussion of which would get me into books more formidable than those from which I got those passages on anticyclones. Suffice it to say that the Eskimo is looked upon as an immigrant from Asia, whose arrival in Greenland fortunately antedated the Danish ban on tourists. Furthermore, before that ban came in southwest Greenland was a headquarters for whalers and sealers and fishers from Norway, England, Italy and where-have-you. That circumstance and the later arrival of the Danes in force has resulted in the native Eskimo strain being mixed with assorted European bloods. Practically the entire population of the southwest coast—which is to say most of the population of Greenland—is of this mixed race. The people in question call themselves *Greenlanders* to distinguish themselves from the pureblood Eskimos. Pureblood Eskimos are found only on the eastern coast, and far north on the western coast.

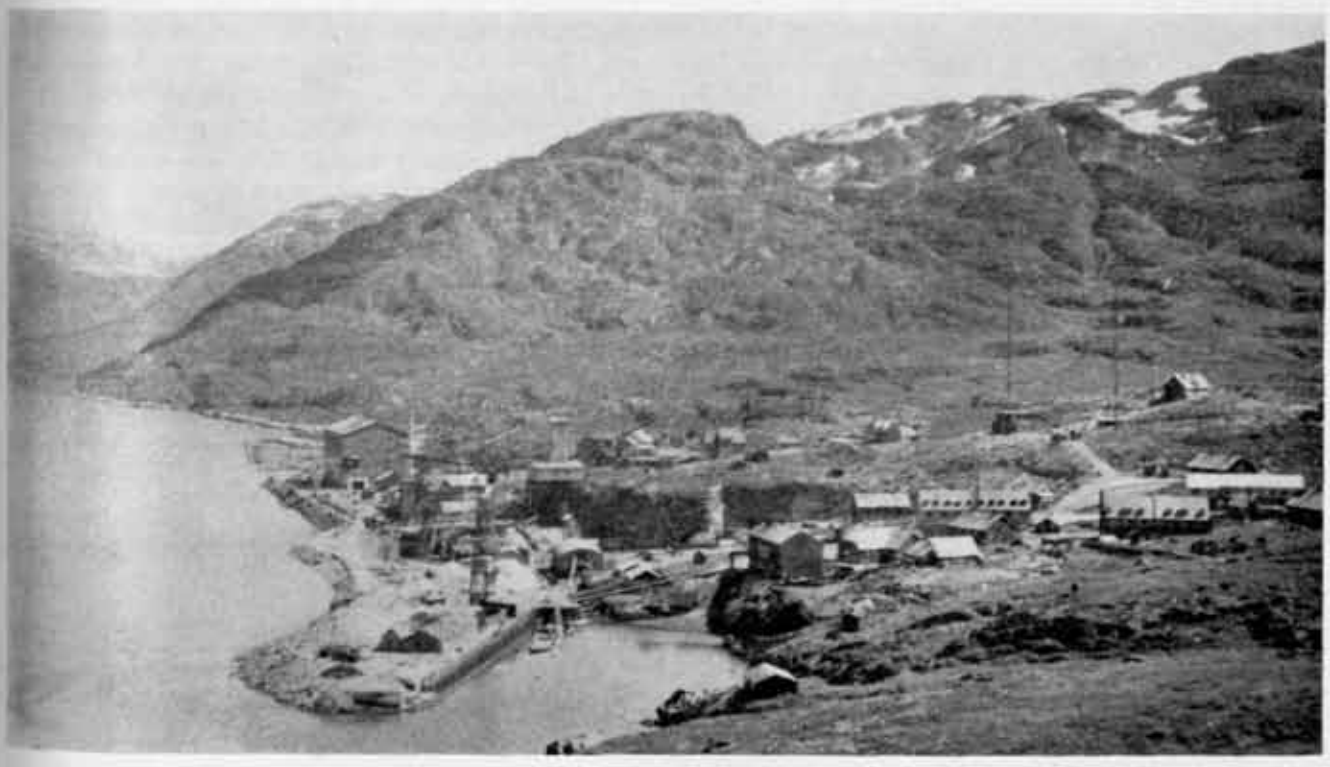
In Jamaica, we saw a place where a native could be

indolent and still live. In Greenland, it's otherwise, particularly in the north beyond the benevolent arm of the Danish Trading Commission. The people of Greenland make their living the hard, and often the dangerous, way. The sea is the source of most of their food: seal in the south, fish in the center, and walrus in the north. These staples may be supplemented by such items as ptarmigan, polar bear, whale, reindeer, the little Auk bird and even, if worst comes to worst, seaweed.

Being essentially a meat-eater, the Greenlander necessarily is a hunter—a meat-on-the-table hunter. The hunting of the seal, and especially the hunting of the walrus, brings out not only the courage and skill of the hunter, but also the characteristics of that remarkable craft, the *kayak*. This is a cigar-shaped skin-covered boat about twelve feet long, completely decked over except for an opening in the center just large enough to receive the kayakman. Every good hunter has his kayak and he handles it with astonishing abandon and dexterity. For example, one of the more useful maneuvers, employed just before a heavy wave breaks over the kayakman's neck, is to capsize the boat, hang head downward in the water for a moment, and then right the boat with a sharp kip.

The basic weapon of the kayakman is the harpoon. The idea is to slip up on a seal or walrus, and harpoon him from a range of about twenty-five feet. The idea then becomes to reverse the kayak and get somewhere else, and quickly. Meanwhile, the seal or walrus will have made off with the harpoon, to which, however, a line connected to a bladder is attached. The hunter then follows the bladder around until the wounded prey comes to the surface. At this point the old method was to go to work with a long lance and the fun was just beginning. I am reluctant to report that the new way is to bring in a rifle at this point.

The Eskimo cuisine has its points of interest. To begin with it includes considerable raw meat, the eating of which proceeds in two easy steps: grip with the teeth, and cut off even with the nose. There are a number of delicacies. One is the contents of the stomach of a walrus, especially if he has just been feeding on oysters and clams. In this case, the somewhat sour acids of the stomach are said to form a delightful cocktail sauce. Another delicacy also involves the walrus—his liver, that is. The liver is placed in an airtight bag of blubber. The bag then is hung in a cave, where the sun cannot reach it. After it has hung there for a while, that is, for not less than a year, it is ready for the gourmet. The liver now has become "as green as grass, and tastes like strong, hot curry." I recommend eating it with a straw, through a gas mask. The final delicacy for which we have space has to do with the auk, a sparrow-size fish-eating black-headed little bird which frequents the coasts of Greenland by the millions. When the auks are flying, you can catch six or eight of them with one swipe of a handnet through the air. The procedure then is to kill the bird (by a little pressure on his breast bone), skin him (by a deft inside-out operation), and eat him forthwith. The auk also is said to make up into a good soup. So if the gourmets don't object, please make mine soup.



A small mining town in Greenland, Ivigtut, where cryolite, a material used in the manufacture of aluminum is found

It will be evident that about all the Greenlander hopes to do is to catch and kill enough to keep the family alive. He hasn't much in the way of a cash crop and not much in the way of a need for one. Up north, however, there is a lively trade in fox skins, and further south there is a surplus of cod and halibut and seal skins. The Danish monopoly always has taken care of these surpluses, and has seen to it that the natives have the essentials of life (mostly flour, coffee, tobacco, and the tools to keep catching and killing) in return. Just what the situation is today is something I'll want you to tell me when you come back.

The traditional Greenlander house is made of rock and earth, and is a sort of cut-and-fill job: half below and half above ground. Ventilation is bad, and even the most elemental facilities are lacking. Aside from rock and earth, the chief building material available to the natives has been driftwood. In this respect, the inhabitants of the east coast finally get a break. The same current that sweeps the ice against the coast also brings to it considerable quantities of driftwood, the ultimate source of which, apparently, is northern Canada. Meanwhile you'll have to go far to the north, or to a movie, if you want to see a real snow igloo.

The Eskimo (or Greenlander) is a gentle, hospitable, child-minded soul who, as indicated, has his share of courage. However, he has the hunter's viewpoint on labor of the cruder types. He doesn't mind risking his neck in his kayak, but if one of the big open skin boats has to be rowed some place, that's a job for the womenfolk. The native lives in instinctive dread of the big ice cap, and he will venture far out on it only when well paid and well propagandized.

Travel in Greenland is a major undertaking. The narrow coastal ledge on which the people live is traversed at many points by fjords and inlets, and at other points it is pinched off by mountains rising straight from the sea. Of course there are no roads, and in fact, no trails. In the south where the sea is open the year around travel is normally by boat. In the north travel is by dog team, following the relatively smooth ice that forms near the high-tide mark immediately adjacent to the shore. Travel on the ice cap, on the rare occasions when it cannot be avoided, is by dog team.

The Greenland dog team is quite an institution. It is found only in the north, and consists of eight or ten dogs per team. The sledge has a payload of about seventy pounds per dog, and a good day's run is fifteen miles. The dogs are supposed to get about a pound of meat a day. This keeps them in a state of ravenous hunger, and in fact one of the problems is to keep them from eating the sealskin lines.

Some years ago the German Wegener (of anticyclonic note) brought to Greenland two motor sledges designed for use on the comparatively smooth surface of the ice cap. The Wegener sledge was powered by a gasoline motor driving an airplane propeller—the same system used by our Engineers in their "airboats" on the bayous of Louisiana. The sledges appear to have been fairly successful, but no one has tried the idea since. As a matter of fact, no one has fooled around on the ice cap much since Wegener's day (1930).

* * *

In going to Greenland one would leave behind his recreations, his automobile, his luxuries and many of his semi-necessities but, in my book, he would still be ahead of the game. This is the year I'm due to break 100 on the golf course, but I will gladly trade my chances on that for the chance of learning to handle one of those kayaks. I like the prospect of getting in on some of that elemental hunting: ptarmigan, ducks, seal, walrus, and even polar bear. I'm curious about those speeding glaciers, and I'm anxious to climb up on that ice cap, to see what an ice age making its last stand really looks like. Incidentally, along with my seeing, I hope to be able to work in a little skiing. When the temperature touches a minus-fifty during those long winter nights I may think differently. But right now—and probably still more so when the thermometer hits a hundred this summer—Greenland looks interesting to me—the biggest, coldest, wildest, most primitive of all our island bases.

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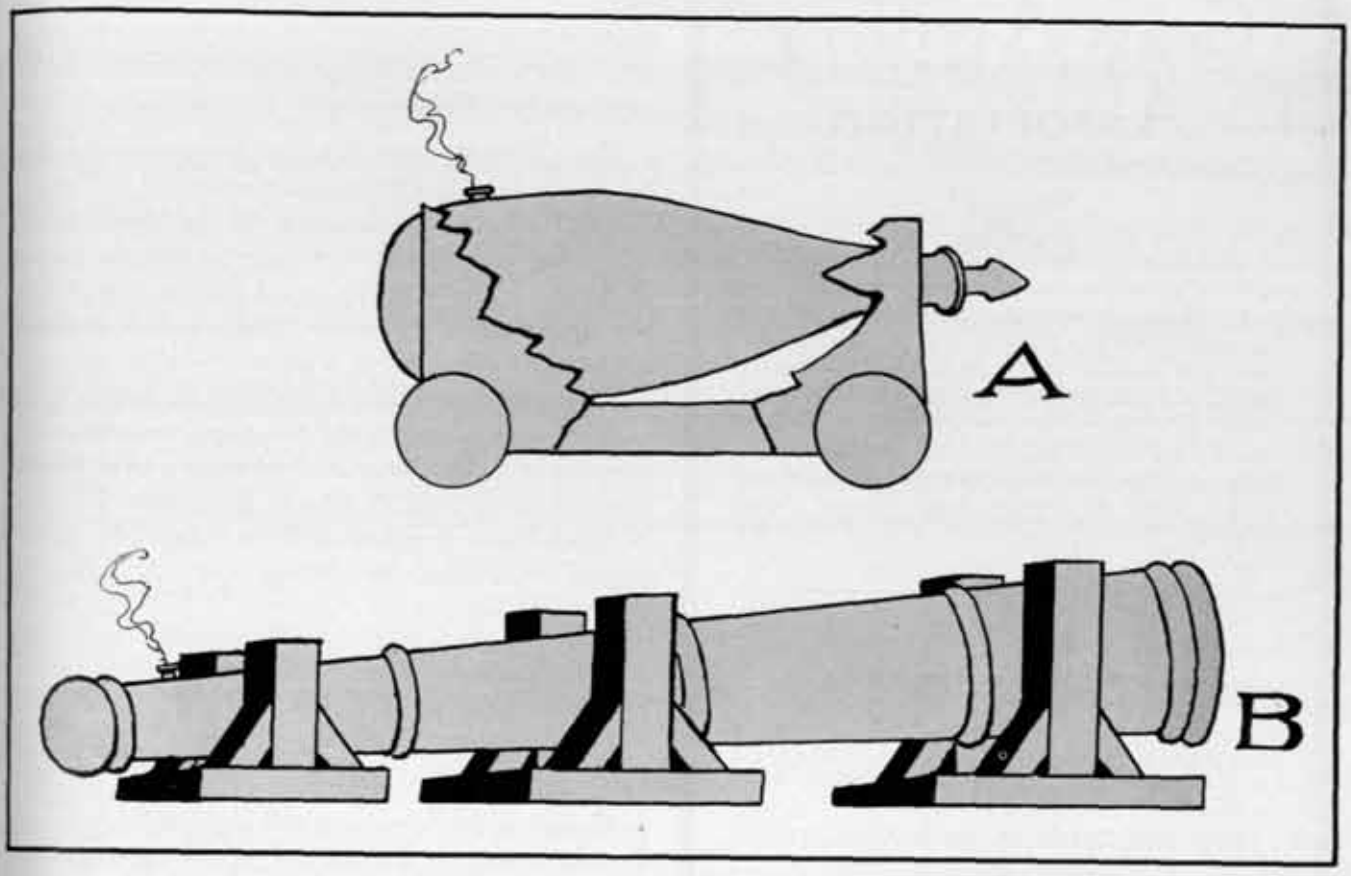
The Story of Artillery Through the Ages

By W. A. WINDAS



Chapter 13: THE FIRST GUNS

It is hard to fix, with any degree of precision, the date or even the century when gunpowder was first used in warfare. We know that the Chinese used it for ceremonies, and there are a few isolated instances when they used it for grenades, but no true guns are mentioned by the early Chinese writers.

A Japanese tapestry depicting a naval battle shows very obvious gunsmoke. The tapestry is dated far earlier than the European's knowledge of gunpowder, but the validity of the date chosen for the tapestry is not guaranteed. Alexander the Great was stopped at the Indus by natives who mounted strange war engines on the walls of beseiged cities. These engines hurled missiles with a "noise like thunder and lightning." Scipio Africanus had a brief skirmish with a foe whose weapons emitted a brief puff of smoke.

Historians seem to agree that the Battle of Crecy, in 1346, marked the debut of gunpowder in Europe, although the French navy, 100 years earlier, mounted one *Pot de Feu* per ship. The wheeled mount of this gun changed little throughout the era of sail. It is depicted in *A* in the illustration herewith.

The principle value of the English guns at Crecy was not in fire power but in noise—the French cavalry was stampeded by the din of the firearms.

Shortly after Crecy, the Bombard (figure *B*) came into prominence as a substitute for the battering ram. These weapons were made of brass, threw stone balls, and had a range slightly greater than a longbow.

The rate of fire of these early pieces had little relation to loading time. These cannon (from "Canna," a hollow reed) required an interval of several hours between rounds—higher rates of fire were apt to make casualties of the progressive gunners who did the experimenting. The brass of the time couldn't take it.

The knights boycotted gunpowder and all its works, branding it unchivalrous. But all attempts to suppress the new invention failed; the day of the knight and the walled city was approaching its dusk.

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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

COLONEL CHARLES THOMAS-STAHLE, Editor
CAPTAIN ARTHUR SYMONS, Associate 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

Regular Army Trophy

The Chief of Coast Artillery has announced that the regiment in the Philippines commanded by Colonel Joseph F. Cottrell is the winner of the United States Coast Artillery Association Trophy for the year ending December 31, 1940. The award is made annually to the regiment of the Regular Army which is outstanding in target practice.

Another regiment in the Philippines, the one commanded by Colonel Willis Shippam, won honorable mention in the competition. The regiments in Hawaii commanded by Colonels Charles K. Wing and Eugene B. Walker also won honorable mention. The officers named commanded the winning regiments during the competition year.

Courses at Leavenworth

The fourth in a series of two-month courses for specially selected officers of the Army at large, will start June 28th at the Command and General Staff School, Fort Leavenworth, Kansas, the War Department has announced.

The course comprises a short period of instruction in staff duties followed by specialized instruction in the duties of the four staff sections.

It was indicated that officers to attend the new course will be selected from those now on duty as instructors in service schools, on regimental or battalion staff duty or general staff duty with troops, giving preference to those who are graduates of special service schools. However, commanders may select officers considered suitable for later staff assignments.

Student officer quotas for the new course are as follows: First Army, 57; Second Army, 36; Third Army, 63; Fourth Army, 39; Armored Force, 13; GHQ Air Force, 40; Washington Provisional Brigade, 1; each Corps Area, 5; each chief of branch, 2; War Department General Staff, 6; and each replacement center, 1.

Corps Area commanders may order individual reserve officers to active duty, within authorized quotas, to attend this course. After completing their studies the officers will proceed to contemplated assignments.

Officers of National Guard units, now in the federal service, may be detailed as students to the course if division commanders so desire.

Night Fighting

Night interception was proved in last week's actions to have advanced to a stage at which success is no longer a flash in the pan. For the first time since the heavy raids began the Royal Air Force showed a consistent record of success at night. A total of 36 German bombers were shot down after dark during the week, 13 of them in one night. Of the 36, a total of 21 were destroyed by night fighters.

Brilliant moonlight made the work of interception much easier. To it must be attributed much of the success. The most effective "secret device" of all is to be able to see the enemy. Nevertheless detector apparatus is known to be working well and doubtless contributed to the victories.

A wide variety of night fighters shared the success. They included the Hawker Hurricane, the Boulton Paul Defiant, the Bristol Beaufighter, and probably a few Douglas Bostons which Sir Archibald Sinclair announced can be used for this purpose. Even a Supermarine Spitfire was reported to have achieved a victory at night, the first intimation that Spitfires were flying after dark. Antiaircraft guns and "other devices" accounted for 15 of the night raiders.

Over France a further three enemy machines were destroyed by Bristol Blenheim long-range marauding fighters sitting above the enemy aerodromes and by our own bombers.

Though the Beaufighters have been in action for some time news of the existence of this machine was withheld from publication until a revelation came in the Air Minister's speech. Such tit-bits are now frequently held-up to add spice to what might otherwise be an unexciting peroration. The name Beaufighter—not an inspired choice—suggests a close relationship between the Beaufighter and the Beaufort. Powered by two Bristol Hercules motors it is just the sort of long-range fighter with exceedingly powerful armament which the Royal Air Force has lacked for so long. Its presence in a few squadrons at the time of the Norwegian campaign might have had a decisive influence on the air operations there.

Converted to a fighter the Douglas Boston would come into much the same category. Obviously a powerful armament could be concentrated in the nose and the tricycle landing-gear should make it particularly suitable for night landings.

While the defensive weapons of the R.A.F. have been scoring so much success the offensive arms have taken advantage of the moonlight also and the new and more powerful bombers have been officially reported in action. The Short Stirling, the Avro Manchester and the Handley Page Halifax can all carry far greater loads than their predecessors. In fact, the Air Minister indicated something of their power when he said of them: "These bombers are more than twice the size of an

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The Coast Artillery Journal

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earlier type." (The Wellington weighs 13 tons fully loaded.) "They are faster and carry not only a heavier defence armament but also three times the weight of bombs for the same distance as their predecessors." (The Wellington carries 2,500 pounds of bombs and fuel for 2,000 miles.)

Thus as new squadrons of these immensely powerful types come into service the Royal Air Force will be able to strike with ever-increasing intensity at the heart of the German War effort.

All indications so far suggest that the enemy is some way behind in night interception. The power-operated gun turrets mounted on our bombers have been as successful in dealing with such night fighters as came within range as they were in the daylight work last spring. So long as our present superiority in equipment can be maintained the numbers possessed by the enemy are of no avail—*The Aeroplane,* London; March 21, 1941.

The Knights of Artillery

At Camp Stewart, Georgia, the gun commanders of the 212th Coast Artillery (AA), New York National Guard, have organized the *Knights of Artillery*, a 1941 version of the artillery guilds of mediaeval times. Lieutenant R. A. Lepesqueur is Honorary Grand Knight, acting as adviser for the group.

The Knights will meet frequently, opening their meetings with a formal lecture on some subject either intimately or generally connected with artillery firing. After the lecture, the meeting will be thrown open to discussion. The basic thought behind the organization is to make the experience and knowledge of one member available to all. Experts in various fields will be invited to speak before the Knights.

Lieutenant Lepesqueur invites comments and suggestions from other regiments.

Civilian Volunteers for Aircraft Warning System

Five hundred thousand civilians will be enrolled as volunteer observers to constitute a nationwide force to coöperate with the four Air Forces of the Army Air Corps in warning of the approach of enemy aircraft, the War Department has announced.

Organization of this volunteer Observers Corps will begin immediately under the direction of Lieutenant General Delos C. Emmons, Commander of the General Headquarters Air Force. It is estimated that from 500,000 to 600,000 civilians will be enrolled by the end of August, 1941, for active participation in air defense. They will be affiliated with the Interceptor Commands of each Air Force.

The new organization will be formed along lines formulated at the orientation and indoctrination course held recently at Mitchel Field, New York, for Air Force commanders and staffs. Embodied in the civilian observer plan, as a result of this course, were the results of the recent experimental air warning system employed in the New York-New England "test sector" by the Air Defense Command from January 21 to 24. Methods used abroad, as reported by American officers there, were also taken into consideration.

This move to systematize the air warning defenses of the nation is another step in real preparedness for a possible emergency. It is being taken now in recognition of the fact that the active coöperation and collaboration of the general public are essential in the air phase of defense.

Coast Artillery History

The JOURNAL is planning a series of articles outlining the history of the Coast Artillery Corps. In addition to the facts and figures available from official sources, The JOURNAL desires to include in this series such interesting data of an informal anecdotal, unofficial or legendary nature as may be available from any of our readers. If you are in a position to supply such material, it will be gratefully received by the editor.

Scholarships

Many educational institutions are offering concessions to sons and daughters of army personnel. Some of the scholarships carry an appreciable money value, and it will pay the parents of students to investigate the matter before choosing a school.

Information is available from the Adjutant General. If information is desired on any particular school, that institution should be mentioned in the correspondence.

Army Strength

The strength of the Army of the United States on May 15, 1941, was estimated at 1,320,500 officers and enlisted men. The break-down follows:

OFFICERS	
Regular Army	14,000
National Guard	20,500
Reserve Officers	46,000
Total	80,500
ENLISTED MEN	
Regular Army, three-year enlistments	462,000
Regular Army, Reserve and one-year enlistments	18,000
National Guard in Federal Service	270,000
Selective Service Trainees	490,000
Total	1,240,000
TOTAL COMBINED STRENGTH	
Regular Army	494,000
National Guard	290,500
Reserve Officers	46,000
Selective Service Trainees	490,000
Total	1,320,500

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.

THE COAST ARTILLERY BOARD

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Commissary rolls or chests. A field ration has been prescribed for all camps, posts and stations within the continental limits of the United States, with certain exceptions and special provisions, for a trial period of three months beginning May 1, 1941 (see War Department Circular No. 28, February 17, 1941). Station sales officers are to issue field rations in bulk, either to the division quartermaster or regimental or similar unit supply officers. Breakdown of field rations to smaller units is to be effected by the division quartermaster or the unit supply officers.

In normal service at camps, posts and stations, it is not likely that units of Coast Artillery troops will be attached to divisions, so that field rations in bulk probably will be issued to the supply officers of regiments and separate battalions. It appears that the supply platoons of the headquarters batteries of the organizations receiving the bulk rations should be equipped to divide these rations among the component smaller units during the three months period mentioned in paragraph 1, above, as well as during any subsequent period in which the field ration is issued. The utensils needed to perform these duties are not now readily available within the organizations for such use. While some of the articles necessary are to be found in the equipment of headquarters batteries, they are intended for other use; and to attempt to use them in the distribution of rations would hamper other activities of these units. For instance, it does not seem feasible to borrow cleavers, knives, meat saws, etc., from a headquarters battery kitchen to cut up meat for issue to other batteries of the organizations.

The commissary chest and the commissary roll are considered suitable for use in distributing rations to the units of a regiment or separate battalion.

The following basis of issue for these items has been recommended to The Adjutant General:

	Mob.	*Peace*	
Chests, commissary, complete	1	1	Per Regt.
Rolls, commissary, complete..	1	1	Per Battalion

Bantam cars. The truck, ¼-ton 4 x 4, command and reconnaissance (Bantam), has been tested to a limited extent by the Coast Artillery Board. Steep, sandy hills at Fort Story and very rough terrain at Langley Field were negotiated easily. Steep banked ditches with muddy footing and rough fields were crossed readily with three occupants in the truck. Judging from these tests and from past experience with other vehicles, the cross-country mobility of the ¼-ton truck is considered to be materially superior to other wheeled vehicles under consideration. Acceleration is good, but it is not as good as that of the motorcycle with sidecar or of a commercial Ford passenger automobile. The Coast Artillery Board has submitted detailed recommendation to the Chief of Coast Artillery as to the substitution of the truck, ¼ ton, 4 x 4, command and reconnaissance, for types of vehicles in the Coast Artillery.

37-mm. Gun Drill. The following changes in the drill for emplacing and returning the 37-mm. antiaircraft gun, on the M-3 carriage, have been recommended by the Board and approved by the Chief of Coast Artillery as changes to Field Manual 4-140:

"21. EMPLACING GUN.—The gun being in traveling position (fig. 7), when the command *PREPARE FOR ACTION* is given, the gun commander repeats the command. He then supervises the movement of the gun to the designated position, removal of the cover

and cover supports, and emplacement of the gun. Nos. 1 and 2 uncouple the carriage from the truck and see that the wheels are parallel to carriage side frames. No. 1 grasps tripping and locking lever (fig. 8) at front end of carriage. No. 2 grasps tripping and locking levers at rear end of carriage. Nos. 3 and 5 to take posts at the right front and left front, respectively, of the carriage; Nos. 4 and 6 take posts at the right and left rear, respectively, of the carriage. The gun commander then commands: *TRIP*. Nos. 1 and 2 operate the locking and tripping levers and apply pressure downward on the carriage. Nos. 3, 4, 5 and 6 apply pressure downward on the carriage at the handles provided on the frame. As soon as the carriage strikes the ground, Nos. 3, 4, 5 and 6 extend the adjacent counterpoise levers. The gun commander commands: *LEVERS DOWN*. Nos. 3, 4, 5 and 6 apply pressure downwards to the extended counterpoise levers, rotating the counterpoise cylinders till the wheels are locked off the ground. (NOTE: It may be necessary to lift the wheels from the ground to the locked position but standing or jumping on the counterpoise cylinder levers to increase the applied force is strictly prohibited since the increased force exerted thereby may bend the counterpoise rods.) If necessary, the gun commander and Nos. 1 and 2 assist the men at the counterpoise levers. No. 3 lowers and adjusts right outrigger and No. 4 lowers and adjusts left outrigger. Nos. 5 and 6 unload ammunition and other personnel unload matériel from the truck. The truck is then moved to the designated parking area by No. 6. Drill then proceeds as prescribed in Section I.

"22. MARCH ORDER.—The gun being emplaced (fig. 9), when the command *MARCH ORDER* is given, the gun commander repeats the command. No. 1 elevates or depresses the gun and No. 2 traverses the gun until the barrel can be engaged by the traveling lock bracket. No. 5 raises the traveling lock bracket and locks the gun. No. 3 disconnects the flexible cables and then raises and locks right outrigger. No. 4 raises and locks left outrigger. Nos. 1 and 2 remove the sights from the sight seats and replace them in the chest. No. 6 returns the ammunition to ammunition chests. All numbered personnel take post around the carriage as at *PREPARE FOR ACTION*. The gun commander then commands: *READY*. Nos. 3, 4, 5 and 6 each press down on the adjacent wheel until contact is made with the ground. Nos. 3, 4, 5 and 6 each grasp the adjacent counterpoise lever with both hands. The gun commander then commands: *LEVERS UP*. Nos. 3, 4, 5 and 6 lift on their levers, rotating the counterpoise cylinders and forcing the rods down. The gun commander and Nos. 1 and 2 assist the men at the counterpoise levers, if necessary. If the mount has sunk into the ground the full length of the spade, difficulty may be encountered in pushing the wheels down far enough to allow the counterpoise cylinders to be rotated. Remove sufficient earth from under the wheels to allow them to be sufficiently depressed. On uneven ground, the counterpoise rod may not stay below the center of the axle and one man will have to hold up the counterpoise lever. The counterpoise levers being up, No. 1 takes position at the front of the carriage, grasping the tripping lever in such a manner as not to interfere with the other numbers. Nos. 3 and 6 grasp the handles on the right front of the carriage and Nos. 4 and 5 grasp the handles on the left front. The gun commander then commands: *READY, UP*. Nos. 3, 4, 5 and 6 lift together raising the front end of the carriage. When the chassis comes up, No. 1 pulls the tripping lever quickly to the rear, making sure that the locking levers engage. (Do not attempt to lift the carriage by means of the counterpoise levers.) The gun commander and No. 2 assist in raising the carriage when necessary. Nos. 3, 4, 5 and 6 then take similar posts at the rear of the carriage and, with No. 2 at the tripping lever, raise the rear of the chassis. The order in which the ends of the chassis are raised should be reversed if the rear of the carriage is appreciably lower than the front end. The gun commander checks to see that locking levers are engaged and the outriggers and gun are secure. He then supervises the attaching of cover supports and cover, if used. The truck is brought up by No. 6. The gun commander supervises the unloading of matériel, including ammunition, and the coupling of the gun carriage to the truck. Nos. 5 and 6 load ammunition into the truck. Other members of the gun section assist in the loading as required. When loading is completed, Nos. 1 and 2 couple the gun carriage to the truck. Personnel are then loaded onto the truck and the truck and carriage moved to the point designated by the platoon commander. (NOTE: This drill is prescribed as a temporary expedient, pending redesign of the counterpoise mechanism.)"

These changes were considered necessary as the counterpoise cylinder levers were not designed to be used as a means of leverage for raising or lowering the M-3 carriage. A redesign and test of the carriage is being made which will, if accepted, completely eliminate the necessity of personnel handling the counterpoise cylinder rod assembly.

Table of Organization No. 4-28, November 1, 1940, provides a total of eight men for the 37-mm. gun crew. Field Manual 4-140 and the changes thereto contemplate a crew of seven. The additional personnel is normally required for the service of ammunition.

Radio Communications. The Board has completed tests of two radio sets for use with railway artillery. It is believed that the Radio Set SCR-177-A, now issued to railway regimental and battalion headquarters for both peacetime training and mobilization, has a greater power output and range than is required for a set issued to railway batteries, and that this set is too complicated for such use. The SCR-177-A is deemed more suitable for use in the radio nets of regiments and higher echelons. Accordingly, in February, 1940, the Board recom-

mended a commercial marine radio telephone set, of the type later designated as SCR-281, for issue to railway artillery batteries. The recent tests were conducted using the SCR-281 and the SCR-245 radio sets. The maximum operating range on voice transmission was found to be about seventeen miles for the SCR-245, while the SCR-281 operated satisfactorily at ranges up to thirty-five miles. Communication over greater ranges was not attempted, but it is possible that the maximum range of the SCR-281 is even greater than thirty-five miles. The distance tests were made using two-way communication, with both sets stationary and equipped with vehicular antenna of the type furnished by the Signal Corps for the test.

Railway artillery batteries are to be equipped with 110-volt, 60-cycle, alternating current, gasoline engine-driven generators of adequate capacity to supply power to a radio set of the size contemplated, in addition to supplying the other power requirements of the battery. Radio Set SCR-281 uses 110-volt, 60-cycle current and the maximum power required is 230 watts. On the other hand, Radio Set SCR-245 operates on 12-volt direct current. A storage battery of high ampere hour capacity is required, and for best results, this storage battery should be floated across a 12-volt, gasoline engine-driven generator. In the equipment furnished for the test, this auxiliary power unit occupies almost as much space as the SCR-245 and weighs about five hundred pounds. No auxiliary power equipment is necessary with the SCR-281 when 110-volt, 60-cycle alternating current is available as it will be in railway batteries.

The SCR-281 set weighs 93 pounds and is about one-fifth the size of the SCR-245 set.

The normal power output of SCR-245 is ten watts; that of the SCR-281 is twenty-five watts. The SCR-281 is much simpler in operation than the SCR-245 and has fewer controls. It is provided with simple shock mountings for installation on the top of a table or on a wall.

The Board recommended that Radio Set SCR-245 not be standardized for railway artillery use and that the tables of basic allowances be changed by eliminating the SCR-177-A set provided for the railway firing battery and by authorizing the additional issue of one SCR-281 (marine radiotelephone) for railway regimental headquarters, battalion headquarters and firing batteries.

Dust respirators. Military characteristics for a dust respirator for infantry use have been approved by The Adjutant General, and a respirator meeting these military characteristics has been standardized as Respirator, Dust, M-1. The Coast Artillery Corps has been asked to consider the question of whether dust respirators are required for its troops and make recommendations as to type and a suitable basis of issue. Three types of commercial respirators found suitable in tests by the infantry have been furnished to the Coast Artillery Board for test. A study of this equipment is now in progress.

Of the motor vehicles listed in Coast Artillery Tables of Organization and Tables of Basic Allowances, only the motorcycle with sidecar and the ½-ton, 4 x 4, command and reconnaissance truck do not have enclosed bodies or cabs. It is believed that the personnel on motorcycles and the operator and assistant operator of command and reconnaissance trucks need dust respirators. Conditions of heavy dust are often encountered when outside temperatures are high. Under these circumstances, it is not always practicable to keep bodies or cabs of vehicles tightly closed. For this reason, it is believed that the operators and assistant operators of vehicles with enclosed bodies or cabs also have need of dust respirators.

Personnel operating vehicles of the antiaircraft, railway and tractor-drawn units need dust protection under the conditions mentioned above. Personnel riding within the truck body are not normally as greatly inconvenienced by dust as the drivers and assistant drivers. The personnel accompanying tractor-drawn 155-mm. guns on the march are without any protection against dust. In spite of the low speeds of tractor-drawn artillery, considerable dust is often raised by the action of the tractor treads and gun treads. For this reason, it is believed that all personnel required to ride on tractors and guns should be furnished dust respirators. The issue of three respirators per gun and three per tractor probably will be adequate in the average case.

Cases may arise where personnel other than those enumerated above, will have need of dust respirators. It is believed that the issue of respirators in these cases should be at the discretion of the Army or department commanders. It is believed that personnel operating motor vehicles assigned to the following organizations are not likely to encounter conditions requiring the use of dust respirators: harbor defenses; headquarters and headquarters companies, coastal frontier; and replacement centers.

The Coast Artillery Board recommended that dust respirators, commercial type, be issued on the basis of two per motor vehicle in antiaircraft, railway and tractor-drawn organizations; three per tractor and per gun in tractor-drawn organizations; and one per individual in antiaircraft, railway, and tractor-drawn organizations as directed by the Army or department commander. Recommendations as to type of respirator will be made at the conclusion of tests on the three commercial respirators now at the Coast Artillery Board.

COAST ARTILLERY ACTIVITIES

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Coast Artillery Journal
COLONEL C. THOMAS-STAHLE
CAPTAIN A. SYMONS

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The Coast Artillery School

BRIGADIER GENERAL FRANK S. CLARK, U.S.A.,
Commandant

Since our last letter, Groups XVI, XVII, and XVIII have entered the School for refresher courses. Group XVII is pursuing the course in Seacoast Artillery, the other two the course in Antiaircraft Artillery. Each group numbers slightly more than one hundred.

Meanwhile, Groups X, XI, XII, and XIII have graduated, the last group completing its course on April 26th.

The Department of Enlisted Specialists has graduated three classes totaling 291, of which 227 were from the Regular Army, fifty-seven from the National Guard, five from the Marine Corps, and two from the Engineer Corps. The Regular Army graduates were given warrants as temporary staff sergeants.

Instruction was given in electrical work, radio communication, automotive transportation, and as master gunners.

In addition classes totaling thirty-six were graduated from the coincidence range finder and the antiaircraft height finder courses.

Among the graduates of Group XIII were Captains Origenes Soledade Lima, Voltaire Londero Schilling, Manuel dos Santos Lage, Sebastiao Leao, Mercio Caldas, and Lieutenant Darcy Alvares Noll, of the Brazilian Army. Lieutenant Arnaldo dos Santos was transferred to Group XIV for antiaircraft instruction and will graduate with that group.

These officers are to be attached to units at Forts Hancock, Banks, and Totten, where they will perform battery duties and observe training methods, until July 21st. On August 1st they will sail for Rio de Janeiro.

Lieutenant Colonels Porter P. Lowry and Parry W. Lewis have been ordered to the Balloon Barrage Training Center at Camp Davis, North Carolina. Colonel Lowry leaves his position as Secretary, The Coast Artillery School, to become Secretary and Supply Officer of the school at his new station. Colonel Lewis leaves the Department of Artillery to become the Director of the Officers' Division, Balloon Barrage Training Center. Both officers are to report at Camp Davis by May 5th.

Lieutenant Colonel Henry F. Grimm reported on April 7th to become Director of the Department of Tac

tics. Colonel Grimm has come to the School from the University of Illinois, where he was on duty with the Coast Artillery R.O.T.C. unit.

Brigadier Generals Nathaniel H. Egleston and Donald B. Robinson are taking special instruction in antiaircraft artillery training methods. General Robinson commands the 101st Coast Artillery Brigade (AA) at Camp Haan, California; General Egleston, the 102d Coast Artillery Brigade (AA) at Camp Stewart, Georgia.

A group of fifteen, representing nationally prominent radio, newsreel, and photographic services, under the direction of Lieutenant Colonel Frank A. Allen, Jr., General Staff Corps, visited the Coast Artillery School on April 2d. The group was making a survey of the facilities of the new army to provide a suitable background for the various agencies which provide public information.

Major Vernum C. Stevens has just received orders to report to the United States Military Academy in June for duty as Chemistry Instructor. Since May, 1936, Major Stevens has been Instructor of Motor Transportation at The Coast Artillery School.

Lieutenant Colonel Harold C. Mabbott, until recently on duty with the Engineer Board, Fort Belvoir, arrived at Fort Monroe on May 5th to become the Senior Instructor of searchlight operation in the Department of Engineering and Supervisor of the Officers' Camp Area.

A cadre of eight colored NCO's and privates of the 77th Coast Artillery (AA) arrived at the Coast Artillery School from Fort Bragg, North Carolina, on April 30th for Training Battery No. 1. It is expected that by June 1st the cadre will be increased to fifty-six. Effort is being made to draw upon local communities for these additional men.

Plans are also being made to receive sixty colored students in the Enlisted Specialists Division for the course which begins on July 7th. Upon completion of this course, graduates will be qualified for appointment as Staff Sergeant.

First Lieutenants Wei Shing Yuan and Ping Tsuan Ho, Field Artillery, Chinese Army, are in attendance at the Coast Artillery School. Lieutenant Yuan is pursuing the course in antiaircraft artillery, and Lieutenant Ho the course in seacoast artillery.

Lieutenants Yuan and Ho graduated from the Nanking Military Academy at Nanking in 1938 and from the Royal Military College, Sandhurst, England, in 1940.

Upon completion of their studies in England, Lieutenants Yuan and Ho sailed for the United States, arriving in New York on April 12, 1940. Shortly afterwards, they went to Fort Sill, Oklahoma, and completed the Battery Officers' Course at the Field Artillery School last February. They have been in residence at Fort Monroe since the middle of April.

The families of both officers have remained in China.

Seven Chilean journalists who have been on an extensive "good-will" tour of defense establishments throughout the United States visited the Coast Artillery School on May 5th. They were greeted by Brigadier General Frank S. Clark, U.S.A., who escorted the party on a detailed tour of the school.

Upon leaving the school, the journalists saw a gun drill at Battery Montgomery, and then watched the 3-inch antiaircraft guns and the 37-mm. automatic antiaircraft weapons fire several rounds.

In the party from Chile were: Senor Joaquin Muirhead, Associate Editor of La Hora, Santiago; Senor Rafael Valdiviesco, Foreign News Editor of El Imparcial, Santiago; Senor and Senora Carlos Eastman, Senor Eastman being the Foreign and Financial Editor of El Mercurio, Santiago; Senor Manuel Vega, Sub-Director, El Diario Illustrado, Santiago; Senor Guillermo Valenzuela, Foreign Editor of La Nacion, Santiago; Senor Francisco Le Dantec, Sub-Director, El Mercurio, Valparaiso; Senor Louis I. Silva, Political Editor of La Union, Valparaiso.

Mr. Edward Johnston, Vice-President of the Western Newspaper Union, New York City, acting as official host and guide, accompanied the party on its visit, which is sponsored by the Publicity Reciprocal Program, sponsored in turn by the National Defense Council.

To keep pace with the increased tempo of instruction, the Coast Artillery School has increased its classroom facilities by the use of four temporary buildings. Three of these buildings are at or near Wilson Park, the fourth at Camp No. 3. At the latter place, student officers are housed in twelve of the new type barracks Messing facilities are provided in two nearby messhalls.

Major General Joseph A. Green, U.S.A., Chief of Coast Artillery, was a visitor at Fort Monroe. In his two-day visit to the post, General Green inspected various activities at the Submarine Mine Depot, the Coast Artillery Board, and the Coast Artillery School. With the Commandant, he discussed plans for the expansion of the Coast Artillery School, inspected the new construction along the beach, and heard classroom instruction.

A party of nearly forty scientists, representing the National Defense Advisory Committee, spent the days of May 9th and 10th inspecting activities at Fort Monroe. It witnessed a series of demonstration firings with all types of antiaircraft guns at Wilson Park.

On the first day, the party were the guests at a luncheon at the Casemate Club, and later at a reception by Brigadier General and Mrs. Frank S. Clark. The second day was spent in committee work at the Coast Artillery Board.

Third Coast Artillery District

BRIGADIER GENERAL ROLLIN L. TILTON, *Commanding Third Coast Artillery District, Harbor Defenses of Chesapeake Bay, and Fort Monroe*

By Major Franklin W. Reese

The organization and activation of Headquarters and Headquarters Battery of the Harbor Defenses of Chesapeake Bay under the command of Brigadier General Rollin L. Tilton has completed the hub of a wheel which has been accelerated to an ever-increasing tempo of basic and advanced unit training.

Authorized strength of the organizations at Fort Monroe, Fort Story, and Camp Pendleton was virtually an accomplished fact with the arrival and assignment of approximately 1,800 selectees during the past two months, 1,100 going to the 74th Coast Artillery, the last unit to receive recruits. For the majority of the men in the other units, the eight weeks basic training was completed during the first two weeks in May.

One of the highlights in the training of units of this command was an exhibition of antiaircraft defense at Richmond by detachments of the 71st and 246th Coast Artillery from Fort Story. Some 825 troops participated in the problem, primarily concerned with the occupation of defensive positions, and searchlight and dummy gun drill during the mock air raid. Major A. C. Spaulding, commanding officer of the 1st Battalion 71st Coast Artillery announced that the attack was successfully repelled.

Intensification of training on artillery matériel is evidenced by the almost daily rumble of major calibre guns punctuated by the staccato treble of automatic weapons that rolls across the waters of Hampton Roads. Much of the firing has been conducted as problems for the Coast Artillery Board and demonstrations for the Coast Artillery School. A submarine mine practice was held early in April.

Battery H of the 246th Coast Artillery fired a praiseworthy 3-inch antiaircraft service practice, while nearly all of the other units have had excellent training in their respective armaments, either through the conduct of demonstration or problem firing for the School or Board or of sub-calibre practices in preparation for service practices which are scheduled for June and July. Three-inch seacoast, automatic weapons, .30 and .50 calibre machine gun, 37-mm., 75-mm., 155-mm., 8-inch railway, and 16-inch howitzer trajectories have arched out over the waters surrounding the entrance to Chesapeake Bay. All units have had extensive small arms firing.

A high point for the 244th Coast Artillery (tractor drawn) of the New York National Guard, now stationed at Camp Pendleton, came with the award of the Coast Artillery Association Trophy on Army Day. This highly prized award is made annually by the Association to the regiment obtaining the best score in firing practice of all the Coast Artillery National Guard regiments in the country. The 244th won the award for the training year of 1939-40 with its target practice fired at Fort Ontario last August. In addition, four of six firing batteries were awarded the coveted E by the War Department.

Operating on full schedules for advanced and tactical and technical training, the 57th, 244th, 246th, and 71st are well advanced in convoy, reconnaissance, occupation of positions, local defense measures, and command post drills. Regimental, post, and specialists schools are conducted for both officer and enlisted personnel. Many have completed instruction to one or more groups graduating in most instances fully qualified in their subjects.

Selectees in the 74th Coast Artillery who have been unable to read or write are attending a school organized by that regiment under the supervision of Chaplain Oliver D. Coble, inaugurated to teach the fundamentals of reading, writing, mathematics, spelling, and American history. Classes meet evenings four times weekly, and are attended by 4½ per cent of the regiment. The men have progressed with such rapidity that expectations have been exceeded by 50 per cent.

Transfer of the 74th Coast Artillery (AA) to Camp Pendleton, Virginia Beach will be effected at an early date, as soon as work has been completed on the tent camp, about to be constructed. Commanded by Colonel Samuel F. Hawkins and consisting of 1,700 officers and enlisted men, the regiment was activated one year ago next month under the command of Lieutenant Colonel William Hesketh.

The Post Intelligence School at Fort Monroe finished its second course of instruction the last of April. This school, which is attended by officers and enlisted men from tactical units stationed at the fort, aims to give basic training in military intelligence. A foundation is first laid by practical instruction in the use of maps and aerial photographs, then the course advances into intelligence activities embodying actual practice with tools employed in this field. The course ran for a period of six weeks, totaling 60 hours of instruction. Similar schools on a regimental basis are being conducted at Fort Story and Camp Pendleton. Another course began in May.

The majority of construction projects for this area

have been completed or are nearing completion. The new 1,038 capacity theaters at Fort Story and Camp Pendleton are due to open early in June.

Fort Monroe, Fort Story, and Camp Pendleton played hosts to a large number of civilians of the surrounding territory on Army Day. All organizations took part in the many displays of matériel and equipment, several regimental and brigade parades, band concerts, and ceremonies. Popular among the displays were the field kitchens and kitchen cars from which refreshments were served continuously.

Six Canadian Army officers led by Colonel Craig and Major McDonald of the Canadian Artillery School, made a day's inspection and tour of Fort Story recently. They were generous in their praise of the fine morale of the personnel and commented upon the appearance of the men and matériel as a whole. A group of fifteen representatives of radio, newsreel, and photographic services, with Lieutenant Colonel Frank A. Allen, Jr., General Staff Corps, in charge, witnessed 3-inch antiaircraft and automatic weapons firing at Fort Monroe. The group made a tour of several camps and installations which was intended to be a graphic survey of activities of the new army to provide a background of information for the representatives of agencies serving the public. Again in May, Fort Monroe was host to a group of seven Chilean journalists who visited the Coast Artillery School, the Coast Artillery Board, and made an inspectional tour of installations. They were under the sponsorship of the Publicity Reciprocal program which is directly sponsored by the National Defense Council.

With the advent of spring, the basketball season wound up in a fast and furious climax, the Detachment Medical Department nosing out Headquarters battery of the 2nd Coast Artillery for the championship of Fort Monroe. Battery C, 246th Coast Artillery topped the Fort Story League. Athletic interest then shifted to what promises to be an extremely busy and highly competitive softball season. Every battery has entered a team and they all seem to be able to find plenty of good fast material among their newly filled ranks.

Two regimental newspapers have been organized and added to those already on the active list—*The Cannoneer*, organ of the 71st Coast Artillery and *The Thunderbolt*, mouthpiece of the 74th Coast Artillery.

Second Coast Artillery District

Brigadier General Forrest E. Williford, *Commanding*

By Lieutenant Charles F. Heasty

To carry out further the broad training program of the First Army, a command post exercise was conducted by the Second Coast Artillery District on April 17th and 18th. The situation was handed to Brigadier General Williford, commanding the District, by Lieutenant General Drum, commanding the First Army, on the morning of April 17th.

With the umpires representing both the enemy and friendly higher authority, a brisk paper war was fought. By 10:00 AM, April 18th, the enemy forces had been successfully repulsed and the exercise was ended. After the critique, which was attended by all officers and noncommissioned officers of the first three grades who had been engaged in the exercise, General Drum said, "The enthusiasm shown by all ranks engaged in the exercises from the oldest in the service to those who have just joined was an expression of the fine spirit of the American Army today."

During the exercises, General Drum made a personal inspection of Fort Hamilton, Fort Tilden, Fort Hancock, and Fort Wadsworth.

Batteries E and F of the 7th Coast Artillery, stationed at Fort Hancock have been moved to Fort Tilden for training. With the activation of Batteries E and F, the 7th Coast Artillery has been completely activated with the exception of one searchlight battery.

Trainees of the 62nd Coast Artillery (AA) at Fort Totten are experiencing the real thrills of competitive training. Having worked hard at night drills with searchlights, day convoys, and intensive gunners instruction, practically all trainees stationed here have been turned to duty as privates upon recommendation of the Officer-in-charge for outstanding achievement during the proposed eight weeks training period. Some turned to duty after five weeks, others after six weeks.

A brigade review was held on Monday, April 21, in honor of Brigadier General Philip Gage whose appointment had been confirmed the previous Saturday. The 7th, 52nd, and 245th regiments participated.

In addition to the accelerated military training, spring athletic programs of an outdoor nature and indoor activities at the Y.M.C.A's have occupied a position of importance in the lives of the trainees in the Second Coast Artillery District.

First Coast Artillery District

MAJOR GENERAL THOMAS A. TERRY, *Commanding*
By Captain George R. Carey

Command post exercises, training tests, military competitions and target practices have become normal procedure for the First Coast Artillery District. Every element of defense has been prepared for immediate use. Every gun that can be manned and fired has been put in firing condition and fire control has been improvised where it did not already exist. General Terry continues to stress the importance of having every man expert in the performance of his individual task, not with the modern weapons expected to arrive sometime in the future, but with the equipment and matériel now on hand.

The Commanding General of the First Army arranged a Command Post Exercise on April 10th and 11th to test the defense of New England. The results obtained are best summarized by quoting from General Drum's remarks to the press at the conclusion of the exercise. "While the exercise was well conducted, especially at the Headquarters, First Coast Artillery District, an exercise such as this has added value in showing in what respects improvements are needed. It is only by actually doing the work that we learn how best to do it, and I feel that this CPX has been of real value to all concerned."

The first issue of a newspaper chronicling the activities of personnel in the Harbor Defenses of Portland hit the streets on May 1st. Congratulations to General Garrett and the Staff are in order.

Colonel W. K. Dunn has recently detailed Private Phillip Callahan to decorate the walls of the main buildings at Camp Langdon with murals in keeping with the historical significance of the forts which comprise the Harbor Defenses of Portsmouth. Private Callahan, a native of Worcester, Massachusetts, enjoyed an excellent reputation as a muralist prior to his induction into the service.

Battery B of the 9th Coast Artillery, and the 241st Coast Artillery Band represented the Harbor Defenses of Boston in a colorful parade through the streets of Boston on April 19th, the annual observance of Patriots' Day.

Present plans at the Harbor Defenses of New Bedford call for the activation of batteries D and E of the 23rd Coast Artillery prior to July 1, 1941; this action will give Fort Rodman an enlisted strength of over a thousand men. A year ago the same garrison consisted of one officer and about a dozen enlisted men.

Governor J. Howard McGrath of Rhode Island and a distinguished group of visitors were present during a program prepared under the supervision of Brigadier General Ralph E. Haines for the observance of Army Day at the Harbor Defenses of Narragansett Bay.

Good news from Colonel T. H. Jones has just been received to the effect that additional water transportation will be available in the Harbor Defenses of Long Island Sound to transport the officers and enlisted men to the mainland more often.

The 36th Coast Artillery Brigade (AA) completed its organization on March 19th when Brigadier General Olin H. Longino arrived at Camp Edwards to assume command of the unit which includes the 68th Coast Artillery (AA), the 198th Coast Artillery (AA), 208th Coast Artillery (AA) and the 102nd Separate Battalion Coast Artillery (AA).

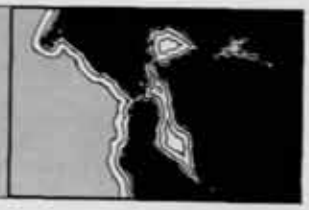
Seasoned and well balanced, the 68th Coast Artillery (AA) is now coursing through a rigid schedule of anti-aircraft target practice, camouflage work, and advanced group instruction in persistent anticipation of early orders to another station for service or maneuvers.

The 102nd Separate Battalion brings with it the traditions of the 101st Cavalry, New York National Guard. The unit was inducted on January 6, and, after strenuous recruiting, entrained at Buffalo on January 14th and arrived at Camp Edwards on the morning of the 15th. Since arrival at Camp Edwards, basic training has been completed with the exception of target practice with the basic weapon, 37-mm. gun. To date, these guns have not been issued to the battalion, but through the coöperation of the 68th Coast Artillery and by lectures and gun drill, the officers and enlisted men of the 102nd have a working knowledge of this piece.

The 198th Coast Artillery is steeped in the traditions of the Delaware National Guard; it is an ambitious and eager outfit. The regiment was designated as winner of the Coast Artillery Association Trophy in the year 1934. The outstanding performance of the regiment was again rewarded with the same distinction in 1939. Since the induction of this regiment into federal service on September 16, 1940, modern equipment has been received, the use of which is now being mastered.

In May of 1940, officers and enlisted men of the 110th Cavalry, Connecticut National Guard, from New Haven and Hartford, turned in their horses, buried their yellow hat cords with fitting ceremonies, and formed the 208th Coast Artillery (AA). During the past month, this regiment has received its full quota of selective service trainees. Officers and men alike are now looking forward to the day when they will be ready to fire their weapons at Scroton Neck, the newly established firing point on Cape Cod Bay.

Ninth Coast Artillery District



MAJOR GENERAL HENRY T. BURGIN, *Commanding*

By Lieutenant Miller Ryan

San Diego is doing a fine job as host to the Harbor Defenses of San Diego. Long a Navy center, this area now bustles with Army activity. Inspired with the sunshine and the hospitality of this city the Harbor Defenses of San Diego are coming into their own. Fort Rosecrans has ceased to be the quiet two-battery post of last year. The garrison is rapidly preparing for record service practices and will very likely be much in the limelight as the selectees get their first real taste of seacoast firing.

Down Los Angeles way the 3d Coast Artillery continues to be the moving picture models for the Army. Training film productions and regular movie productions supplement their daily army routine and target practices. One of the outstanding reasons for their continued movie career is a complete mastery of infantry drill and marching formations. Subcaliber firings have been completed and a good deal of interest is attached to the future record service practices which will be under way soon. The big guns of these defenses are going to let loose for the first time since 1929. Incidentally, this is also a band training center. Along with the Leopold Stokowski experimental Army band several other band units are being trained, including one for the Torrey Pines replacement center.

From the standpoint of Army training the California weather this year has been out-doing itself to be unusual. At the Harbor Defenses of San Francisco it has dampened everything but the spirit of the troops. Between the deluges of California mist a much-interrupted series of Army Day celebrations were finally completed before a large audience in Golden Gate Park stadium in San Francisco.

Building construction sounds are physical evidence of the activation of the 56th Coast Artillery which is due to move into its new buildings on the Marin County side of Golden Gate at Fort Cronkhite in early June. Many of the officers for the 56th have recently arrived and are going through refresher courses. Record service practices are under way, being hampered somewhat by the poor weather conditions, but they will continue to be very much in evidence during the coming months in these defenses.

The 250th Coast Artillery at Camp McQuaide took its place in the sun on Army Day by keeping the skies clear and putting on a colorful celebration to the intense appreciation of a large civilian audience. Record service practices with the 155-mm. guns were conducted on April 15th. Five separate batteries fired, each with a great deal of success.

Where the Columbia River meets the sea the Harbor Defenses of that area have come out from under a blanket of rain. The 249th and the 18th Coast Artillery are actively rounding out their training programs for their expanded regiments. A post paper, as yet unnamed, appeared at Fort Stevens this month. An appropriate name will be chosen. A genuine creative interest in this new paper is being shown by the entire personnel at Fort Stevens.

The 249th Coast Artillery recently entered a short war training period. All stations and emplacements were manned in record time. The old soldiers fitted into the picture like a glove, and the new soldiers got a taste of the real thing by answering their first call to arms at 4:45 one morning. Record service practices are now in full swing and the 249th has its eye on the National Trophy.

The 248th Coast Artillery in the Harbor Defenses of Puget Sound has finished initial mobilization training, and has successfully completed battalion and group tests and about half of its service practices, and is now in its regimental phase of training. The 14th Coast Artillery, consisting almost entirely of selectees, will complete the initial 13-week training program on May 3d. The 14th is well started on its annual service practice schedule. Both regiments have completed a war condition period of one week, and are now preparing for another one. Army Day was appropriately celebrated by the firing of the first target practice of the year and a review by the largest body of troops seen at Fort Worden in recent years.

New recreational facilities are adding to the already fine state of morale in these defenses. A skating rink is being set up and new bowling equipment has been obtained. War Department Theaters have been built at Forts Casey and Flagler; the one at Fort Casey is now in operation and the one at Fort Flagler will begin operation soon.

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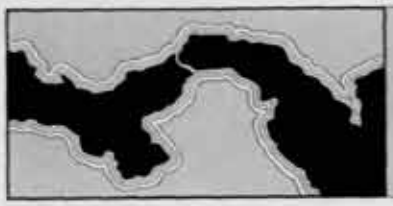


Panama Coast Artillery Command

MAJOR GENERAL SANDERFORD JARMAN, *Commanding*

By Captain Franklin B. Reybold

The Panama Coast Artillery is prepared to demonstrate its efficiency in the defense of the Canal. However, a problem of importance faces the high command here. Efficiency is, in a great sense of the word, dependent upon the morale of the men. To maintain the efficiency at a high peak it is necessary also to maintain a high standard of morale. During the period of construction of jungle housing competitive zeal kept enthusiasm at a high pitch. Target practice periods have a similar result, but the effects of routine must be anticipated. Because of this General Jarman has instituted several schemes to maintain the general good feeling of the men.

A very recent procurement authority has allotted to the Coast Artillery a sufficient sum of money to purchase one-year subscriptions to six magazines for each outlying searchlight and outpost position on the Isthmus. The first issues of these several magazines arrived here on April 18, 1941, and the reception given them by the men was most gratifying.

The men at the searchlight positions are far from group activities and therefore more attention is being devoted to them. At the gun batteries we are constructing softball diamonds, miniature golf courses, basketball courts, volleyball courts, tennis courts, badminton courts, boxing rings, and other facilities. Due to terrain a difficult problem presented itself. However, aid was forthcoming from the Engineer Corps and labor-saving devices were generously supplied. Each battery position even though located far in the dense tropical jungle will now be a small independent city with its own light and refrigeration, its own group of buildings, including mess hall, barracks and latrine, its own athletic fields, and its own stores, supplied by boat, pack, truck, or foot. Stretching over an area of some 1,000 square miles these many small cities form a widespread pattern of our contribution to the defense of the Canal. With their own 16-millimeter talkies, their own P.C.A. Newspaper with a circulation of over 4,000 copies and with their own broadcasting station, these little cities are the latest thing for tropical suburban life.

The broadcasting station is organized and operated by members of the command and is at present covering every baseball game of the Pacific Side League played at Fort Amador. A great deal of enthusiasm has been shown over this novel idea. Radio can reach each outlying position and with such events as basketball games, track meets, boxing bouts, etc., on the horizon the possibilities of this broadcasting station are unlimited.

Up Rio Hato way we find many batteries completing their annual target practices. To date a great majority of the batteries have performed most creditably, firing at times against unexpected odds. The time for analysis of target practices has been greatly reduced and each battery commander has been permitted to spend a greater amount of time on the actual firing of his battery. Due to the limited facilities at Rio Hato and also due to the tremendous number of batteries in the command it is necessary that there be a constant turnover in personnel. The tasks of coördinating the movement of these batteries from their various positions in the jungles on both sides of the Isthmus to Rio Hato with the accomplishment of a prearranged firing schedule and returning these men to their positions has required extensive planning.

The Command G-3 has drawn up the safety regula-

Powder for Panama antiaircraft

Battery position in the Panama jungle

tions for firing at Rio Hato and is well satisfied with the results as demonstrated by the performing batteries.

Training along all lines continues at a fast rate. Due to the fact that many of the older and more experienced personnel are due to return to the states in the very near future it is necessary that the training of the new and less experienced men progress without delay. All regiments are operating schools of every type for enlisted and commissioned personnel.

Construction of outlying positions is progressing and is at present drawing to an end. June will see the completion of one year in the jungle for practically every battery and will also see the completion of practically every position. Finishing touches will continue to be put on, but in every case the men at each position will find themselves well provided for. The construction at each of the new posts is making great strides and it is expected that late in August or September many new barracks and quarters will be available at Kobbe, Gulick, Clayton, and Sherman. Each of these posts will be well set up to provide adequate facilities for recreation, amusement, and comfort of many thousands of men. New theatres, gymnasiums, swimming pools, and barracks will add much to the general welfare.

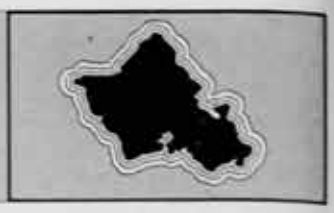
As was mentioned in our last article the P.C.A.C. has started rolling in athletics. Due to the location of outlying batteries some difficulty was experienced with the transportation of the various squads to and from practice. However, arrangements were made satisfactorily and all teams were enabled to get into their respective post of participation in their regimental leagues. The reëntry of the Coast Artillery brought out many outstanding athletes and the chances for copping Department titles look good. Baseball is ruling the athletic schedule here at present and one of our regiments is pushing for a top place in the Pacific Side League. On the Atlantic Side we find Sherman holding up the honor of the Coast Artillery with Randolph close behind.

The training of these squads was at first very difficult due to important military duties which required the presence of many of the players. However, after a rather slow start all teams got under way and are now pushing slowly to top honors.

Wetzel Lee Bias, 20-year-old West Virginian who has spent almost all of his fifteen months of military service at isolated outposts in the Panamanian jungles, has been selected as the outstanding private soldier in the Panama Canal Department. He is a searchlight commander at Fort Randolph.

Jungle luxury: a mess hall

Hawaiian Separate Coast Artillery Brigade



Major General Fulton Q. C. Gardner,
Commanding

By Captain Milan G. Weber

Antiaircraft Target Practices

During the past two months, all units of this Brigade have been busy preparing for and conducting target practices. The two antiaircraft gun battalions commanded by Lieutenant Colonel Edward H. Taliaferro and Major Harold T. Turnbull, and the battalion commanded by Lieutenant Colonel Ronald M. Harris, are now on the firing line at Malakole. It is contemplated that fourteen record practices will be conducted during this series of firings. Emphasis is being placed on the training of the batteries to deliver accurate fire in a minimum of tracking time and the training of substitutes for all key positions.

A photo laboratory has been built at the camp, thus eliminating the long delay formerly necessary due to bringing the spotting films to Fort Shafter for processing. Camera posts have been established in the rear of each battery position. An O^3 station has been established at Barbers Point. These camera posts and the additional flank station, together with spare cameras now on hand, facilitate considerably the change of the records section from one firing battery to another and reduce the number of courses lost by flank observers due to cloud interference.

The battalion commanded by Major Vivian Rapp, fired its machine gun practices at Camp Malakole during March.

The Harbor Defenses commanded by Colonel P. H. Herman are now firing additional assignment antiaircraft gun practices at Sand Island. Two batteries of the battalion commanded by Lieutenant Colonel D. L. Dutton, and two batteries of the battalion commanded by Captain H. R. Boyd, are conducting these practices.

Seacoast Target Practices

The Harbor Defenses commanded by Colonel E. B. Walker, has completed its series of seacoast target practices. The battalion under the command of Lieutenant Colonel H. Pendleton, conducted four practices. The battalion commanded by Major W. I. Brady fired three practices, one of them being a night practice. The battalion under the command of Major W. J. McCarthy conducted two practices, one of them being an advanced practice during which a change from a high-speed to a slow-speed target was made with a minimum of delay as well as a change from aiming point to aiming rule.

During all of these practices, service conditions were again stressed. Every practice was conducted against the prescribed maneuvering target and several of the service conditions mentioned in a previous letter were imposed during each firing. Particular stress is being laid upon accurate opening of fire with a minimum of tracking and upon vertical base tracking.

Presentation of Knox Trophy

On April 5, 1941, at a review of all the troops at Fort Kamehameha, Major General Fulton Q. C. Gardner presented the Knox Trophy to Major W. J. McCarthy, who accepted it on behalf of the winning battery. The training of the battery for the Knox Trophy practice was outlined in a previous issue of The Coast Artillery Journal.

Illumination of Easter Crosses

During Easter Week, three crosses were illuminated by searchlights manned by units of this Brigade. A searchlight squad from a harbor defense illuminated a cross near Pearl City; a cross at Kahuku was illuminated by men of another harbor defense, while one of the mobile regiments illuminated the cross on the top of Punchbowl.

Coast Artillery Association Competition

Word has just been received that the regiments commanded by Colonels C. K. Wing and E. B. Walker have been awarded honorable mention in the annual United States Coast Artillery Association competition for excellence in target practices conducted during 1940.

Marches by Coast Artillery Troops

The physical condition of the Coast Artillerymen is not being overlooked. Each battery in the Brigade is now required to make two marches each month. These marches are made with full packs and are proving a good means to keep the men in top physical trim.

Maneuvers

Each echelon in the Brigade conducted maneuvers of its own during the past several months, in addition to a surprise Department Maneuver conducted during the last week in February. Preparation for the annual Department Maneuvers in May are now being made.

Corregidor

BRIGADIER GENERAL GEORGE F. MOORE, *Commanding*

By Lieutenant Colonel S. McCullough

The solid rumble of the heavy seacoast guns and the sharp crack of the antiaircraft guns, the frequent martial strains of the *General's March*, the howl of sirens, the roar of aeroplanes, the silent flashing of searchlights, the flashing of naval vessels' lights, the metallic sound of the voices of dozens of telephone operators and the hurried tread of thousands of feet are sounds which have made the months of February and March at Corregidor the busiest in years. Interspersed with these sounds is the hustle and bustle of frequent incoming and outgoing transports, and the hurry of packing departing dependents.

The transports have brought many changes of command. On February 15th Brigadier General George F. Moore was welcomed to Corregidor as the new Commanding General. He reviewed his troops for the first time on March 18th at a garrison review and then, with his family, met the officers and their families on March 6th at a large reception at the Corregidor Club. The February *Grant* brought several new officers including Colonels Paul D. Bunker and Theodore M. Chase. Lieutenant Colonel Boudreau, formerly a regimental commander, relieved Lieutenant Colonel Delbert Ausmus at Fort Wint while Colonel Holcombe relieved Colonel Willis Shippam who was returning to the States. Lieutenant Burton R. Brown was appointed Aide de Camp to General Moore.

In the midst of this shift of command all the seacoast batteries finished their annual target practice season. Despite the many service conditions imposed on the batteries, such as change of course, interrupted T1 system, failure of power supply, opening fire with minimum tracking time, vertical base tracking and spotting, and sudden changes from Case II to Case III, practically all batteries are expected to be rated "Excellent" this season. The fact that various combinations of these several complications did not affect the firing efficiency of the batteries is a good indication of the high state of training and morale of the officers and men. An outstanding example is that of the battery commanded by Major N. B. Simmonds. After having two changes in course while firing, the battery changed from Case II to Case III without loss of a single time interval and obtained a double hit on the first Case III shot. The rest of their practice was comparable to this incident. Targets were partially or wholly destroyed by several batteries.

The antiaircraft gun batteries have completed the first phases of their practice; Captain G. R. Ames' battery fired from "battle positions." Although it is still too early to tell how the practices as a whole will look, the results in these first phases were commendable.

Between these target practices and the Annual War Condition Period, the command has been honored by visits of high officials of both the Army and the Navy. On March 12th, Rear Admiral Bemis, Commandant at Cavite made an official call on General Moore. He was received with full military honors, his Honor Guard being composed of two picked batteries. During his short visit, he was much impressed by the military alertness of the command. Two days later, Major General Grunert, Philippine Department Commander, arrived. On March 15th he received a garrison review. Immediately following the review, he met all officers of the command and then spent the remainder of the forenoon inspecting several of the new projects on the post. The remainder of the week-end he, with his family, spent visiting his many friends at Corregidor.

March 17th began the Annual War Condition Period. It was made more complete this year than at any other time because of the increased coöperation of the Navy, the Army Air Corps, and the Naval Air Forces. Landing attacks, air raids, naval bombardments, and other problems were all handled by the command with a speed and spirit coming only from good training and high morale. The weather coöperated by giving us absolutely no rain. Many difficulties heretofore unsuspected were ironed out, and the constant activity of "enemy" forces gave much valuable training both in Infantry tactics and weapons and in Coast Artillery.

Because of this busy spell, sports have naturally been reduced but have not been dropped entirely. Regimental baseball schedules have been run off with close and interesting contests in all regiments. Moreover, Corregidor has entered two teams, one American and one Philippine Scout team in the Manila Bay League and, from performances in the regimental leagues and the wealth of material here, it appears that Fort Mills will once again finish at or near the top.

During all this activity, Fort Mills has gradually approached the state of a "bachelor post." The *Grant* that left in March, carried with it a great many wives and dependents while the *Republic*, due to leave April 16th, is scheduled to take more than half the remainder. Many officers now due to leave have extended their tours. All this leads to many sad but courageous farewells at the transports. Nevertheless the grass widowers return to work harder than ever.

January to April—Forest to Regimental Area. The buildings of the 67th Coast Artillery (AA) at Fort Bragg. The quadrangle in the foreground is the regimental drill field; the area in the right center is the brigade parade ground and drill field

Fort Bragg

BRIGADIER GENERAL CLAUDE M. THIELE
Commanding 34th Coast Artillery Brigade (AA)

By Lieutenant William D. Workman, Jr.

Fort Bragg's antiaircraft organization has become a full-fledged brigade with the activation of brigade headquarters and headquarters battery and the promotion, April 7, of Colonel Claude M. Thiele to the rank of brigadier general. The three component regiments, the 67th, 76th and 77th, became full regiments February 10 with the activation of the 2d battalions of each unit.

Brigade training for the most part has comprised the reception of selectees and the continuation of the mobilization training program, which now is well under way in all three regiments. The brigade is not at full strength but the remainder of selectees necessary to attain full strength are scheduled to arrive prior to June 1.

Cadre training has been a major consideration in the instruction of troops of the brigade. The 67th Coast Artillery (the brigade's white regiment) has trained two cadres for the Coast Artillery Replacement Center at Camp Wallace, Texas; one for Camp Callan, California, and one for Fort Eustis, Virginia. The 67th also has sent a temporary training cadre to Camp Davis, North Carolina, to assist in the initial training of the 99th and 100th Coast Artillery (semi-mobile) regiments.

The two colored regiments of the brigade, the 76th and the 77th, have trained cadres for the 99th and 100th Coast Artillery at Camp Davis, and in addition have dispatched cadres to Chanute Field, Illinois; the Ordnance Replacement Center at Aberdeen, Maryland; Fort Eustis, Virginia, and the Coast Artillery School at Fort Monroe, Virginia.

Supplementing drill with the 3-inch AA guns, the 37-mm. AA guns, .50-caliber machine guns and the 60-inch searchlights, the brigade troops carried on small arms target practice during April and May. With many of the basic subjects completed, or nearly so, the training is concentrating on gun drill and problems. Regimental and battalion command post exercises and convoys began in April and continued into May, with brigade exercises beginning early in May.

Antiaircraft target practice is being conducted at the firing range near Myrtle Beach, S. C., approximately 100 miles from Fort Bragg. First regiment to take the range was the 67th, scheduled to remain three weeks at the beach beginning May 15. The 67th will be followed in order by the 76th and the 77th, each of which also will have three weeks of firing.

Of the brigade's current officer strength of 218, thirty-nine are attending the Coast Artillery School at Fort Monroe; two are attending short courses at the Command and General Staff School, Fort Leavenworth, Kansas, and two are at the Chemical Warfare School, Edgefield Arsenal, Maryland. Several of the attached medical officers are attending the Medical Field Service School at Carlisle Barracks, Pennsylvania.

Recent changes in officer personnel have been numerous. Lieutenant Colonel Robert E. Turley, Jr. has been ordered to duty as assistant commandant of the new Balloon Barrage School at Camp Davis, North Carolina, and will be replaced as commanding officer of the 67th Coast Artillery by Lieutenant Colonel James P. Hogan, who has been on duty in Washington with the National Guard Bureau. Lieutenant Colonel Harold R. Jackson, brigade executive who is on detached service at Governors Island, also has been ordered to the Balloon Barrage School at Davis.

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Camp Callan

BRIGADIER GENERAL FRANCIS P. HARDAWAY, *Commanding*

By Captain William J. Hauser

Training activities at Camp Callan are going ahead at a rapid pace. The unusually coöperative spirit of the staff officers and the officers of the training units has done much to weld together a smoothly functioning team.

As rapidly as complete activation was accomplished in March, units immediately employed their efforts to accomplish the twelve-weeks basic training of about 5,000 selective service trainees. As time passes, the smoothly organized operation of this basic training proves the value of careful plans made well in advance.

Major General Joseph A. Green, Chief of Coast Artillery, visited Camp Callan in April. During General Green's visit the trainees marched in their first military review. The short period of training prior to the parade certainly paid dividends, for the battalions' alignment as they passed in review before the Chief was gratifying. A United States Marine Corps Band graciously volunteered to play for the ceremony, which assistance did much to insure its success. Our own band had not yet reported from Fort MacArthur.

After the troops marched by the reviewing party, all officers of the command were assembled. The General offered congratulations on the condition of progress attained by the troops in such a short period of time, and on the satisfactory operation of the Camp Callan Replacement Center.

For the enlisted men, the Camp has a large service club with many facilities. A large cafeteria has been installed in one wing and a large ballroom is located in the main part of the building with a huge fireplace in one end. On the second floor balcony is an up-to-date library, lounge space and a fireplace. Near the Service Club is an accommodation Guest House for the mothers and fathers of the enlisted men.

On March 28, the United States Army Motion Picture Theatre of Camp Callan threw its doors open to a capacity crowd.

The officers have formed an Officers' Club and operate an Officers' Mess. Other social affairs for the officers included a formal Dinner Dance at the La Jolla Beach Club. The club is located about four miles from camp. This affair was held on the 19th of April and proved a great success. Some day the officers hope to have a building on the post, but plans have not yet materialized.

We look into the future when at the end of the twelve weeks basic training of the present trainees, Camp Callan will furnish replacements for many Coast Artillery units. The first big change will then come, and a new group of trainees, requiring activation of seven additional training batteries, will arrive for their basic training at Camp Callan.

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Fort Eustis

BRIGADIER GENERAL H. F. NICHOLS, *Commanding*

Construction operations are practically completed. Fort Eustis is performing its mission as the largest Coast Artillery Replacement Training Center.

Cadres for fourteen training battalions were furnished by the 2nd C.A., 11th C.A., 13th C.A., 52nd C.A., 62nd C.A., and 70th C.A. The 15th Training Battalion is expected to be activated not later than June 30, 1941. The strength of the cadre personnel is approximately 1,950 enlisted men. The strength of the station complement, at present, is approximately 800 enlisted men.

The first selectees arrived from Fort McPherson, Georgia, detraining at the Lee Hall, Virginia railroad station and were moved a distance of two miles into Fort Eustis by truck convoy. The first troop train directly into Fort Eustis arrived shortly thereafter from Fort Benjamin Harrison, Indiana. Both movements were completed on March 29, 1941.

The training of selectees in the basic subjects pertaining to seacoast and antiaircraft artillery is proceeding smoothly. Post facilities are operating according to schedule. An excellent selectee band is part of the station complement. Recreational and welfare installations are functioning.

At the date of going to press the total strength of the command was 14,125; consisting of 18 Army Nurse Corps, 450 Officers, 13,657 Enlisted Men.

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Camp Wallace

Brigadier General John B. Maynard, *Commanding*

A Houston newspaper of April 27, 1941, carried a full-page spread headed "CAMP WALLACE FINDS ARMY'S NEW TRAINING METHODS PRODUCING BETTER SOLDIERS." Camp Wallace is doing just that. We believe we have licked the bad weather, the delayed housing facilities and the lack of training materials. The satisfaction of overcoming the toughest obstacles has strengthened the determination of all to achieve our objectives in a creditable manner.

The Replacement Center is eighteen miles from Galveston on the flat coastal plain. The two main highways to Houston pass the camp on either side. East of the parade ground is the hospital area and the battalion areas of the seven white replacement battalions. Each of these is laid out in a quadrangle, service buildings to the east and administration, recreational and school buildings, together with officers' quarters, on the west. South of the parade grounds are the main theater, hostess house and guest house, with camp headquarters buildings and fire station at the southwest corner. On the west side of the parade is the battalion of colored selectees and also the area now occupied by the 54th Coast Artillery. To the southwest of the main camp are the warehouses, offices and shops of the services, with quarters for the headquarters detachment. Except for some of these shops and auxiliary buildings, camp construction is almost complete.

The Camp organization consists of a Camp Headquarters with services, a Third Army Regiment—the 54th Coast Artillery (155-mm. gun) (Colored)—and the Sixth Coast Artillery Training Group. This Group contains a headquarters and eight training battalions, five of which have been activated.

Although designated as tactical to distinguish it from administrative, the Sixth Coast Artillery Training Group is quite different from the usual tactical organization. In fact it is purely a training organization. Basic training is conducted in the training battalions. Specialist training is mainly given in controlled courses at special schools.

One of the activated battalions is an AA gun battalion, two are automatic weapons battalions, a fourth is a composite battalion, and the colored battalion will consist of headquarters batteries of all types, of which only one battery is yet active. The gun battalion has a headquarters and four gun batteries, while the automatic weapons battalions contain instead a similar number of automatic weapons batteries. The composite battalion consists of a headquarters, one searchlight battery and three headquarters batteries for all types of units.

Battalions and batteries are organized to facilitate the training of individuals and not of units. Individuals directly connected with the operation of weapons are generally placed in gun or automatic weapons battalions, and the remainder in other battalions. For example, the headquarters battery contains all receiving and shipping clerks and all radio operators; two such batteries have all the observers and spotters, and so on. Thus specialists are concentrated to facilitate the conduct of specialist schools.

The Sixth Coast Artillery Training Group is analogous to a military school with the non-military classes replaced by specialist classes. It is a vast educational plant capable of graduating four classes per year of 7,600 Selectees each. All trainees take a common basic course of soldiering for four weeks and then are intensely trained for eight weeks in batteries and in specialist schools to produce the 48 types of specially trained individuals to fill quotas of filler and loss replacements for tactical organizations. Instructors are officers and enlisted men of the training cadres, normally 5 officers and 30 enlisted men to a battery of 220 selectees.

Our task is not only physically conditioning our recruits and teaching them the use of the various weapons. These are the easiest hurdles to surmount. The big job is the development of specialists. After accomplishing the psychological transition from civilian to soldier, each man is placed in a job that parallels as closely as possible his civilian occupation, then given intensive specialist training. In this our officer and enlisted instructors are assisted in such vocational subjects as radio operation and auto mechanics by civilian teachers furnished by the Texas State Department of Vocational Education.

Military and vocational training covers 44 hours a week and is supplemented by schools in foreign languages, schools for illiterates, and schools for officers. Extra-curricular schools are organized as the demand develops. In all, 21 schools are now operating within the Sixth Group.

The training of the initial allotment of Selectees will be our most difficult task. One reason therefor is that arrivals were staggered, some men being in their seventh week of training while others have only reached the second. But in spite of the long working day there is time for recreation and morale is high. A fine band and an outstanding orchestra have been developed. The nearby civilian communities, especially Galveston and Houston, have been most active in providing recreational features.

Our population is fairly cosmopolitan. Among our personnel are such public figures as Private "Motts" Pinelli, Notre Dame 1939 All-American fullback; Lieutenant T. D. Brissman, Captain, University of Minnesota 1937 baseball team and player with St. Paul American Association team; Lieutenant Mark S. Cox, International Pistol Champion; Private Jimmie Valentine, formerly with the Will Bradley "Boogie Woogie" Orchestra; and Private Carl Hutchings, formerly with

(1) and (2) Sound locator detail after four weeks' training. (3) Rhythm section 6th Coast Artillery Training Group Orchestra. (4) Occupational and military specialists classification section

St. Louis Municipal Opera Company. We have also some 1,500 colored enlisted men, and a large number of citizens of Mexican descent who are loyally and enthusiastically taking hold.

The progress made to date is serving as a real incentive. It is planned by June 21 to furnish 2,000 trained enlisted men, the major portion of whom are specialists, as filler and loss replacements. We also plan to furnish a completed regiment of 1,617 trained men to be known as the 79th Coast Artillery AA. One week after June 21, we shall be prepared to receive 7,600 additional enlisted men and start their training. The small arms firings, those with the automatic weapons and with the 3-inch antiaircraft guns at towed targets have been very encouraging.

The 54th Coast Artillery (155-mm. gun) came into being on February 10, 1941, with the activation of Headquarters Battery. Its activation is a redesignation of the 44th Coast Artillery, disbanded in 1921, rather than a rebirth of the wartime 54th.

Four Regular Army field officers and six of battery grade were initially assigned, as well as some sixty reserve officers. As most of the latter came direct from civil life, refresher classes were immediately organized at Fort Crockett.

The remaining ten batteries were activated March

5, 1941, at Camp Wallace, and on the following day 112 cadre men arrived from Fort Bragg. All were from the 76th and 77th Coast Artillery, and nearly all had been enlisted only since August. The first selectees, a trainload from Fort Leavenworth, arrived March 15th. In the succeeding two weeks increments of Texas colored selectees brought the strength to 1,273.

A full training schedule was started at once, but almost before it got underway the announcement of early transfer to Camp Davis necessitated special emphasis on driver training and on other preparations for the move. If the truck column makes the 1,400-mile trip without serious mishap it will be to the credit of the convoy commander, Lieutenant Colonel Ladd, and of the motor transport officers.

Satisfactory training progress is being made, particularly if consideration is given to the inexperience of 98% of the men. Morale is high, for the selectees are proud to belong to the first colored medium artillery regiment to be organized since 1918.

Colonel Oscar C. Warner has commanded the regiment since its activation.

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Camp Davis

BRIGADIER GENERAL JAMES B. CRAWFORD, *Commanding*

By Captain Jeff Barnette

The Army's new Antiaircraft Firing and Training Center takes its initial bow. Located thirty miles north of Wilmington, North Carolina at Hollyridge, the camp stretches north and south for four and one-half miles and east and west for approximately one and one-half miles. It represents 3,200 acres of what was pine-studded swamp land in December, 1940. Today it has been transformed into a cantonment type camp of nearly one thousand buildings which will house 20,000 Coast Artillerymen. At this time six semi-mobile antiaircraft regiments have been activated, and a regiment of 155-mm. tractor drawn has been ordered to Camp Davis from Camp Wallace, Texas. Two of the antiaircraft regiments and the 155-mm. regiment were activated with colored troops.

Camp Davis was named in honor of an illustrious son of North Carolina, Major General Richmond Pearson Davis. General Davis was born at Statesville, North Carolina in 1866 and was a member of the class of 1887 at West Point. During the World War he commanded a Field Artillery brigade in France and later was Chief of Artillery for the 9th Corps. For his services in this command he was awarded the DSM. His last command prior to retirement, after more than forty years of service, was Commanding General of the 4th Corps area.

The small-arms firing point has been located just south of the main reservation and two firing points for 3-inch, 37-mm., and machine guns have been located on the beach just east of Camp Davis and at Fort Fisher fifty miles south. Fort Fisher was the famed old blockade fort of the Civil War period.

The first troops arrived from Fort Bragg on April 10th. They included cadres for the station complement groups. Simultaneously with the arrival of the first regular troops Colonel Crawford received notification that he had been elevated to the rank of Brigadier General. The first group of selectees is scheduled to arrive before the middle of May and it is expected that Camp Davis will be well under way with the major portion of troops on hand by early June.

More than three hundred officers of an expected total of nine hundred have reported for duty.

The selection of Camp Davis for the United States Army's first Barrage Balloon School has been announced by the War Department and General Crawford said that approximately 2,000 officers and men would attend the school, scheduled to open late in May.

Preliminary tests conducted at Fort Lewis, Washington, have demonstrated the practicability of balloons as defense instruments. Likewise, the balloons have proven their value in the defense of London and other English cities.

Instructors for the Balloon Barrage School will be drawn from the experimental staff at Fort Lewis.

It is not planned to locate the school permanently at Davis but the Davis reservation will be used for approximately six months, pending completion of permanent quarters elsewhere.

COAST ARTILLERY ORDERS

(Covering period March 1 through April 30, 1941)

Colonel Robert Arthur to BBTC Camp Davis.

Colonel Frank Drake to 33d Coast Artillery Brigade Camp Hulen.

Colonel William D. Frazer to 215th Camp Haan.

Colonel Felix E. Gross to AATC Camp Stewart.

Colonel Monte J. Hickok to 39th Coast Artillery Brigade, Fort Bliss.

Colonel Lloyd B. Magruder to HD of Pensacola, Fort Barrancas.

Colonel Clarence T. Marsh to RTC, Fort Eustis.

Colonel Arthur E. Rowland to 9th Coast Artillery District, Fort Winfield Scott.

Colonel Ralph W. Wilson to HD of Sandy Hook, Fort Hancock.

Lieutenant Colonel Sam W. Anderson to 34th Coast Artillery Brigade, Fort Bragg.

Lieutenant Colonel Harold G. Archibald to HD of Puget Sound, Fort Worden.

Lieutenant Colonel Harry C. Barnes, Jr. to Hq. Third Army Corps, Presidio of Monterey.

Lieutenant Colonel Philip F. Biehl to 14th Fort Worden.

Lieutenant Colonel Charles M. Boyer to commanding officer Pensacola Recreational Area.

Lieutenant Colonel Albert C. Chesledon to recruiting duty Detroit, Michigan.

Lieutenant Colonel Harrington W. Cochran to Christian Brothers College in addition to other duties.

Lieutenant Colonel Eugene T. Conway to General Staff with troops Hq. Puerto Rican Department, San Juan.

Lieutenant Colonel Nelson Dingley, 3d to IGD Hawaiian Department sailing New York, June 21, 1941.

Lieutenant Colonel Caldwell Dumas to General Staff with troops Hq. 3d Army, San Antonio, Texas.

Lieutenant Colonel Fenton G. Epling to Hq. General Headquarters, Air Force, Bolling Field.

Lieutenant Colonel Charles R. Finley to 34th Coast Artillery Brigade, Fort Bragg.

Lieutenant Colonel William C. Foote to AA Section, Second Army, Memphis, Tennessee.

Lieutenant Colonel Paul H. French to Hq. Interceptor Command, First Air Force, Mitchel Field.

Lieutenant Colonel Lloyd W. Goeppert to HD of Narragansett Bay, Fort Adams.

Lieutenant Colonel Henry F. Grimm to staff and faculty, Coast Artillery School.

Lieutenant Colonel Milton Heilfron to RTC, Camp Wallace.

Lieutenant Colonel Charles W. Higgins to Hq. Second Army Corps, Wilmington, Delaware.

Lieutenant Colonel Carl E. Hocker to 40th Coast Artillery Brigade, Fort Sheridan.

Lieutenant Colonel James P. Hogan to 34th Coast Artillery Brigade, Fort Bragg.

Lieutenant Colonel Harold R. Jackson to BBTC, Camp Davis.

Lieutenant Colonel William Q. Jeffords to Assistant Military Attaché, London.

Lieutenant Colonel Harold S. Johnson to Hq. First Army Corps, Columbia, South Carolina.

Lieutenant Colonel John F. Kahle to General Staff with troops, Panama Canal Department.

Lieutenant Colonel Peter K. Kelly, (Inf), to 7th, Fort Hancock.

Lieutenant Colonel Lester M. Kilgraf (FA) to RTC, Fort Eustis.

Lieutenant Colonel Parry W. Lewis to BBTC, Camp Davis.

Lieutenant Colonel Porter P. Lowry to BBTC, Camp Davis.

Lieutenant Colonel John W. McCormick (Inf) to 9th Coast Artillery District, Presidio of San Francisco.

Lieutenant Colonel Harold C. Mabbott to instructor, Coast Artillery School.

Lieutenant Colonel William F. Marquat to Philippine Department, sailing Charleston, April 12, 1941.

Lieutenant Colonel Lawrence C. Mitchell to 36th Coast Artillery Brigade, Camp Edwards.

Lieutenant Colonel Don R. Norris to RTC, Camp Callan.

Lieutenant Colonel George A. Patrick to retire March 31, 1941.

Lieutenant Colonel C. Hanis Potts to Hawaiian Department, sailing San Francisco, April 21, 1941.

Lieutenant Colonel Carroll G. Riggs to 40th Coast Artillery Brigade, Fort Sheridan.

Lieutenant Colonel Gerald B. Robison to Hq. Seventh Army Corps, Birmingham, Alabama.

Lieutenant Colonel Francis S. Swett to HD of San Francisco, Fort Winfield Scott.

Lieutenant Colonel Edward H. Taliaferro, Jr. to HD of San Francisco, Fort Winfield Scott.

Lieutenant Colonel Robert E. Turley, Jr. to BBTC, Camp Davis.

Lieutenant Colonel Arthur W. Waldron to RTC, Fort Eustis.

Lieutenant Colonel Victor R. Woodruff to 19th, Fort Rosecrans.

Lieutenant Colonel Fred A. Wright to 250th, Camp McQuaide.

Major Edward F. Adams (Inf) to RTC, Camp Callan.

Major Laurence W. Bartlett to OCCA.

Major Augustus J. Beaupre CA-Res. to active duty, Hawaiian Department, sailing San Francisco, June 12, 1941.

Major Harold A. Brusher to instructor, Coast Artillery School.

Major Geoffrey C. Bunting to AATC, Camp Haan.

Major George R. Burgess to 2d Coast Artillery District, New York, N. Y.

Major John F. Cassidy to Hq. Sixth Army Corps, Providence, Rhode Island.

Major Frederick E. Day to instructor, Coast Artillery School.

Major Henry H. Duval to 54th, Camp Wallace.

Major John W. Dwyer to BBTC, Camp Davis.

Major Dean S. Ellerthorpe to instructor, Command and General Staff School.

Major Robert T. Frederick to 9th Coast Artillery District, Fort Winfield Scott.

Major Ralph I. Glasgow to Office of the Chief of Staff.

Major James R. Goodall to 19th, Fort Rosecrans.

Major Sanford J. Goodman to Hq. Eighth Army Corps, Brownwood, Texas.

Major Malcolm H. Harwell to 39th Coast Artillery Brigade, Fort Bliss.

Major Melton A. Hatch to BBTC, Camp Davis.

Major William B. Hawthorne to Coast Artillery School.

Major John S. Henn to 19th, Fort Rosecrans.

Major Harold P. Hennessy to Panama Canal Department, sailing New York, May 1, 1941.

Major William H. Hennig to Virginia Polytechnic Institute, Blacksburg, Virginia.

Major William L. Immer to General Staff with troops, Sixth Corps Area.

Major Russell M. King, CA-Res. to active duty, Washington, D. C.

Major Olaf H. Kyster, Jr. to Hq. Third Air Force, Tampa, Florida.

Major Lyman L. Lemnitzer to GSC, Office of the Chief of Staff.

Major Walter L. McCormick to instructor, Coast Artillery School.

Major Donald McLean to AATC, Camp Haan.

Major Harry F. Meyers to instructor, Coast Artillery School.

Major Frank F. Miter to 54th, Camp Wallace.

Major Paul B. Nelson to AATC, Camp Haan.

Major Howard H. Newman to Hq. Interceptor Command, Second Air Force, Fort George Wright.

Major George W. Palmer to HD of Pensacola, Fort Barrancas.

Major John H. Pitzer to 36th Coast Artillery Brigade, Camp Edwards.

Major James G. Renno to USMA, West Point.

Major Paul R. Rinard to Wilmington, Delaware.

Major Joseph S. Robinson to Hq. Fifth Army Corps, Camp Beauregard.

Major Arthur Roth to instructor, Coast Artillery School.

Major Edmond E. Russell to General Staff with troops, First Division, Fort Devens.

Major Frederick F. Scheiffler to Hq. Ninth Army Corps, Fort Lewis.

Major Vernum C. Stevens to USMA, West Point.

Major Ernest B. Thompson to AATC, Camp Stewart.

Major Carl B. Wahle to Hq. Interceptor Command, Fourth Air Force, Riverside, California.

Major Vern Walbridge to HD of New Bedford, Fort Rodman.

Captain George E. Adams (FA) to 9th Division, Fort Bragg.

Captain Gilbert N. Adams to BBTC, Camp Davis.

Captain Charles L. Bean to Puerto Rican Department, sailing Charleston, April 14, 1941.

Captain Norman J. Bukey to instructor, Coast Artillery School.

Captain Wofford T. Caldwell to instructor, Coast Artillery School.

Captain Albert F. Cassevant to OCCA.

Captain Joseph C. Crouch to Puerto Rican Department, sailing New York, April 12, 1941.

Captain Chester A. Culham to AC Gunnery School, Las Vegas, Nevada.

Captain Ralph Davidson to instructor, Coast Artillery School.

Captain Glenn E. Decker to Puerto Rican

Department, sailing New York, April 12, 1941.

Captain Harold C. Connelly to AATC, Camp Haan.

Captain Philip V. Doyle to Camp Davis.

Captain Paul Elias to HD of New Bedford, Fort Rodman.

Captain Harold A. Gardner to instructor, Coast Artillery School.

Captain Alfred C. Gay to CAUTC, Camp Davis.

Captain Carl E. Green to Camp Davis.

Captain Harold D. Grothusen to Puerto Rican Department, sailing New York, April 12, 1941.

Captain Ernest W. Gustafson to AC Gunnery School, Las Vegas, Nevada.

Captain Harry N. Hardsog to Submarine Mine Depot, Fort Monroe.

Captain George W. Hibbert CA-Res. to active duty, Office of the Chief of Staff.

Captain Monte J. Hickok, Jr. to Hawaiian Department, sailing New York, April 1, 1941.

Captain Rossiter H. Hobbs to instructor, Coast Artillery School.

Captain Jack D. Hunnicutt to instructor, Coast Artillery School.

Captain Paul M. Hunt to instructor, Coast Artillery School.

Captain Howard W. Hunter to USMA, West Point.

Captain Jason E. Jennings to instructor, Coast Artillery School.

Captain William H. Kinard, Jr. to USMA, West Point.

Captain Conrad J. Lutgen to instructor, Coast Artillery School.

Captain Roger A. MacArthur to instructor, Coast Artillery School.

Captain George E. McCormick, Jr. to General Staff with troops, Sixth Division.

Captain Roger W. Moore to Camp Davis.

Captain Dwight E. Moorhead to instructor, Coast Artillery School.

Captain Robert Morris to 108th Observation Squadron, Chicago, Illinois.

Captain Russell M. Nelson to instructor, Coast Artillery School.

Captain Clemont C. Parrish to Puerto Rican Department, sailing New York, April 12, 1941.

Captain Malcolm O. Petrie to Philippine Department, sailing San Francisco, April 21, 1941.

Captain Peter Schmick to USMA, West Point.

Captain Frank N. Seitz to instructor, Coast Artillery School.

Captain David F. Sellards, Jr. to instructor, Coast Artillery School.

Captain Herman R. Smith, Jr. to instructor, Coast Artillery School.

Captain William F. Spurgin to Camp Davis.

Captain Tom V. Stayton to Hq. First Army Corps, Columbia, South Carolina.

Captain Lawrence P. Vito to Puerto Rican Department, sailing New York, April 12, 1941.

Captain Thomas H. Walker to Puerto Rican Department, sailing Charleston, April 14, 1941.

Captain Elensworth C. Wallace to AC Gunnery School, Las Vegas, Nevada.

Captain Benjamin M. Warfield to 33d Coast Artillery Brigade, Camp Hulen.

Captain George J. Weitzel to USMA, West Point.

Captain Norton B. Wilson to HD of Galveston, Fort Crockett.

Captain Boyd Yaden to Fresno, California.

First Lieutenant Loren J. N. Allison, CA-Res. to active duty, Recreational Area, Panama City, Florida.

First Lieutenant Gordon N. Arlett, CA-Res. to active duty, Pascagoula Recreational Area, Ocean Springs, Mississippi.

First Lieutenant George H. Best to instructor, Coast Artillery School.

First Lieutenant Harold Blackstone to 119th Observation Squadron, Newark, New Jersey.

First Lieutenant Phillip A. Bullen to Utah State Agricultural College, Logan, Utah.

First Lieutenant David E. Deines to Air Corps Advanced Flying School, Mather Field.

First Lieutenant Conrad G. Drexel to instructor, Coast Artillery School.

First Lieutenant Kenneth W. Gillespie to New York Port of Embarkation, Brooklyn.

First Lieutenant Charles J. Hackett to 8th, Fort Preble.

First Lieutenant William J. Henry to Panama Canal Department, sailing New York, May 1, 1941.

First Lieutenant Donald L. Herbert to 28th Engineers, Metlakatla, Alaska.

First Lieutenant Willard J. Hodges, Jr. to 34th Coast Artillery Brigade, Fort Bragg.

First Lieutenant Walter B. Hotvet to Puerto Rican Department, sailing New York, April 12, 1941.

First Lieutenant Noel A. Iverson to Puerto Rican Department, sailing New York, April 4, 1941.

First Lieutenant Thomas C. Keeling, Jr. CA-Res. to active duty, Office of the Assistant Secretary of War.

First Lieutenant William D. Kimble to Puerto Rican Department, sailing Charleston, April 14, 1941.

First Lieutenant Robert C. Lewis, CA-Res. to active duty instructor, Coast Artillery School.

First Lieutenant Oren R. Link to 28th Engineers, Metlakatla, Alaska.

First Lieutenant Charles M. McClain CA-Res. to active duty instructor, Coast Artillery School.

First Lieutenant Howard E. Michelet to 34th Coast Artillery Brigade, Fort Bragg.

First Lieutenant Richard H. Moore to Puerto Rican Department, sailing New York, April 12, 1941.

First Lieutenant Franklin T. Nichols to instructor Coast Artillery School.

First Lieutenant Finton J. Phelan, Jr. to Bangor, Maine.

First Lieutenant John G. Pike, Jr. CA-Res. to active duty, Coast Artillery Board.

First Lieutenant Rodney K. Potter to Puerto Rican Department, sailing New York, April 12, 1941.

First Lieutenant William H. Prentice to instructor, Coast Artillery School.

First Lieutenant Arthur L. Sanford, Jr. to Camp Davis.

First Lieutenant Cyril J. C. Schmidt CA-Res. to active duty instructor, Coast Artillery School.

First Lieutenant Francis J. Shea to Inf. RTC, Camp Wolters.

First Lieutenant James V. Starnes to Puerto Rican Department, sailing Charleston, April 14, 1941.

First Lieutenant Earl G. Stegemiller, CA-Res. to active duty instructor, Coast Artillery School.

First Lieutenant Frank F. Tenney, Jr., Aircraft Observer with 39th Observation Squadron, France Field.

First Lieutenant Walter MacR. Vann to 8th, Fort Preble.

First Lieutenant Arthur D. Waid to Philippine Department, sailing San Francisco, April 21, 1941.

First Lieutenant Heinz Weisemann to 34th Coast Artillery Brigade, Fort Bragg.

First Lieutenant Eben S. Whiting to instructor, Coast Artillery School.

First Lieutenant Kenneth G. Wickham to HD of Narragansett Bay, Fort Adams.

First Lieutenant Joseph W. Zimmerman to Philippine Department, sailing San Francisco, April 21, 1941.

Second Lieutenant George D. Bennett to Charlotte, North Carolina.

Second Lieutenant Ernest R. Blackmore to Philippine Department, sailing San Francisco, April 21, 1941.

Second Lieutenant Veto Blekaitis to 211th, Camp Hulen.

Second Lieutenant Harry C. Brown to Hawaiian Department, sailing San Francisco, May 17, 1941.

Second Lieutenant Wilbert A. Calvert to Philippine Department, sailing San Francisco, April 21, 1941.

Second Lieutenant William D. Chadwick, Jr. to retire March 31, 1941.

Second Lieutenant Lewis B. Chevaillier to Philippine Department, sailing San Francisco, April 21, 1941.

Second Lieutenant Joseph A. Clark, Jr. to Puerto Rican Department, sailing New York April 12, 1941.

Second Lieutenant Shelby J. Cullison to Philippine Department, sailing San Francisco, April 21, 1941.

Second Lieutenant William C. Devereaux to Puerto Rican Department, sailing New York, April 12, 1941.

Second Lieutenant John S. Diefendorf to 65th, Camp Haan.

Second Lieutenant John P. Dwyer to Air Corps Advanced Flying School, Selma, Alabama.

Second Lieutenant William D. Evans, Jr. to 36th Coast Artillery Brigade, Camp Edwards.

Second Lieutenant Eugene H. Field to Air Corps Basic Flying School, Moffett Field.

Second Lieutenant Walter J. Fitzgerald, Jr. to Bolling Field.

Second Lieutenant Samuel S. Gregory, Jr. to Puerto Rican Department, sailing New York, April 12, 1941.

Second Lieutenant Philip A. Hutchinson to Submarine Mine Depot, Fort Monroe.

Second Lieutenant Marion E. Johnson to Puerto Rican Department, sailing New York April 12, 1941.

Second Lieutenant Bernard H. Langley to instructor, Coast Artillery School.

Second Lieutenant Goodman K. Larson to 108th Observation Squadron, Chicago, Illinois.

Second Lieutenant John T. Leonard to Philippine Department, sailing New York April 8, 1941.

Second Lieutenant George T. Mehalko to USMA, West Point.

Second Lieutenant Donald R. Morton, Jr. to Fort DuPont.

Second Lieutenant Robert W. Muir to Philippine Department, sailing San Francisco, April 21, 1941.

Second Lieutenant Edward A. Murphy, Jr. to Air Corps Advanced Flying School, Stockton, California.

Second Lieutenant Shelby North to instructor, Coast Artillery School.

Second Lieutenant Theodore W. Pannell to AATC, Camp Haan.

Second Lieutenant Robert C. Raleigh to HD of Galveston, Fort Crockett.

Second Lieutenant Charles E. Roper to Philippine Department, sailing San Francisco April 21, 1941.

Second Lieutenant John B. Titherington to Langley Field.

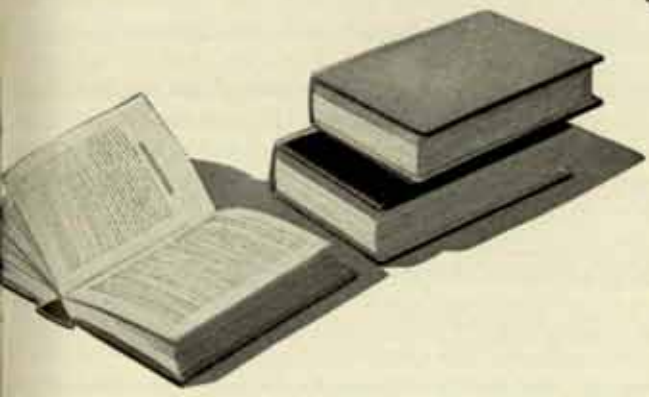
Second Lieutenant Edward Tomsich to 28th Engineers, Metlakatla, Alaska.

Second Lieutenant William S. West to Hq. Ninth Corps Area, Presidio of San Francisco, California.

Second Lieutenant Floyd E. Wiley to Aircraft Observer with 39th Observation Squadron, France Field.

Second Lieutenant Philip R. Willmarth to Puerto Rican Department, sailing New York April 12, 1941.

BOOK REVIEWS



"Only America Can Defeat America"

UNITED WE STAND! DEFENSE OF THE WESTERN HEMISPHERE. By Hanson W. Baldwin. New York: Whittlesey House, Inc., 1941. 374 Pages; Map; $3.00.

Hanson Baldwin, widely known as the military writer of *The New York Times*, gives us a scholarly estimate of the situation. Written in a flowing, easily-read style, the book is crammed with facts and figures that should interest every member of our armed forces, and most civilians. The recipe for successful national defense which Mr. Baldwin has evolved from many and varied ingredients may or may not suit our tastes as soldiers, but it is well worth study.

Faults in our military and naval set-up are pointed out in a gratifyingly dispassionate manner. Many of the faults are well known and are in process of correction; others are caused by the fact that Americans are a peculiar breed and cannot be coerced into change with any degree of ease. And again, some of us will find that Mr. Baldwin's idea of a fault and our own will not coincide.

The book includes information about our new bases, their uses and value in our scheme of defense, and what we have done with them up to early this year. Our older bases, too, are treated rather thoroughly.

Where the author and most of us will fail to see eye to eye is on the question of the size of the army we need for an adequate job of national defense. Mr. Baldwin believes that a *quality* army of between 515,000 and 865,000 is more than reasonable; that an army of 400,000 to 600,000 would be about right. He emphasizes that this force must be kept to full strength and intensively trained. He raises the question again of a long-term army, with men enlisted for six, ten or twelve years, with pay high enough to attract the flower of our youth. Mr. Baldwin wants the army to be an élite corps of an élite nation—as do most of us. He fails to take into account the American temperament and the average citizen's dislike of heavy emphasis on the military.

Here is food for thought:

> "A strong navy, powerful air force, and the best army in the world cannot keep war from our shores, cannot adequately protect the hemisphere, unless they act as a team. Upon no single one of them rests the sole responsibility for defense. All of them share the heavy burden of intelligent coöperation to a common end—and aggressive and successful defense. The fighting team—articulated, smooth-working, indoctrinated with a common purpose—is the only surety of victory. We still lack it."

The navy is treated very thoroughly in the book. In fact, it is dissected and analyzed so thoroughly that one doubts the wisdom of putting so much information between the covers of one book open to sale to the general public. However, in one paragraph, Mr. Baldwin writes:

> "There are—in a military sense—few real secrets when a nation is not actually involved in a war. There are a lot of things that military men *think* are secrets; there are a lot more that military men, and politicians particularly, do not *want* to be known. But the defense program, if it is to succeed, if it is to have the healthy help of the public, must be subjected to the microscopic scrutiny of the press."

United We Stand! is recommended reading for every soldier.

* * *

Western Exploration

A PATHFINDER IN THE SOUTHWEST. Edited and Annotated by Grant Foreman. Norman: University of Oklahoma Press, 1941. 279 Pages; Illustrated; Index; $3.00.

This is another of the fine volumes of carefully edited and annotated documents on Western Exploration produced by Grant Foreman and the University of Oklahoma Press. The book contains the itinerary of Lieutenant A. W. Whipple during his exploration for a railway route from Fort Smith, Arkansas, to Los Angeles, in the years 1853-54. Lieutenant Whipple not only knew how to cover ground, but he knew how to write a good report.

We think mainly of Lewis and Clark when we think of Western exploration. But many other exploring parties in the years after those two crossed the Continent were eventually to open the vast extent of the unexplored West.

Jefferson Davis, then Secretary of War, gave to Whipple's exploration and his report of it "the highest commendation." Mr. Foreman now deserves his own commendation for a careful and thorough job of editing an historical document well worth preservation.

Map and Aerial Photograph Reading

By LIEUTENANT COLONEL W. F. HEAVEY,
Corps of Engineers, U. S. Army

This manual is written primarily for the combat officer and noncommissioned officer. It is profusely illustrated with forty-five drawings. The text on the important subject of Aerial Photograph Reading features twelve full-page reproductions printed on enamel stock (to bring out all details) and a four-color map carrying an overlay in a fifth color indicating the location on the map of various aerial photographs.

All problems have been based on the same map, and a four-color reproduction, size 31" x 34", is included with each copy of this text. Also included are two protractors, one graduated in degrees, the other in mils, and a photo coördinate and grid coördinate card.

"Its chief value is that it is simple and clear cut, excellently illustrated with diagrams and with twelve of the clearest representations of aerial photographs which it has been our pleasure to see in a printed textbook. . . . This is the kind of text I should like to use to train my soldiers."—*The Military Engineer.*

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I. INTRODUCTION.
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III. DISTANCE AND TIME.
IV. DIRECTION AND AZIMUTHS.
V. ORIENTATION.
VI. ELEVATION AND RELIEF.
VII. MAP READING IN THE FIELD.
VIII. READING AERIAL PHOTOGRAPHS.
IX. APPENDIX.
INDEX.

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The Coast Artillery Journal

1115 Seventeenth Street, N.W., Washington, D. C.

What Might Have Been

THE ARMY OF THE FUTURE. By General Charles deGaulle. New York: J. B. Lippincott Company, 1941. 179 Pages; $2.00.

It is hard to realize that General deGaulle wrote this book in 1934. One is obsessed with the idea that the book was written *after* the disastrous summer of 1940; that it is second-guessing pure and simple. Newly translated into English, the book is a blue-print of the German system of warfare. The Germans seemingly took the lessons of de-Gaulle to heart; the French were not impressed.

DeGaulle pleads for a small, mobile professional army; an army of technicians with the skill of the mechanic and the devotion of the Old Guard. He saw the necessity for taking advantage of the products of modern industry; he would expend gasoline rather than blood. He preferred a few, intensively trained soldiers, devoted to the army, to the conception of masses of men, sketchily trained, to whom the army was an unpleasant fact.

The book is superbly written, in a literary sense. There is a slight touch of poetic Gallic phraseology which strangely enough does not seem out of place, but the vivid wording, the well-turned phrases lift the book from the tone of a professional treatise to that of literature. For instance:

> ". . . And so one frequently sees those in command indulging in tactical exercises which are unsuited to the instrument which will have to put them into practice, while, for their part, the rank-and-file make efforts which are useless, owing to the lack of time to acquire the technical skill and the firmness of purpose necessary to manoeuvre in the way that is expected of them. It is like a rash horseman claiming to get all the fine points of horsemanship out of a decrepit old screw."

Again:

> ". . . War is, perhaps, in the general activity of men, an ineluctable element, just as much as birth and death; it may be that it is the disturbance necessary to destruction and renewal, the ploughshare in the soil, the axe on the tree, the battering-ram against the wall, but it is none the less true that its horrors depend, very largely, on the dimensions one gives to it. On the whole, no form of battle is more sanguinary than that of nations-in-arms."

Even in the today of motorization and mechanization, there are soldiers who may disagree with portions of this work, but there are few who will not be able to think more clearly on the subject for having read it. It is all the more valuable for having been held until the major premises were proved true—in 1934 *The Army of the Future* might have been dismissed here, as in France, with a careless nod.

* * *

RANKS AND MEDAL RIBBONS OF THE FIGHTING SERVICES. London: *The Daily Mirror*, 1941. Distributed by Collins, Toronto. 31 Pages; Illustrated in Color; 25c.

An interesting paper-bound pamphlet, illustrating in full color the rank insignia of the British fighting services and the medals and ribbons awarded to service personnel. Short historical and explanatory notes are especially informative.

North of the Border

CANADA FIGHTS. Edited by John W. Dafoe. New York: Farrar and Rinehart. 280 Pages; Index; $2.00.

It seems that Canadians have always known more about the United States than our own people have known about Canada and Canadians. To many of us, Canada is a vague, yellow spot on the map, providentially supplied with good trout streams, old-world village churches, and the Northwest Mounted Police.

Canada Fights changes a few of our views, or gives us a bit more of the picture than we can learn in a quick trip through Toronto and Montreal. This volume, written by six top-notch writers, editors, and political experts, gets down to concrete detail with a mixture of history and present fact that explains some of the things that are going on north of the border.

Some of the questions the book answers include those of the capacity of Canada's war effort; the portion of that capacity that is being made available; the meaning of the joint defense pact with the United States; the economic and related industrial situation in the Dominion; and the strength, present and potential, of her armed forces.

It seems our future is destined to be bound with that of Canada in increasing degree. It is probably as important to know what makes Canada "tick" as it is to know what makes our own far west think and act as it does. *Canada Fights* is admirable source material for the story of what goes on above the Forty-ninth Parallel—and what may be expected in the future.

South of the Border

ZAPATA THE UNCONQUERABLE. By Edgcumb Pinchon. New York: Doubleday, Doran and Company, 1941. 332 Pages; Maps; $3.00.

To one who was snapping cap pistols at imaginary Mexicans while the young men of his home town were chasing Villa, this book was an entirely new conception of Mexican revolutionists. In this case, it seems that a bandit is an unsuccessful revolutionist.

Mr. Pinchon, who wrote *Viva Villa*, writes a very sympathetic biography of the leader of the southern forces in the last full-dress fighting in Mexico. The novelistic technique of the biography makes the book exceptionally good reading, even though it may detract from the work's value as a historical source.

Zapata, who in the beginning was a simple Indio with a love of liberty, fought from 1910 to 1919 to break up the huge haciendos which were spread over land that once had belonged to the peons. We can watch his stature grow, from that of an unimportant ranch hand to that of a successful general. As a general, Zapata was a man to reckon with. His leadership and his tactics were superb. He knew how to get the most from his necessarily undisciplined horde, and how to fit his tactics to his situation.

In the instances when he failed, he failed as a politician rather than as a soldier. As long as he fought, getting his ammunition and his supplies from the government he was sworn to overthrow, he was truly unconquerable. It was in the periods between the battles, when he attempted to translate his military gains to the political reforms for which he fought, that he felt the bitter taste of defeat.

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Pacific Power

BEHIND THE RISING SUN. By James R. Young. New York: Doubleday, Doran & Company, 1941. 334 Pages; Illustrated; $3.00.

One doesn't have to read many pages of this book before it is evident that the author has little love for the Japan of today, and for many of the leading figures in Japan.

Mr. Young was a newspaper man in Japan for thirteen years. Two months of that time he spent in a rather uncomfortable Japanese jail—which might account for part of his pronounced dislike for certain things Japanese.

The burden of Mr. Young's tale seems to be that most Japanese are nice people, and that the country itself could be pleasant. But the police, certain elements of the army, and most of the navy seem to vie with each other in being obnoxious to the world in general and the Japanese public in particular.

Many of the news stories from China and Japan are explained in this book. The stories seemed inconsistent and unreasonable because the people who made the news are inconsistent and unreasonable. As a case in point, the Japanese say none of their soldiers are prisoners in China—in spite of the evidence of those who have seen the prisoners. The explanation is that once a Japanese soldier is taken prisoner, his family is paid the death gratuity and the soldier is stricken from the rolls, because no true Japanese soldier would surrender.

From the tone of the book, it would seem that judging the character of Japan is doubly hard, not only because they are Orientals, but because they are Orientals with an Occidental veneer. One hardly knows whether he is seeing the veneer or what lies beneath.

There are many incidents that are amusing, and at the same time illuminating. The elaborate counterespionage system comes in for its share of smiles—even to the point where the author calls upon his particular shadow to prove he was not at the scene of an accident where his license number was taken by mistake. The language difficulty also comes in for its share of humor.

The book seems to have been hastily written, and contains annoying bits of repetition, but on the whole it is informative, provocative, and good reading.

ALL AMERICAN AIRCRAFT. By Ernest K. Gann. New York: Thomas Y. Crowell Company, 1941. 122 Pages; Illustrated; Index; $2.00.

Any air-minded youngster from seven to seventy would find this book instructive. Good pictures, short but informative explanatory material, and effective format combine to form a pleasing volume for those who want to see what today's planes look like, and what they do.

Mr. Gann, an airline pilot, has chosen military, commercial and sport types of planes for inclusion. There are nearly a hundred listed, with illustrations.

A Good Eyewitness

I SAW ENGLAND. By Ben Robertson. New York: Alfred A. Knopf, Inc., 1941. 213 Pages; $2.00.

One of the current flood of books by those who have lived through the bombings and invasion fears, this volume

is better written than most. Ben Robertson, *PM*'s London correspondent, is tops both in observation and writing. He has the knack of picking out the significant fact or incident, and then putting it across in a few words.

His story agrees with the rest of the stories we have read of England under pressure—the English (and the Scotch and the Welsh) can take it. They can take it with calm cheerfulness.

Certain sentences in the book will bear quoting, even in as short a review as this. For instance, "The blitzkrieg was to teach us that war was not so bad as the fear of war." "Suddenly six million people came to realize that human character could stand up to anything if it had to." The comment of a refugee from London's slums, living in a mansion, is particularly British—"We're glad of any kind of home, even if it is a palace."

I Saw England is one of the best of its kind.

✓ ✓ ✓

London Again

THIS IS LONDON. By Edward R. Murrow; edited by Elmer Davis. New York: Simon and Schuster, 1941. 237 Pages; $2.00.

This is a collection of some of Mr. Murrow's broadcasts from London during the present war. The fact that the material was written originally for the ear, rather than for the eye, adds to the charm of the work.

Mr. Murrow tells us nothing that the feature stories in the daily newspapers haven't told us, but he does tell it in an appealing way. The broadcaster is an ace observer, with a feeling for the little things as well as the big things. The message of the King and the conversation of the hardware clerk both help to brush in the picture of England in the war.

The book should appeal especially to those who enjoyed Mr. Murrow's broadcasts over C.B.S. The best of them are here, preserved for calmer days.

✓ ✓ ✓

R.A.F.: THE STORY OF A BRITISH FIGHTER PILOT. By Keith Ayling. New York: Henry Holt and Company, Incorporated, 1941. 332 Pages; Illustrated; $2.50.

This is a synthetic biography of a British Spitfire pilot; it is the combined stories of several members of the R.A.F. in biographic form.

Where the story sticks to flying and fighting, it is excellent. When the author attempts to exploit the propaganda possibilities of the book he does none too well. Propaganda must be subtle to be effective. Mr. Ayling's brush is a bit heavy.

✓ ✓ ✓

WINGS OF VICTORY. By Ivor Halstead. New York: E. P. Dutton and Company, Inc., 1941. 221 Pages; 26 Pages of Illustrations; Appendix. $2.50.

This is another of the series of books glorifying the R.A.F. If the books are correct the British airmen need no further glorification; their work assures them everlasting fame.

This particular story of the war over England is lacking not only in continuity, but in the facility of transition, however, the series of accounts it contains are well done, individually.

Getting Into Gear

ARSENAL OF DEMOCRACY. By Burnham Finney. New York: Whittlesey House, 1941. 284 Pages; Illustrated; $2.50.

This book is the answer to those who have been wondering why an industrial country like the United States cannot turn out war materials by the wave of a magic wand. Mr. Finney, editor of *The American Machinist*, takes the reader behind the scenes of industry and explains what goes on between the contract and the finished product.

The book goes into its subject thoroughly. There are chapters on Labor, the OPM, Bottlenecks, Tooling Up, and other factors that stand between the desire for arms and the fulfillment of desire. The economic factors as well as the limitations of industry are touched upon.

The book explains why automobile factories cannot produce airplanes without changes that might make it advisable to build new airplane factories and be done with it. It mentions the $100,000 and the four-and-one-half weeks that Chrysler spent before "tooling up" was even considered in the production of the medium tank. Few of us realize the interlocking problems of machine tools and assembly lines. We should have a better idea of the job ahead of us, and how we're progressing, after reading this book.

✓ ✓ ✓

Mistakes of the Past

AMERICA IN ARMS. By General John McAuley Palmer. New Haven: Yale University Press, 1941. 207 Pages; $2.00.

General Palmer traces the history of America's citizen armies from the days of Plymouth to the passage of the Selective Service Act. Most of us are familiar with our country's expensive habit of dropping defense preparations after the close of a war, and then doing nothing about training until we are being pressed by the next war. General Palmer takes up the subject in detail, places the blame where the blame belongs, and offers suggestions to overcome the usual objections to universal military service in time of peace.

✓ ✓ ✓

THEIR FINEST HOUR. Edited by Allan A. Michie and Walter Graebner. New York: Harcourt, Brace and Company, 1941. 226 Pages; 32 pages of photographs: $2.50.

Here are sixteen personal narratives by people who are fighting the battle of Britain. Many of the stories have appeared in *Life* magazine, under the bylines of Michie and Graebner.

The narratives include one by an officer of a submarine that sank a German transport; one by a woman whose home was bombed; one by a London auxiliary fireman; and one by two petty officers on the *Scotstoun*. This will indicate the scope of the book.

The photographs are particularly well selected.

Survey of Chemical Warfare

CHEMICAL WARFARE. By Curt Wachtel. Brooklyn: The Chemical Publishing Company, Inc. 312 Pages; Index; $4.00.

Curt Wachtel organized the pharmacological section of the Kaiser Wilhelm Institute during World War I. After the war, Dr. Wachtel studied noxious gases in England, France, Russia and the United States. He is recognized as one of the outstanding World War I experts on the subject of chemical warfare, and has continued his work and research.

This book is written in a style that any line officer, and many laymen, should be able to understand. It is not an overly-technical treatise that requires the knowledge of a physician or chemist.

Dr. Wachtel goes into the history, economic and strategical aspects, and toxicology of chemical warfare. Bacteriological warfare and poisons are touched on also. He poses knotty problems for the United States, but admits that our own highly efficient Chemical Warfare Service may have the answers.

The author believes in dissemination of information on defense against chemical warfare in time of peace, especially to qualified physicians. He states that a translation of our own defense regulations, restricted in this country, has been issued to the air-raid precaution service of a great foreign power.

The book is well worth while, to the battery commander and the army commander alike. Chemical warfare increases in importance with the growth of modern chemistry—it behooves every soldier and statesman to know at least as much about the subject as he can learn from this book.

Automobile Encyclopedia

DYKE'S AUTOMOBILE AND GASOLINE ENGINE ENCYCLOPEDIA. By A. L. Dyke. Chicago: The Goodheart-Willcox Company, Inc., 1941. 1,483 Pages; 4,600 Illustrations; Index; $6.00.

Dyke's Encyclopedia is an old stand-by in the commercial automotive field. The Nineteenth Edition has been published this year, with information added about aircraft including engines, magnetos, carburetors, fuel injection, superchargers, propellers, principle of flight, nomenclature, civil air regulations, specifications of American aircraft engines, and other material; additions and revisions on Diesel engines; and material on fluid drive. Other additions and revisions touch on automatic transmissions; battery and electrical testing equipment; engine tune-up and service specifications; specifications of trucks, busses, tractors and outboard two-cycle engines; and welding.

The book should be almost indispensable in the commercial garage or automotive classroom. The motorist who likes to tinker and the youngster who fancies himself an automotive expert will find the book valuable because it touches on subjects that the average motorist or mechanic never heard of, and yet are vital to a thorough understanding of automotive and related mechanics.

The diagrams and editorial matter have been designed for ease of understanding.

Preparing for Bombs

AIR RAID PRECAUTIONS. Reprinted by permission of HM Stationery Office, London. Brooklyn: Chemical Publishing Company, 1941. Illustrated; Tables; Appendixes. $3.00.

CIVIL AIR DEFENSE. By Lieutenant Colonel A. M. Prentiss, General Staff Corps. New York: Whittlesey House, 1941. 334 Pages; Bibliography; Appendixes; Illustrated; Index. $2.75.

This country is awakening gradually to the desirability of preparing for the possibility of air raids. England has learned by bitter experience that air raids are not nearly so damaging, materially or morally, if the civilian population is prepared to resist them. *Air Raid Precautions* is a reprint of the official British regulations on the subject; *Civil Air Defense* is an original work, frankly borrowing heavily from the British publication as well as from other sources.

Both books go into the technical aspects of defense, as well as the organization and training of defense organizations. Both are profusely illustrated, and any intelligent person may glean enough from either one to awaken him to the dangers of aerial attack as well as to reassure him concerning the effectiveness of defense measures.

There is more to effective defense against aerial bombardment than adhesive tape on store windows, and blackout curtains. Provision must be made against blast effect, fragments, glass splinters, incendiary bombs, gas attacks; systems of fire fighting, gas decontamination, evacuation of casualties, and replacement of essential utilities must be maintained; the morale of the citizenry must be kept in mind.

It would be well for some of us to be thinking about these things; after thought action must follow. As a basis for thought and action, either or both of these books should be valuable.

Departure from Dunkirk

MY FIRST WAR: An Army Officer's Journal for May, 1940. By Captain Sir Basil Bartlett. New York: The Macmillan Company, 1941. 131 Pages; $1.25.

This is a day-to-day chronicle of a British Field Security Officer during the epochal month of May, 1940. Captain Bartlett undergoes through the pages of his diary a gradual metamorphosis from an Epicurean Pepys, concerned chiefly with the facilities afforded by his various billets, to an apocalyptic chronicler, recording the epic evacuation from Dunkirk. In the pages of *My First War* are confirmed the amazing speed and unbelievable relentlessness of the blitzkrieg in its impact upon Belgium and northern France. One begins to appreciate the utter confusion resulting when the communications zone suddenly becomes the theater of operations.

The book is far from a tactical treatise on the Dunkirk withdrawal. It is a portrayal of the psychological effect on the victims of terrible and irresistible force. Predominant in the portrayal are the apathy, unbelief, confusion and chaos that were the prelude to Dunkirk. The burden of the story may be summarized in the author's dedication: ". . . a tribute to that extraordinary mixture of gaiety, ribaldry, kindliness, and sheer stark courage: the British soldier."

Are You Professionally LITERATE?

We make no claim that reading, or even memorizing, these books will qualify you as the present-day Clausewitz, but we are sure that every Coast Artillery officer needs at least some of the volumes listed on this page to round out his military education, and for reference.

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