

29TH YEAR OF PUBLICATION
BATTERY EXECUTIVES' NUMBER

THE FIELD ARTILLERY JOURNAL

MARCH-APRIL, 1939

The 1939 Prize Essay

FIRING TABLES FOR BATTERY EXECUTIVES

—CAPTAIN MURRAY O. KLINGAMAN, FA-RES.



PUBLISHED BIMONTHLY BY
THE UNITED STATES FIELD ARTILLERY ASSOCIATION

March-April, 1939

CONTENTS

	<i>Page</i>
Editorial	99
Frontispiece (Figure 3 of illustrations to accompany 1939 Prize Essay)	100
Firing Tables for Battery Executives (<i>The 1939 Prize Essay</i>)	101
By Captain Murray O. Klingaman, 367th FA	
G-3 Chews an Issue Pencil	108
By <i>Rollin Quezon</i>	
Some Notes for Battery Executives	109
By Captain Harold F. Handy, FA	
The Executive and the Firing Battery	122
By Lieutenant John W. Hackney, 107th FA	
Practical Method for Converging the Sheaf	126
By Lieutenant Bernard Thielen, FA	
"Cavalry <i>the Successful Arm</i> "	127
(<i>From the Journal of the Royal United Service Institution</i>)	
Firepower, Mobility, Communication—(photographs)	128
The Cavalry-Artillery Team.....	130
By Lieutenant John F. Greco, FA	
A Short Visit to the American Artillery	142
By Captain W. G. H. Pike, R.A.	
Type Problems and Writ	150
Typhoon and Flood	155
By Captain Tom Sherburne, FA	
2,000 Miles Through the Rockies	159
By Captain W. J. Rogers, 143d FA	
Solution to Writ	165
The French Fire Direction Chart	166
By Captain M. L. Curry, USMC	
Italian Gunnery Methods	171
By Captain Voris Connor, FA	
Reviews.....	176
Notes and Comments	178
By J. S. W.	
More on the Santa Barbara Theme	189
Some Forward Observations.....	191
Military Books	192

AUTHORS ALONE ARE RESPONSIBLE FOR STATEMENTS CONTAINED IN THEIR ARTICLES

VOL. 29

29TH YEAR OF PUBLICATION

NO. 2

MARCH-APRIL, 1939

THE FIELD ARTILLERY JOURNAL

Copyright, 1939, by
The United States Field Artillery Association

**A PUBLICATION FOR THE FIELD ARTILLERY OF THE REGULAR
ARMY, NATIONAL GUARD, AND ORGANIZED RESERVE**



Patron Saint of Artillery

**PUBLISHED BIMONTHLY FOR
THE UNITED STATES FIELD ARTILLERY ASSOCIATION**

BY MONUMENTAL PRINTING COMPANY

32D STREET AND ELM AVENUE

BALTIMORE, MD.

Editorial Office, 1624 H Street, N. W., Washington, D. C.
Michael V. Gannon, Captain, Field Artillery, Editor

Entered as second-class matter August 20, 1929, at the post office at
Baltimore, Md., under the Act of March 3, 1879

Published without expense to the government

The Field Artillery Journal pays for original articles accepted

THE U. S. FIELD ARTILLERY ASSOCIATION

1624 H Street, N. W., Washington, D. C.

Please enroll me as a member of the Association and as a subscriber to *The Field Artillery Journal*. I inclose \$3 for subscription and dues.

Name

Rank and Organization

Street

City **State**

ARTICLE II OF CONSTITUTION

"The objects of the Association shall be the promotion of the efficiency of the Field Artillery by maintaining its best traditions; the publishing of a *Journal* for disseminating professional knowledge and furnishing information as to the field artillery's progress, development, and best use in campaign; to cultivate, with the other arms, a common understanding of the powers and limitations of each; to foster a feeling of interdependence among the different arms and of hearty cooperation by all; and to promote understanding between the regular and militia forces by a closer bond; all of which objects are worthy and contribute to the good of our country."

Please change my address

from

to

.....
(Signature)
.....



Editorial

Guest editor this issue is Hero of Alexandria, to whom is attributed the invention of a steam engine, a slot machine, and many other devices. The Leonardo da Vinci of his time, he also wrote, about 250 B. C., a technical military treatise, which includes the quotation below, cited in "Pen and Sword,"* by Colonel Oliver L. Spaulding, FA:

"The greatest and most essential part of the study of philosophy is that which deals with tranquillity of mind. This has always been, is now, and probably always will be the chief preoccupation of philosophers. But mechanics may claim a higher place than philosophy, for it, merely by one of its minor applications, teaches men to live in tranquillity—I refer to that branch of mechanics that treats of gun construction. For the philosophy taught by its engines gives one a feeling of security, either in peace or in war time. For this reason the study should always be encouraged. Even in profound peace, one may hope by this art to make it even more enduring; for one's own mind is at ease, remembering his state of readiness, and possible enemies, observing it, will be slow to risk an attack. But if the art is neglected, and due preparation is not made, even the slightest quarrel may have the most serious consequences."

*Princeton University Press.

	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0																																										
TNS	RDS	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	SR																						
1500																																											
2000																																											
2500																																											
3000	5	2	24	25	27	29	30	11	32	13	34	15	35	16	37	18	39	20	40	21	42	23	44	25	6	26	7	28	9	30	11	31	12	14	16	9							
	TNS	RDS						4					3																														SR
			4	4	4	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	2	3	2	3	2	3	2	3	2	3	2	2				
			4	4	4	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	2	3	2	3	2	3	2	3	2	2	2					
5000			100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10																						
5500																																											
6000																																											
6500																																											
7000																																											
7500																																											
8000																																											
8500																																											
9000																																											
9500																																											
10000																																											

Figure 3 - Form of table showing illustrative data for 200-yard width of target at 3000 yards. Selector scale in place for 3000 yards. Scale is marked for battery layout in opening problem, in which intervals from Number 1 are: Number 2, 15 yards; Number 3, 45 yards; Number 4, 70 yards.

For normal (left) sweeping, read: NUMBER 2 LEFT 14, NUMBER 3 LEFT 23, NUMBER 4 LEFT 34, BATTERY 2 ROUNDS SWEEPING, 5 TURNS.

For right sweeping, read: NUMBER 1 LEFT 9 (9 + 0), NUMBER 2 LEFT 23 (9 + 14), NUMBER 3 LEFT 32 (9 + 23), NUMBER 4 LEFT 43 (9 + 34), BATTERY 2 ROUNDS SWEEPING, RIGHT, 5 TURNS.

FIGURE 3 (TO ACCOMPANY "FIRING TABLES FOR BATTERY EXECUTIVES").

THE FIELD ARTILLERY JOURNAL

VOLUME 29

MARCH-APRIL, 1939

NUMBER 2

THE 1939 PRIZE ESSAY

Firing Tables for Battery Executives

BY CAPTAIN MURRAY O. KLINGAMAN, 367TH FA

THE battery of French 75's is laid on base deflection. Pieces are staggered and the intervals from Number 1 happen to be: Number 2, 15 yards; Number 3, 45 yards; Number 4, 70 yards (Figure 1).

Down comes a fire command: BATTERY ADJUST, BASE DEFLECTION RIGHT 130, 200 AT 3000. SITE O, SHELL MARK I, FUZE LONG, BATTERY, 2900.

The Executive commands: BATTERY ADJUST, BASE DEFLECTION RIGHT 130. Flipping open his *Battery Executive's Firing Tables* at the 200 yards page,

placing his selector scale under line 3000 on this page, and taking all needed data directly from this line, he commands: NUMBER 2 LEFT 14, NUMBER 3 LEFT 23, NUMBER 4 LEFT 34, SITE O. SHELL MARK I, FUZE LONG, BATTERY 2 ROUNDS SWEEPING, 5 TURNS, 2900 . . . FIRE.

Simple, accurate, rapid—illustrative of the possibilities of tabular solution for firing data at the firing battery.

Consider the jobs that have been done.

The Battery Commander determined,

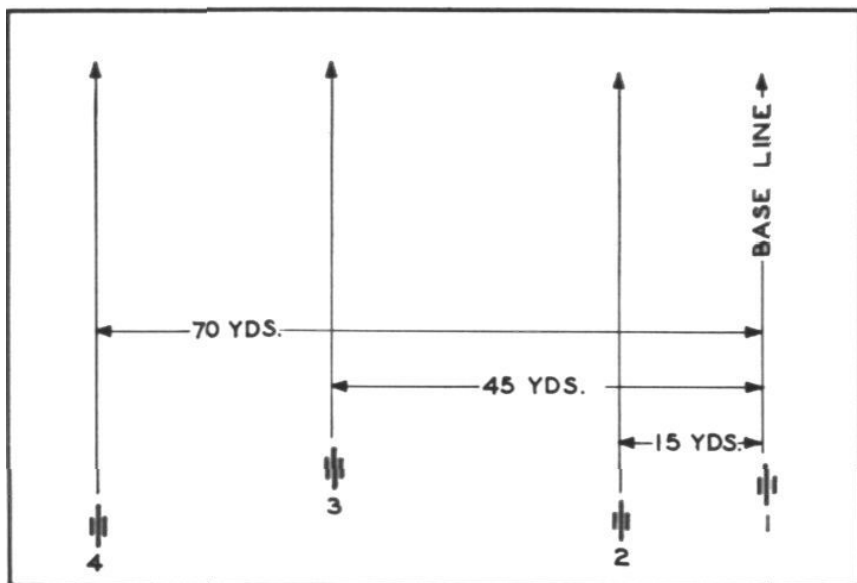


FIGURE 1.

THE FIELD ARTILLERY JOURNAL

and furnished to the Executive, information as to the location of the right edge of the target, the extent of the target in width, the ammunition to use, and the range setting at which to open fire. He was relieved of the "third grade arithmetic" required to form the sheaf from convergence, and to move it from its initial position for delivering fire to a second position to complete the coverage of the target in width. He had fewer firing data to transmit.

The Executive's task, so far as the problem is concerned, has been set forth. In preparation for firing he had a simple job. On occupation of position he determined the intervals from Number 1 of Numbers 2, 3, and 4, and placed three identifying marks on his scale. He computed nothing. The convergence plan was eliminated.

The gunners were given a shift from base deflection and Numbers 2, 3, and 4 were given individual deflection differences. This is identical with the best practice possible under the convergence plan, which is the one most advantageous to the gunners—the too seldom used practice which requires the Executive to determine the net result of convergence and the subsequent opening, and to order the net change.

Work operations throughout have been simple, and reduced in number. As for accuracy, the figures used in this problem are illustrative of method, not final determinations. The point is: *perfection can be built into tables*. Let's call it *practical perfection*, that is, perfection modified to square with the capacities of our available laying mechanisms and the most efficient of the possible methods of firing battery operation. That perfection, attainable in expertly constructed, carefully checked, and proved tables, is unattainable in spot computations on the range or in the field.

Before discussing the table which the Executive in our problem used to

determine his commands let us take up the matter of the distribution in width of the guns of a staggered battery, and the basis on which the development of tabular methods to solve the resulting problems can be considered.

Without going into the determination of the total number of possible combinations of intervals a four gun battery may have, we can readily agree that it is wholly impracticable to develop a table for each of these combinations. While the number of combinations is large, the number of intervals at which any one gun may be placed is small. The sum of the individual totals of the four guns is a small figure, assuming a reasonable unit of interval, say five yards.

With a small total there is a possibility of constructing tables. We can employ tables at the firing battery provided that we can have all the data that we want at one time in one place and that we can readily select them from the array in which they are included.

Suppose we take a five-yard unit of interval and we say that a battery front may extend from a minimum of 40 yards to a maximum of 100 yards, and that the interval between adjacent guns may extend from a minimum of 10 yards to a maximum of 40 yards. Differences of opinion concerning these minimums and maximums will make no important differences in the number of possibilities due to the necessarily large part on which there will be agreement. Differences of opinion regarding the unit of interval to be used will make significant differences. It may be argued that five yards is a serviceable unit and that some attention can be given to placing guns at such unit intervals without unnecessary work, and at the same time satisfying the conditions which necessitate irregular intervals. Insistence on a unit much

THE 1939 PRIZE ESSAY

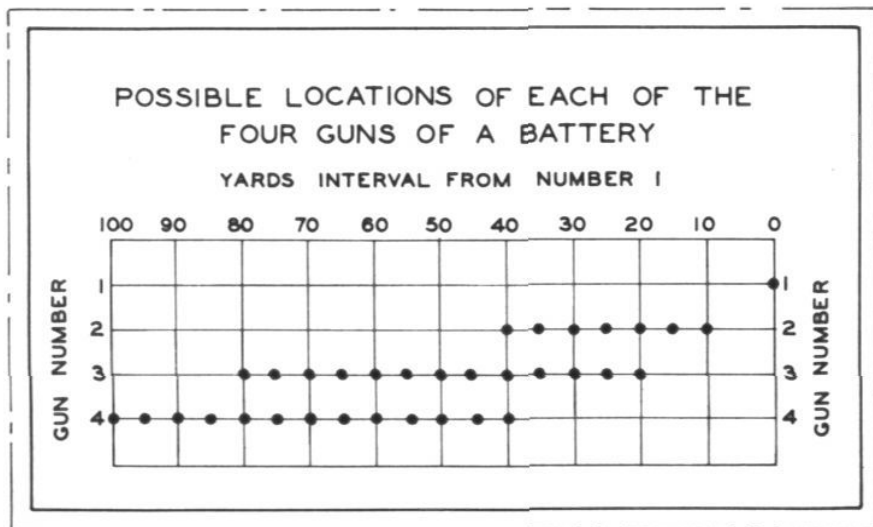


FIGURE 2.

smaller than five yards would so increase the number of possibilities that only unwieldy tables could result.

With the stated assumptions of allowable minimums and maximums there are 34 possibilities, shown graphically in Figure 2. Each dot represents a possible placement of a gun. Physical and functional numbers of the guns are alike, as we are considering four guns in position, and four guns firing.

At 0 yards there can be but one gun, Number 1. Between 10 and 20 yards, and between 80 and 100 yards, there can be but one gun; Number 2 in the first case, Number 4 in the second. Between 20 and 80 yards there may be at any interval either of two guns (numbers varying), with the exception at 40 yards where there may be one of three.

With these preliminaries out of the way we can organize our tables. We can have a table for each width of target, in yards. Starting with sheets for the widths of standard targets we can add sheets for other target widths to the extent we choose.

There will have to be some definite unit of width in any case. All tables in a series should be uniform in structure and dimensions.

On each table we will show for each range:

1. The shifts of Numbers 2, 3, and 4 at each possible location of those guns, from their basic laying parallel to Number 1 to their laying to reach their proper places in the sheaf as placed on the target for the initial round. These data will be based on normal sweeping to the left, if more than one round is required.
2. The number of rounds to be fired to cover the target in width, if more than one round is required.
3. The amount to traverse between rounds, if more than one round is required.
4. A correcting figure, to modify the shift figures (1 above) to put the sheaf initially at the left edge of the target for right sweeping. In this case Number 1 shifts left by

THE FIELD ARTILLERY JOURNAL

the amount of the correcting figure.

A table of this kind is shown in Figure 3. It is arranged from right to left, just as the guns are arranged. All columns are placed in the order in which they will be used, reading from the right. The table contains:

1. Lines — *ranges*, here 1500 - 10000, using a 500 yard unit. Range figures are shown on both ends of the lines.
2. Primary columns (except specially designated flank columns) — *yards interval from Number 1*, here 10-100, using a 5 yard unit. Each column is composed of one, two, or three secondary columns, one for each gun that may occur at that interval.
3. Secondary columns within primary columns—*gun number* (2, 3, or 4). Here we have columns of data for the shifts from parallel laying to form the sheaf for the attack of the target—one column for each of the 34 possible gun locations previously discussed (except Number 1 at 0 yards, for which no data are required). Each datum is for a shift in mils, *left* unless prefixed by a minus sign, in which case *right*.
4. Left flank columns — *number of rounds sweeping* (labeled RDS) and *number of turns between rounds* (labeled TNS). For guns other than 75 mm. M1897, with French sight, substitute mils (m) for turns (TNS). All flank columns are left blank if only one round is required.
5. Right flank column—*correcting figure for right sweeping* (labeled SR). This represents mils, and is always *left*. It is the shift for Number 1, and is also added algebraically to the individual shift figures shown in secondary columns for Numbers 2, 3, and 4.

There are some difficulties in selecting data from such tables due to the mass of

figures presented. With any table of this kind the repeated unassisted selection and verification by inspection of the line and column and the reading of the required datum is slow, tedious, and subject to error. Some assisting device is required to secure efficiency. The line-column selector scale shown in place in Figure 3 solves the problem.

It is divided in the same manner as the columns of the table. When placed across the table so that the outside column lines of table and scale register, complete registration is secured. This scale, in place, masks lines immediately below the line required and indicates the columns required by markings immediately below these columns at the required line. The figures next above the column indicating markings on the scale are the data required.

To prepare the scale for use, on occupation of a new position, requires only the erasure of old pencil gun numbers on the leading edge of the scale, and the insertion of new gun numbers on the leading edge in the secondary columns appropriate to the new position. Some accentuation can be made if desired. Indicating marks for flank columns are standard and therefore are printed on the leading edge of the scale.

A system that will function only when four guns are available will not serve for use in the field. We are likely to have only three guns available, sometimes two, once in a while one. Three or four will be the common cases. Three-gun firing tables, *based on any one of the four guns being out*, can be constructed in the same form, and used with the same facility, as four-gun tables.

With our assumptions regarding the possible distribution of guns of the battery there are 40 possibilities for locations of the guns, according to *function*

THE 1939 PRIZE ESSAY

as Numbers 1, 2, and 3 of a three-gun fire unit. These possibilities are shown graphically in Figure 4. "Gun number" represents *functional number only*. "Yards interval from Number 1" refers to physical Number 1.

Note that functional Number 1 may occur at 0 yards or at any point between 10 and 40 yards. The areas in which functional Numbers 2 and 3 are found are extensive.

A single scale instrument will suffice for all tables, different scales appearing on different edges of the instrument. Automatic and foolproof association of the proper scale and table in use can be assured by proper design.

The physical make-up of a series of tables for this job presents some interesting problems to which there are various solutions. We want tables of convenient

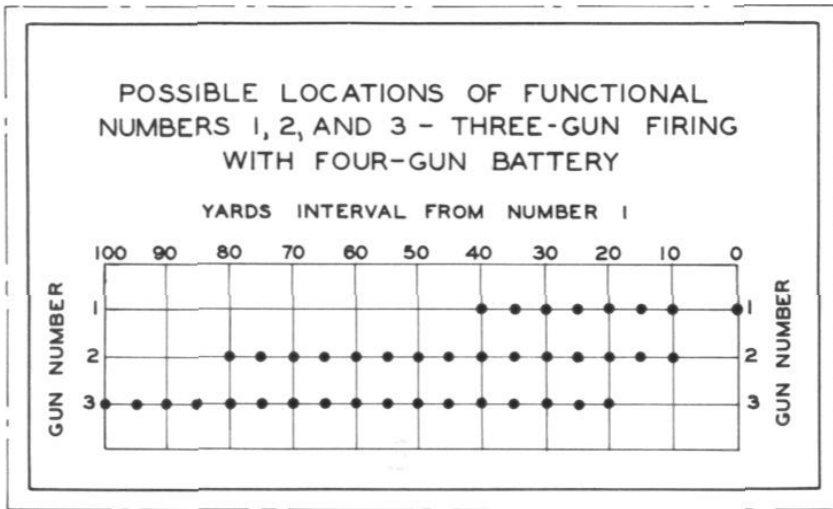


FIGURE 4.

Our three-gun table requires 39 secondary columns, which means a wider table, and one which requires a different selector scale. With this table, if physical Number 1 is out and physical Number 2 becomes functional Number 1, it must shift to reach its proper place in the sheaf in all cases.

Two-gun tables (34 columns) and one-gun tables (19 columns) likewise can be constructed. Two-gun tables will be useful: (1) when the battery is reduced to two guns, any other two being out; (2) for platoon fire; and (3) for cross-sweeping.

size; tables that when opened stay open; each table complete, at least in width, on one side of one sheet; rapid opening to sheet to be used; durability of sheets, cover, and binding; maximum legibility; resistance to dirt; and continuous association of scale and tables.

Tentatively, how about making sheets, cover, and scale of non-inflammable celluloid or similar material; using the currently popular spiral binding, binding at the top of the sheet; providing visible self-indexing of sheets by marginal cutouts; joining scale with back cover by a short length

THE FIELD ARTILLERY JOURNAL

of cord or other flexible connector? Wise selection of background color and size, style, and weight of type will solve legibility and sheet size requirements. Some typographical distinction could be made in place of, or in addition to, the minus signs indicating shifts to the right. Finish of the cover, sheets, and scale can be selected to avoid glare and at the same time be dirt resistant. That part of the scale on which gun numbers are to be written should be roughened to take pencil

markings, and to hold them until they are intentionally removed.

Why thrust these tables on the Battery Executive? Why have tables anyhow?

A simple tabular system can be developed to solve for the Battery Commander the computations for distribution that he now makes. The matter of convergence, handled by the Executive, can continue to be handled in one or more of the methods now in use.*

The convergence plan artificially divides

*An example of failure to take full advantage of an opportunity to avoid field computations, in connection with the introduction of a tabular method, is found in the master convergence table published in Field Artillery Book 162 "The Firing Battery" and elsewhere (Figure 5).

While there has been no official statement concerning a unit of interval for staggered guns, it is implied by the publication of this table that five yards is a satisfactory unit. This table shows a 5-yard column at the right. Other columns are for 10-yard multiples. For a 25-yard interval, for example, it is necessary for the Executive using the table to perform some operation to get each figure required: interpolate between 20 and 30, add 20 + 5, or subtract 30 — 5. It is unlikely that he would multiply 5 by 5. It is interesting to note that different methods in some cases give different results. A column should have been provided for each multiple of 5 yards. Had this been done the Executive could take all required figures directly from the table.

The provision in instructions concerning the convergence plan for the construction of a convergence table for each position occupied is sound. It is a better method for this job than the use of a master

convergence table with or without an assisting device. Here we need only one three-column table, containing figures which will be used over and over again. Simplicity and speed of operation readily justify the time necessary to copy and verify columns of figures taken from a master table.

With a position convergence table, column selection is automatic. Due to the narrow width of the column group line selection is rapid. Data can be determined by inspection. In practice it will be observed in many cases that the Executive uses the thumb of the hand in which he holds the table as a line selector, partially masking the lines below the required line.

Blank forms for position convergence tables are of use in speeding up table construction and in producing orderly uniform appearance, which has definite utility. Such forms can show column and line structure and range designations. It is desirable that position convergence tables be marked for positive identification, showing battery, position, and date. This may avoid subsequent use of an obsolete table which has not been discarded.

Range	Interval from No. 1—yards										
	100	90	80	70	60	50	40	30	20	10	5
1500	67	60	53	47	40	33	27	20	13	7	3
2000	50	45	40	35	30	25	20	15	10	5	3
2500	40	36	32	28	24	20	16	12	8	4	2
3000	33	30	27	23	20	17	13	10	7	3	2
3500	29	26	23	20	17	14	11	9	6	3	1
4000	25	22	20	18	15	13	10	8	5	2	1
4500	22	20	18	16	13	11	9	7	4	2	1
5000	20	18	16	14	12	10	8	6	4	2	1
5500	18	16	15	13	11	9	7	5	4	2	1
6000	17	15	13	12	10	8	7	5	3	2	1
7000	14	13	11	10	9	7	6	4	3	1	1
8000	13	11	10	9	8	6	5	4	3	1	1
9000	11	10	9	8	7	6	4	3	2	1	1
10,000	10	9	8	7	6	5	4	3	2	1	1

FIGURE 5

THE 1939 PRIZE ESSAY

one job into two parts, involving two sets of finished data instead of one. This in itself introduces significant systematic error. By integrating the job, using tables, we are able to reduce error. We are able to reduce the total work. We are able to take full advantage of operating procedures, technical information, and deliberate expert judgments which under present methods are unavailable, and in less inclusive tabular systems either unavailable or available to a lesser extent.

If we are to integrate, producing specialized data to lay each gun on its part of the target, the officer determining the data must know the intervals between guns. Any system involving this requirement must be handled at the firing battery. Fire of the battery may be prepared and conducted by any one of a number of officers, not more than one of whom is likely to know anything at all about the physical arrangement of the battery. These officers, or most of them, may have occasion to prepare and conduct fire of all the batteries of the battalion. It would be unworkable to burden them with any scheme that would require them to keep track of, and to consider in their preparation of fire, the physical layouts of the batteries. What we should strive to do is to make the job of preparing fire as simple as possible. With the right kind of tabular system we can make it easier to prepare fire, and at the same time make it at least no harder for the Executive, to whom the responsibility for the changes in laying necessary for the initial distribution of fire over the front of the target is entrusted in its entirety.

It is reasonable to expect that the elapsed time between the picking up of the target by the Battery Commander and the Executive's command FIRE will be reduced, because the work operations will be reduced.

The outstanding reason for using an integrated tabular method is not because it is easier to prepare fire, or because it may be faster, but because it offers superior data.

It cuts down the number of rough and ready computations. It reduces accidental error. "Firing point jitters" and "fog of fighting"—the need for fast answers under pressure—take their toll in reducing accuracy. With tabular solution, computations within the scope of the table are eliminated from consideration. There are no opportunities, so far as the elements of data are concerned, to make an accidental error, or within the limitations of the laying devices an approximation error. The data are correct. However, it must be recognized that although the possibility of selection of the wrong data from the table may be minimized, it cannot be eliminated entirely.

In the construction of tables we have a choice. We can merely reduce to tabular form the data as the Battery Commander would compute them, or we can make the data as nearly perfect as we know how to make them. A table made on one basis is as simple to use as one made on the other.

We want the best tables that can be made. Making them requires that the constructors put aside the rules and practices to which they are accustomed, and that they reconsider the effects of projectiles, probable error, sheaf formation—everything that has any bearing on the problem of distribution of fire in width *at the target*.

In addition to offering a solution to the problem of distribution of fire in width, tabular methods make possible the improvement of distribution of fire in depth—zone fire. Better results in range distribution may be obtained, particularly at the longer ranges, with more precisely determined data which take probable error into consideration.

We may have a greater expectancy of actually getting the distribution over the target than we plan to get, and actually placing on the target the maximum part of the total number of rounds fired.

A table could be developed for each combination of ammunition. For each *zone center* the sequence of ranges for each standard and adjusted standard depth of target could be shown. Such tables would permit improved location of range centers of impact and efficient variation of the number of rounds to be fired, according to range of zone center.

In what form should tables be made? Should additional tables be developed?

Development of the tables requires the complete, deliberate, expert consideration of all pertinent factors, and lots of work. It

involves not only simple calculations and recording of figures. It requires determinations as to what we want, then what we can get with our laying devices, next what we can expect to happen when we fire—and revising until an optimum solution is determined. Then the data must be checked and proved. Tabular development is a job worthy of assignment to our best gunnery experts.

Tabular methods in their application to the problem of distributing fire should be investigated thoroughly. They offer substantial advantages in technique. Further developed and properly applied, tabular methods can increase the influence of artillery in the determination of the result of battle.

ROUND COMPLETED

G-3 Chews an Issue Pencil

(Between attacks of writer's cramp)

Consider well the Saxon thane,
When he went out to hunt the Dane,
Or Briton, Norman, Pict. or Scot,
Or other foe that was his lot:
Of words he used the bluntest kind.
No doubt his orders were: "Go find."
But I, post-Hastings chap, poor dunce,
I have to spell "reconnaissance."

No wonder Englishmen are heard
So oft ejaculate, "My word!"—
The syllables with arrows sped
On that far field where Harold bled;
And since that time all Britons blench
At love and war in Norman French.
Ah, great our loss as William's gain—
We must "debouch" upon the plain!
"Communications"—having writ.
The moving finger weaves a bit:

"Twere better far the Conquer'r died
Than I use "lateral" for "side,"
"Deployment" when just "spread" would
do.
Thus saving letters not a few.
And optic strain at flaring lamps
Amidst the well-known dews and damps.

Ah, would the date I now affix
Were "Hastings, Eng., ten sixty-six."
That this effective stuff I strut
Might save the day for Saxons, but—
Verbose machine guns prattle here.
No honest thud of Saxon spear—
To dollar words I yield* my fate.

*Old English. Means "capitulate."

—Rollin Quezon.

Some Notes For Battery Executives

BY CAPTAIN HAROLD F. HANDY, FA

THE effectiveness of artillery is limited to that of its firing batteries. The firing battery cannot be much better than the Executive who trains and commands it. Since this officer is unquestionably a key member of the Infantry-Artillery Team it is essential that he know his job, work at it, and give it plenty of thought. This paper is written in the hope of provoking discussion, of stimulating thought, and of making common property a few shortcuts and refinements which have been worked out, over a long period of years, and by many experienced officers, to fit cases where regulations allow latitude. Any duplication of matter known to be covered elsewhere is made purely for emphasis.

TRAINING

Training literature for the Executive is excellent and plentiful. Of the publications designed especially for him a lecture by Colonel Fred C. Wallace on fire discipline is one of the most instructive and helpful. Its official title is Instruction Pamphlet A-3, F.A.S., Camp Knox, Kentucky, 1921. Most units have copies.

Let the Executive train himself along with his battery. Largely his is the responsibility that commands are understood. Therefore it is not good practice to conduct drill with pieces placed hub to hub, giving commands in a conversational tone. Spacing the guns at full intervals gives valuable practice in enunciating and in making the voice carry. Numerals are best pronounced in the manner prescribed for telephone operators. "Site" might possibly be

confused with "right," for which reason some prefer to say "esseye." In some commands a short pause is helpful, "Base deflection right (short pause) one six zero." This gives the cannoneer time to react as to direction of shift. One must school himself always to announce "The command was" before complying with any request to repeat an element of data, this unless such repetition could not possibly cause duplication of a change in settings. It is not ordinarily necessary, for instance, when repeating range or elevation.

The recorder and *both* telephone operators (T2 and T3) are so closely involved with the firing battery that they may be regarded as key members of it. Therefore they should by all means drill with it. If one would be sure of having a recorder present at the next service practice it is essential, in this day of rapidly changing personnel, that he have at least three men so trained. These can get no better practice than at drill with the firing battery. It is well to have a simulated OP close by, preferably out of sight and hearing of the gun squads, where fire commands can be read to T3 in the cadence normally used at the firing point.

Do not bore the men with long, half-organized drills. If the battery is well trained a half-hour period is ample provided the drill is fast and free from lost motion. If men are at attention make them realize the fact and *make them keep their eyes on the Executive* except when laying or making settings prevents. Give "at ease" or "rest" whenever possible, even if only for a few seconds.

THE FIELD ARTILLERY JOURNAL

Prepared fire commands are generally, and rightly, considered indispensable for properly organized drill. It is excellent practice to make up several sets on cards, two cards to the set, one card bearing only fire commands and the other the same fire commands plus correct settings for all pieces. The card bearing only commands is read to T3 as described above. The Executive keeps the other for checking. He should prepare new sets of commands from time to time lest the men become too familiar with the old. He will find it convenient to have a case for these cards and to carry it habitually during duty hours.

Require exactness in settings, in laying for deflection, and in centering bubbles. Very close isn't good enough. Any leeway permitted in drill will multiply itself by two or three in firing. Uniformity must be required as to the final motion in making settings and in laying. With breech-heavy material the last motion of range or quadrant bubble is from front to rear. The final motion in laying for direction is muzzle left to right. With the panoramic sight the gunner, before calling "ready," should take up the backlash in the sight mount by twisting the sight head lightly to the left. If the vertical hair does not then come to rest exactly on the aiming point he must again traverse on.

The use of the "follower" or "gunner's aid" (not used in some batteries) is highly recommended. The less mental arithmetic the gunner is bothered with the better. The Executive should, however, make a daily check of the "followers" on all panoramic sights, for they frequently get out of adjustment and cause deflection errors by sticking.

Checks of settings and laying must be unexpected and rather frequent. Immediately after the first simulated salvo

of a new problem it is well to command "At ease—deflections." Any deflection errors are corrected at this time, thus insuring that all gunners get properly started on the problem. At one or more other times during the problem, when the hands of all chiefs of section are raised, give "In rear of your pieces, fall in. At ease. Check settings and laying"; then announce quickly the correct settings for all elements of data in use. Each section is then checked by its chief, who calls the Executive's attention to any erroneous or questionable work. The latter then carefully explains the effect which each error found would have had if the round had actually been fired. Many good artillerymen insist that the Executive do all checking in person. The writer believes that, under average circumstances and provided he occasionally and without warning "checks the checkers" to make sure no slipshod work is being allowed to pass, the time saved justifies the procedure of having the chiefs of section do most of it.

Cannoneers who cut fuzes must be taught to align the fuze lug with the slot in the fuze setter before inserting the round. This saves time, confusion and erratic cutting. At drill the fuze cutting often goes unchecked. A good way to check it is as follows: Instead of commanding "Fire," when all sections are ready, command "Unload. Read time of burning." If times vary by more than one tenth of a second something needs correcting. It is admittedly difficult to keep the time fuzes on drill projectiles in such condition that they will cut properly. Even so, effort put forth in this direction will more than pay for itself.

OCCUPATION OF POSITION

Some of the suggestions offered in this section are more or less universal

SOME NOTES FOR BATTERY EXECUTIVES

in their application. Others apply mostly to service practice.

The importance of care in occupying a position for service practice must never be lost sight of. The assumed tactical situation usually permits this occupation to be deliberate. Whenever possible the Executive should make a preliminary reconnaissance of his position. To take along a detail and dig the trail holes at this time is often good practice, provided one bears in mind the fact that a trail hole full of rain water is worse than useless. Before leaving park the Executive checks carefully his materiel, sights, and ammunition, this being one of his major responsibilities.

Upon arrival of the battery at the position, the Executive indicates the position of each piece, the safety limits, and the general direction of fire. If trail holes have not been dug in advance they are dug at this time, making sure that they are deep enough for firing with any quadrant elevation permitted by safety limits and materiel. While trail holes are being dug the range drums and quadrants are checked and the pieces are carefully boresighted. The Executive does the boresighting in person, taking up backlash and play in all mechanism just as he requires the gunners to do in laying. If there is the remotest possibility that direct laying may be used he boresights the horizontal hair as well as the vertical one. It is a good idea to do this anyway. He sees that each piece is so emplaced that both wheels are at the same level. He takes the precaution of checking, at three or four different elevations, all gunners' quadrants against his master quadrant, which should be that of the first section.

The more convenient one makes matters for the safety officer the less delay the latter will have to cause. Largely for this reason most batteries use

safety stakes. Any sort of marker will do. Some organizations have iron rods, sharpened so as to be easily driven and having some sort of distinctive section mark at the top. For these distinguishing marks some batteries use spades, hearts, clubs, and diamonds. Others use the section number. Some such marking is advisable for, if the field of fire is wide, number 2's right stake will be to the right of number 1's left stake, and so on. At any convenient time during the occupation and after boresighting, the chiefs of section supervise the setting out of safety stakes, using the panoramic sight to set off proper safety limit angles and to line-in the stakes. After a safety stake is lined-in with the panoramic sight it must be moved laterally by the horizontal distance between panoramic sight and axis of gun tube. Otherwise an error of 10 or 15 mils would be brought about due to parallax, for the safety officer checks his lateral limits by sighting over the tube. The safety officer checks the marking of safety limits before any firing is permitted. For night firing the safety stakes must be lighted. An ordinary lantern, shielded by a number 10 can with a hole cut in it, will serve the purpose. Small electric lights, powered by local batteries, are better, especially so if each section can have a distinctive color of light. If centrally located batteries are used, with wires running out to the various stakes, it is much easier to darken the position when not firing. Anybody who has slogged about North Arbuckle on rainy nights, tripped repeatedly in the maze of wires, and had his lights shorted out by water will recommend against this, however, for lights on either safety stakes or aiming stakes. When local batteries are used men have to be sent out to turn lights on and off, so that due precaution must be taken to make sure all men are behind

THE FIELD ARTILLERY JOURNAL

the guns and safe before opening fire on a new problem.

One must always allow plenty of time for occupying and organizing the position. Always be ready to fire at least 10 minutes before the time set. A half hour is better. No time will be wasted, for there are always refinements and additional checks which can be made with advantage. The firing battery which arrives too late to open fire on time commits a rather serious military crime.

Make it a rule always to have field glasses and Firing Tables at the battery position, for in nearly every service practice there is occasion to use both.

In recent years the Field Artillery School has laid considerable emphasis on the probability that in modern warfare the "staggered" or irregular position of the piece will be the rule and the regularly spaced position the exception. The simplest (and therefore the best) means of getting a regular sheaf from a staggered position is to converge the sheaf to a point, at a range equal to or slightly greater than that of the target, then open it to the desired width by applying a deflection difference. In order thus to converge the sheaf with facility it is necessary that the pieces be carefully and accurately laid parallel at the start. *This parallelism of initial laying is of paramount importance and, time permitting, it must be had regardless of whether the position be staggered or regular.* As a rule the Battery Commander is in no position to handle the sheaf except to determine the proper opening of it from convergence. The Executive is therefore charged with the responsibility for initial parallelism and for converging the sheaf at whatever range may be announced. In the general case the Battery Commander tells the Executive where to put the bursts and the Executive puts them there, using such

means as he may find most efficient. More often than not the Battery Commander does not know what aiming point the battery is using. Sometimes the Executive elects to use an aiming point of his own choosing rather than the one announced in the firing data. All that is required of him is to put down fire when and where called for. The "payoff" is on results, not on minor details of method.

For the initial firing from a position most authorities now prefer "compass" data to that which designates an aiming point and announces a deflection, the former being more readily computed and just as easy for the battery to handle. Once the initial laying is complete, the Executive should never have to return to his aiming circle except in case of emergency. When a problem opens with the command "Compass so-and-so," he who runs to his instrument and uses it to lay the battery is guilty of a serious waste of time and effort. The azimuth of the initial laying must be known. Then by a quick calculation, usually mental, a shift to any other azimuth ("compass") can be made with speed and facility and, far more important, *the initial parallelism, which was arrived at so carefully, will be retained.* Many good Executives first lay the battery parallel on a reference point of known azimuth. Knowing the azimuth of the line base piece-reference point, a quick shift to any other azimuth is readily possible. Inasmuch as parallelism of sheaf is of such outstanding importance I prefer the scheme outlined in the following paragraph because it takes care of the case in which the OP designates an aiming point different from the one in use.

Lay the battery parallel, near the center of the sector and on an azimuth which is a multiple of 100 (if the azimuth to the center of the sector is 4667 lay with "compass" 4700. The

SOME NOTES FOR BATTERY EXECUTIVES

multiple of 100 is merely to facilitate mental arithmetic in making the first shift if initial data is "compass"). Then have the pieces referred to the best aiming point visible and command "Record base deflection." (The fact that this "base deflection" is artificial makes no difference to the gunners.) Continue to use this good aiming point throughout the practice, even though another be announced. (There is one exception to this last precept. If another aiming point is designated *and the command "On number one form sheaf parallel" is omitted*, which circumstance means that the Battery Commander has

(The only reason for having number 2 measure these other deflections is to check number 1 against gross errors. A shift to the right increases "compass" and decreases deflection. The R's and L's are written on the card as a safeguard against making the initial shift in the wrong direction. Inspection will readily show how to use this convention.) The battery is now prepared for speedy laying, *without disturbing its carefully obtained parallelism*, with any sort of initial data which the OP may announce. The following examples illustrate how the initial deflection is handled:

Command from OP		Executive's Command
Compass 4665	BD	Left 35
AP Block House Sig Mt. Df 3125, On No. 1 form sheaf parallel	BD	Left 82
AP Marker Mt. Hinds, Df 525, On No. 1 form sheaf parallel	BD	Right 122
AP Marker MB4. Df 2170, On No. 1 form sheaf parallel	BD	Right 209

elected to take the sheaf away from the Executive and handle it himself, the newly announced aiming point must be used. This occurs very rarely.) Next, record on a small card, the "compass" of the recorded base deflection and the referred base deflection for number one piece. Then have the gunners of numbers 1 and 2 measure the deflection to each of the other visible aiming points and record number 1's measured deflection (which *is* "base deflection" if and when the aiming point in question is designated from the OP) for each such aiming point on your card, which now appears somewhat as follows:

If and when registration is completed the OP will give some such command as "Right 2. On number one form sheaf parallel (or on number one adjust sheaf parallel). Record base deflection. Report adjusted compass." The Executive then commands "Right 2" (and adjusts the sheaf parallel if so directed). He then ascertains number 1's current deflection and compares it with number 1's original base deflection, thus determining the net shift which number 1 has made. For example, assuming that number 1's deflection is now 2914 and that the aiming point in use is Block House Signal Mountain,

	R		L
Compass 4700		Block House Sig. Mt. 3043	
	L		R
	L		L
Marker Mt. Hinds 647		Marker MB4 2379	
	R		R

THE FIELD ARTILLERY JOURNAL

the Executive commands "Base deflection right 129. Record new base deflection." He then reports to the OP, "Battery is on the base line. Adjusted compass 4829." Finally he corrects all data on his card to correspond to the new base deflection, applying in the proper sense the difference between old and new base deflections for number 1 (right 129 in this case) for the purpose. His card will now read as follows: The possibility that a different aiming point may be announced is the sole reason for

	R		L
Compass 4839		Block House Sig. Mt. 2914	
(Scratching off "4700")	L	(Scratching off "3043")	R
	L		L
Marker Mt. Hinds 518		Marker MB4 2250	
(Scratching off "647")	R	(Scratching off "2379")	R

keeping track of base deflection as referred to aiming points other than the one in use. The record on the card serves to prevent possible delay by having the figuring done in advance. For example, if a new problem opens with the command "Aiming point marker on Medicine Bluff Number 4. Deflection 2190. On number 1 form sheaf parallel," the Executive merely commands "Base deflection right 60" and there is his battery, laid parallel in the required direction and laid there quickly.

Unless one takes certain precautions when a new base deflection is recorded there is an excellent chance for large and gross error. The precautions: Make sure that each gunner has completely erased his old base deflection, recorded his new one, and checked it with the recorder. Check to see that each chief of section has the direction of his *new* base deflection materialized in some manner so that he can check shifts from it by sighting over the tube. Make sure that the Executive and such assistants as he may have know where

each gun tube should be pointed when laid on new base deflection. Many a good battery has had its pride laid low by letting some piece shift from an out-of-date base deflection.

A few observations on laying the battery parallel: Since one depends throughout the practice on his initial laying for parallelism, such laying must be done with extreme care. Reciprocal laying of one piece by another is to be discouraged, since a more precise means

is usually available. Use a distant, clearly defined, common aiming point whenever possible. Good parallelism can be had by computing and applying a deflection difference (if pieces are not spaced at regular intervals compute and apply individual shifts for numbers 2, 3, and 4) provided one knows the aiming-point range. After laying by this means always check by laying the aiming circle reciprocally with number 1 and commanding "Aiming point this instrument. Measure the deflection." If instrument and panoramic sight agree within a mil or so in each case, the laying is good. *Trouble is pretty sure to occur if one tries to lay parallel by means of a deflection difference when using a common aiming point which is close, especially so if it lies toward the flank.* If the aiming-point range is not known the pieces are laid in the usual manner with the instrument. A fair check can then be had, if pieces are at regular intervals, by seeing if they

SOME NOTES FOR BATTERY EXECUTIVES

have a uniform deflection difference when referred to a *distant* aiming point. In using a common aiming point to the rear for his initial parallel laying a certain officer, who had become accustomed to a *front* aiming point, opened his sheaf for parallelism. Fortunately for him he took reciprocal readings with his aiming circle and thus caught his error. This illustrates the wisdom of checking *by independent means* whenever circumstances permit.

A word as to initial laying for direction: If the map azimuth of the line from base piece to a visible reference point is accurately known it is better to use it than to rely on the compass needle. Always check with the needle, however, to guard against gross error. Before taking a reading with the aiming circle twist the head of it lightly but firmly to the left. When the head is released the vertical hair should come to rest exactly on the point sighted. Do this also when centering the needle and when declinating, as it removes backlash and play uniformly. After laying the battery always recheck the direction of the instrument to see whether a loose clamp or a jolt has disturbed the azimuth of its zero line.

If there is the slightest possibility that aiming stakes will be needed have them set out as soon as the battery is laid. It is highly preferable that they be directly to the front or directly to the rear, so that the shock of recoil will not be apt to throw the gun sights out of line with them. If the natural aiming point in use is well to front or rear it is excellent practice to align the aiming stakes accurately with gun sight and aiming point. Then, if the aiming point becomes obscured during firing, no delay will result.

As soon as the battery is ready to fire send a message to the OP, stating the types and amounts of ammunition on hand, the aiming points which are visible, the

minimum range as measured at the battery, the fact that the battery is ready to fire, and giving any other information which may be pertinent.

FIRING

The firing battery which tries to achieve speed by hurrying will surely come to grief. True speed is to be had by eliminating lost motion. It cannot be acquired in any other way. The good Executive is something of an efficiency expert. He does not himself throw away valuable seconds by such silly procrastination as to command "Number one-Fire." He faces toward the piece to fire and brings his arm down the instant the chief of section signals that he is ready.

In working for speed it is important that the firing data come to T2 in a certain cadence which can be determined only by experience. Fast data is worse than slow data because the Executive, unable to keep up with T2, is forced to consult the recorder for the latter elements. In extreme cases the recorder gets behind: then the war stands still while the OP repeats data. Immediately T2 announces any element of data the cadence should permit the Executive to announce it, in proper form, to the battery in such time as to complete his command just before T2 repeats the next element. Enough slack wire must be left so that T2 and the recorder can follow the Executive about when data are being received.

The usual problem opens with an individual piece. (Note: The first problem of a service practice is likely to be a registration on the base point, with the ultimate object of laying number one on the base point, sheaf parallel. In this case the smart Executive will save the time consumed in laying parallel a second time. Although he may *receive* the command "Number one

THE FIELD ARTILLERY JOURNAL

adjust," he *gives* the command "Battery adjust*** Number one** rounds," thus insuring that his battery will automatically be laid parallel on completion of adjustment.) The Executive immediately places himself behind this piece and checks its direction by sighting over the tube, thus detecting any deflection error greater than about twenty mils. If laying appears correct the piece fires as soon as ready. (The loss of time consequent to checking with the recorder *before* firing is not justified unless the Executive lacks full confidence in the personnel of the section.) *Immediately* the piece has fired its settings are checked with the recorder, so that if an error has been made it can be reported to the OP *at once*. The Executive then quickly checks the laying of all other pieces which are following data, first by sighting over the tube, then with the recorder. At the start of a problem, or after a large deflection shift, *there is no substitute for the visual check*, for the gunner may be using the wrong aiming point; it is truly surprising how often this can happen, even with the best of personnel, and once a year is too often. (An Assistant Executive is very useful here for verifying direction for one platoon. In motor-drawn batteries the First Sergeant is often available. This is not a proper duty for the Safety Officer.) Chiefs of section must be trained and required to make this visual check, also.

In firing by platoon or battery neither the chief of section nor the Executive should hesitate to call a piece "out" if there is the slightest doubt as to its laying. The best of cannonneers will make an occasional mistake. Errors must be caught *before* they are fired, not after.

Once in a great while, despite the wisest of precautions, an erroneous round may get away. Cannonneers and

chiefs of section *must* be trained to detect such errors at once and to report them immediately. The embarrassed Executive must then make prompt report to the OP, stating the error and the fact that it has been corrected. It is human nature to try to "cover up" a mistake of this sort. However, the officer firing may have based the limit of a bracket on the one bad round, making his success or failure entirely dependent upon it. The ethics are obvious.

No matter how carefully the guns have been boresighted, adjusted, and laid, the sheaf is almost sure to be somewhat ragged unless it is adjusted in some manner. It is most reassuring to the Executive, circumstances permitting, to have him "adjust sheaf parallel." He need then have no further concern about it, even though he fails to see it again during the practice. When shrapnel is lacking it is entirely feasible, provided a spot of terrain (of reasonably central location and at a safe and convenient range) is visible to the Executive, to adjust parallel with percussion bursts. The Executive places a burst from number one where he can see it, setting his vertical hair on the burst. He then gives the command requisite to converge the sheaf on the burst and causes number two to fire, sensing with the reticule and giving the proper corrective command. Numbers three and four are handled likewise. Knowing the range at which his sheaf is now converged, he computes and commands, for numbers 2, 3, and 4, shifts to the left which will lay each parallel to number one. Finally he shifts the whole battery through the angle necessary to lay number one back on the base point (referring to the recorder's sheet for the purpose if necessary). If sufficient terrain of uniform nature is visible it is preferable that

SOME NOTES FOR BATTERY EXECUTIVES

he omit the steps of converging and opening. He can adjust on the ground just about as he would do in the air. In any lateral setup where the sheaf has been *adjusted* parallel, the Battery Commander who takes the distribution into his own hands is guilty of wasting the rounds expended in adjustment of sheaf.

In adjusting the sheaf with high bursts one must get the vertical hair of the instrument, set at zero, exactly on number one's point of burst. If there is a strong cross-wind this is hard to do unless some expedient like the following is used: Sense the lateral deviation of the burst, using the mil scale in the reticule. Then depress the instrument by a convenient amount and note some terrain feature or object on which the vertical hair rests, improvising such object (at night a flashlight fixed at a distance of a hundred yards or so can often be used) if necessary. With the upper motion traverse the instrument through a number of mils equal to the measured deviation, *but in the opposite direction*. With the lower motion traverse so that the vertical hair rests upon the object noted. With the upper motion set the instrument at zero. Elevate to the proper site. The vertical hair is now on number one's point of burst.

When observation is not axial or nearly so, common sense dictates that the Executive make necessary adjustments to his sheaf if and when he can see it. He is responsible for the sheaf. Nobody else is in a position to do anything about it. Lest he mislead the Battery Commander in the matter of deflection sensings, he must not make any adjustment to the sheaf during the current problem. By following commands he can easily tell how wide the sheaf should be. If he sees a salvo he can measure it with his field glasses and make a note of the command necessary to put each burst where it belongs and then, at the

end of the problem, apply each such command to the base deflection of the piece concerned. Note that number one's base deflection is *never* changed after registration without command from the OP. Note also that the foregoing, while it conforms to common sense, is not authorized. Proceed with caution.

The fact that the guns are irregularly spaced need cause no difficulty or delay provided certain tricks of the trade are known and practiced. The Executive uses the quickest means at hand for computing convergence shifts. His first move is to step off in yards, in a direction perpendicular to that of fire, the distance from number one to each other piece, making notes of these distances. He can then determine the convergence shift for any piece by dividing its distance from number one by 1/1000 of the converging range. As soon as time permits he "cans" some arithmetic against the future by making up a convergence table similar to that shown in footnote (*next page), in which piece intervals are assumed as indicated.

Some prefer habitually to use a universal convergence table which gives piece intervals to the nearest 5 yards. Others find that the universal table is little or no improvement over the "figure as you go" process. The table made up especially for the position is better, as will be shown further in the discussion of recording.

Some find it expedient to delegate convergence shifts to subordinates; that is, to organize matters so that they may transmit directly to the battery such a command as "Converge at 4500" and have it executed without further action by the Executive. One way of doing this is to give each gunner concerned an extract from the convergence table, this extract bearing so much of

THE FIELD ARTILLERY JOURNAL

he convergence data as pertains, to his piece. The gunner fastens the extract card to his shields and uses it in executing commands. This is bad practice. The gunner already has a great plenty to worry about without being given an additional piece of data to remember and an individual shift to look up. If convergence shifts *must* be delegated, it is far better to give the table extract to the chief of section, who is in a position to watch the gunner and give him the command for the individual shift at an instant when he is not otherwise occupied. Suppose, however, the chief of section mislays his convergence table! Any officer who has had this happen will be inclined to discard the scheme.

A quick and safe way to handle convergence data is as follows: Skip the convergence command as T2 announces it, merely noting which line of the table to use. Announce the deflection difference and all other elements of the data, thus giving all cannoneers something to do. As soon as the battery seems ready for them,

announce the convergence shifts ("Number two right 2. Number three right 17. Number four right 25"), then repeat the range or elevation. If the Executive tries to give the commands for individual shifts as soon as T2 repeats the converging range T2 will get ahead of him, so that he will have to go to the recorder for subsequent elements. Moreover, several cannoneers will stand idle during valuable seconds.

When the guns are regularly spaced the Executive should combine into one command the convergence shifts (which in this case amount to a deflection difference of "close") and the announced deflection difference. Example: Pieces are at normal intervals of 20 yards. T2 announces "Converge at 3500. On number one open 11." The double command "On number one close 6. On number one open 11" throws unnecessary work (and chance for error) on the gunners. On hearing the command "Converge at 3500" the good Executive merely makes the mental note "close 6." As soon as he hears "On number one open 11" he does a split second's

*See page 117.

RN	4	3	2	RN
2000	38	25	4	2000
2500	30	20	3	2500
3000	25	17	2	3000
3500	22	14	2	3500
4000	19	12	2	4000
4500	17	11	2	4500
5000	15	10	1	5000
5500	14	9	1	5500
6000	13	8	1	6000
6500	12	8	1	6500
7000	11	7	1	7000
7500	10	7	1	7500
8000	10	6	1	8000

SOME NOTES FOR BATTERY EXECUTIVES

thinking and commands "On number one open 5." His gunners show their appreciation by making fewer mistakes.

Sometimes, especially when firing for students, one gets an unauthorized command which is a little tricky. The following example will illustrate: The battery is laid with an open sheaf, as at the close of the last problem. The officer firing elects to shift from the last target rather than from base deflection and commands, "Right 80. Converge at 4000, etc." (The officer firing has merely committed the sin of failing to command "On number one form parallel sheaf.") If the Executive follows the book he will tell the OP "Sheaf is not parallel." However, the smart Executive likes to shoot these without hesitation and let the people at the OP wonder how he did it. He handles this particular one by comparing number one's present deflection with its base deflection, then computing and commanding the proper base deflection shift to put the shooter where he says he wants to be. Note that the shift from base deflection automatically gives a parallel sheaf, from only which is convergence readily feasible.

Never allow sight extension bars to be used in actual firing if it can be avoided, for the additional play in mechanisms will cause the pieces to wander about too much in deflection. It is far better to refer to another aiming point which will permit firing without extension bars.

The question is sometimes asked, "At the end of a problem should one leave the pieces as laid or should he have them laid back on base deflection?" This one almost answers itself. The next problem may open up with a shift from the last target. Therefore the battery must be left laid on that target. No matter how the guns may be laid, a shift from base deflection requires

merely a quick setting of sights and "traversing on."

If the safety officer refuses to allow firing the OP must be told the reason as well as the fact—report "Unsafe to fire; 15 mils outside left safety limit," rather than merely "Unsafe to fire." So doing will save time and telephone traffic. If the message "Safe to fire" is then received, the Safety Officer must insist on knowing the name of the officer who declares firing safe. If he neglects to ascertain this the Executive may well remind him. Furthermore, the Executive himself must know the name of the officer who decides any question of safety which neither he nor the Safety Officer is authorized to decide, such as the unloading of certain types of ammunition.

RECORDING

As has already been stated, the recorder is one of the principal key men of the firing battery team. Unless he is both fast and reliable he is a liability. The one fundamental requirement for fast and dependable recording is a uniform deflection difference, either real or fictitious. A *real* uniform deflection difference never obtains in a staggered position. It is rarely found in a "normal" position if anything has been done about adjusting the sheaf parallel. Fortunately it is readily feasible to set up an artificial common deflection difference through the simple expedient of using what we shall here speak of as "problem constants." Let us resort to illustrative examples.

Example 1 (simplest case): All pieces have deflection 1604. T2 announces "Right 75. On number 3 open 7."

4	3	2	1
1604	1604	1604	1604
	—75		
—	—	—	—
1536	1529	1522	1515

THE FIELD ARTILLERY JOURNAL

The recorder has only to apply the shift to the piece on which the deflection difference is applied. Having got number three's new deflection he rapidly gets the others by applying the common difference of 7.

Deflection figures having the artificial common deflection difference are set up by
a. Carrying "problem constants" at the tops of columns 4, 3, and 2, and by

b. Keeping track of the net amount (which is the artificial common deflection difference and which is hereinafter referred to as "Executive's DD") by which the sheaf has been opened or closed, *by command of the Executive*, from original deflection column figures.

Example 2: Pieces are at regular 20-yard intervals. Sheaf has been adjusted parallel and base deflections recorded as follows:

4	3	2	1
2152	2157	2150	2153

By using "problem constants," to be applied according to sign when determining the deflection which a given piece should actually have, the recorder now makes *all* deflections agree with that of number one. Note that he handles a shift for an individual piece by changing the problem constant.

To check the deflection for any piece the recorder has merely to apply the problem constant to the figure shown in the column. In the order 4, 3, 2, 1, actual deflections are now 2306, 2303, 2292 and 2291. Determination of the "Executive's DD" should be apparent from the example. We are now ready to discuss the general case, which embraces the staggered position.

Example 3: Staggered position, with same disposition of pieces as shown above in discussion of convergence table. Sheaf has been adjusted parallel and base deflections recorded as follows:

4	3	2	1
1794	1801	1792	1796

For clarity let us coin the term "parallelism correction." meaning that number which must be added algebraically to number one's deflection to make it equal the base deflection of the piece under consideration; and the term "convergence shift." meaning the amount by which a given piece must be shifted to the right to converge it on number one at the range announced. The problem constant for a given piece is, then, the algebraic sum of its parallelism

Commands	Ex DD	4	3	2	1
(Problem constants).....		—1	+4	—3	
		2153	2153	2153	2153
BDL 165, Cv 4500. On number one open 7. (Executive actually commands "On number one open 3, for converging at 4500" requires closing 4.).....	Op 3	2327	2324	2321	2318
			—35		+165
R 35. Number four left 4 (problem constant now changes from —1 to +3). On number 3 close 4.	Cl 1	2288	2289	2290	2291
		+15			
L 15. On number 4 open 5.....	Op 4	2303	2299	2295	2291

SOME NOTES FOR BATTERY EXECUTIVES

correction and its convergence shift. The recorder can determine all parallelism corrections as soon as base deflections are recorded. The convergence shifts vary, of course, with the problem, so that before computing them he must wait until the converging range is announced. He then takes them from the convergence table (identical with the Executive's table) which has been furnished him. Let the converging range be 3500:*

Actual deflection settings on pieces must now be, in the order 4, 3, 2, 1, 1731, 1740, 1737 and 1737.

Note that in Example 2 the "problem constant" and the "parallelism correction" are identical, since the uniform intervals between pieces permitted the Executive to incorporate the "convergence shifts," a closing of 4 on number one, into his initial command.

The rather academic discussion makes this simple trick seem complicated. It is not so at all. It is much easier to execute than to describe. It is easy to teach and easy to acquire. It enables the recorder to keep up with the fastest of gunners. It reduces very appreciably the chance of error.

*

	4	3	2	(Noted when BD is recorded)	
Parallelism corrections	-2	5	-4		
Convergence shifts	-22	-14	-2	(Noted when converging verging range is announced)	
Problem constants	-24	-9	-6		
Commands	Ex DD	4	3	2	1
(Problem constants).....		-24	-9	-6	
		1796	1796	1796	1796
					-135
					1661
BDR 135. Cv 3500. On number one open 9.	Op 9	1688	1679 70	1670	1661
L 70. On number three close 3.	Op 6	1755	1749	1743	1737

AUTHOR'S NOTE: For the section on recording I wish to acknowledge my indebtedness to Captain G. J. Reid, from whom I obtained it, and to Captain L. W. Haskell, who added some refinements.



Preliminary preparation for maneuvers, in the 111th Field Artillery, (Va. N.G.), includes a test on Field Artillery Book 224 to be taken by all officers. The mimeographed course consists of 101 (true-or-false) questions. The officer receiving the highest mark is to be presented with a subscription to THE FIELD ARTILLERY JOURNAL for NEXT year. (All officers of that regiment now are members of the Field Artillery Association.)

The Executive and the Firing Battery*

BY 2D LT. JOHN W. HACKNEY, 107TH FIELD ARTILLERY

THE executive is the quarterback of the firing battery. He must provide the brain work and play his part as a member of the firing battery team, but most important, he must be the spark-plug, coordinating and regulating the activities of his department. In the following pages the writer has attempted to set down some lessons, most of which he learned the hard way, from his peacetime experience as quarterback of a National Guard battery of French 75's (truck-drawn).

A good starting point is the position from which the battery is to fire, its occupation, organization, and maintenance. In almost every situation, it is necessary that the location of the battery be concealed from air and ground observation. The critical period in the concealment is the occupation of position. Anyone who has hunted knows how difficult it is to see a deer in the woods *until it moves*. The human eye and brain has difficulty in sensing the subtle differences in texture and outline between the deer and its background, but the slightest *change* in that outline or texture exposes the whole. The hidden deer flicks an ear and immediately the eye picks out its entire outline. It follows that the battery is most at the mercy of hostile observation during its periods of movement. Mistakes made in concealment during periods when the unit is stationary may be overlooked by enemy observers but similar errors made while on the march will be disastrously revealing. It follows that the occupation of a position must be carefully planned and the movement made rapidly so that the critical

period will be as short and as little subject to observation as possible.

An occupation in the presence of the enemy must usually be made at night, but it must be realized that any movement made at night is handicapped by the almost inevitable confusion and loss of control. Military history is studded with accounts of night movements made by veteran soldiers commanded by able and distinguished officers which ended in disaster. No executive should consider lightly a movement of the type which broke the power of the Athenians at Syracuse, cost the life of Stonewall Jackson, and contributed to the plight of the Lost Battalion in the World War.

When possible, the position to be occupied should be reconnoitered by daylight or, even better, at dusk, when the reconnaissance party is less likely to be observed and both the daylight and the dark characteristics of the position may be studied. Natural features observed in the daytime often have an entirely different and confusing aspect at night. The party should consist at least of the executive, and one other person; the assistant executive, the first sergeant, or a key noncommissioned officer. The party may be made larger when the possibility of being observed by the enemy is remote.

The occupation should be laid out so that a minimum of confusion will result. Gun positions are marked with pieces of paper pegged down and mentally referenced to nearby objects. If the chiefs of sections have not been to the gun positions before, it is usually advisable to halt the guns close to the position and move them individually to

*These are extracts from a paper delivered by Lt. Hackney at an officers' school of the regiment.

THE EXECUTIVE AND THE FIRING BATTERY

their posts. In any case the movement should be so planned that incoming sections will not be blocked by trucks returning from the gun position. The trucks, after dropping the pieces, should be collected by the first sergeant and moved to a previously selected place of concealment.

The lights to be used in a night movement should be strictly controlled. Only noncommissioned officers and key privates should be allowed to possess flashlights during such movements. The best means of dimming flashlights we have found to be a blue bandana handkerchief, folded several times and taped over the lens of the light. Unless the moonlight or starlight is particularly good, each vehicle should be preceded by its section chief, carrying one of these lights. If there is some light, the guide may make himself more visible by merely carrying a white handkerchief or removing his shirt to show his white (?) underwear and back. Squares of white cloth on the front and rear of vehicles render them more visible in the darkness. Needless to say, no headlights should be used and automatic stop-lights should have their bulbs removed. During maneuvers, vehicles should be operated without head and stop lights only in areas where civilian traffic is barred.

Unnecessary noise and loud talking during the occupation should be kept down, not because the enemy might hear, but because such noises increase the confusion, and orders go unheard.

It is the duty of each chief of section to see that all equipment, section and personal, is removed from the truck before it returns to echelon. When the emplacement and laying of the piece has been completed, he should, using the tarpaulins available, supervise the organization of the section bivouac. Such an arrangement has many advantages. Not

only are the men more comfortable, but the section can be alerted more quickly than when the men sleep individually or in groups of mixed sections. A group spirit also develops which makes the section more effective in all its activities.

Once occupied, a position must be continuously improved in order to provide the maximum of comfort and safety for the defenders with a minimum possibility of detection by the enemy. Trail logs should be provided as soon as practicable. A trail log should be sound timber, at least three feet long and seven inches in diameter. This should be placed in the back part of the trail trench so that its top is about level with the surface of the ground and it is fully supported in the rear by undisturbed earth. The use of a trail log permits the piece to be fired at higher elevations and makes it easier to shift the trail. Without a trail log the trail will bury itself in the ground every time the piece is fired. A good trail log is difficult to find and it is often advisable to carry one in the truck, using it in successive positions.

As to camouflage, natural growing vegetation offers the best cover and the battery position should be chosen with this in mind. When necessary, the natural cover may be improved, using a few fairly large bushes, rather than a large amount of smaller material. It must be remembered that such cuttings must be maintained so that no withered branches show, and no leaves are turned with the wrong side out. The appearance of the position from the air cannot be neglected and natural or cut bushes and saplings should so overhang the pieces as to break their outlines. The effectiveness of the camouflage should be checked by observation from the direction of the enemy and by photographs taken from the air. Such checking not only discloses errors, but also tends to break down a smug confidence

THE FIELD ARTILLERY JOURNAL

in inadequate camouflage measures. This is more necessary in peace than in war, where mistakes are immediately punished by the enemy.

Camouflage must not only be provided but maintained. If necessary, circulation sentinels are provided to prevent the formation of revealing trails and tracks. In stable situations the paths to be used may be wired in.

Several other types of sentinels may be necessary. The executive should not rely on the infantry to provide local security. Sentinels at the gun position or in an outpost, if necessary, should be posted to prevent surprise. This fact was underlined by an accident in the maneuvers at Indiantown Gap in 1938 when the enemy forces appeared almost at the gun position before the Infantry commander had any knowledge of their presence.

These security sentinels, or others specially posted, should also be prepared to warn of gas attacks and watch for rocket signals from other troops. In situations where such precautions are indicated, a sentinel should be posted at each piece to fire the pieces singlehanded on the normal barrage until the gun crews can be alerted.

In organizing the position the executive should not forget his own command post. This could be conveniently located so that as many of the sections as possible are visible from it and all are within easy reach of the executive's voice. The executive should see that his own bedding roll and personal equipment are left in the near vicinity so that he may sleep within easy reach of the telephone. Nothing is more disconcerting than to be called from your warm blankets at 2:30 in the morning, walk twenty feet through the wet bushes answer the phone, tell some hard-working staff officer that, "Yes, the battery is laid on compass 1650," and then try to get comfortable

again with the twigs, leaves, and moisture you have unwittingly introduced into your formerly comfortable cocoon. Telephone and radio men should also bivouac in the immediate vicinity and arrange to divide the night into watches so that one operator is always on the alert.

When the position is to be occupied for more than one day, further improvement of the position should be undertaken. Gun pits are no joke when the gun crews can hear the whistle of the shells passing overhead and are wondering when the enemy battery will find the range. As Major List, in "The Defense of Booby's Bluffs, has it. ". . . nothing so nerves the brain as a knowledge that the worthy foeman will have to expose several square feet of vulnerable human corpus while his nerved opponent is well sheltered by several feet of earth." Intrenchments are important to a field artillery battery. In the ordinary situation, enemy artillery cannot see the battery which they are firing upon. They are firing from sound-and-flash data, map data, "guess data," or perhaps just covering the area. The density of the fire will not be great, the duration will not be long. The pieces themselves will not be damaged except by a direct hit. Unfortunately, men are more vulnerable and moreover they have nervous systems. A man who has been lying unprotected in a barrage, waiting for the next (and perhaps last) burst is in no condition to lay a piece. The situation is quite different if he is in a deep trench or dugout and knows his chances are pretty good. Of course, the gun pit should not be neglected in favor of deep shelters for the gunners when they are not firing. While the gun pit can never be made as safe as the dugout, it should not suffer too much by comparison or the dugout may become overly popular.

When the battery is to occupy a position and fire during the hours of darkness

THE EXECUTIVE AND THE FIRING BATTERY

the aiming stakes should be placed and the data computed for each piece during the daylight if possible. The location of each piece is selected with reference to the field of fire and the camouflage opportunities and the exact location of the sight of the piece is marked by a stake. The executive then goes to a position 100 yards or more from the battery where he can be seen from each of the gun positions and drives another stake in the ground. Over this he sets up his aiming circle and sets off the *Y*-azimuth of the direction of fire, centering the needle so that the 0-3200 line of the compass is in the direction of fire. He then causes his assistant to hold an aiming stake over each of the gun stakes in succession and reads the deflection to each. This deflection is marked on a piece of paper and the paper tacked or tied to the gun stake. He should also record these readings in his notebook. When this is completed the aiming circle is replaced by an aiming stake well imbedded in the ground. It is possible to lay the battery using only this one aiming stake, but it is desirable for safety's sake to repeat the operation to provide an auxiliary aiming point. Other stakes may also be necessary if the first stake cannot be seen from all gun positions.

One major advantage of this system of laying is that fewer aiming lights are required. Various types of lights have been tried, from a small "keyhole" flashlight to standard flashlights taped to leave only a narrow strip of the lens exposed. None have been entirely satisfactory, but one of the best is the issue light which has a battery at the gun position and wires leading out to the light on the aiming stake.

Above all, the stakes should be mentally referenced to fence lines or other easily identified landmarks. The writer spent the longest two hours of his life stumbling

through a pitch dark field in a desperate hunt for one elusive aiming stake.

The executive should also have an eye out for violations of the safety regulations, such as cannoneers jumping over the trail, holding a fuzed round near the path of recoil, or any of the other thousand and one things an active National Guard cannoneer can think up. As an example, the writer remembers very vividly a gunner corporal standing astride the trail to set the safety block on a misfire!

Soon after occupying a position the executive should appoint an ammunition sergeant. This individual keeps a record of the rounds of ammunition and fuzes received at the battery, their type and powder lot number. He sees that this is properly distributed so that each piece has its proper share of each type. Its "proper share" will of course depend on its position in the battery. The normal situation for the 107th has been that the flank pieces fire the greater part of the shrapnel and number one fires a large part of the shell. The ammunition sergeant also keeps track of the number of rounds fired and, in peace times, must account for the remaining brass. Section chiefs keep a record of rounds fired which should tally with the above. These reports are consolidated by the executive for the gun books and for ammunition reports as required by the battalion commander.

The executive must drive his men: insist on speed, precision, and above all, accuracy. He is the one man who can put these qualities into a firing battery. Section chiefs trained under a good man will hold these characteristics in their sections for a while, but without the spur from above they will not continue for long. The type of spur, or driving, required is different for different individuals. The most effective are, the delegation of authority, praise where praise is due, and a tone of command which

wakes up the half-sleeping cannoneer.

The delegation of authority can be surprisingly effective. Some men are so constituted that when given a job and the authority required to do it, they put their entire energy and initiative into the task. If put in a position where someone else has the responsibility they fold up and become lackadaisical. The 107th has several cases to the point—men who were mediocre privates but good section chiefs. The use of praise is almost indispensable. Very few men will continue to turn out an A-1 job if

they feel their efforts are not noticed. On the other hand, the praise must not be too lavish or too easily won, lest it become cheap. There have been cases, however, when a bit of unwarranted praise has spurred a man to live up to the praise.

It is true that the duties of the executive are many and varied, but at the firing point he has what amounts to an independent command. He has a clear-cut job and the means and authority for accomplishing it. All in all he has the best job in the field artillery.

Practical Method for Converging the Sheaf

BY 1ST LIEUT. BERNARD THIELEN, FA

THE following simple solution to the gun-convergence problem which has been occupying the pages of THE FIELD ARTILLERY JOURNAL for the past few months has proved entirely satisfactory over a period of years in almost daily use with school troops at the Field Artillery School and with the Eighth Field Artillery at Schofield Barracks.

Immediately upon going into position the recorder paces (or measures) the intervals from No. 1 gun. He then prepares for himself a three-column convergence table, extracting data from a printed table similar to that given in Field Artillery Book 162 or computing the shifts himself by obvious methods. On sheets torn from a notebook or field message book the recorder copies the appropriate column for each gun and delivers the proper sheet to each chief of section. It is apparent then that any given chief of section has only one column of commands with which to concern himself.

In operation the system is simple. The battery being laid parallel, the executive repeats all fire commands pertaining to distribution as received from the OP (FDC). When a chief of section hears:

"Converge at (range) he immediately commands his gunner: "Right (so much)."

The system described works much better in actual practice than might be assumed from the description. The recorder has plenty of time to perform the operations indicated while the pieces are being prepared for action and laid. The executive can check the recorder's work at a glance, dividing a few intervals by even thousands and interpolating mentally to check his other shifts. The method outlined has two conspicuous advantages: (1) It minimizes the possibility of error by eliminating unnecessary data on each gun, and (2) it avoids the use of specially constructed gadgetry which is an anathema to a field artilleryman. No disadvantages have appeared in actual use. No battery using this system has ever been criticized for an erroneous sheaf or delay due to computing distribution.

AUTHOR'S NOTE: It is not intended that any such system be used when the pieces are at regular intervals. In such cases, of course, the executive mentally computes the algebraic sum of the convergence and distribution differences and announces the result as a single deflection difference.

"Cavalry *the Successful Arm*"

AS recounted in the February issue of the *Journal of the Royal United Service Institution* (G. Bt.). Wing-Commander A. W. H. James, M.C., M.P., lectured before the Institution on "The Spanish Civil War," of whose operations he had been a frequent eye-witness. Extracts of several of the more interesting of his statements are reproduced here:

"[Teruel]. . . in the final operation the success rested with the Cavalry Division. It is hardly fashionable to mention it in this country just now. but the fact remains that cavalry have been *the successful arm* of the current war in Spain. One does not see many tanks there; nor are they highly thought of. . . ."

"[Nationalist crossing of the Ebro] . . . Two companies of Spanish (Navarrese) Sappers brought up by night metal pontoons on lorries; a place had been selected where there was a loop in the river, with the apex of the loop toward the South; they ferried across a few men, who found the other bank unguarded, and they put two pontoon bridges across. The pontoon on which I crossed was about 160 yards long and was carried on twenty-seven boats . . . within 500 yards they [the crossing troops] could hear machine guns rattling. The crossing was supported by three or four field batteries, two small long-

range guns and one battery of anti-aircraft guns shooting horizontally when, as on one or two occasions, ground targets presented themselves."

"[Crossing of the Guadaloupe, March 26, 1938] I got into a rifle pit on the forward edge of a precipitous hill about seven or eight hundred yards above the river that was to be crossed. The furthest mountain horizon from me was five miles away, and I could see the whole panorama spread out in the deep valley before me. I watched the troops advancing, not in lines and waves, but in groups behind the red and gold standards of the Nationalists. Behind each group followed pack mules. It was interesting to watch the unavailing efforts the men made to get a mule to walk faster with a machine gun shooting at it. I saw single-seater fighters, flown by young Spaniards, doing 'ground strafing' with amazing gallantry. They dived so low that the machine and its shadow merged together into the ground on the target. I saw one shot down. A 'chain' of five was diving and shooting, when the third one in the 'chain' was shot down and crashed into the ground, but the others went on for ten minutes, flying just as low against the same position. The cavalry were a picturesque feature. I could see cavalry squadrons moving across the open on the right."



William I. Wood, winner of the 1938 Field Artillery Association Medal at the University of Florida, is reported to be this year's outstanding student in Field Artillery. He has won appointment as Senior Colonel of the Corps, and is expected to graduate Honor Student in Military Science, and in Engineering.





**SCENES
FROM THE
FIRST
CAVALRY
DIVISION**

Wide
World
Photos



The Cavalry—Artillery Team

BY FIRST LIEUTENANT JOHN F. GRECO, FA

I

THE employment of artillery with horse cavalry is a matter of great importance—to deny this is to deny the necessity for horse cavalry. This subject, however, by comparison to such topics as "Gunnery," "Liaison," "Counterbattery," etc., has, it seems, been sadly neglected in the past. With the exception of two or three studies, our artillery literature, which is quite extensive, deals with other aspects of the arm. It is not easy to understand why such little attention has been accorded this subject. Perhaps there has been an oversight, or perhaps even an underestimation of the importance of the problem. At any rate there has been little mental fervor created by this topic recently. My interest in the subject has developed during current service with horse artillery, service which has not been completely satisfactory from the standpoint of cooperation and understanding between the supported and the supporting arms. Joint exercises with the cavalry usually evoke such remarks as, "The artillery can't keep up with the cavalry," and, "It takes too long for the artillery to concentrate fire on a target." It is my intention to show that these statements are partially true, and to suggest remedies, so that the artillery's ability to support the cavalry by fire is unquestionable.

The difference between the tactics and technique as practiced by artillery with cavalry in contrast to artillery with infantry consists principally in a sacrifice of technique in order to achieve mobility. For

example, the method of employing the fire-direction center, although admirably suited to the needs of the artillery with infantry only partially fits the needs of the horse artilleryman who has to drop trails and start shooting. But the "bow and arrow" tactics of the horse artillery thus preclude the rapid concentration of more than a *single battery* upon any one target. Obviously here is a necessity for effectual technical methods.

It is well briefly to review the characteristics of artillery with a horse cavalry division. The organic field artillery is one regiment of horse artillery, armed with the 75-mm. howitzer. The weapon is an excellent one. It allows a wide latitude in the selection of positions for indirect laying, and is efficient for direct fire at moving targets. The regiment is divided into two battalions, each normally in support of a cavalry brigade. Liaison sections are provided for as follows: One in regimental headquarters and two in each battalion.

The horse artilleryman places his battery as close to his observation as the situation allows, except in an advance, when the continuity of artillery support is sometimes provided for by forward movement of the observation. For communication the horse artilleryman is relying more and more upon radio, due to delays occasioned by laying wire. It is a certainty that the laying and maintenance of long wire lines in a rapid cavalry action is not practicable; but it is equally certain that difficulties with radio will sometimes compel the use of wire despite the delays it occasions.

In the majority of cavalry actions, speed is paramount. FAB 224 (1938

THE CAVALRY—ARTILLERY TEAM

edition) states, "Typical cavalry action, as compared to an infantry battle, is apt to be of brief duration. To provide effective support, the artillery must be prepared to give this support at the moment needed."

This study will attempt to bring out some deficiencies in the horse artillery's doctrine of employment and thus may give rise to adverse criticism. In self-defense, if such be needed, the writer wishes to stress the point that what follows is advanced in the genuine belief that at present horse artillery sometimes falls short of its mission—to support the cavalry by fire *always*.

II

Military history affords some examples of the cavalry-artillery team in action. Along this line the comments of the editor of the *FIELD ARTILLERY JOURNAL* (September-October, 1937) in reviewing "Cavalry Combat," are interesting:

"The editor and compiler made thorough search, with the military libraries of the world at his disposal, for examples of detailed cavalry—artillery cooperation. Such instances were comparatively few. The cavalry commander was concerned with the disposal of his troopers. After that, it would appear he thought of his artillery—but after, not simultaneously." Similarly, the editor of the *Cavalry Journal* (September-October, 1937), at the conclusion of an article, "Artillery Support of Cavalry," by Major Douglas Wahl, states:

"The lack of historical data on artillery support of cavalry is made evident by the scant references to this subject in *Cavalry Combat*. The foregoing article by Major Wahl was written on the earnest solicitation of the editor. For an intensely interesting elaboration of this theme, the review of *Cavalry Combat* in the September-October (1937) issue of the *FIELD*

ARTILLERY JOURNAL is highly recommended." To anyone interested in this subject both the article by Major Wahl and the partially quoted review of *Cavalry Combat*, are highly recommended. Another excellent study of the subject is presented by Lieut. Col. H. C. Vanderveer, FA, in the *Cavalry Journal* of January-February, 1937.

For an early example of the assistance rendered cavalry by artillery we go back to the Battle of Rossbach on November 5, 1757, when Frederick's army was disposed with its left on Rossbach and its right on Bedra. He was opposed by a greatly superior force, the French and Allies under Soubise. They were encamped about two miles from Frederick's right flank and had decided to move around Frederick's left, attack him in the rear and thus cut off his communications. Frederick, perceiving the move, maneuvered his force to the left, marched parallel to his opponents, but remained concealed from their view. Seydlitz, Frederick's cavalry commander, maintained scouts on hilltops who reported on the enemy's progress. When reports indicated that Frederick's cavalry were sufficiently ahead of the enemy's column, he brought into action eighteen 12-pounders (one battery) and concentrated their fire on the head of the enemy's advancing columns; which were thrown into confusion by the unexpected fire. Then Seydlitz's squadrons, taking advantage of the enemy's confusion, successfully charged the Allies. Later when the cavalry was reforming for action, the battery's fire prevented the Allied infantry from forming to withstand the advance of the Prussians.

In all, the achievements of the artillery in this battle were:

- (1) It disorganized, by fire, the Allied attempt to deploy, and thus assured

THE FIELD ARTILLERY JOURNAL

the initial success of the cavalry under Seydlitz.

(2) It then brought fire down on the Allied guns and rendered them ineffective against the Prussian cavalry and infantry.

(3) The artillery cooperation with their own infantry in the advance, plus the shattering of attempts at resistance by the opposing infantry, paved the way for Seydlitz's second charge and victory.

Thus a single battery of eighteen guns well employed was instrumental in the defeat of an army of fifty to sixty thousand men by a force consisting of four thousand cavalry, seven battalions of infantry, and eighteen guns.

Quoting from "Achievements of Field Artillery," by Major E. S. May, R. A., reference to this battle, "Decker thus eulogizes the performance of this battery. 'We may say with all assurance that the success of the day belonged to the artillery. If, as at Kolin, it had remained inactive, the enemy's infantry could have formed any advanced; its defeat would not have been so complete, and the success of the Prussian cavalry would have been less brilliant.' St. Germain, writing of it afterwards, declares 'The first common salvo decided our route and shame.' Surely Rossbach may be quoted as an example of a brilliant artillery achievement, even though the arm was then first feeling its strength and its efforts were but the struggles of a vigorous child chafing at its swaddling clothes. The much lauded deeds of Seydlitz's cavalry are, however, chiefly associated with the victory, and admiration for their splendid discipline, the perfection of their training and the genius of their General has blended men to performances which went far to render their success possible, and they have been allowed to run away with all the credit."

Moving forward to 1809, we find that in the battle of Wagram. Napoleon, although victorious, failed to crush his Austrian opponents. It is held by some authorities that the lack of decisiveness of this battle was due to the ineffectiveness of the final artillery blow, occasioned by their lack of mobility. This prevented the cavalry from exploiting the initial successes.

Brigadier General R. B. Long in a letter dated the 26th of June, 1811, speaks of the services of D Troop, Royal Horse Artillery as follows: "The dispersion of our cavalry scarcely left us 400 or 500 British at any point, and these, with two regiments of Spaniards, were all we had to offer by way of resistance to their (French) numerous and overwhelming columns. The ground, however, favored us, and the Royal Horse Artillery did its job with brilliant effect. The enemy lost a great number of men, and from 400 to 500 horses, *by the operation of this arm alone!*"¹

On July 24th, 1812, after a cavalry action at Ribera, when General Long's force defeated the French under General Lallemand, the action of D Troop, Royal Horse Artillery, was again so notable that the French commander sent the following message for the British artillery commander. "Tell that brave man that if it had not been for him I should have beaten your cavalry, but that, meeting me in every movement with his fire, he never would allow me to form for attack. Say that I shall mention his name in my orders as having been the cause of our defeat, and not your cavalry."²

The gallantry of Major John C. Pelham, commander of Stuart's horse

¹Quoted from "Achievements of Field Artillery," by Major E. S. May, R. A.

²Quoted from "Achievements of Field Artillery," by Major E. S. May, R. A.

THE CAVALRY—ARTILLERY TEAM

artillery, has been the subject of many an interesting account of our own Civil War. During the Battle of Fredericksburg, for example, it was the brilliant action of Pelham's horse artillery that brought forth Lee's remark to Jackson, "You should have a Pelham on each flank."

A vivid account of the employment of a battalion of horse artillery during the World War appears in the *FIELD ARTILLERY JOURNAL* (September-October 1920) in a translation of Major A. Seeger's "Operations of the Horse Battalion of the (German) 15th Field Artillery, Bapaume, Autumn of 1914." In reading this account one gains an impression of almost constant and rapid movement with the resulting exhaustion of men and animals, of unsatisfactory communication and observation, and of difficulties in getting reliable information. Yet despite all these troubles, the artillery battalion was successful in its cooperation with and its support of the cavalry.

The examples cited illustrate forcibly past successes and importance of cavalry-artillery teamwork. Certain features in this teamwork have remained fairly stable until the past few years. But modern warfare with its increasing speed, its more powerful weapons, demands corresponding improvements in technique—and horse artillery must keep pace with the progress of other arms or else find itself becoming decreasingly useful.

III

Earlier I stated that an essential difference in the employment of artillery with cavalry in contrast to artillery with infantry was a sacrifice in technique for a gain in mobility. To illustrate this point, I will assume a situation in which the 1st Cavalry Division, on the march, has a mission of securing a critical area until the arrival of the I Corps. The

advance guard has gained contact with the enemy, and its one battery of artillery, Battery A 1st FA (Horse), has dropped trails and is firing. The advance guard has been ordered to seize a certain line and to develop the enemy situation while the division is being developed for attack. The artillery colonel, commanding the 1st FA (Horse), receives orders to put in position immediately two additional batteries in support of the advance guard. He decides to employ the remainder of his 1st Battalion.

This horse battalion is equipped with ten SCR 194 radios, and in this situation they are disposed as follows: One with each liaison section, two for use at the fire-direction center, and two each are allotted the three howitzer batteries for initial communication between howitzers and battery observation posts (Figure 1).

Immediately upon occupation of position by the remainder of the battalion, and before any battery has had an opportunity to register, a call from a liaison officer is received. He requests that the fire of the entire battalion be concentrated on a specified target. The liaison officer adds that his call is made at the urgent request of the advance guard commander, and that the lack of immediate concentrated fire on this target may endanger the success of the advance guard's efforts. The target is *not visible from any point in the battalion position area*.

To concentrate the fire of the battalion on this target, had the batteries registered, would be a matter of from four to six minutes. In this particular instance the battalion S-3 is in a predicament, and I doubt that he will be able to comply with the liaison officer's request within a reasonable length of time.

We can follow the actions of this S-3 who is at the fire-direction center, fortunately located near B Battery's OP.

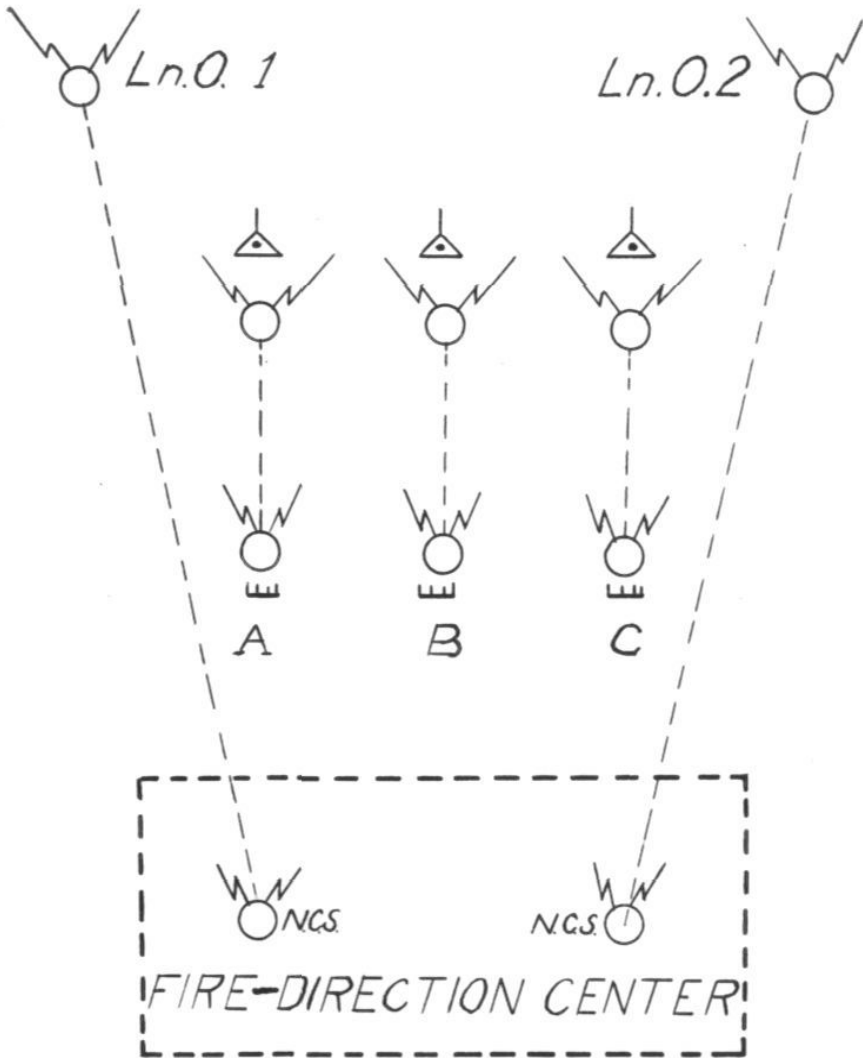


FIGURE 1

Distribution of radios, 1st Bn 1st FA (Theoretical unit)

THE CAVALRY—ARTILLERY TEAM

He instructs the liaison officer to adjust, in turn. Batteries B, C, and A. A staff officer is directed to adjust Battery B. While he adjusts Battery B, another staff officer calls Batteries C and A by telephone, commands "Fire Mission," and *estimates* their initial data. Upon the conclusion of Battery B's adjustment, and based upon knowledge of the relative locations of the batteries, the initial data of Battery C are corrected (*still an estimation*), and its adjustment begins. Similarly the adjustment of Battery A begins at the conclusion of Battery C's adjustment. THE BATTERIES ARE SUCCESSIVELY ADJUSTED ON THE TARGET.

The total time required before all three batteries are firing effectively at the target will be at least twenty minutes and in most cases longer. It must be remembered that the initial data, prepared for an invisible target and based on a *guess* as to the location of the battery positions, are apt to be very inaccurate. Initial fire near the target would be pure luck. Actually the first several salvos might very probably be out of view of the liaison officer conducting fire.

FAB 224, in summarizing the objects of fire-direction methods states, "The battalion commander should be able to maneuver the fire of his battalion with the same relative efficiency that a battery commander maneuvers the fire of his battery." In the foregoing situation, however, the power of this battalion of artillery to concentrate the fire of its twelve howitzers on a target quickly and effectively has been to a great extent nullified; principally because there was no time for registration. The battalion S-3, *employing the fire-direction methods now prescribed*, was unable to give the cavalry the prompt fire support it wanted. The cavalryman can justly

remark, "It takes too long for the artillery to concentrate fire on a target."

IV

FAB 224 provides for a simplified communication system in rapid actions, when immediate fire of *one* battery is required. This is at its best only a makeshift procedure. It does not, however, provide for the rapid conduct of a battalion fire mission by a forward observer, when neither registration nor survey are accomplished. Such situations are not thought to be uncommon in rapid cavalry actions, for it is seldom that they will permit the fifteen-to-thirty minutes necessary to register a battalion.

I quote again from FAB 224, where, in a discussion of fire-direction and selection of targets for horse artillery, it is stated that, "Normally, the only information arriving in time to be of use to the artillery is from the artillery observers or liaison officers. . . . The methods of fire direction employed by the horse battalions are similar to those used by any light battalion, with the necessary modifications to suit the more rapid action and the greater use of observed fires." I propose to determine what the "necessary modifications" should be.

The importance of artillery registration in more deliberate situations, where time is available to perform the necessary survey, has been greatly reduced. Whether registration is permitted or not, the artillery can render and has rendered effective support. We must similarly get rid of the shackles imposed on us by registration in observed fire. Many important targets appear to forward observers which require the fire of more than one battery. Even though some of these targets may be described so as to permit adjustment by battery commanders from their observation posts, it is preferable

THE FIELD ARTILLERY JOURNAL

that the adjustment be conducted by the officer who initially locates the target.

In the same situation as above, let us assume that it is the 2d Cavalry Division which has the mission described. The organic artillery of this division is the 2d Field Artillery. This regiment of artillery will be employed in a manner which, the writer believes, will guarantee effective fire support for cavalry, no matter how rapid the action. By comparing the employment of the 2d Field Artillery to that of the 1st Field Artillery, in an identical situation, I propose to justify the statements made in Part III above.

Prior to the day's march we find the brigade commanders of the 2d Cavalry Division with the artillery battalion commanders. They are studying, in detail, the plans for the next day's movements. Points of expected resistance are noted and the artillery plan of support is discussed for various situations. (A similar conference had been held in the 1st Cavalry Division. It, however, was more hurried and did not consider the artillery march plan in nearly as great detail).

After the conference, each artillery battalion commander selects, on some kind of a *photo map*, check concentrations and probable position areas. Overlays are distributed in each battalion to both liaison officers, the battalion reconnaissance officer, and to each of the battery commanders. Similar overlays had been prepared in the 1st Field Artillery, but without locations of probable position areas.

In this regiment, when contact is imminent, the reconnaissance officers of each battalion habitually march with the most advanced elements of the division. Each one is constantly on the lookout for and actually reconnoiters suitable positions for his battalion, should it have to occupy position quickly. Each detail is

transported in two reconnaissance cars, and so keeps up with the cavalry by bounds. These vehicles are allowed each horse artillery battalion in the latest War Department tables. (December 15, 1938). Mounted in one car is an SCR 194 radio for communication with the battalion commander. (Figure 2). At all times there will be located and reconnoitered battalion positions, which will afford support for the cavalry through an advance of about thirty-five hundred yards. Each battalion RO is accompanied by the three battery RO's and a detail of four noncommissioned officers.

When the commanding officer of the 2d Field Artillery receives orders to employ two additional batteries for the support of the advance guard, he too decides to employ the remainder of his 1st Battalion.

This battalion is equipped with ten SCR 194 radios and they are disposed as follows: One each to the liaison officers, one to the battalion RO, two to B Battery, three to the fire-direction center, and one each to Batteries A and C. (Figure 2). An objection anticipated to the illustrated radio distribution is that the SCR 194 radios are not completely reliable when operating in a three-station net. This is a mechanical problem, and is not difficult to remedy. Actually, the writer has seen such a net in operation and the results were entirely satisfactory.

The 1st Battalion's commander, immediately upon receiving orders to occupy position, radios this information to his RO. The RO has a position area already reconnoitered, so he instructs the battalion to march to a selected assembly point in the vicinity of the position area. There, he, with his detail of four noncommissioned officers, meets the battalion. The four enlisted men guide the batteries to their positions.

THE CAVALRY—ARTILLERY TEAM

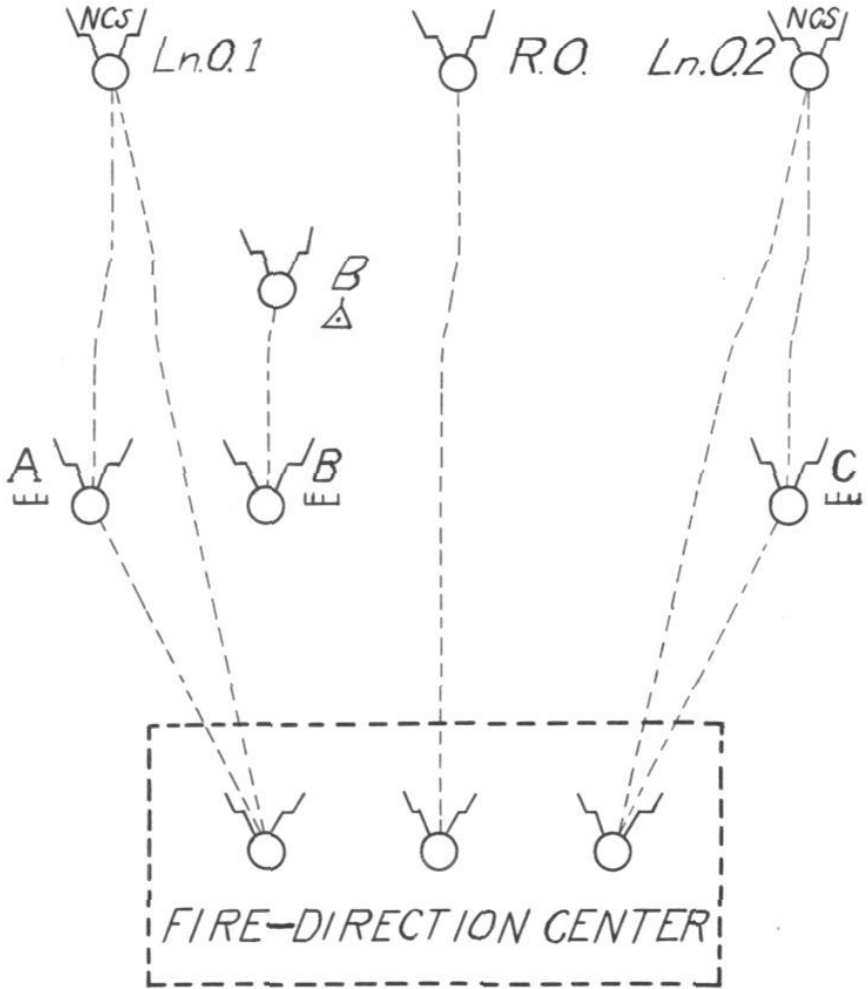


FIGURE 2

Distribution of Radios, 1st Bn 2d FA (Theoretical unit)

Ln Net 1, on Frequency A

Ln Net 2, on Frequency C

Btry B Net, on Frequency B

R O Net, on Frequency R

THE FIELD ARTILLERY JOURNAL

The battery reconnaissance officers, meanwhile, locate their howitzer positions on the photo map by inspection. All available means are employed to facilitate this task. Photo maps, supplemented by single air photos, are used in preference to maps. When battery positions are initially selected, an important consideration is that they can be readily identified on the photo map. The great number of suitable howitzer positions makes this a practical consideration.

Thus, when a battery arrives at the battalion assembly point, it moves directly into a position already *accurately located*. The Digest of Field Artillery Developments, 1937, discussing artillery survey, as influenced by new maps, based on air photo states, "The selection of points for use in making a graphical resection (especially an Italian resection) becomes difficult, WHEREAS LOCATION BY INSPECTION BECOMES SIMPLE." (The capitals are the writers).

The advantage gained thus far in employing the 2d Field Artillery rather than the 1st Field Artillery is that the time necessary for a battalion to occupy position has been reduced by at least fifty per cent. This is due to:

- (1) No time necessary for reconnaissance after receiving orders to occupy position.
- (2) A brief informatory order to occupy positions is all that is initially needed. All the work has already been done by the battalion reconnaissance detail. Orders may be issued in fragmentary form after the battalion is in position.

Very often this gain in time will be sufficient to permit registration, although in the following events the time factor is disregarded.

It is desirable here to examine the fire-direction methods employed by this

battalion of the 2d Field Artillery in the conduct of fire by forward observers, when registration is not yet accomplished. Both single-battery and battalion fire missions will be considered.

Each liaison officer has an SCR 194 radio, which is the NCS of a three-station net. The set at the fire-direction center listens in. It does not transmit except in cases of urgent messages, and in the initial reply to a liaison officer's call for fire. (This procedure will be explained in more detail later). For example, the Liaison 1 net consists of three SCR 194 radios operating on Frequency A (Figure 2); Set 1 with liaison officer one, Set 2 with Battery A at the battery position, and Set 3 at the fire-direction center.

Each battery has at the piece position an observed-fire chart. This is ordinarily the photo map on which are plotted the battery position and the check concentrations. A *master* observed-fire chart (a consolidation of the three battery charts) is at the fire-direction center.

Let us assume in our tactical situation, that when the battalion occupies position, liaison officer One calls for the fire of a single battery. The procedure is as follows:

- (1) The liaison officer, on frequency A, sends this message, "Enemy machine guns two hundred yards southwest of concentration 100." (The location of the target is estimated in relation to concentration 100, which is plotted on photo map).
- (2) This message is heard by both the fire-direction center and Battery A. The decision as to whether this mission is to be fired rests with the battalion commander, so both Set 1 and Set 2 wait for his reply. In this instance the decision is to

THE CAVALRY—ARTILLERY TEAM

fire, so the message from Set 3, at the fire-direction center, is, "Concentration 250, adjust Battery A." Set 3 transmits nothing else during the remainder of this mission.

- (3) From the liaison officer's description, "200 yards southwest of concentration 100," a plot is made and data prepared for the target. This is done at Battery A's howitzer position. After hearing the battalion commander's approval of the mission, and when the battery is ready to fire, the battery executive reports, "Battery is ready, compass 3500, range 4000."

At the conclusion of the fire mission the adjusted compass and range are reported to the fire-direction center, where the target is plotted on the master observed-fire chart.

Note the advantages gained in the conduct of the above mission as compared to the conduct of a similar mission by the 1st Field Artillery:

- (1) The emphasis placed on accurate location by inspection insures more accurate initial data. This results in a speedier adjustment.
- (2) If such a mission is received before the complete installation of the wire net, the procedure in the 2d Field Artillery will be unchanged and will be *just as fast*. Not so in the 1st Field Artillery, for the delay in transmitting commands from the fire-direction center to the guns will prevent even reasonable speed in executing the mission.

To continue with our comparison of the employment of the two regiments, the S-3 1st Battalion 2d Field Artillery receives a call from a liaison officer to concentrate the fire of the battalion on a specified target. None of the batteries have

registered and the target is not visible from any point in the battalion area. Let us follow the actions of this S-3 and determine whether he, too, is in the predicament of being unable to comply with the liaison officer's request within a reasonable time.

- (1) The message received is, "Enemy reserves three hundred yards northeast of concentration 210, adjust battalion."
- (2) The S-3 replies, "Concentration 251, adjust Battalion, Battery A." The adjustment of Battery A proceeds as described above. The S-3 calculates the initial data for Batteries B and C from the master observed-fire chart. (It will be remembered that Battery A when transmitting "Battery is ready" adds its initial compass direction and range.) So the S-3, when hearing the liaison officer command, "Fire for effect" can immediately plot the target relative to A pieces, and correct the initial data of Batteries B and C. A delay in waiting for the adjusted data of Battery A is thus eliminated. The two batteries then fire for effect through a *three-hundred yard zone with a two-hundred yard sheaf*.

It is just as reasonable to employ a safety factor in range and deflection in this case, as it is when employing unobserved fire. The additional ammunition expended is negligible when compared to the speed gained in completing the mission.

At the conclusion of this mission, S-3 commands each battery to record base deflection. This is used until, when time permits, a more accurate registration is made.

The advantages gained in this situation by employing the 2d Field Artillery,

THE FIELD ARTILLERY JOURNAL

in addition to those already enumerated may be summarized:

- (1) Registration is not essential when employing a single battery on a fire mission. The speed of adjustment is dependent on whether or not the first salvo is visible to the forward observer. This is practically always certain in the 2d Field Artillery.
- (2) A battalion's fire may be effectively concentrated on a target in from four to six minutes, despite lack of opportunity for registration. This in contrast to the minimum of twenty minutes required by the 1st Field Artillery.
- (3) With the battery positions accurately located (when both mosaics and air photos are available and considering the care exercised to facilitate location by inspection, it is not unreasonable to assume this accuracy), *the 2d Field Artillery can concentrate the fire of a battalion as rapidly without registration as the 1st Field Artillery does with registration.*

V

The employment of the battalion reconnaissance detail stands in need of more detailed explanation. This, in view, of the fact that the manner in which their work is performed is a deciding factor in how effective the artillery support will be.

Their principal task is to select artillery positions which are suitable for the support of cavalry through an advance of about thirty-five hundred yards. This is twenty minutes' marching time for the cavalry. The exact distance and time of course will vary with the terrain. Obviously speed is a prerequisite

qualification for this detail. It must function rapidly and accurately.

These features are obtained by making careful preliminary preparations and by employing highly qualified personnel to carry out the plans. Prior to the march the RO, together with the battalion commander, makes a detailed study of the route of march, using for this purpose all available maps, air photos, and the like. The successive position areas are marked on the best of the existing photo maps. At the start of the march, the reconnaissance detail moves to the first selected area, where it locates battery positions and a *battalion assembly point*. These are plotted on the photo map. Then they move to the second position area where they repeat the procedure. Care is exercised to advance the reconnaissance in accordance with the movement of the cavalry advanced elements.

When the battalion receives orders to occupy position, this information is sent to the battalion RO by radio. He decides which of his selected positions is suitable for the particular situation, then radios the battalion to march to the assembly point in that area. He and his detail proceed to that position area, where the battery RO's check their survey. This survey must not be confused with that required when unobserved fire is to be delivered. In this case, all that is required is the *location by inspection* of the battery positions. As previously stated, this is a simple procedure when some form of air photo is used.

The personnel to perform this reconnaissance are selected primarily because of their eye for ground. The battalion RO, in addition, must be completely familiar with cavalry principles, for it is his decision which commits the artillery to action in a certain location.

During an attack the reconnaissance

THE CAVALRY ARTILLERY TEAM

moves forward close behind the attacking troops, so that when the artillery must displace the procedure in occupying position is unchanged. This continuous reconnaissance insures continuous artillery support, regardless of the rapidity of the action. The artillery moved from one located position to another, and with forward observers can promptly bring down the fire of a battery or a battalion on any designated target. There will be no comments such as "The artillery can't keep up with the cavalry."

VI

I have not intended to discredit the considerable advances made during the past several years toward improving artillery support of cavalry. Nor has it been

my intention to make it appear that the horse artillery as now organized and employed does not, *in most cases*, render satisfactory fire support. Nevertheless, I have shown that dependence upon registration often prevents concentrating the fire of more than one battery upon a target, within a reasonable time.

For this reason I have recommended changes in the present method of employing a battalion of artillery with cavalry. Although not based upon extensive field tests, they seem to me to fill a definite need in the artillery's plan of fire support.

The cavalry deserve our full fire support and so we must be prepared to place our fire where they want it—AT THE MOMENT NEEDED.



CLANSMEN OF THE 13TH FIELD ARTILLERY

(Left to right) 1st row: Meservey, Cross, Brown, Thurmond, Bell, Pressman, Sowl, Ehnott, Perko, Rock. 2d row: Capt. E. L. Johnson (Head Coach), Martinkovich, Peart, Dickerson, Jones, Myers, Grazul, Accardi, Thomason, Richards, Wiszneski, Lieut. E. J. Koehler (Asst. Coach). 3d row: Sgt. E. T. Harris (Mngr.), Lieut. Clyde McBride (Asst. Coach), Lord, Beck, Marzec, Gruber, Stuller, Brooks, Easter, Fuchylo, Deaton, Strawser, Costa. 4th row: Thompson, Jakubowski, Jewett, Lawhon, Bernaski, Atkins, French, Csicsila, Fritz, Atwell, Lieut. George Eckhardt (Asst. Coach).

The Thirteenth Field Artillery Football Squad completed in December a most successful season to share the hard-fought championship race for football supremacy of the Hawaiian Division at Schofield Barracks.

Starting the season by defeating last year's champions, the 35th Infantry, the 13th FA "Clansmen" were beaten only once throughout the eight game interregimental schedule, unscored upon in the last six

games, and ended the season as co-champions with the 35th Infantry "Cacti."

Their season's record follows:

13th FA	13	35th Inf	6
13th FA	7	8th FA	34
13th FA	6	21st Inf	0
13th FA	13	19th Inf	0
13th FA	13	27th Inf	0
13th FA	13	11th FA	0
13th FA	7	3rd Engrs	0
13th FA	7	Staff Regt	0

A Short Visit to the American Artillery

BY CAPTAIN W. G. H. PIKE, R.A.

Through the courtesy of the author (now with an antitank battery at Aldershot) and the *Journal of the Royal Artillery*, in which the article recently appeared, we present some extracts from a most interesting survey made by a fellow gunner of the British forces. The article was written before the recent reorganization of the Royal Regiment of Artillery took place.

AN ambition to see both America and the American army decided me to apply for a short attachment to the latter during my summer leave. The British Military attaché at Washington arranged this with the U. S. War Department and for their kindness and assistance my grateful thanks are due.

I was sent to the 7th Field Artillery Regiment, stationed at Fort Ethan Allen, near Lake Champlain in Vermont. The country in this part of America is not only magnificent from the point of view of scenery but it is also of great historic interest. It was the scene of all the great wars for supremacy in North America, and places such as Crown Point, Ticonderoga and Saratoga are beautifully kept up with memorials to the great men and famous regiments of all countries. French, British and American soldiers lie side by side and worthy tributes to the gallantry and achievements of them all are recorded without respect to race or creed.

THE SPIRIT OF "AMERICANISM"

Before being able to understand anything American, it is essential to try and understand the great underlying spirit which pervades Americans of every class and creed. Everywhere and amongst all people, there is to be found a wonderful spirit of freedom and equality. It is far more psychological than actual, for the divergence between rich and poor is probably as great, if not greater, than in any other civilized country. But in

every class of society an American has a feeling of social equality; he can throw out his chest and believe that he belongs to a race where all men are born free and equal, and where he will be treated for what he is, regardless of birth. Our class system with its privileged classes and public schools is not generally admired, and it is considered that a child in America has more chance of rising, and being treated, on his merits.

It is impossible to generalise on the people of a nation springing from so many different sources and in the process of nation building, but the deepest impression left after a short visit is that of their generous mindedness. They appear to be always ready to see the best points in other people, whilst being keenly critical of themselves. This remarkable attribute is more pronounced than their traditional hospitality and, as an Englishman, a visitor will find a tremendously warm appreciation and regard for Great Britain and the British Empire. The difficulties of the former in the complicated situation of the world today are fully realized, and there is the utmost sympathy for our efforts which are generally considered to be guided by true and upright principles, such as are admired and advocated by Americans themselves. This feeling, however, does not generally go to the extent of wishing to adopt a policy of active support. It is impossible to gauge the trend of public opinion in the event of war, and it would be

A SHORT VISIT TO THE AMERICAN ARTILLERY

largely guided by circumstances. A great section of the population would undoubtedly wish to support Great Britain, but an even larger section would almost certainly be against anything but strict neutrality. There is a very general feeling that America was "sold a pup" in the last war, and came out of it with few thanks, much abuse and many bad debts. The private arms manufacturers made good money, but the country as a whole gained nothing. Any form of intervention is extremely unlikely though I could not help getting the feeling that America would not, in the long run, be willing to see Great Britain sink.

* * * *

PUBLIC ATTITUDE TOWARDS THE ARMY

The absence of any immediate danger of invasion has resulted in a public attitude of indifference to the state of readiness for war of the American Army. The state of re-armament and the trend of tactical thought in the army seem to be behind that of other great powers, and it would probably take the best part of two years before America could equip and train a large army to take the field. This does not, however, mean a lack of public interest in the army. The navy, and the air branches of the army and navy have better propaganda than the army, but the latter is far ahead of us in that respect. The cinema, as will be seen later, has a great effect on enlistment and the public are encouraged to visit the army under all conditions. For instance, a regiment in camp may have a continual stream of civilians walking round its lines, seeing its men, animals and machines. The officers and men enjoy their company and there is a general feeling of good comradeship that results in a close touch between soldier and civilian.

OFFICERS

Officers come from all classes, though the majority are from the middle classes. The tradition of father to son is not as prevalent as with us, but it is on the increase and produces a fine type. The material amongst the officers is excellent, and there appeared to be a really good feeling between officers and men.

* * * *

There is in other ways, however, rather less touch between officers and men than in our army. The average young officer in the artillery, for instance, has no executive command and did not appear to know very much about the men in his battery. He was not father and mother to them in the same sense as the British subaltern; he is not allowed to play games with them, and he is usually married within a year or two of being commissioned. This somewhat naturally transfers much of his time and interest elsewhere than to his unit!

In striking contrast to this lack of formality between officers and men, there are considerable barriers of rank amongst the officers themselves. This is due to a variety of reasons. In the first place, there is an almost entire absence of mess life. The officers' mess merely consists of one dining room where members have their meals at set places. There is an officers' club at every station, but this did not appear to be used a great deal. Bachelors thus tend to keep closely to friends of their own age and interests, and there is little vertical interchange of sociability and ideas. Officers, moreover, get married at a much earlier age than in the British Army. A great number marry the day they leave West Point, and it is most unusual to find a bachelor with more than a few years service. The training at West Point

THE FIELD ARTILLERY JOURNAL

also probably has considerable effect. Cadets here are kept for four years under a far stricter discipline than at the Shop or Sandhurst and great emphasis is laid on rank and seniority. For his first year, a cadet is as near an untouchable outcaste as it is possible to find outside India. West Point undoubtedly turns out a fine specimen of young men, physically and mentally: above all it inculcates a wonderful sense of honour and esprit de corps. But it seems to do this largely at the expense of individuality and officers derived from other sources had, on the whole, a broader outlook and more intelligence.

N.C.OS, AND MEN

Both mentally and physically the United States Army enlists a very fine type of man. Their physique is first class and their education and intelligence are considerably superior to that of the enlisted British soldier. There is no army educational system as in the British Army: it is unnecessary and by comparison shows the great superiority of American over British primary education. With few exceptions, all American children are educated at the government high schools, with a consequent levelling up of classes, of education and of opportunities for advancement to the child of merit. The only education in the American Army is entirely technical.

There is apparently little difficulty in obtaining sufficient recruits and as the mentality of the American and British soldier are similar, it is interesting to compare their conditions of service. The American soldier is paid better, though by comparison with outside wages, not a great deal better than the British soldier. His feeding is excellent: in quantity and quality it is first-class and it is quite unnecessary for the soldier ever to have to

pay for extra food out of his pay. The cooks are specially selected men and they receive special rates of pay. At Fort Ethan Allen the feeding was actually better than in the officers' mess! The barracks and recreation rooms are considerably better and more comfortably furnished than in the British Army, and there is more freedom for the soldier when off duty. His spare time is his own and he can go and do more or less what he likes, and in whatever clothes he likes, when not actually on duty. Games are well run and are less centralized than in the British Army: distance makes a network of inter-unit competition difficult, and the result is that more men play and less attention is given to teams of the regimental gladiators. There is no organization similar to our army sports' board with centralized control, and the same applies to a lesser extent to physical training. The saving in overhead expenses, office work and personnel in the departments of education, games and physical training must be considerable and, in the case of games at least, means that far more men get healthy exercise.

On the whole the American soldier has a greater spirit of adventure than the British soldier. He does not want to serve at home and he likes foreign service. I found great envy of our North Western Frontier of India; many men told me how they longed for such a place where they could see some service. Their tour of foreign service, however, is much shorter than ours (two years). Their periods of enlistment are for three years only with the opportunity of extending in three year periods up to thirty years, but it is usually only N.C.Os. who extend. Two other factors which affect recruiting are interesting. The cinema has a great effect and several men told me that they had decided to enlist after seeing a good army film. The American

A SHORT VISIT TO THE AMERICAN ARTILLERY

loves a military film, and I found men who had been four or five times to see films such as *The Charge of the Light Brigade*, *Bengal Lancer* and *Wee Willie Winkle*, to say nothing of their own army films. The other factor is that of allowing the public in to see their army. In barracks, in camp, on maneuvers and on the ranges, the public are given a hearty welcome and not asked "to move along quietly, please," as they are in England.

It is difficult to express an opinion on American Army discipline after only a short visit. On first sight it appears to British eyes to be somewhat lax. The first impression is that there is too much discipline amongst the officers and not enough amongst the men. The former may be true, but the latter is more questionable. "Guards" discipline has been tried and has failed. The American will not stand for it. In their present discipline they aim at inculcating the requisite habit of cheerful obedience to orders without destroying a man's initiative. They realize the necessity for obedience but hate the automaton who cannot think or act for himself. After only a three weeks' peace attachment it is difficult to express an opinion on the result attained, and the only opinion offered is that they manage to retain the individuality of the man, who is freer than the British soldier, particularly when off parade, but possibly rather at the price of the great corporate spirit and esprit de corps of the British soldier. We want more of the former without losing the latter, whereas the American could probably do with more of the latter without necessarily losing any of the former.

The N.C.Os. are usually long service men who are making the army their profession, and they are a first class lot. It is curious to find therefore that they are allowed less responsibility than

British N.C.Os. Many routine or technical duties which are normally done entirely and most efficiently by N.C.Os, in the British Army are considered to be beyond the scope of what an N.C.O. can be trusted to do. The result is that the officer tends to waste his time on trivialities, with detriment to his study of the higher branches of his profession, whereas the N.C.O. has little opportunity to express his individuality and power of command in training and leadership. Several N.C.Os. who had visited Canada told me this and expressed the wish that they had the same responsibility as British N.C.Os. They were also extremely envious of British sergeants' messes, of which they have no counterpart. The men are well turned out but their present service uniform is unsuitable for life in a mechanised or motorized formation. It will probably be eventually changed for a smart blue patrol type of uniform for dress parades and walking out, with a more suitable type of fatigue dress for ordinary work in the field. There are the usual rounds of inspections such as we know so well, but less attention is paid to outward appearance. Their system of periodical maintenance checks and inspections is excellent. The twin Gods of "Spit and Polish" receive certain essential courtesies but not the reverent homage of the British Army. Vehicles and equipment are therefore less beautiful to the eye but equally serviceable for war.

THE LIGHT FIELD BATTERY

An American "75" or light field battery is commanded by a captain and is a smaller unit than the British battery. When up to strength it has only three other officers. It is on a four gun basis, with a smaller battery staff and very small administrative responsibilities.

THE FIELD ARTILLERY JOURNAL

The gun is the French 75 mounted on a split trail American carriage which has several interesting features, such as a central jack from which the gun is normally fired. This jack gives a three point suspension with an equal strain on both trails on uneven ground. It is a beautifully mounted gun and as steady as a rock when firing. The "prime-mover" is a 30-cwt. truck with four wheel (front and rear) drive; this form of drive is considered much superior to the six wheeler with its drive on the four rear wheels. The rear wheels push the front over an obstacle, and the front then pull the rear wheels out. The truck certainly has a first class cross country performance; when tracks are fitted, which is not often necessary, it can pull a gun out of almost all conditions of mud, frost and snow. The battery staff are at present carried in trucks or station vans similar to those now often used in England. The latter have a poor cross country performance, and will probably be replaced by trucks. The wire truck contains a wire reel operated by a small one-half horsepower petrol engine for reeling in; this is an extremely useful gadget as it can be easily transferred to any truck. A battery carries 6 miles of cable; communication from the O.P. to the battery is by line, lamp or flag. There is no wireless inside the battery. Neither are there any motor cycles in the battery which seems a mistake, as a station van, with a poor cross country performance or a 30 cwt. truck has to be used for the smallest intercommunication task.

The firing battery consists of its four gun trucks, with four ammunition trucks and one truck for gun fitters and spare parts. The aim is to have 200 r.p.g. in the firing battery, but the actual amounts in number and type do not appear to have been definitely settled yet. Shrapnel is dying a hard death but it is probably

moribund and it is likely that a 75mm. gun-howitzer will eventually replace the 75mm. gun. There is finally a maintenance section with trucks for rations, water, blankets, petrol and spare parts. It also contains two "pick ups" for general purposes. These "pick ups" are similar to station vans except that they have a carrying instead of a passenger type of body. They are of inestimable value as "odd job" vehicles. The mobility of these motorized batteries is very high. A regiment of field artillery thinks nothing of doing 250 to 300 miles a day: it can, and does, average 200 miles a day for a fortnight. Its cross country performance is at present limited by its station vans, but if it is eventually equipped entirely with trucks, this will also be extremely high.

THE BATTALION

A battalion contains three batteries and, as in the French and German organization, is the real tactical fire unit. Batteries can, and do, act independently at times, but the battalion is, in effect, normally a twelve gun battery, dispersed in packets of four guns. These are normally close together in action and are controlled from the battalion O.P. The battalion commander has to assist him a staff, a headquarters battery and a battalion combat train for ammunition supply. The battalion commander's staff consists of an executive officer (second-in-command): an administrative officer (adjutant); one intelligence and one operations officer who are responsible for fire control; a supply officer, a communications officer, two liaison officers and one reconnaissance officer (survey officer).

The H.Q. battery is commanded by the communications officer and contains:—one wire section, one radio

A SHORT VISIT TO THE AMERICAN ARTILLERY

section, two liaison sections, and one reconnaissance section.

The radio section is normally used for communication to the infantry and artillery regiments and to the air, though it is sometimes used for communication to batteries; it contains six wireless sets. The two liaison sections have wire and wireless and are communication sections for the two liaison officers. The reconnaissance section contains the survey and fire control personnel.

RECONNAISSANCE AND OCCUPATION OF POSITIONS

The battalion commander makes his reconnaissance, usually taking with him his second in command, communications officer, reconnaissance officer and such of the remainder of his staff as he may require. He leaves the bulk of his staff at a convenient place in rear if the tactical situation does not permit of a larger party. He selects the area, or in some cases, the actual gun positions first and then his O.Ps. He has meanwhile ordered his battery commanders to a convenient rendezvous where he issues orders.

The battery commander usually takes forward one or two of his battery staff vans, giving a forward rendezvous to the remainder of his staff. He leaves his G.P.O.* back with the guns. He reconnoiters and selects both his O.P. and battery position, trying to have communications established by the time the battery arrives. He leaves one man to mark the battery position. An N.C.O. (the scout corporal) is sent back with orders to the G.P.O., who brings the battery into action. The battery sergeant-major then collects all vehicles and takes them back to the wagon lines.

The procedure for advances and withdrawals is similar to our own, but in

every case the G.P.O. is always left with the guns. In a quick action, there are no preparations, other than signals, at the battery end before the arrival of the guns and time is undoubtedly lost by not adopting our system of taking the G.P.O. forward and allowing him to select his own position and make all preliminary preparations before the arrival of the battery. In fact, all through American organisation and procedure there seems to be a disinclination to decentralise to subordinates. Each rank seems to try and do half of what could and should be done by the next rank below. This is strange amongst a people whose individuality and initiative are not only highly developed but greatly prized. When a more leisured occupation of position is possible, the reconnaissance officer carries out the preliminary plans, preparations and survey. He does all the fire control work from the O.P. where he is in charge of all the specialists. He shoots the battery if the battery commander is away with the infantry commander.

SHOOTING

With the battalion organisation of three four-gun batteries, a great deal of the shooting that is done by the British battery commander, is carried out by the battalion commander. For instance, as soon as the batteries are in action, he will normally shoot each one in on the same base point (Zero point). In a quick mobile action, the fire control personnel will plot this base point in on a board, draw an arbitrary north and south line through it and then plot the battery positions from the line and range at which they hit the base point. Any succeeding targets it is desired to engage are then registered by one battery; the line and range from the other batteries is computed and they can shoot without registration. This method,

*Battery executive.—*The Editor.*

THE FIELD ARTILLERY JOURNAL

which is very quick and accurate, has no relation to the real co-ordinates and is entirely separate from the fire chart (or surveyed map board) which is built up, when time permits, by similar survey methods and organisation to our own. The targets plotted in after firing on this rough system can be corrected for conditions of the moment and transferred to the surveyed board, if required, by reference from the base point.

The American G.P.Os. union is evidently a good deal stronger than its British counterpart for, whether the shooting is done at the battalion or the battery O.P. all calculations are made at the O.P. The most intricate calculations are done here and it is amusing to see young officers, whether regular or reserve, tying themselves up with abstruse calculations on the backs of envelopes. The G.P.O. meanwhile sticks to his guns and remains, as formerly in the British Army, a gentleman of leisure. The standard of shooting, however, is high and though the drill appears somewhat lackadaisical to a British gunner, the shells hit the target and hit it quickly. The signalling, particularly the telephony, also appears distinctly casual, but again it produces the results and who is to say which is the more suitable war cry—the snappy British "Shot one" or the laconic American "On the way"! On the whole the systems of gunnery and of predicted shooting are very similar to our own, except that the battalion is usually shot as a twelve-gun battery and the mill system is used instead of degrees and minutes. The mill system is very simple and its advantages over degrees and minutes seem so overwhelming that it is surprising that we have never adopted it.

Annual practice is done under regimental arrangements at a local practice camp, which each regiment seems to possess. At Fort Ethan Allen, the

ranges were limited in size and gave little scope for tactical manœuvre and they were little more than a shooting gallery. Battery positions were all known and numbered: in fact they have to be, for when firing H.E., gun detachments have to take cover behind splinter proof shelters. This is due to a number of prematures from bad ammunition left over from the war, but it slows down drill and must have a certain effect on the morale of detachments when they go to war. In addition to firing their own practice, regular batteries do a good deal of shooting for reserve officers. For the latter, a great saving in expense on ammunition is effected by fixing a 37mm. infantry gun on to the 75 piece. This small shell gives excellent results for gunnery purposes up to a range of about 3,500 yards. Batteries seem to be out in camp for a great deal of the summer and to get a great deal more shooting practice than British batteries. The standard they achieve is certainly very high.

THE REGIMENT AND BRIGADE

A regiment of light field artillery at present contains only two battalions. It is commanded by a colonel and is more an administrative than a tactical unit. It is, however, provided with an ample staff, which enables it to centralise and control fire when required. It also has a service battery which is the main administrative element in the regiment and this unit relieves battalions and batteries of all but the essentially internal administrative matters. Above the regiment is the brigade, which is the highest subdivision of artillery in the American Army and which corresponds to our divisional artillery. This brigade at present consists of one medium regiment of three battalions and two light regiments. The whole higher organisation of artillery is however

A SHORT VISIT TO THE AMERICAN ARTILLERY

under consideration and will probably be changed as a result of experiments which are being carried out this year with a new and smaller division. In the experimental establishment for this division, the artillery brigade is abolished and replaced by a larger mixed artillery regiment of four battalions. This, however, reduces the gun power to a dangerously low level and is unlikely to come through unchanged. The basis for any organisation, however, is the battalion of three batteries, and this is unlikely to be changed.

CONCLUSION

Unfortunately, manœuvres did not start

until later in the autumn and I was therefore unable to see them. In fact, my only complaint is that I could not stay longer as it was one of the most enjoyable holidays I have ever spent. In three weeks, it is possible to get but impressions of a country but my feelings towards America, her people and her army are extremely warm ones. Especially are they warm towards a wonderful commanding officer who set the hall mark to one of the happiest and most efficient units which I have ever had the pleasure of meeting, and to his charming wife whose kindness and hospitality did so much to make my visit such a happy one.

A Note from the Panama Packers



Previously published accounts in this Journal of the variations of the traditional caisson ride for the bride and groom adopted for use in truck-drawn and pack artillery have perhaps failed to indicate both the enthusiasm and the rigor of such experiences. Let this picture of Lieut. and Mrs. Rudolph Laskowky's initiation into the fold of married couples of the First Battalion Second Field Artillery (Pack) at Fort Clayton, C. Z., last December 23d be more instructive with respect thereto.

"Illustrating that neither mud nor grades deter us in our work or play," is the accompanying note from Lieutenant Colonel G. H. Francke, the battalion commander.

Lieut. H. J. Lemly (who passed this test last June) recently coached the battalion track team to first place in the Post track meet against the four battalions of the 33d Infantry, 55 points to nearest competitor's 39 1/3.

Type Problems

Prepared by instructors of the Department of Gunnery, the Field Artillery School

PERCUSSION BRACKET LATERAL, SMALL-T

(75-mm.)

Target: Machine-gun fire from the vicinity of a dead tree.

Mission: Neutralization.

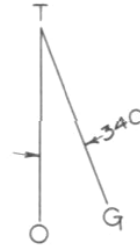
Deflection obtained: Shift from base point.

Range obtained: Range finder.

Factors: $R = 3500$, $r = 3600$, $T = 340$, Site = 0, $s = 10$, $r/R = 1$.

Initial Data: BD R 220, Converge at 3500, On No. 1 Open 9,

Site 300, Shell Mk. I, FQ ("Fuze Quick")



Commands	Range	Observation	Dev	Rn	Df	Remarks
No. 3, 1 Rd	3500		20 L	+		(R 20 + L 20)
R 10	3300		10 R	?		(Battery Right)
L 10	3300		5 L	?		
R 5, BR	3300			—	—	
				—		
				—		
R 15, B 1 Rd	3400			?		
				+	Correct	
				—		
				?		
	3500	End of Problem				
	3300					
	3350					
	3450					

CRITIQUE

A 200-yard bracket and an open sheaf were required.

The mission was accomplished. The final range, deflection, and width of sheaf are correct. The range bracket, 3300-3500, is correct.

The command, "R 10," for the second round was not correct. To get on the line a shift of R 20 was required. To stay on the line a shift of L 20 was necessary. The resultant is no change in deflection. Had the battery been brought in at this point, sensings would probably have been obtained and time saved. The time, four minutes, five seconds, was good. The problem as a whole was excellent. It is to be noted that it was fired with small-T methods although T was 340 mils.

TYPE PROBLEMS

PRECISION LATERAL, LARGE-T

(75-mm.)

Target: Base Point.

Mission: Registration.

Deflection obtained: Instrument.

Range obtained: Range Finder.

Factors: $R = 3600$, $r = 3800$, $T = 600$, $c = 5$, $s = 19$. $d = 15$, $F = 3$,
 Site = +5. (Use Fuze Short tables for Fuze Quick.)
 Modified $s = 12$, $c/d = .3$, Fork = 3.



Initial Data: Compass 2470, Sh Mk I FQ.

Commands	Elev	Dev	Rn	Df	Remarks
No. 1, 1 Rd Q	110	Line		—	Line — at 110
L 24	116	5 R		—	Line — at 114
L 24	120	3 R		+	Line + at 119
					Spilt bracket 114-119 to stay on line.
R 12	116	2 L		?	
	116	Line		+	Line + at 116
					Split bracket 114-116.
R 6, 3 Rds	115	2 R	+	+	Range sensed by rule.
		Line	+	+	
		5 R	+	?	
	113	"Cease firing" (instructor)			No comment made.
R 3	113	Line	—	—	Decrease elevation ½ Fork.
		Line	—	—	
		8 L	—	?	6 rounds fired at 114.
L 2	114	End of Problem.			

*EDITOR'S NOTE: Illustration is in error to the extent that R and r distances are reversed.

CRITIQUE

The target was a base point to be registered upon. The mission required a precision adjustment with a quick fuze.

The mission was accomplished. The adjusted elevation is correct and the correct command to continue the deflection adjustment has been given.

The officer firing failed to make the deflection change indicated after the first series of three rounds but realized his mistake when the instructor stopped firing.

THE FIELD ARTILLERY JOURNAL

PRECISION LATERAL, SMALL-T
(75-mm.)

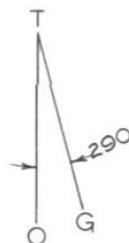
Target: Stalled Truck.

Mission: Destruction.

Deflection Obtained: Shift from range-deflection fan.

Range Obtained: Range finder and range-deflection fan.

Factors: $R = 4100$, $r = 4000$, $T = 290$, $c = 5$, $s = 7$, site = 0.
(Use Fuze Short tables for Fuze Quick.) Modified $s = 4$, $r/R = 1$, Fork = 3.



Initial Data: No. 2 Adjust, BD R 90, Shell Mk I. Fuze Quick.

Commands	Elev	Dev	Range	Df	Remarks
No. 2. 1 Rd Q	130	10 L	?		R 10 to get on line.
R 10	130	3 R	—		L 3 to get on, R 16 to stay on.
R 13	142	Line	+		L 8 to stay on line.
L 8	136	1 L	+		L 4 to stay on line.
L 4	133	1 R	—		R 2 to stay on line.
R 2, 3 Rds	135	1 R	—		(1 R +, Df +) (Over on terrain)
		2 L	+		(Deflection ?)
		2 L	+		(Deflection ?)
	135	1 R	—		(1 R +, Df +) (On terrain)
		2 R	—		(Deflection ?)
		2 L	+		(Deflection ?)
3 Rds	135				

CRITIQUE

A precision adjustment was called for. Shell with a quick fuze for best blast action was the correct ammunition to use.

The mission was not accomplished. The final elevation and deflection are not correct because of missensings in each series of three rounds. The first round in each series was over on terrain and accordingly was a forced sensing of deflection over. Based on proper sensings the command for the second series of three rounds should have been: L 2, 2 rounds, 133. The officer firing failed to sense deflection during fire for effect. A 2-fork elevation change should have been made, instead of one of 4 forks.

The problem was interesting in that a forced sensing for deflection was encountered, that is, a sensing of range over on terrain when following the rule called for a sensing of range short. In this case the deflection, then, is bound to be over.

TYPE PROBLEMS

PERCUSSION BRACKET, LARGE-T

(75-mm.)

Target: Infantry in the vicinity of a small bush.

Mission: Neutralization.

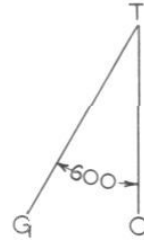
Deflection obtained: Shift from range-deflection fan.

Range obtained: Range finder and range-deflection fan.

Factors: $R = 3100$, $r = 4000$, $T = 600$, $s = 20$, $d = 10$.

Initial Data: BD L 470, Converge at 3500, On No. 1 Open 9.

Site + 5, Percussion. Fuze Quick.



Commands	Range	Observation	Dev	Rn	Df	Remarks
No. 2, 1 Rd	3300		10 R		?	(20 R)
	3200		5 R		?	
	3100		Line		+	
R 20, BL	3000			?		
				—	Correct	
				?		
B 1 Rd	3100			+		
				+	Correct	
				?		
				—		
		3200	End of Problem			
	3000					
	3050					
	3150					

CRITIQUE

The target was infantry in the vicinity of a terrain feature, to be neutralized. A 200-yard bracket and an open sheaf were required.

The mission was accomplished. The proper bracket and sheaf were obtained and the correct ammunition and fuze were chosen. The initial data were excellent. The officer firing showed very good judgment in making a one-s deflection shift on seeing that his deflection was close. The time, three minutes, forty seconds, was excellent.

THE FIELD ARTILLERY JOURNAL

A WRIT

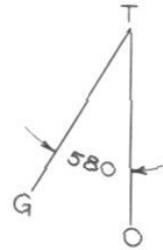
Conduct of Fire, Lateral, Large-T

Your battery of French 75-mm. guns is to your left rear. You are adjusting on a check point with Shell Mark I. Fuze Quick. Your data were obtained from a fire-control data sheet. (For Fuze, Quick, use Fuze, Short, tables.)

Factors: $R = 4900$, $r = 3200$, $T = 580$, $c = 6$, $F = 4$, $d = 18$, $s = 12$.

Use: $c/d = .3$, Modified $s = 8$, Fork = 4.*

Complete the following sensings and commands:



Command	Elev	Dev	Rn	Df	Remarks
No. 2, 1 Rd, Q	180	60 L		?	
		8 L		—	Make a 2-s deflection bound
		6 R		?	
		Line		+	
		4 L		—	
		4 L		?	
		Line	—	—	
		3 L		?	
		3 R		?	
		2 L		?	
		Line	—	—	

Next Command ?

*EDITOR'S NOTE: Illustration is in error to extent that distances R and r are not in proportion.



The assignment of Colonel R. E. D. Hoyle to command of the Sixth Field Artillery at Fort Hoyle, Md., will remind those of long service that the post was named after his father, the late Brigadier General Eli D. Hoyle. Colonel Hoyle was a lieutenant in the regiment during his father's command of it, and, indeed, before that time, under its first commander, the late Brigadier General M. M. Macomb, first President of the Field Artillery Association, of whose Executive Council Colonel Hoyle is a member. Pre-War polo left many cups in the regimental trophy case, with Lieutenant Hoyle's name on all of them.

TYPHOON and FLOOD

BY
CAPTAIN
TOM SHERBURNE

IMPOSSIBLE as it seemed, there they were. Six officers, some two hundred men, trucks, field guns, and equipment, all huddled together miserably on that tiny sandbar in the middle of a river gone mad. A tropical typhoon at its worst raged about them; rescue attempts had failed. Now night was rapidly approaching, and the rising waters threatened to engulf their all-too-meager refuge. Through the gloom and driving rain there could be made out only three figures among the trucks. One man, apparently an officer, clinging for life to the side of an upturned truck, was directing and assisting two badly buffeted Filipino soldiers in lashing the scattered vehicles together. In one of those trucks was a lieutenant who was to have met his



ON THE ROAD BY DEAD RECKONING

incoming bride-to-be on the Transport *Grant* next morning.

The outlook was tragic. And only by the most incidental chance had I escaped being out there with them.

* * * *

Fort Stotsenburg is a typical tropics post. Situated in central Luzon it nestles among the eastern foothills of the long, rugged range of mountains along the China Sea. Apparently overlooking the station but actually seventeen steep miles away are the two highest peaks of this range. Apo and Pinatubo. Drainage from the slopes between the two culminates in a small mountain stream, the Bambam, which passes around Stotsenburg to the north and out on the flat plain below. Crooked and rocky and overhung with



THE ROAD AFTER THE STORM



THE BREECHES BUOY

THE FIELD ARTILLERY JOURNAL

jungle foliage, the Bambam is merely a slender, tumbling brook in the dry season. But, as a Texas arroyo, it assumes the proportions of a dangerous torrent when the big rains come. Its bottoms, just north of the post, were a half-mile wide, even though normally its branches were easily waded.

When the 24th FA went out to service practice this same little Bambam had to be crossed to reach the range. This the 2d Battalion did, with ease, one warm evening in November, 1936, en route to camp preparatory to firing on the morrow.

Camp was struck early the next morning. The kitchens and tentage were sent in, and firing batteries and OP details then proceeded to their assigned positions. The sky was overcast and a haze hung in the deeper valleys, but observation was satisfactory and firing began promptly on schedule.

About this time a faint drizzle began and the early morning breeze quickened. The sky became a yellowish black. Instruments and charts were moved into the rear of trucks, under canvas, to permit continuation of fire. A brief lull in the rain and wind at this time lent hope of finishing. Then suddenly there was an oppressive silence. The sky darkened considerably. The dirty stringy cloud masses seemed to be rushing around the horizon, with a restless calm directly above us. Then the quiet was broken. Head-high cogon grass in the distance was whipped about and flattened in advancing waves and there was faintly heard that low, ominous moan of the wind, which presages a typhoon. Further firing was folly.

Almost with "March Order" the efficient and fast-working batteries were on the trail and moving in. Sheets of rain, whipped along by the now-

descended hurricane, peeled tightly laced tops open on the cargo trucks, drenched the occupants, and added seriously to the difficulties of the drivers in negotiating the tortuous trail down to the Bambam. By the time that the leading vehicle of the column had reached the river bottoms, the rush of water from the hills was rapidly flooding the dry bed.

The first vehicles jounced slowly across and out of the river. Then trouble began. Motors flooded and stalled in the deepening ruts, tow chains came out and extra men worked furiously, pushing and heaving. The leading battery was all but across when one of its last trucks became stuck immovably. No amount of pulling or pushing would budge it. A rushing current walled up to the sides of its hood. All progress was blocked to vehicles behind it. The rest of the column closed up, doubled, and finally spread out on a high flat bar in rear of the jam. Then the river burst in behind!

This was a serious turn indeed. The men's lives were now in serious danger if the water should rise much more. A desperate effort was made to put a life line across the now intervening two hundred yards of cascading torrent. One of the best swimmers, stripped to shorts and with the end of a rope tied about his waist, rushed into the water to be caught in an eddying wave and swept fifty yards downstream before he could be dragged back in. half-drowned. The bump, bump, of many large boulders being rolled down the stream bed indicated an additional danger to such attempts and the battalion commander rightfully ruled against them at this time.

Men were perched in the tops of the trucks by now. Darkness was near and they were wet, cold, and hungry. A consultation was held among the



RESCUE

members of the post and regimental staff on the near river bank. The Air Corps was asked to help and Captains Wurtsmith and Morgan responded nobly. Carrying sacks of food hastily collected from battery kitchens these two nery fliers maneuvered down in that terrific gale, their ship snapping about like a trolled minnow, to drop their welcome cargo from within ten feet of the tops of the trucks. Flashlight messages received later that night indicated

that most of the food had been found and that no one was lost or hurt.

* * * *

Needless to say both rescue crews and anxious families were down at the river early the next morning. Fortunately the rain had ceased during the night and the flood, at its peak, had not reached the highest ground. Food was dropped in again several times during the day. Meanwhile shovel crews



A SECTION OF THE ROAD

THE FIELD ARTILLERY JOURNAL

worked feverishly upstream to divert the near channel of the river to that beyond the island. Several attempts were again made, unsuccessfully, to get a man and or a rope across. They were within shouting distance and it seemed as if it should be easy. A trench mortar, balloon, plane, or even a bow and arrow appeared in turn to be the solution, but the wind and current were too great. The battalion spent another wet night in trucks.

The morning of the third day found the river receding, a man on a rope managed to get across at a bend of the stream above, a larger rope followed, and soon a breeches buoy was set up. The long-overdue groom was first across, to the accompaniment of rousing cheers. (I forgot to say that one of the first messages received from the island

requested that notification and assurance be sent to the future Mrs. Herlong in Manila.) The rest followed in short order and loose equipment was secured by the dry rescuers.

The trucks could not be extricated for several more days. Many had sunk into the sand over their axles and the labor of digging out and cleaning them was immense. A surprisingly small amount of property had been swept away, attesting to the zealous care taken by Scout soldiers of government property.

In a week's time the river was back to normal and the vehicles were as good as new. But I will never forget the scene I witnessed at the Bambam River in the far-away Philippines when the Army nearly suffered one of its greatest tragedies.



The amphibious carabao, who would just as soon be in a washout as not. He will give you any part of the road you want, as long as you don't want any of the middle. Guns, it is said, have been hauled by carabaos, but not very rapidly.



2000 Miles Through the Rockies

BY CAPTAIN W. J. ROGERS, 143D FA

WHEN bigger and better road marches are authorized the 143d Field Artillery will make them.

Sounds like a Native Son, but the latest in a long list of notable feats by the California Field Artillery Regiment—the 1938 road march to Utah—appears to bear out the motto on the Regimental Crest—"Facta Non Verba."

Here's the story in brief. The details follow the synopsis.

More than 2,000 miles of road march with 101 vehicles in column, for a total of 221,359 vehicle miles and 1,182,335 man miles.

Not a single serious accident on the march.

Not a single man suffering anything worse than minor scratches or bruises en route.

Every vehicle into bivouac every night under its own power and ready to roll the next morning with the column, thanks to the regimental repair unit.

Average strength, all ranks, 580; for 16 days a total of 9,280 man-days; actually obtained, 9,260 man-days of training.

How do you do it?

Careful planning, strict discipline, constant watchfulness and, above all, safety precautions and regulations enforced to the letter.

The details:

This march was no set-up—no Sunday drive in the park with a hot bath waiting you when you got home in the afternoon to listen to the radio. Everyone knew it would be that way. The "careful planning" was needed if the march was not to develop into a case of herding a disorganized mob of

trucks across country, with a large detail in the rear to pick up the pieces.

It was just about service conditions, without anyone shooting at you. It was over varied terrain, from the flat and reasonably cool valley of the home state, over high mountains and through arid country.

Before the march started two preliminary trips were made. One was by the regimental commander, Col. Otto E. Sandman, and the executive, Lt. Col. Ralph E. Merritt. The other was by the regimental S-3, Capt. I. B. Aylesworth, and the assistant supply officer, Lt. R. E. Bancroft.

The first was to inspect the general route, the second to contact contractors and food purveyors, after the march was authorized.

Against a certain amount of opposition the commanding officer obtained permission to make the march over two routes. This was in the interest of morale and to vary the training more than making the trip both ways over the same route would have done.

The annual trip to the state training camp at San Luis Obispo, about 250 miles, is made in one day and presents little or no problem. Part of the route on the Utah march was over very similar terrain.

The journey was designed, primarily, to find out what officers and men of the regiment did NOT know and to teach them these things. Despite the long and careful planning a few "bugs" did appear, but they were eliminated as quickly as they showed their heads.

One thing was stressed, morning, noon and night and at the hourly halts. That was SAFETY.

The principal safety factor, aside

2000 MILES THROUGH THE ROCKIES

from the pledge which each driver took, was the system of changing drivers every hour. Each driver had a "companion." When he relinquished the wheel at the end of his hour's drive he vacated the cab and so did his "companion." A new driver took his place and a new "companion" took the seat beside him.

If the driver became a victim of that "hypnotic influence" of straight roads the "companion" was able to keep awake and watch the driver.

Thus the other driver and the man riding with him were relieved from the tendency to "help drive" while sitting in the cab of the truck.

There was a strict adherence to maximum speed and to distance in the column. On the heavily traveled roads in California, particularly, this was a courtesy much appreciated by civilian traffic.

Two columns were originally organized at the home stations, from which they made the first stage of the march to Madera. Here the two columns were split into three serials, refueled and had lunch.

The San Francisco Bay area contains the first battalion, with the Service Battery and Headquarters Battery. The Sacramento column had the Second Battalion, with the Medical Detachment.

The division into serials was made by a carefully arranged plan. By this each vehicle was numbered on windshield and tail gate. Using the numbers it was possible to tell at a glance at any stage of the march just what vehicle, if any, was out of column.

It was decided before the march started the manner of traveling most likely to succeed was in serials of not more than 40 vehicles. More than this, it was believed, prevented proper column control, made for unwieldiness, and increased possibility of accident or disorder.

The march was over well-traveled roads and so markers were unnecessary. Every driver had a map on which were indicated each day's gassing stops and the night's bivouac location. Each battery commander had a march graph.

In the first serial, commanded by Capt. Aylesworth, as billeting officer, were 25 vehicles, with supply officers, kitchen details and units, service battery and band, battery agents, rolling kitchens and trucks carrying staples and dry rations.

The second serial, with 38 vehicles, was in command of Maj. Harmon S. Kelsey and had 38 vehicles. It contained the first battalion and the Headquarters Battery.

The third serial had the second battalion and was in command of Major William H. Morgan. It had 40 vehicles, including the regimental repair unit, commanded by a lieutenant, and the ambulance.

Members of the Medical Department detachment were assigned, under a medical officer, to each serial.

The first night, at the Kern County Airport, Bakersfield, was "just another bivouac." Officers were a little apprehensive everything had gone so well. The men were tired, but interested. They were a lot more interested a few hours after taps when the Kern airport ants decided they had company for lunch and started dragging the men around.

The cold grey dawn of Sunday, June 12. Stiff joints, occasional excited chatter of a young soldier—the low growl of a sergeant "pipe him down"—and so off, over the hills, to Las Vegas.

It's a very nice summer trip from Bakersfield to Las Vegas, with a cooling breeze fanning your cheek and the bright sunlight overhead.

Oh, yeah?

Try pulling a rolling kitchen up that long drag to Tehachapi, 4,100 feet in

THE FIELD ARTILLERY JOURNAL

45 miles, with 10 passengers and their blanket rolls, the bright sun hammering down on the hard, hot highway—alkali and sagebrush all around.

And if you feel any cooling breeze you brought it with you.

Down hill, then to Barstow and an altitude of 2,000 feet, 140 miles along the way. Lunch and refuel, then down some more to Baker, which is at an altitude of 800 feet and 200 miles out.

Up again, 3,200 feet in 40 miles and down again, to 1,800 feet at Las Vegas, almost 300 miles from Bakersfield.

Lorenzi's Park, just out of town for the night, with a fine swimming pool and plenty of cool water. And a symphony of big, green frogs to lull you to sleep—if you needed it.

Out of bivouac just at dawn on Monday morning, through the still-sleeping town and just on the other side park guns, rolling kitchens, and baggage trucks. All hands except guard load into personnel trucks and off to Boulder Dam. And that, soldiers, is a sight worth getting up at 3:45 A.M. to observe.

Back to Las Vegas after oh'ing and ah'ing, then to Mesquite, up to 2,500 feet and down again to 1,500 and a stop for lunch and refuelling.

Up we go, again, after a few preliminary hoists. *Really* up and up. In 30 miles up 3,000 feet. Then down 2,000 feet in 10 miles, and then up again. Like a giant roller coaster.

And so to Zion National Park for the night, 245 miles from Las Vegas and 3,100 feet from sea level.

Better artists with words have told the story and the beauties of Zion Park. There were cold showers, a lecture by a National Park Service ranger who knew how to disguise a "lecture," and a view of the river, which runs through a gap so narrow it has to turn on its side. And over all of it the brooding, everlasting hills.

Cold, and clear, and very dark down in the bottom of Zion Canyon for next morning's Reveille. But a trip through the park by the entire column spent the hours after breakfast until full daylight and then the climb out of the canyon. The first part, along a road carved out of the wall of the canyon, brings you up 3,000 feet in less than 10 miles. The view is marvelous, but a truck doesn't appreciate that and would rather have a little cool air in its innards. Canyons cut off the breeze.

Mid-morning and it's been climb all along the way and here's Bryce Junction.

Once again drop all unnecessary vehicles and up the hill to Bryce Canyon, at an elevation of 8,000 feet and 19 miles from the main road.

That is another sight worth getting up before dawn to see. Nature had a lot of colors left over from Spring and Autumn and was in a playful mood when she made Bryce.

More Oh's and Ah's and then back to the main road and to Panguich for refueling and lunch. Typical south-Utah town, wide streets, water running through the gutters on almost every street, all the time.

Out of there and with little incident to Richfield for the night. County Fair grounds a little crowded but there was water to wash, a place to eat and sleep. Who could ask more? Mileage for the day, 195.

Last day before going into Camp Williams. Up again before dawn and out on the highway just at sunrise. To Camp Williams, 30 miles south of Salt Lake City and 150 miles from Richfield, at noon—just two minutes off schedule.

In the five days of travel from home stations to Camp Williams there were 40 involuntary stops by motor vehicles. These ranged in seriousness from a failure of a steering gear on a truck, the first day, to the loss of a radiator cap.

2000 MILES THROUGH THE ROCKIES

Most frequent cause of stops was burned-out generators—four—and running out of gas, four. As a group, electrical equipment was chargeable with 13 stops out of the 40 made.

The stay at Camp Williams was one of the most enjoyable camp periods the regiment has had since the war. A fine range, with varied terrain, good quarters, frequent opportunity for entertainment in the free hours, a fine welcome by officers and men of the other regiments in the brigade and reasonably fair weather—all combined to make the time spent in the camp one to be remembered for a long time.

During the period in the camp, seven full days and part of two others, two more generators burned out. The morning after the regiment arrived in Camp Williams it took part with other units of the National Guard and Regular Army in a parade in Salt Lake City. While in camp it engaged with other units of the brigade and certain Regular-Army personnel in an overnight bivouac and tactical problem involving a road march of about 200 miles.

There was also the usual service practice.

The return journey to California was started at noon on June 23 (MST) with the first stop for the night at Wells, Nevada. Arrived there at 8:35 (PST).

Nothing unusual happened this day. To Wendover, 145 miles, and a stop for gas, between 5 and 6 o'clock. All between altitudes of 4,200 and 4,800 feet.

Out of Wendover bound west, however, the story is different. The road climbs from 4,200 to 7,000 feet in less than 30 miles, then drops back to 5,800 feet at Wells. Mileage for the day 205.

Out of bivouac at 5 A.M. on the 24th, 125 miles, up 1,000 feet and down again, to Battle Mountain for refueling and lunch.

Then on to Lovelock for the night. A total of 250 miles for the day and several

good climbs—one near Primeaux from altitude 4,800 to 6,200 in a little over five miles, and several other milder and shorter ones.

Next to the last day of the march, from Lovelock to Al Tahoe, was comparatively simple, although it contained one of the most severe grades along the way and entailed passage through the City of Reno and over roads with a considerable amount of traffic.

From Lovelock to Reno the road rises slightly, about 400 feet in 100 miles. Between Reno and Carson City is another 400-foot rise—this time within 30 miles.

These, however, were the overture. Out of Carson is Clear Creek Grade. 2,500 feet up in 10 miles or less, with sharp turns in a number of places. It was pretty warm along this stretch, too, and there were three stops on account of vapor lock. Mileage 170.

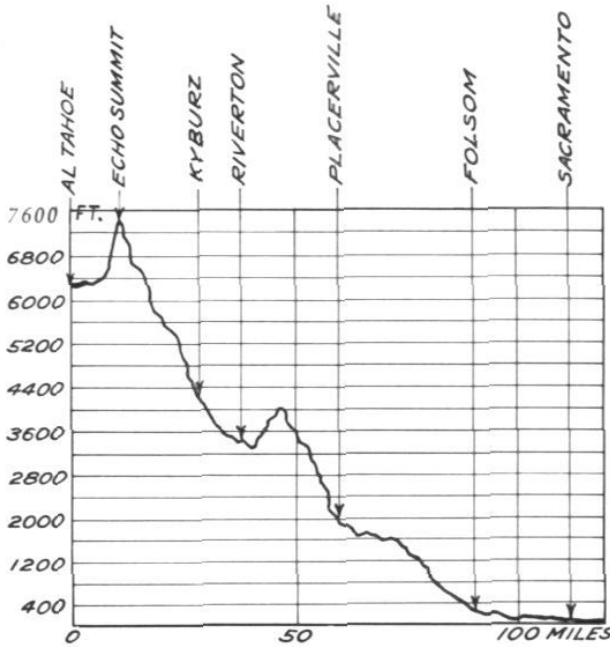
Tahoe was a pleasant prelude to the last day. There was swimming in the icy waters of the beautiful lake—announcement of the winners of the various regimental competitions—the last Retreat ceremony.

The final day was easy. Reveille was later than usual and everyone was up and about his business when the bugler sounded First Call, to an accompaniment of ironic cheers and advice.

Soon after leaving Tahoe, at 6,400 feet, the fun commences. Up she goes, that road, over Meyers Grade, to Echo Summit. Compound low for a rise of 1,100 feet in five miles.

Soon, however, this grind is over and it's all downhill, except for about five miles, to Sacramento. The drop of 7,500 feet in 85 miles has its problems, too, but they are easier to solve and the road is a model of gentle turns and fine pavement.

At Sacramento the serials were divided again, the city being the home station of one battery, and the rest of the



DOWNHILL TO HOME STATION

regiment proceeding, by battalion, to other home stations. It was 125 miles to Sacramento, 34 more to Lodi for F Battery, 14 additional to Stockton for C, Medical Department Detachment, and Second Battalion Headquarters, and 78 to Oakland for the rest of the regiment.

On the return journey the fuel system was charged with the greatest number of involuntary stops, seven out of a total of 22. Of the seven stops three were caused by vapor lock on the climb to Al Tahoe.

Some of the plans originally made for the march had to be modified in a small degree but, in the main, the entire journey went as scheduled.

One thing which contributed to the success of the march and the ability of the unit to function as a whole was the composition of the first serial. As soon as

breakfast was out of the way this unit packed up and got on its way without waiting for the usual policing or other duties. It was smaller than the others and so able to travel faster when it moved. Details from the other units completed policing after the kitchen pulled out.

The advance serial arrived at the noon halt about an hour before the main column and was out of the way before the next unit arrived. Gasoline purveyors learned with the smaller unit how best to handle the larger ones.

Many improvisations were used in the regiment—too many to

be detailed here—but one is worthy of particular note.

This was the arrangement of seats in the personnel trucks. A number of rattan cushions were obtained from dismantled street cars and these, with backs provided for all seats, promoted comfort to a large extent. Sitting on a bare plank in a truck for 250 miles a day a man doesn't have much left to go on when he arrives at bivouac.

The regiment was fed from the three rolling kitchens night and morning—one kitchen for each battalion and one for the special units. These, with field ranges for heating hot water, did very well. They were old-type kitchens, adapted for high-speed towing and in only one instance was there any difficulty with them—a drawbar crystallized and broke. The bar was welded at the

2000 MILES THROUGH THE ROCKIES

nearest garage and the kitchen was used for dinner that night, as usual.

No effort was made to cook in them en route. Sandwiches were prepared during the previous night for each day's lunch and these were served with fruit and with coffee, milk, or iced drinks.

By the time the main column arrived at each night's bivouac area dinner was well on the way. The first echelon had all supplies drawn and distributed and battery agents were waiting to guide each unit to its bivouac area. Full information was available at each bivouac as the unit commanders arrived.

All this promoted smoothness and a quick disposal of the regiment for the night.

Morale, during the entire trip, was high. A large part of the credit for this may be given the regimental chaplain, Maj. David Todd Gillmor. His nightly programs of entertainment along the way, his unflinching good nature and helpfulness, and the assistance of the members of the band all combined to assist in this part of the plans.

The value of the march came in the stiff course of training it provided for officers and men. It was something many had not had before. It showed all concerned what they knew and, more important, what they did not know. It provided altitudes, climbs and temperatures which are not usually found in California.

Solution to Writ

(See page 154)

Factors: $c/d = .3$, $s' = 8$. $F = 4$.

Commands	Elev	Dev	Rn	Df	Remarks
No. 2, 1 Rd, Q	180	60 L		?	$60 \times .3 = 18$
	198	8 L		—	$8 \times .3 = 2$ Line — at 200. Make 2-F change to stay on line.
L 16	208	6 R		?	$6 \times .3 = 2$
	206	Line		+	Line + at 206 Split bracket 200-206 to stay on line.
R 8	203	4 L		—	Line — at 204. Split bracket 204-206 to stay on line.
L 4, 3 Rds	205	4 L	—	?	Range sensed on rule.
		Line	—	—	Split deflection bracket. Make $\frac{1}{2}$ -F elevation change.
		3 L	—	?	
L 2	207	3 R	+	?	Six rounds fired at 206.
		2 L	—	?	5 shorts, 1 over.
		Line	—	—	$4/12 \times 5 = 1.7$
Next Command:					
L 1, 6 Rds	207.7				

The French Fire Direction Chart

BY CAPTAIN M. L. CURRY, USMC

THE purpose of this article is to present the *Abaques de Corrections Planimetriques* of the French Artillery, or, in our terms, their Fire Direction Chart, which was prescribed in 1936, and is regulation at the present time.

It should be understood that in the French artillery it is normal practice to have the base lines of all batteries of a battalion parallel. This the French can do more easily than we by virtue of an abundance of accurate fire-control maps and the fact that accurate basic survey and the determination of *K*'s are entrusted to a highly specialized regimental *Section de Reglage par coups Fusants Hauts* (High-burst Section). Their fire-direction chart is designed to determine parallax corrections for any given target for *parallel* base lines.

The drawing of the chart in question shows essentially a series of straight lines intersecting at a common point *O* and a series of eccentric circles all tangent at the same point, *O*. The line *XOY* serves to orient the chart. Consider a guide piece *P-1* (such as the base piece of any battery making an adjustment) and any other piece, *P-2*, for which corrections are to be determined in order that it may fire on the same target as *P-1*. This, of course, is the old fire-direction problem. Call the linear distance from *P-1* to *P-2*, *L*, and the mid-point of *L* we shall call *O'*.

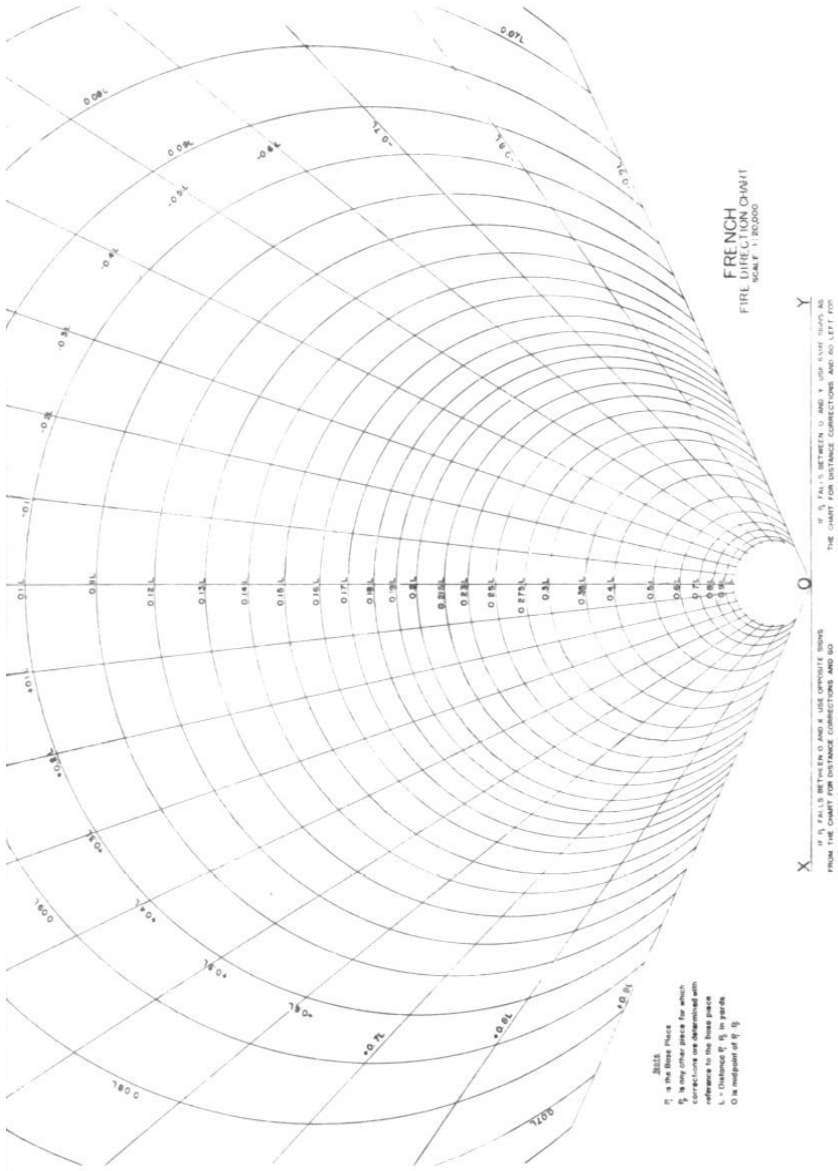
Now for the circles: Any circle which passes through both *P-1* and *P-2* is the locus of the apex of a constant angle subtended by these two points, the value

of the angle depending upon the length *L* and the diameter of the circle. Since the sizes of the circles are fixed, the subtended angles vary only with *L*. For all points on any given circle, the angle of parallax (offset), for *P-2* with reference to *P-1*, is constant.

As for the straight lines: When we were in high school we learned (or should have) that a hyperbola is a curve such that the difference of the distances from any point on the curve to two certain fixed exterior points (foci) is constant. This difference also depends on the distance, *L*, between the foci. Another thing we learned was that the hyperbola (which is difficult to plot) was closely approximated by two certain straight lines called its asymptotes. The straight lines of the chart are actually such asymptotes. Sixteen years ago this was one big headache but now we begin to see the wisdom of it all.

We now have a means for determining an angular offset and a range correction for *P-2* with reference to *P-1* for any given target—and please note that this does *not* give a shift and a range for either *P-1* or *P-2* for the target about to be neutralized, but the *corrections* for *P-2* with reference to *P-1*. In other words the corrections for Battery *A* are determined *before* Battery *B* (the adjusting battery) has completed its adjustment, and we are therefore one jump ahead of the game. *S-3* can now fume and impatiently finger a scrap of paper on which the corrections are recorded while waiting for Staff Officer *B* to finish his adjustment. When Battery *B*'s adjusted data are obtained, the corrections are applied and immediately telephoned to

THE FRENCH DIRECTION CHART



NOTE—The scale indicated has been reduced in reproduction, to a size but 29% of the transparent original.

THE FIELD ARTILLERY JOURNAL

Battery A for fire for effect—no further plotting necessary.

Fire-direction technique is, of course, susceptible of various solutions; the following procedure is a suggested use of the chart in question:

Assume that the entire battalion is in position and supporting an attack. The fire-direction center is functioning normally and the communication hookup is of the conventional type with complete wire net and the usual radio facilities. One of the liaison officers reports a threatening counterattack and requests artillery help. S-3 decides to concentrate the entire battalion on this mission. The target may have been designated by any one of the usual methods; say, for example, that the liaison officer reported it by its coordinates. S-3 passes the information to Staff Officer A saying, "Bn 7, use Battalion. Adjust with Battery B." Staff Officer A records sufficient information to determine the initial data for Battery B by a rapid plot on his grid sheet. He then passes the coordinates of the target to Staff Officer B, saying "Bn 7, adjust Battery B." Up to this point the procedure has coincided with that taught at Ft. Sill, but here there is a slight deviation. Staff Officer B is also equipped with a firing chart on which are plotted the positions of base pieces of all batteries of the battalion. He now plots the target on this second grid sheet—this he may do to the nearest *hundred yards* without serious loss of accuracy. Now comes *Les Abaques de Corrections Planimetriques* (transparent) which is placed by Staff Officer B on his grid sheet with the base piece of Battery B (P-1) and the base piece of Battery A (P-2) on the line XOY and with O' the mid-point of P-1 and P-2. at O. The distance in yards between P-1 and P-2 has been previously determined and jotted down as L, and will now be used to determine the

corrections in range and deflection for Battery A with reference to Battery B (making the adjustment). Suppose that the plotted position of the target falls on the circle marked 0.2 L and that L has been determined as 300 yards. The offset correction for Battery A to converge on the same target as Battery B is 0.2×300 or 60 mils. If the target also falls on the straight line marked $-0.5 L$, the range correction is 0.5×300 or 150 yards. Values between lines are determined by interpolation.

Now for the signs; It will be noted that the straight lines on the right of the chart are given minus values and those on the left plus values. The circles have no signs. The rule of thumb is: "If P-2 falls between O and Y use the same sign as the chart for distance corrections and go left for direction corrections." The opposite is true, of course, if P-2 falls between O and X. A rough sketch makes this quite evident. Therefore in this example the corrections for Battery A are LEFT 60 mils and MINUS 150 yards. Staff Officer B jots down these values and then does the same thing for Battery C.

During this time. Staff Officer A has been determining the initial data for Battery B by a range-deflection fan or a rapid plot on his own chart. As soon as they are known they are passed to Staff Officer B who conducts the fire of the adjusting battery by liaison methods. If Staff Officer B does not have sufficient time to determine the corrections for Batteries A and C, they may be equally well determined by a trained enlisted assistant.

During the conduct of the adjustment by Staff Officer B. Staff Officer A follows the commands to determine the adjusted data of Battery B on the target in question. As soon as these data are known, the previously determined

THE FRENCH DIRECTION CHART

corrections are applied and commands are telephoned for Batteries A and C to commence fire for effect immediately. For example, suppose that Battery B begins fire for effect with adjusted data: Base Deflection Left 240, and with a mid-range of 3600. Staff Officer A immediately applies the above corrections and telephones to Battery A a fire command giving a base deflection shift of Left 300 ($L\ 240 + L\ 60$) and an appropriate zone command with 3450 ($3600 - 150$) as the mid-range. The same thing can be done simultaneously for Battery C.

This system is a little faster than that taught at Sill but is less accurate *if* the position of the target as indicated by the adjusted data differs greatly from the position originally assumed. It is, of course, this former position which was used to determine the initial data and the corrections for parallax and distance. Even under these conditions, however, the system is still satisfactory. For example, firing at mid-ranges with 300 yards between the base pieces of the two batteries in question and making initial errors of from 10 to 75 mils in direction and from 200 to 500 yards in range, the fire of the dependent battery will still be from 60 to 80% effective. At the end of this article are given in tabular form four examples showing initial and final data of the adjusting battery, the direction and range corrections corresponding to each (in other words, the corrections actually used as determined by the initial data and those necessary to make the concentrations fall exactly in place as determined by the adjusted data), the errors in range and deflection resulting from faulty initial data, and the effectiveness of the fire of the dependent battery using the corrections determined from the initial firing data.

The degrees of effectiveness shown are based on the 200-yard concentration, which is normal for the light battery. If the target is located with an accuracy of 100 yards, the effectiveness is about 90%.

It is not the writer's purpose to show that this device is superior to the Field Artillery School Fire Direction Chart, but it is believed that it has its place. For example, in the case of reenforcing artillery which occupies position at night, after a careful topographical survey, silence being imposed prior to H hour, batteries may be laid on arbitrary azimuths and base lines will frequently be parallel. This situation will certainly be common in any modern war. Of course, this chart can be used when base lines are not parallel by applying a constant correction, but that is an added complication which is undesirable—it is essentially a chart to be used with *parallel* base lines.

It would seem that this device is particularly useful in landing operations. In this case, battery commanders are generally forced to select tentative battery positions from maps or air photos before landing and to prepare map data uncorrected for the position so selected. More likely than not, upon landing and making a reconnaissance on the terrain, the BC finds that the position selected on the map is unsuitable for one reason or another and it is necessary to select a new position which is usually within 200 or 300 yards of the point first chosen. Under these circumstances, the French Fire Direction Chart offers a ready means to correct the concentrations which were prepared aboard ship several hours before the BC had a chance to see the ground. The point first selected is P-1 and the one definitely occupied is P-2. The distance between them (L) is determined and recorded. The French Fire Direction Chart is placed over the map or grid sheet

THE FIELD ARTILLERY JOURNAL

showing the plotted concentrations and battery positions, in the usual manner, and corrections for the final battery position are determined with reference to the tentative position. The application of these corrections brings the "map data uncorrected" up to date, after which a *K* may be determined and applied by any one of the approved methods.

The construction of the chart is simple and is as follows:

- (1) Draw the base line XOY in any convenient position.
- (2) Draw the center line perpendicular to the base line at its midpoint O.
- (3) Through O drawn straight lines such that the cosines of the angles made with the base line are, 0.1, 0.2, 0.3, 0.9. Label these lines respectively 0.1L, 0.2L, 0.3L

. . . . 0.9L. The lines to the right of the center lines are positive, those to the left negative.

- (4) Draw circles tangent to the base line XOY at the point O. The centers of these circles lie on the center line. The radius of the circle for which the parallax (or target offset) is nL mils, is $\frac{1000}{2n}$ yards.

Label these circles L, 0.9L, 0.8L, . . . nL.

The chart should be made to the scale of the firing chart and on a good grade of transparent paper. The French habitually use this chart to the scale of 1/50,000 which gives very satisfactory results, but by making it to a scale of 1/20,000 it may be applied directly to the usual American firing chart.

EXAMPLE 1

	Data of the Adjusting Battery		Corrections for the Dependent Battery		Approx. Effectiveness
	Deflection	Range	Deflection	Range	
Initial	BDL 150	3000	R 100	— 30	70%
Final	BDL 200	3400	R 86	— 45	
Difference	50 m	400 yds.	14 m	15 yds.	

EXAMPLE 2

	Data of the Adjusting Battery		Corrections for the Dependent Battery		Approx. Effectiveness
	Deflection	Range	Deflection	Range	
Initial	BDR 300	3600	R 78	+ 105	80%
Final	BDR 325	3200	R 86	+ 105	
Difference	25m	400 yds.	8 m	7 yds.	

EXAMPLE 3

	Data of the Adjusting Battery		Corrections for the Dependent Battery		Approx. Effectiveness
	Deflection	Range	Deflection	Range	
Initial	BDL 280	4000	R 74 m	— 72	60%
Final	BDL 205	4500	R 63 m	— 48	
Difference	75 m	500 yds.	11 m	24 yds.	

EXAMPLE 4

	Data of the Adjusting Battery		Corrections for the Dependent Battery		Approx. Effectiveness
	Deflection	Range	Deflection	Range	
Initial	BDR 50	4100	R 72	+ 27	80%
Final	BDR 60	3600	R 83	+ 30	
Difference	10 m	500 yds.	11 m	3 yds.	

Italian Gunnery Methods

BY CAPTAIN VORIS CONNOR, FA

THE following is a summary of the methods employed by the Italian artillery in the preparation and conduct of fire, together with a few general notes on Italian organization and equipment. No attempt has been made to cover the Italian training regulations completely as the teachings or in general identical with, or very similar to, those of the American Field Artillery. Only those methods have been touched upon which were considered of interest due to their differing in some degree from our own.

Organization of the Division Artillery

The battery consists of a headquarters (*comando*), a firing battery, a munitions echelon, and a train. The headquarters is divided into sections composed of: Command post, topographic, observation post, and communication personnel. The firing battery has four pieces, four caissons (horse-drawn batteries), and a machine-gun section for close defense. The munitions echelon (pack, horse-drawn vehicles, or automotive) is normally detached from the battery under the command of an officer designated by the battalion commander.

The battalion (*Gruppo*) consists of a headquarters unit (organized as in the battery), three firing batteries, and train. The munitions echelons of the three firing batteries are generally organized into a munitions train under the command of a battalion officer.

The regiment is the largest group of the organic divisional artillery; it consists of a headquarters, of three or more battalions of the same or different type, and of a train.

Communication

Communication of the Italian battery consists of the telephone wire net and of

visual and acoustical means, flags, lamps, discs, pyrotechnics, voice, trumpet, siren, whistle, and so on. The battalion and regiment have, in addition, telegraph and radio, the latter being confined in the battalion to receiving sets.

Wire lines are laid from lower to higher command posts. All the OP's of the battalion are connected into the battalion wire central: those of the batteries may also be connected directly to their respective battery switchboards.

A liaison "patrol" is sent out from each firing battery and from battalion, those from the firing batteries to positions in or near the front lines, that from the battalion headquarters to the infantry assault battalion commander; the wire-heads of all four patrols are connected into the battalion central. Each firing battery lays its own liaison patrol line.

The battalion radio station receives the reports and sensings of the airplane observer by radio and replies by visual means; this station is connected by wire into the battalion central.

Calculation of Firing Data. Rapid Methods

Immediately upon the occupation of position by a battalion of artillery a "direction of orientation" is designated by the battalion commander. This may be the direction from the battalion OP to a battalion reference point or a compass direction.

All aiming circles set up at the OP's, and all guns, are then laid with the 0-3200 line of the former and the axis of the tubes of the latter in the direction of orientation, using any standard method (compass method or reciprocal

THE FIELD ARTILLERY JOURNAL

laying between aiming circles and between OP aiming circles and guns with or without an intermediate aiming circle according to the terrain conditions). The guns are then referred either to a distant aiming point or to aiming stakes.

The deflection of a target is usually calculated by the following method: The angle from direction of orientation to target is read at the OP, to the angle obtained the target offset ("angle of convergence") is applied, and the result is sent to the guns as a deflection shift. This method has the advantage over our "parallel method" of requiring the calculation of only one offset; it necessitates, however, a more elaborate previous preparation, namely, the laying of all aiming circles and guns of the battalion parallel on the direction of orientation.

Deflection difference and angle of site are obtained by methods identical with our own. Range is obtained by estimation, range finder, or calculation from a short base.

Where the battery is operating independently or when the direction of orientation is for any reason not designated by the battalion commander the battery commander designates same to his subordinates.

Rapid plotting methods are also much favored for the determination of firing data; these offer no innovations as compared to our own.

Calculation of Firing Data, Deliberate Methods

Upon occupation of position the regiment or groupment carries out topographical operations sufficient to coordinate the topographical work of the battalions and subsequently amplifies these by further survey and by the collection and dissemination of pertinent data.

A number of terrain points are located by the regimental or groupment

topographical section from the map or by reference to one arbitrary origin. These should be sufficiently numerous to provide at least two points for each battalion, one of which can be occupied. These points are identified physically and tagged with their identification numbers, coordinates, and elevations.

The battalions are then furnished with an "Index of Geodetic Points." a topographical map or a control grid, according to the method employed in locating the points and the time available.

The regiment or groupment continues survey operations locating all points of reference in the area occupied and the targets and prominent points in the enemy area. The battalions are supplied fragmentarily with the result of this work by "indices."

A large-scale map or grid sheet is built up as the above operations progress, showing all data collected, the locations of OP's, gun positions, and other information reported by the battalions, and also normal zones, contingent zones, objectives, etc. This map or chart is designated the "Map for the Maneuver of Fire."

The battalion topographical section conducts topographical operations, based on the data received in the "Index of Geodetic Points" or from the tags placed on the control points themselves, either to locate secondary control points for the use of the batteries, or to locate the gun positions of the batteries directly. In the first case the batteries are furnished control data by means of a chart known as the "Planimetric Sketch of the Net of Support."

Where undue delay would result from awaiting receipt of the index of geodetic points or other data from the regiment or groupment the battalion topographical section locates the guns and OP's with reference to an arbitrary

ITALIAN GUNNERY METHODS

origin, but must immediately upon receipt of control data from higher headquarters correct these locations to conform to the "net of support."

The battalion records all data determined by its own work and received from higher headquarters on a map or grid sheet called the "Map of Fire." This map is of a scale of 1/25,000 or greater. All pertinent data shown on the map of fire are transmitted to the batteries of the battalion. The battalion commander also designates the direction of orientation described in the preceding section, if this has not already been done.

The battery topographical section, starting from the locations furnished by the battalion (planimetric sketch of the net of support) locates the guns and the OP of the battery, reports their location to the battalion, and builds up a map of fire. The guns and aiming circles of the battery are laid on the direction of orientation as soon as they are in position.

Conduct of Fire

1. *Adjustment by Terrestrial Observation.*

Adjustment by terrestrial observation is classed as axial, lateral, and transverse according to the size of the angle T . When T is less than 100 mils, axial; over 100 and less than 1,300 mils, lateral; and over 1,300 mils, transverse.

a. Percussion Adjustment.

All adjustment of fire from ground OP's is reduced in the Italian procedure to one method consisting of three stages, one, two, or three of which are completed, depending upon the accuracy of adjustment desired.

The first stage consists of fire by one piece to determine a bracket of two forks, only one sensing at each limit being required when second stage of adjustment is not to be carried out. Otherwise each limit must be verified by firing an

additional round at each limit. Initial range changes of 2, 4, 6 or 8 forks are made, depending upon method used to ascertain initial range and upon the character of the target and its mobility. This stage results in a trial elevation (*Alzo di prova*) which must be one of the following:

- (1) The mid-elevation between 2 sensings in opposite sense varying by 2 forks.
- (2) The elevation of 2 rounds sensed in opposite sense.
- (3) The elevation of a target hit.

Note: When the second stage of adjustment is not to be carried out the battery may be brought in at any time.

The second stage of adjustment consists of firing 4 rounds by the adjusting piece at the trial elevation determined by the first stage, and determines an improved trial elevation or an adjusted elevation by the following rules:

- (1) 2 +, 2 — : Adjusted elevation equals trial elevation.
- (2) $\left. \begin{array}{l} 3 +, 1 - \\ 1 +, 3 - \end{array} \right\}$ Improved trial elevation same as trial elevation.
- (3) 4 + or 4 — : Improved trial elevation equals trial elevation corrected by 1 fork.

Note 1. Target hits are given the sense of the minority of sensings.

Note 2. When trial elevation of the first stage results in an adjusted elevation in the second stage the third stage need not be completed.

The third stage of adjustment consists of firing 4 rounds at the improved trial elevation determined by the second stage, and results in an adjusted elevation, determined by the following rules:

Case I. Second 4 rounds fired at same elevation as first group.

- 5, 4, or 3 rounds in one sense and 3, 4, or 5 in the opposite sense:

THE FIELD ARTILLERY JOURNAL

Adjusted elevation same as improved trial elevation.

6 rounds in one sense and 2 rounds in the opposite sense: Adjusted elevation equals improved trial elevation corrected by $\frac{1}{2}$ fork.

7 rounds in one sense and 1 round in the opposite sense: Adjusted elevation equals improved trial elevation corrected by 1 fork.

Case II. Second group of 4 rounds fired at elevation 1 fork distant from elevation of first group of 4 rounds.

4 rounds in same sense as first group: Start adjustment anew.

3 rounds in same sense as first group: Adjusted elevation is taken as elevation of second group.

4, 3, or 2 rounds in opposite sense of first group: Adjusted elevation is the intermediate elevation between elevations of the two groups.

b. Adjustment of Time Fire.

Adjustment of time fire is normally carried through only the first stage of adjustment when shrapnel is used: through the second stage when time shell is the projectile. The adjustment for range is completed using percussion burst; a group of 4 rounds is then fired (using either one piece or the battery) with the fuzes cut for time burst and the mean height of burst is obtained. Upon going into fire for effect the mean height of burst is brought to normal height. 2 to 4 mils, for shrapnel; for time shell to zero height. The range bracket elevations are increased by the number of mils of the height of burst employed.

c. Lateral Adjustment.

Adjustment by lateral observation is carried out by the standard procedure as to range. Deflection shifts are made in conjunction with changes in elevation: one s for each F . s is computed rapidly from the formula: $s = FTR$ where F equals the fork in meters.

d. High Burst Adjustment.

Adjustment by high burst is carried out exactly as in our procedure except that the center of burst is determined from 8 or 12 rounds instead of from 6.

2. *Adjustment by Aerial Observation.*

a. Airplane Adjustment.

The use of airplane observation of fire is confined, in general, in the Italian artillery, to the medium and heavy calibers. The Italians expect a heavy mortality of planes used for this purpose and teach that airplane observation is to be used sparingly and only against important targets.

The observer reports the location and nature of targets discovered and does not request fire, the decision as to the placing of fire upon the targets reported being considered the function of the artillery commander. Location of targets is reported by map coordinates, by dropped sketch, by photo, or by reference to known points, using the same method as that described below as used in sensing rounds fired.

Rounds are sensed with reference to two perpendicular axes, the directions of which are North-South and East-West and the intersection of which is on the target. The four quadrants formed by these axes are designated as follows: NE-K; SE-O; SW-S; and NW-R. A burst occurring 300 meters east and 200 north of the target is reported "300 K 200," or in the sequence, abscissa, quadrant, ordinate. This method has the advantage of not requiring the observer to know the location of the gun-target line. Conversion of sensings into firing data corrections is done by rapid plotting methods. Communication is by radio.

b. Observation by Balloon.

The balloon is used among other things as an observation post for all artillery but chiefly for artillery of the medium and heavy calibers. The normal ascension height is between 3,000

ITALIAN GUNNERY METHODS

and 3,600 feet. Sensings are referred to the balloon-target line and not to compass directions, as in the case of airplane observation.

An important duty of the balloon observer in supervision of artillery activity is the surveillance of camouflage and advice as to its efficiency.

3. *Transfers of Fire.*

Transfers of fire are effected in a manner similar to our methods. Limits of transfer of fire are given as 1,000 meters in range at midranges and as 100 to 300 mils in deflection depending upon the velocity and direction of the wind.

When no suitable check target upon which the preliminary adjustment can be made is available, a group of 8 or 12 rounds is fired at a suitable range and deflection, the center of impact is plotted, and the transfer effected from this arbitrary point. This procedure, it may be noted, is the same as that used in high-burst adjustment.

4. *Fire for Effect.*

When neutralization is desired over a 200-meter depth the battery is brought in (if this has not been done during the adjustment) as soon as the first stage of adjustment has been completed.

When neutralization is desired over an area of less depth than 200 meters (as for instance in neutralization of definitely located trenches) the battery is brought in at the improved trial elevation determined by the second stage of adjustment. The elevation of each gun is corrected by an amount previously determined by calibration.

When fire for destruction is to be delivered and the fire of all guns of the battery is to be placed on the target, each piece, other than the piece used in the initial adjustment, fires the third stage of adjustment, using the adjusted elevation of the first piece as the improved trial elevation.

b. *Fire for Effect, Data Corrected for Weather Conditions.*

The Italian battery is equipped with a barometer of the aneroid type, a thermometer, and an attachment to the aiming circle which measures the direction and velocity of the wind. This equipment enables the battery commander, in case the meteorological message from higher headquarters is, for any reason, not available, to make approximate corrections of the moment. For this purpose the following formulas are contained in the artillery handbook.

I. Corrections for condition of the ammunition.

- (1) For each increase of 7 degrees C. in ammunition temperature the muzzle velocity increases 1%.
- (2) For each increase of 1% in weight of the projectile over standard weight the muzzle velocity decreases 0.4%.

(A) For each increase in muzzle velocity of 1% [from (1) and (2)] decrease map range 2% for short ranges, 1% for midranges and 0.5% for long ranges.

(II) Corrections for air conditions.

- (1) Each increase of 1% in weight of projectile over the standard weight is equivalent to decrease of 1% in density of air.
- (2) Each increase of 1% in barometric pressure is equivalent to increase of 1% in density of air.
- (3) Each increase of 1% in absolute temperature of air ($273 + T$) is equivalent to decrease of 1% in air density.
- (B) For each increase of 1% in air density [from (1), (2), and (3) above] increase map range by 0.3%.

(III) Corrections for Range Wind.

- (C) For each multiple of 10 meters

THE FIELD ARTILLERY JOURNAL

per second (22 MPH) in rear wind decrease map range by 2%.

(D) The net correction equals the algebraic sum of (A), (B), and (C).

Corrections of the moment are, of course, calculated accurately from the range tables when the meteorological message is at hand.

5 mils in deflection and 1 fork in range are added to each limit of concentration when fire for effect is based upon map data corrected for meteorological conditions.

GENERAL NOTES

Maps

The map adopted by the War Ministry for military use, known as the Topographical Map of the Kingdom of Italy, is a polycentric projection to the scale of 1/100,000, published in sheets each of which covers an area of 20 minutes of latitude by 20 minutes of longitude. The sheets are numbered serially from west to east commencing at the northwest. Each sheet is divided into four quadrants designated by the Roman numerals I, II, III, and IV, the numerals

starting in the northeast quadrant and progressing clockwise. Each quadrant is further subdivided into "tablets" designated NE, SE, SW, and NW. The quadrants are published separately in a scale of 1/50,000, and the "tablets" in a scale of 1/25,000. The "tablet" is the map used by the artillery for the building up of the "Map of Fire."

All issues of the above map, sheet, quadrant, or tablet are gridded, the Y-lines of which are separated by one minute of longitude, the X-lines one minute of latitude apart. The grid squares are designated by two groups of two letters each. The location of a point within a square is given in millimeters, regardless of the scale of the map. Thus a point in square SN-DF 10 mm. east of the west edge of the square and 21 mm. north of the south edge is given by coordinates reading SN 10 DF 21.

Armament.

The Italian artillery has the following weapons: Guns of caliber 65, 75, 105, and 149-mm., howitzers of caliber 100, 149, 152, 305, and 381-mm., mortars of caliber 210, 240, and 260-mm.



Reviews

Cantigny, A Corner of the War. By Jeremiah M. Evarts, Captain, 18th Inf., 1st Div., AEF. Privately printed by the Scribner Press, 96 pages.

Lt. Gen. Bullard's introduction to this collection of brief sketches is a sufficient general review. He says, "Doubtfully, at the request of the writer whom I commanded in the things he writes of. I picked them up to read, two or three perhaps, surely not all. I laid them down only when I had read the very last. With few words and simple he more accurately and more truly than any other I

have ever known makes us feel, take part in what he and his comrades beside him were feeling at the time of men's greatest strain, fears and passions in perhaps all history."

From the artillery viewpoint, it is evident that the author is, probably quite naturally, not concerned with the niceties of artillery phraseology. The Sixth Artillery will find a particular interest in the chapter "A Cup of Chocolate."

An "infantry book"? Yes, but we seem to remember hearing on numerous occasions something to the effect that

ITALIAN GUNNERY METHODS

the more the artilleryman knows about the infantryman, the better artilleryman he will be.

—H. W. B.

Japan, Government-Politics. By Robert Karl Reischauer, Princeton University, Thomas Nelson and Sons. New York. 221 pages. \$2.00.

This is a book, primarily intended for those beginning the study of Japanese Government, written by a man born in Japan, a good friend of the Japanese and a resident among them for twenty years, who was, ironically, killed by Japanese bombs in Shanghai in 1937 before this work was completed. It has, however, been brought up to date by Mr. H. M. G. Labatt-Simon, to whom Dr. Reischauer's wife gives credit, in a preface dated January 2, 1939, for completing the text.

The author points out that the three categories of government—liberal, fascist and communist—into which governments are today customarily classified are products of European civilization and that Japan's government, whatever its outward form may be, is neither of these but a fourth form—the Kodo. "The Imperial Way." To understand how the Japanese government functions under the principles of "The Imperial Way" one must first understand the fundamentals of Japanese political theory and the evolution of the Japanese state from its primitive tribal form into the present strongly centralized government. How different their political thought is from ours is evident from a mere reading of what the author enumerates as the fundamentals of Japanese political theory: That society is more important than the individual, that all men are by nature unequal, that politics is synonymous with ethics, that government by man is superior to government by law, and that the patriarchal family is the ideal state.

To the American army officer whose knowledge of Japan is elementary, this book is particularly recommended as a valuable background for his natural professional interest in Japanese military organization and methods. To the officer whose knowledge of Japan is extensive, this book will not bring new facts about Japanese government and history, but it will present interesting and thought-provoking interpretation of the facts.

—H. W. B.

NOTES ON FRENCH ORDNANCE, 1717-1936, by Captain James Hicks, Published by Andre Jandot, 234 E. 50th St., New York City. \$3.50.

This book appears to be an extremely valuable reference work. Practically every item of ordnance imaginable is described—if briefly—and illustrated—if not very attractively. The manner of illustration and of reading matter generally is that of reproduction from what appear to be photostats. However, this undoubtedly lends itself to more precise examination of the figures than would any kind of photograph or other medium. The fact that nomenclature often appears in French, untranslated, on the illustrations, is another handicap, but not an insuperable one to the determined researcher.

Not only heavy ordnance, but small arms in great detail, tanks, machine guns—from the beginning of the old mitrailleuse—trench knives, steel helmets, gas masks, are included. Certainly no small-arms or gun-collecting enthusiast should be without this work, and as for the rest of us, while we may not be able to imagine, right now, what information on French ordnance prior to 1936 is important for us to have—there is always a first time. When and if such time arrives one should be pleased to have knowledge of such a compendium, by far the greater part of it already translated.

Notes And Comments

BY J. S. W.

Artillery and Aviation. The present interest and activity in Air Corps development should undoubtedly include measures for increasing the effectiveness of observation aviation. The artillery is particularly concerned in this, for without air observation the varied and important missions of modern artillery cannot be fulfilled.

This is especially true of counterbattery missions which become of prime importance in war of movement. Stabilized situations with their possibility of well organized ground observation, accurate fire control maps, and constant surveillance of enemy activities and installations may allow a reduced number of planes for artillery use, but the need for air observation becomes predominant as soon as movement into new terrain begins.

The need for artillery aviation has long been recognized by artillerymen throughout the world. The question was studied in France by the Commission on Field Firing as early as 1909. In 1911 the Commission recommended the creation of aviation for the exclusive use of artillery. Nothing came of these recommendations however, at that time nor later, and twenty-five years have been required to find the idea again suggested rather timidly in the 1936 French Instructions for Artillery Fire.

The failure of the French army to provide proper observation aviation for its artillery before, during, or since the war has been bitterly criticized by many eminent artillerymen, among them General Estienne, who originally proposed the plan, and General E. Dumas, who has recently discussed the subject in the *Revue de*

L'Armée de L'Air and the *Revue d'Artillerie*. The opinions of the latter are of particular interest and are summarized in the following paragraphs.

General Dumas begins by stating that the needs of the artillery depend on the missions assigned it. After these needs have been evaluated, the amount of aviation necessary to satisfy them may be determined.

In a general discussion of artillery requirements there must be some accepted basis of organization. General Dumas accepts the usual organization of army, corps, and division artillery regiments, and the regiments of the general reserve. He also accepts the usual mode of handling missions by groupings of artillery, the groupments being commanded ordinarily by regimental commanders.

Under such an organization, observation planes should operate with the various groupments whose commanders will handle their air observation just as they do their terrestrial observers. Consequently, the assignment of a certain number of planes to each regiment is indicated, in peace or in war, in order to insure understanding between artillery observers, pilots, and batteries. This is indispensable for rapid and effective execution of artillery missions. The complexity of these missions on the modern battlefield and the large number of units firing in the same zone render observation very difficult and almost impossible for an observer who is not an artilleryman and even a member of the organization firing. The unfortunate consequences of recruiting artillery observers from other arms of the French army in 1917

NOTES AND COMMENTS

demonstrated this in no uncertain fashion. The evidence of the war is all in favor of rendering artillery able to fulfill all its missions, including the prime one of air and ground observation, with its own resources.

The Commission of 1911 recommended an assignment of aviation to the corps artillery on the basis of three planes per regiment. General Dumas believes that the organization proposed would have been satisfactory then and that it would be satisfactory today. As long as the regiments and their groupments are the essential command elements of artillery in action, it is logical to assign planes to them.

The number of planes needed must be determined from the characteristics of the planes in use at any moment (number and duration of flights possible during a day of battle) and the probable duration of the missions to be fulfilled. The artillery will know what air observation its missions will require, and the aviation will know the best type of plane to carry the observers, also the best organization for pilotage and maintenance. The ideal characteristics for an artillery observation plane are: Easy and wide-angled observation, adequate security, ability to land and take off on extemporized fields in the vicinity of the batteries, wide range of speeds (slow for observation, rapid for maneuver or flight), simple and rapid means of communication (two-way radio is the ideal).

The planes for artillery observation need not be confined to one type. In this connection, the helicopter or the autogiro offers evident advantages for the use of division artillery on its close range missions, but its present speed and maneuverability are insufficient to allow its use on distant missions where it will be more exposed to the attacks of enemy pursuit planes and antiaircraft artillery.

The observation plane must have an appropriate armament for its protection if surprised or overtaken in the course of a mission. Furthermore all occupants of the plane should be capable of handling the armament and trained in its use. The objection is sometimes made that observers from the artillery can not participate in this defense—hardly a reasonable objection, as artillerymen are certainly capable of handling guns and can be readily trained to use any type. In any case, the main protection for observation planes is that furnished by friendly pursuit aviation rather than by the observers themselves.*

The time may come when aerial artillery will appear. Close cooperation of artillery and aviation in artillery aviation will assist greatly in such a development. The transition period in the organization of artillery aviation may be of considerable duration, but with the earnest cooperation of both arms, much may be rapidly accomplished.

In 1933, at a time when an increase of heavy artillery was demanded in the French army. General Estienne wrote: "It is not heavy cannon but light airplanes that we artillerymen demand, from the depths of our blindness. With these as much a part of our equipment as our eyes and our glasses, we will make the invader quickly take to earth in spite of his heavy guns which, after all, did not win the war—a fact often overlooked. In war of movement one observation plane is often more valuable than ten guns, and I deplore the fact that an artillery aviation is as nonexistent today as in 1914."

General Estienne lauds the "incomparable services rendered by the single plane which accompanied me everywhere,

*In this regard, it is interesting to note that the Germans contemplate one pursuit squadron and one reconnaissance squadron as part of each army corps.

THE FIELD ARTILLERY JOURNAL

night and day, without regard to wind, rain, fog," at the beginning of the war as part of the division artillery in Pétain's division. On this vital subject, the great Marshal himself expressed his opinion as follows in 1937: "The French artillery can not have full play in battle until it can assure the observation of its fire and location of its objectives by its own means exclusively."

Recent reports indicate that the French authorities have finally taken steps to provide their artillery with its own artillery aviation. The Minister of War, in a discussion before the Chamber, on the military appropriations for 1938, stated that development of special artillery observation planes was contemplated but that, owing to the cost of heavy planes, a light plane with limited armament would be used at first. The autogiro was indicated as offering the best possibilities for artillery observation. The air observers are to be artillery officers from the land army.

Le Temps, in commenting on this, warned against the use of light, relatively slow moving planes, such as the autogiro, which could not maneuver rapidly deep in the enemy lines. It supported the idea of placing observation planes at the entire tactical disposal of artillery commanders, but stated that such aviation should remain under the air army for matters of armament, supply, and training of pilots and gunners.

An expression of the German view on the subject of artillery aviation is given in a recent article in the *Militär Wochenblatt* by Lieutenant General Marx, the foremost German writer on artillery subjects since General von Rohne. General Marx states that, in general, aside from the matter of motorization, no real improvement in artillery action has occurred since 1918; and asks if the artillery is, like the infantry

and cavalry, at the end of its development. After commenting on the various artillery means, which are largely the same as those in use twenty years ago, General Marx indicates two prime necessities for artillery improvement: First, the production and supply of sufficient ammunition for practice in peace and action in war; and second, the development of artillery aviation. "Give us," he says, "a flying observation post; give us our own eyes; give us an observation plane of our own."

* * * * *

The matter of observation aviation for the exclusive use of artillery is as vital to us as to the French and Germans. However, it does not appear necessary to create a separate artillery aviation within the artillery. Closer cooperation and training between the two arms should solve the problem. At the same time, it must be recognized that artillery observation from the air is a difficult job and one that will demand all the time and thought of an observer thoroughly trained in artillery methods and requirements. It is not likely to be handled satisfactorily without observers from the artillery. These can be selected artillery officers detailed to the Air Corps or officers of both arms who are given a thorough schooling at an Artillery-Air Corps Observers School. Such a school for air observation should be established, it is thought, at Fort Bragg rather than at Sill, the extent and nature of the terrain being much more suitable for the purpose.

Motor Marching. During the past few years there has been much use of motor marching by large units, both in military maneuvers and in actual combat. Various forms of marching have been tried, from the independent or infiltration

NOTES AND COMMENTS

system to the close column or moving road-block arrangement. In view of the dangers from air observation and air and ground attack, the general trend of thought and practice appears to be toward more dilute, rapidly moving, small march units.

Two articles have recently appeared which indicate the British and German view of the problem.

Movement of German Artillery

The *Artilleristische Rundschau* for September and October, 1938, contains an article by Lieutenant Colonel Kruse, of the German army, on the employment of heavy motorized artillery. A considerable portion of the article is devoted to a discussion of marching.

Colonel Kruse states that motorized artillery battalions, under conditions in which enemy interference is unlikely, march in the same order as horse drawn battalions: Reconnaissance detachments, headquarters batteries, gun batteries, combat trains, field trains. If enemy interference by armored vehicles, motorcyclists, or inhabitants is to be expected, the order must be changed. A detachment in trucks, accompanied by a motorcycle messenger, must be sent out at least a thousand yards ahead of the column, followed by an anti-aircraft element. One of the gun batteries follows, rather than the headquarters battery, for the reason that it is more capable of immediate action if attacked. Within the battery the guns (or at least one gun) are placed first, followed by the battery detail and the battery section of the combat train. Battery service vehicles, particularly gasoline trucks, should march with their own batteries, as should the field kitchens. Then comes the headquarters battery, the second battery, the remainder of the combat and service trains, and the third battery at the

rear, with a gun section and an anti-aircraft element at the end. The battalion commander keeps in touch with his batteries by radio and motorcycle messenger. The battery commanders remain with their units as long as possible.

The marching speed of a battalion is about 20 kilometers an hour; and about 25 kilometers an hour for single batteries. A first halt of from 15 to 30 minutes is made after about 45 minutes of marching. Thereafter, halts of 15 minutes are made every 1½ to 2 hours. The march distance between vehicles varies, of course, with the speed. Regular distances are not demanded, the important thing being to keep up the speed.

The close control of circulation becomes of major importance in dealing with motor units. It must be practiced in all peacetime maneuvers in order to work in war. Colonel Kruse believes that the assignment of airplanes for circulation control would be of great assistance. By dropped messages and loud speaker, information of changes of route, order of transit, crossing of columns, and so on, could be given quickly to the marching unit or to the traffic control post concerned.

The defense of zones of march by anti-aircraft units is contemplated in all armies. However, each column must be prepared to defend itself not only against air attack, but also against attack by armored cars and motorcycle units. The measures to be taken in case of air attack include halting each truck in place, shutting off motors, opening fire from the ground, keeping away from trees, and making preparations to resist an accompanying ground attack.

Heavy motorized artillery is likely to be employed usually as corps artillery. In an advance, it will follow a division march group. If the latter moves at the rate of infantry, the motorized artillery

THE FIELD ARTILLERY JOURNAL

must advance by bounds, which means long halts. During such halts the various units must separate widely and avoid crowding on the roads. In enemy country or in enemy withdrawals, areas for halts must be carefully examined for contamination by gas. Special precautions must be taken to provide continuous observation for enemy aircraft and to give prompt warning in the event of their appearance. Machine guns and antiaircraft guns are installed to cover as wide a field of fire as possible.

March of an English Division

A road movement exercise of the British 2nd Division, in the Spring of 1938, described in the November *Journal of the Royal United Service Institution*, was held for the purpose of finding the safest and quickest method of moving such a unit over a distance of about 50 miles in a zone protected by ground troops but exposed to air attack. The division comprised 3 infantry brigades of 3 battalions each, 1 mechanized cavalry regiment, 3 field artillery regiments, 1 antiaircraft regiment, 1 engineer battalion, 1 signal battalion, and the service elements. All units except the infantry were motorized.

The tests showed that a division of this sort, with two roads available and with 300 trucks for the transport of infantry personnel, can complete the move, at a density of five vehicles to the mile, in 13½ hours at an average rate of 20 miles an hour and in 18 hours at 15 miles an hour. In view of the discomfort and slowness of night movement, the greatest possible use of day marches is recommended, at densities of five vehicles to the mile to avoid detection from the air. Night moves should, if possible, be restricted to slow or easily detected types of vehicles.

Drivers of the transport trucks were on the road for over 20 hours out of 30. In many cases, the drivers worked without relief, consequently with considerable physical strain.

Three general systems of day marching were considered: The independent movement of individual trucks; the movement according to scheduled times for clearing of given sectors by particular units; and the controlled dispersion of units marching at maximum speed and at a certain density (5 vehicles to the mile), with no closing up at halts. The first system was deemed unsuitable owing to lack of control; the second as uneconomical in road space and presenting serious difficulties in case of obstruction; while the third was recommended as the best for general use. It combines the requirements of simplicity, controlled speed, ease of driving, and relative invulnerability to a greater extent than the others.

For night driving, double hooded tail lights (red and blue) were recommended. With lights, the controlled dispersion system was used for night marches at a rate of 15 miles an hour and twenty vehicles or less to the mile.

Halts were not made for moves of less than 3 hours. For larger moves, a halt of 15 minutes after three hours was required. A long halt of one hour was recommended for moves of more than 100 miles. Units were not closed up at halts and all available cover was used. In secret night movement, ten-minute clock hour halts should be made each hour.

Traffic control posts from 10 to 15 miles apart with telephone and radio communication were recommended. Commanders of these posts should have a motorcycle, a road-patrol unit, a light truck, and a small car at their disposal.

All vehicles should have distinctive

NOTES AND COMMENTS

markings and each vehicle should carry a *Pass* signal for display to vehicles in rear. Unless this pass signal is given individual drivers halt, if possible under cover, as soon as they see the vehicle ahead has halted.

The use of unit trucks for carrying the marching personnel of infantry battalions should be exceptional. The medical, headquarters, and anti-aircraft machine-gun trucks should always keep their normal loads.

The exercise showed that large motor columns marching steadily at low densities have little to fear from the air. With regard to air observation, there is a vast difference between densities of 5 and 10 vehicles to the mile. At the higher figure, aircraft flying at a reasonable height were able to observe the movement almost as soon as it commenced. At the lower density, movements of entire regiments remained undetected.

* * * * *

It is difficult to imagine a situation where motor movements in the zone of combat against a modern enemy will not be in danger of observation and attack from the air. The depth of the danger zone is constantly increasing with the speed and range of airplanes and may be as great as 200 miles behind the front. Under these conditions, the system of moving large masses of trucks in close column along roads in rear of the front appears undesirable from all standpoints. There is no secrecy, the vulnerability is great, and the close mass effectively blocks all back and cross traffic for miles. Yet we see this type of motorized and mechanized road block constantly used during our maneuvers in situations where enemy planes and even ground forces could not fail to be a menace. The idea of making such movements will have to be abandoned in the presence of a real enemy and it

should be abandoned in our peacetime training.

Tactical Trends in the Employment of Artillery. As usual, after long years of peace the hopes and thoughts of military leaders and staffs throughout the world are directed toward a short, decisive war. The Italians base their whole military doctrine on this conception, and even in France, the stronghold of military conservatism, there are indications of a change in views regarding the possibility of a war of maneuver. The following digests of articles which have appeared recently in foreign journals give an idea of the modern trend in this direction:

Modern Artillery Requirements and Methods

General Umberto Spigo, of the Italian artillery, discusses modern artillery methods in the October number of the *Rassegna de Cultura Militare*. He studies the matter with special regard to the training of reserve officers for their role in war.

The prevailing military doctrine today in Italy is based on the conception of a short war brought to a rapid decision by swift movement and fought by the whole "nation in arms." The role of the professional soldier is to furnish an organizing, directing, and coordinating element for the force of the nation—a force which may be evaluated roughly as the mass of men multiplied by the square of their velocity of use. The "nation in arms" means a maximum of citizens under arms: therefore, in time of peace, larger contingents and shorter training periods. There will be only about one regular officer to six of the citizen contingent. These latter will be the troop commanders and to them the artillery must entrust its fire which, in this first phase, may be decisive.

This leads to the question: Are

THE FIELD ARTILLERY JOURNAL

Italian artillery methods suitable for this personnel and is Italian procedure adapted to the requirements of a war of rapid movement? The training problem is to obtain the maximum results in minimum time with the realities of war always in mind. All work in peacetime must be directed to this end.

As concerns the artillery, many of the methods in use are more suited to the conditions of peace rather than war and are adapted to experienced regular officers rather than to officers of the reserve. For example, in the artillery schools, training in conduct of fire has precedence over all other activities. Everything depends on "fire" and the meaning of each single burst. But artillery fire in combat is not merely a ballistic fact. It implies a complete organization of fire action and movement. In fact, the tendency today is toward the maneuver of batteries, prompt to occupy and change position and, above all, ready for immediate action against fleeting targets. The true tactical value of artillery fire depends on the maneuverability of the whole artillery system: Guns, communication, ammunition, observation, and command. However, rapid maneuver receives little attention in peacetime training. The preoccupation with calculations of various sorts precludes this vital form of activity. Fire divorced from tactics is only a false and misleading manifestation. A real tactical atmosphere is not an abstract conception, not merely a matter of a map situation. It must pervade all elements in peace as well as in war.

a. Commanders—The urgent necessity for adapting artillery fire action to the changing needs of infantry requires immediate contact of artillery commanders with the commanders of

supported infantry. The uncertainty of long lines of communication must be avoided. Battery and battalion commanders must be well forward to maneuver fire, or to send out observers still further to the front.

b. Observation—The apparent emptiness of the modern battlefield is well known. Concealment of thousands of troops and weapons in all sorts of terrain has been practiced until distant observation of their activities has become exceedingly difficult.

Night marches, camouflage, rapid movement by motor—all have aided in the concealment of the enemy and his intentions. Moreover, the increased range and number of guns in action have increased the depth of deployment and the distance from gun to target. Under these conditions—those of war which are the only ones that count—where is the artilleryman who believes that he is going to discover the objectives on which he acts and, once discovered, to control fire on them from observation posts in the vicinity of the guns? Artillery observation and fire control have become a matter of advance reconnaissance and observation detachments (*pattuglie*), led by responsible officers, often by the battery commander himself.

In the face of all this, the conditions of observation of fire in service practice are usually elementary and unreal, to wit:

Target zones in plain view with too many reference and check points.

Ranges very limited, particularly for corps and army artillery.

Targets plainly marked out on ground and visible at considerable distances.

Concentration of materiel and personnel of both observation and fire units in congested areas.

Consequently, there is little practice of forward observation detachments in

NOTES AND COMMENTS

the following important essentials:

- Determination of their location.
- Communication with the batteries.
- Designation of objectives.
- Advance observation.

There is an excessive preoccupation with conduct of fire, giving the impression that fire is the end instead of the means. The few rounds saved in careful adjustment actually mean very little. The waste comes in the thousands of rounds absorbed in injudicious or untimely fire action on badly chosen objectives.

In war of movement, the problem of observation is more urgent than ever for the artillery, but in the broadest sense: Close watch of the enemy zone, location of objectives, designation of targets to the proper units of fire, adjustment, and information of results obtained—all this with the shortest possible delay. Timeliness of action is the main requirement.

Generally speaking, the forward reconnaissance detachments in the front lines furnish the only solution and their importance must be stressed. During service practice, all requests for fire should come from them and in most cases the fire should be observed by them.

d. Materiel—The gun is only a machine to deliver a certain amount of ammunition on the enemy. In war of maneuver and with rapid-fire cannon, it is not so much the number of pieces that matters as the ammunition available. Theoretically, the rapid-fire single-gun battery would be ideal, delivering the required tonnage with a minimum of personnel, materiel, and vulnerability. At present, various practical considerations lead to a battery of more than one piece, usually four. Technical improvements, however, may enable this to be changed.

The development of a few standard types of cannon is most desirable from all

standpoints. However, the difficulties of such a standardization are great. The most marked change in recent artillery has been the increase in range.

The density of armament of a modern front of combat is greatly increased over that of the World War, as has the possibility of enemy reaction from similar armament on the same front. Moreover, the bombing and machine-gun action of attack aviation must now be considered. Under these conditions a revision of the old rules for artillery employment and emplacement is necessary. The batteries must, in general, be scattered in a zone of considerably greater depth. The old guns of the war have not sufficient range and flexibility to meet modern conditions. Consequently, we find in nearly all armies a trend toward building new guns with a range of not less than twelve kilometers for light artillery, sixteen kilometers for medium, and twenty kilometers for heavy pieces.

e. Ammunition Supply—In spite of its fundamental importance, the matter of ammunition supply is usually little considered in exercises and maneuvers. In war of movement, the timely supply of ammunition is particularly difficult. The axiom of the regulations that "the problem of artillery is essentially one of ammunition" must be developed and applied in practice. A most important practical requirement, but one that is exceedingly difficult of realization, is the reduction of shells, fuzes, and charges to a few standard types.

f. Preparation and Conduct of Fire—Although many steps have been taken in the past few years to modify the procedure of preparation of fire in accordance with the actual requirements of combat, much still remains to be done. The process must not be too technical to be grasped rapidly

THE FIELD ARTILLERY JOURNAL

by the officers of the reserve contingent and of other arms. The use of mechanical and more or less automatic instruments must be developed. In this connection, greater use should be made of the widely distributed small-scale topographic maps which are available everywhere and to everyone. Time will be lacking for the elaboration of largescale fire-control maps.

The present rules for the conduct of fire, although simplified since the war, still place too much stress on the individual adjusted round—a matter of relative unimportance in the new form of combat where the artillery acts by zone fire for neutralization. Moreover, virtuosity in technique of fire only delays passage into fire for effect without assuring any increase in its effectiveness. In this regard, it must be remembered that a large number of rounds must be expended for each casualty produced. Judicious tactical employment and immediate response to the needs of the infantry are the real guarantees of effective fire. Time has become the most important factor in artillery action.

The artillery must keep up-to-date in both materiel and procedure and its tactical doctrine must conform to the new requirements of modern warfare. Its methods of preparation and conduct of fire must be simplified and adapted to the abilities of the thousands of relatively inexperienced officers who will command its firing units in time of war.

Artillery Support for Infantry. The ever important subject of artillery support for infantry is discussed by the eminent French artilleryman, General V. Buchalet, in the *Revue Militaire Générale* for December, 1938. General Buchalet states that despite all efforts the coordination of infantry and artillery action made little real progress during

the World War and is not much further advanced at the present time, although the constantly increased power of fire in modern armies has rendered the infantry task more and more difficult. Effective liaison between the two arms requires a proper organization of command and must result in prompt and opportune artillery action against the obstacles that impede the infantry advance.

Artillery action for the protection of advancing infantry implies close support. The French define the field of fire of such action as extending only to the limit of the visible horizon, thus securing the two main essentials, timeliness of fire and judicious expenditure of ammunition, by means of terrestrial observation.

Artillery objectives in this field of fire are the zones from which enemy fire impedes the infantry progress and which cannot be neutralized by the infantry with its own fire. Usually these zones can be ascertained and indicated only by the infantry battalion commander. The primary artillery-infantry contact must be made, therefore, within the infantry battalion. However, true liaison requires not only this contact but also a community of command.

In theory, and according to the regulations, community of command of the two arms begins with the division commander. The combined action of an infantry regiment with one, two, or three battalions of artillery and, perhaps, a battalion of tanks, has no common commander closer at hand than the division. According to the usual division orders, the artillery is adapted, but not attached, to the infantry for its support. Collaboration is demanded, but without subordination. Such a system presupposes not only the most cordial understanding between the two commanders, but also a mutual and thorough knowledge of

NOTES AND COMMENTS

the needs and the employment of both arms—a knowledge most difficult to obtain in the ordinary course of service.

From the standpoint of training, the creation of an echelon of command of all arms below the division would present the immense advantage of an early development of the aptitude for higher command. Furthermore, within the division itself, the necessity for subordinate groupings comprising all arms has become imperative owing to the great increase in fire power and in the various elements of combat action. Neither the proximity of artillery and infantry command posts nor the assignment of liaison officers has enabled the old system of artillery adaptation to work successfully.

The objections to the creation of organic groups of all arms within the division fall within two different categories. First, it is believed that the proposed reform will cause dangerous changes in the structure of the army. Second, there is a fear that such a parcelling out of artillery will hinder proper combined mass action.

The first objection can be dismissed without further examination, as it implies an impossible fixity of organization, in denial of the progress of science which keeps the army in a constant state of change. In so far as the second objection is concerned the artillery can always be controlled by orders from the division commander if necessary, whether subordinated to lower commanders or not. When large concentrations of fire are contemplated, they can be arranged through the initial assignment of contingent zones for artillery action. Besides, it is well not to count too greatly on the famous effects of mass action outside of the normal field of fire for close support. Above the battalion, concentrations require considerable time—at least fifteen minutes for well-

instructed units. Moreover, the advantage of such concentrations lies in the greater surface covered rather than in an increased density of fire on the actual ground occupied by the objective.

The question remains as to how far the decentralization should be carried. Undoubtedly, the best coordination of the two arms is assured by close touch between battalions. But the requirements of command render difficult a decentralization below the infantry regiment. Therefore, decentralization of command to an infantry regiment—artillery battalion grouping is indicated, with a decentralization of fire to the battalion-battery echelon.

The temporary solution of improvised groups for combat must give way to a more natural and logical organization of commanders and weapons. With the present necessity for modernizing the army, the time for this change has arrived.

* * * * *

In the United States Army the necessity for direct and close contact between infantry battalions and supporting artillery has long been the basis of our liaison arrangements. With this conception and with our forward-observer methods for the control of fire, our artillery has made much progress toward a solution of the problem of providing timely and effective supporting fire for infantry. From the standpoint of command and combined training, however, we are as far behind as anyone. Our need today, as in the past, is for a combat organization of all arms that can exist in time of peace and provide combined training for the probable situations that will confront our armed forces in time of war.

Our fortunate geographical situation has spared us the necessity of maintaining a large military establishment

THE FIELD ARTILLERY JOURNAL

to assure continual protection of our frontiers. However, our peacetime organization should provide actual combat units in each Corps Area ready for immediate use in small affairs and to serve as a basis for the higher units required in a great national emergency involving modern large-scale warfare.

The wide variety of terrain and of missions which our forces may encounter demands flexibility in the formation of higher units. They must be organized according to the conditions which they are expected to meet and no one fixed unit will satisfy all requirements. At least three or four different types of divisions are organized in Europe today, and we shall probably require at least as many.

The fighting power of any higher unit, whether division, corps, or army, will be based on the combined action of infantry, artillery, cavalry, and mechanized elements, operating in conjunction with aviation. By varying the proportions of the component arms we may form the required type of large unit for any particular situation. The size of such units, however, prevents their actual existence in our peacetime establishment.

The fundamental fighting unit which can actually exist in peace as well as in war to serve as the basic component of the various larger forces must conform to certain definite specifications. First, it must be small in order to exist and train in the posts and training areas which we now possess and in order to facilitate mobility and rapid command. Second, it must be capable of handling the small independent missions which are most likely to confront our widely scattered peacetime forces. Third, it must be suited to the operation and training of the National Guard and the Reserve. Fourth, its peace strength and war strength must be the same, in so far as its basic combat elements are concerned.

A small but powerful combination of the essential weapons seems to be indicated, capable of rapid movement and of rapid maneuver by a single commander in combat. At present, it might comprise reconnaissance, security, shock, and supporting elements of armored cars, tanks, artillery, infantry, and engineers. Finally, its personnel will be trained in the combined action of all these elements, not as separate infantry, artillery, or other units thrown together by chance, but as essential parts of a single fighting organization.

The weapons and the interior organization of this unit force will change with the times. It will be, in fact, a training laboratory for the development and use of new weapons and tactical formations. Its size, however, must remain small—about three thousand or thirty-five hundred men.

The peacetime organization and the actual existence of such combat units in each Corps Area would improve our defense in many ways. With the facilities and posts now available they can be organized and maintained. They would provide a real force for rapid use. Mobilization would be facilitated. They would constitute models for the National Guard and Reserve which would be organized fundamentally into similar units. Their organization would stimulate and vitalize the training of reserve officers as well as those of the regular establishment. Their use would greatly facilitate the combined field training of large units; division, corps, and army. One such unit at each of our schools would give substance and reality to the instruction and serve as a testing laboratory in the development of materiel and of tactics. In short, they would be of the utmost value in the training and effectiveness of our entire Army in peace or in war.

More on the Santa Barbara Theme

WHEN, two years ago, it was suggested to the JOURNAL by a member of the Executive Council of the Field Artillery Association, that the readers might like to know something about the origin of the picture of Santa Barbara which has graced its masthead for now seven years, some research was done on the subject, and a story was published in the May-June number, 1937.

It has been followed by occasional mention since, as interest was aroused, and requests arrived for more data, or readers volunteered more. Brigadier General George A. Wingate (Surrogate of Brooklyn, N. Y.), sent the JOURNAL a Christmas card he had received from a kinsman. Sir Reginald Wingate, which included the reproduction of an old Italian print of Santa Barbara, which is published herewith.

There was a printed explanation of her legendary connection as a field artillery symbol, and a note, in Sir Reginald's hand. "I thought, as a gunner, you might be interested in the story of our Patron Saint." Another portion of the card was embossed with the arms of the Royal Regiment of Artillery, and its historic motto. *Ubique*. This sounded like another story, and here it is.

General Sir Reginald Wingate, holder of practically all the higher orders and decorations of Great Britain, is an artilleryman, one of most distinguished and varied service, staff officer and successor, as Sirdar of Egypt, to the great Kitchener.

There is an account of some of this in "The Royal Engineers in Egypt and the Sudan," by Lt. Col. E. W. C. Sandes. D.S.O., M.C. It appears that in November, 1899, after the capture of Omdurman and Khartum, Lord Kitchener assigned Sir Reginald Wingate to command a flying



column, consisting of all arms, to pursue the Khalifa and the Dervishes, who had escaped. Sir Reginald's force overtook them on November 24th, 1899, and in a final battle the Khalifa was killed and his forces routed. Of this campaign Lord Kitchener said: "Colonel Sir Reginald Wingate's previous services on the Staff are so notable that I need not allude to them. He has shown himself to be a capable leader of men. The operations under him were carried out with consummate ability, energy and determination and he has struck the last blow at Mahdism. The country has been finally relieved of the military tyranny which started in a movement of wild religious fanatacism upwards of 19 years ago."

This opportunity was given Sir Reginald by Lord Kitchener to round out his career and insure Sir Reginald's selection as Lord Kitchener's successor, as Kitchener was leaving to become Chief of Staff for Lord Roberts in the Boer War.

THE FIELD ARTILLERY JOURNAL

He is the sole survivor of that quartet which met on board the steamer *Dal* at the time of the celebrated Fashoda incident, which had threatened the friendly relations of France and Great Britain. These were, for the British, Lord Kitchener and Sir Reginald; for the French, the "brave and chivalrous"—as the book terms him—Commandant Marchand, the French commander, and Commandant Germain. Not present at the discussion, but on board as a member of the staff, was a Captain Mangin, later to become that General Mangin who commanded a group of Allied armies on the Western Front.

Sir Reginald was High Commissioner for Egypt from 1916 to 1919. He retired from active service and from the Diplomatic Service in 1922. One of the Empire's greatest authorities on African affairs, he is frequently consulted, and is a prominent figure in, British public life.

Reserve Officers Organize Military Order of Santa Barbara

The Cincinnati Field Artillerymen met at the Gibson Hotel, Cincinnati, on the evening of December 5, 1938, to pay their respects to the Field Artillery's patron, Saint Barbara, whose feast day occurred Sunday, December 4th.

Four Regular and twenty-seven Reserve Field Artillery officers approved, adopted, and signed the Articles of Association of the "Military Order of Saint Barbara." The title and the Articles have since been copyrighted by the Order.

The object of this Order shall be to promote among Field Artillerymen good fellowship and *esprit de corps* and to foster and develop the professional proficiency of Field Artillery Officers.

Any officer holding a commission in the Field Artillery in the regular or reserve components of the Army of the United States or any officer holding a Field Artillery commission in the National Guard of the United States shall be eligible to active membership.

The Order shall be organized in so far as is possible or appropriate as a Field Artillery Regiment, provided, however, that the membership shall be organized with a Council composed of the Regimental Commander, the Regimental Executive, all Battalion Commanders, and four other members of the Council, said last named four members to be elected annually by the members at large at the annual meeting which shall be held on Saint Barbara's Day, December 4th or, on the nearest appropriate day thereto.

Officers signing the Articles of Association are as follows:

2nd Lt. J. H. Anning, FA-Res.
2nd Lt. J. C. Avery, FA-Res.
1st Lt. R. S. Bowles, FA-Res.
Major F. Camm, FA.
1st Lt. L. F. Camp, FA-Res.
2nd Lt. R. E. Clark, FA-Res.
Major W. Culbertson, FA-Res.
1st Lt. A. H. Gesell, FA-Res.
1st Lt. E. A. Grove, FA-Res.
2nd Lt. F. C. Hamilton, FA-Res.
Lt. Col. F. M. Hammitt, FA-Res.
Major A. M. Harper, FA.
1st Lt. J. C. Holle, FA-Res.
1st Lt. R. P. Hutchins, FA-Res.
1st Lt. W. S. Ibold, FA-Res.
Captain S. F. Little, FA.
2nd Lt. F. P. McDowell, FA-Res.
1st Lt. J. F. Merrifield, FA-Res.
Colonel C. E. Muchmore, FA-Res.
1st Lt. R. P. Myers, FA-Res.
1st Lt. H. C. Park, FA-Res.
2nd Lt. H. C. Peterson, FA-Res.
2nd Lt. J. C. Pogue, Jr., FA-Res.
2nd Lt. J. E. Rood, FA-Res.
1st Lt. W. B. Rulison, FA-Res.
Captain F. W. Smith, FA-Res.
1st Lt. S. Smith, Jr., FA-Res.
2nd Lt. W. D. Wilson, Jr., FA-Res.
Major G. J. Wolf, FA-Res.
Captain G. E. Wrockloff, FA.
2nd Lt. A. A. Wuest, FA-Res.
2nd Lt. E. C. Barber, FA-Res.

Some Forward Observations



CAPTAIN MURRAY O. KLINGAMAN, 367TH FA

CAPTAIN MURRAY O. KLINGAMAN, 367th Field Artillery, FA-Res., winner of the 1939 Prize Essay Contest of the Field Artillery Association, is the first officer, other than of the regular establishment, to win first place in this contest since it was reinstated a few years ago.

The winner was invited, as is customary, to supply a photograph of himself (or a reasonably accurate facsimile) and some account of his personal history. His extremely brief personal synopsis, which follows, is considered enlightening as being typical of those of our citizens who unselfishly devote some burning of the midnight oil

to preparing to serve their country in emergency. It will be noted that wherever he was posted he sought the nearest available arm in which to serve. The ROTC, Officers Reserve Corps, the National Guard, and the Field Artillery, Infantry, and Cavalry are entitled to bows for their contribution to his professional knowledge and industry—

"Born Afton, Iowa, 1904.

"Graduated from the State University of Iowa in 1925, with four years Infantry ROTC and a start on a hitch in the 113th Cavalry, Iowa National Guard.

"Going to New York City after graduation, served three years with the 258th Field Artillery, New York National Guard—enlisted as Private, November, 1925; graduated from the first Candidates School conducted by that organization; commissioned Second Lieutenant, June, 1926; promoted First Lieutenant and assigned to command of Headquarters Battery and Combat Train 1st Battalion, September, 1927.

"After moving to Albany, a year later, served for a year as First Lieutenant, 10th Infantry, New York National Guard, commanding Headquarters Company 1st Battalion.

"Commissioned First Lieutenant, Field Artillery Reserve, January, 1931; Captain, July, 1935—present assignment, S-3 367th Field Artillery—in charge of Field Artillery unit school, Albany Military District, since March, 1937.

"Occupation—Supervising Accountant, New York Telephone Company, Albany, N. Y."

MILITARY BOOKS

Following is a list of books on military subjects which are recommended for their professional value as well as interesting content:

	<i>Price</i>
	<i>(Domestic postage included)</i>
THE UNITED STATES ARMY IN WAR AND PEACE— <i>Col. O. L. Spaulding</i>	\$6.00
WARFARE— <i>Spaulding, Nickerson and Wright</i>	3.00
PEN AND SWORD IN GREECE AND ROME— <i>Col. O. L. Spaulding</i>	2.00
ELEMENTS OF ORDNANCE— <i>Lt. Col. T. J. Hayes</i>	6.50
FROM SAINTS TO RED LEGS— <i>Heiner</i>	1.00
FIELD ARTILLERY: The King of Battles— <i>Maj. Gen. H. G. Bishop</i>	1.00
CARBINE AND LANCE, A HISTORY OF FORT SILL— <i>Nye</i>	3.00
R. E. LEE— <i>Freeman</i> (4 vols., each).....	3.75
A MODERN MILITARY DICTIONARY— <i>Col. Max B. Garber</i> —Cloth	2.50
.....—Leather	2.75
THE STORY OF RECONSTRUCTION— <i>Henry</i>	5.00
COMBAT INTELLIGENCE— <i>Schwieen</i>	2.00
INFANTRY IN BATTLE	3.00
THE INFANTRY BATTALION IN WAR— <i>Lt. Col. Walter R. Wheeler</i>	3.00
CAVALRY COMBAT	2.50
MILITARY HISTORY OF THE WORLD WAR— <i>Col. G. L. McEntee</i>	7.50
THE SIEGE OF ALCAZAR—(<i>McNeill-Moss</i>).....	3.50
ARMY MESS MANAGEMENT SIMPLIFIED— <i>Maj. E. A. Hyde</i>	2.00
TOMORROW'S WAR— <i>Stephen Possony</i>	2.50
NOTES ON FRENCH ORDNANCE, 1717-1936— <i>Hicks</i>	3.50
THE RAMPARTS WE WATCH— <i>Eliot</i>	3.00

A reduction of 10% will be made to JOURNAL readers who purchase any of the above books through the U. S. Field Artillery Association.

The Association is in a position to obtain for its members not only books on military subjects but biographies and fiction as well, at a reduction of 10%.



"Seattle's Own" 146th FA will soon occupy its magnificent new \$1,200,000 armory, largest and most modern of its kind on the coast. With Brig. Gen. A. H. Beebe as chairman, a program of Military Observance will take place April 14-16. The governor of Washington, the Lieutenant Governor of British Columbia, detachments of two Canadian artillery regiments, and the 9th, 10th, 146th, and 148th regiments of U. S. field artillery will participate.



The United States Field Artillery Association
ORGANIZED JUNE 7, 1910

OFFICERS

PRESIDENT

MAJOR GENERAL ROBERT M. DANFORD, U. S. Army

VICE-PRESIDENT

COLONEL AUGUSTINE MCINTYRE, U. S. Army

EXECUTIVE COUNCIL

MAJOR GENERAL ROBERT M. DANFORD, U. S. Army

BRIGADIER GENERAL LESLEY J. MCNAIR, U. S. Army

COLONEL EDMUND L. GRUBER, U. S. Army

COLONEL RENE E. DER. HOYLE, U. S. Army

COLONEL LEROY W. HERRON, Reserve Corps

COLONEL WILLIAM H. SANDS, Virginia National Guard

COLONEL C. C. HAFFNER, JR., Illinois National Guard

LIEUTENANT COLONEL W. C. CRANE, U. S. Army

LIEUTENANT COLONEL RALPH C. BISHOP, Reserve Corps

SECRETARY-EDITOR AND TREASURER

CAPTAIN MICHAEL V. GANNON, Field Artillery, U. S. Army

Subscriptions to *The Field Artillery Journal*:

Domestic, \$3 per annum.

Single copies, 75 cents.

Canada, \$3.25 per annum.

Countries in the postal union, \$3.50 per annum.

Checks drawn on banks in the Philippine Islands, Hawaii and Canada should include 25 cents for collection charges—from the Canal Zone 35 cents.